An observational study of social media technology conversations:
Exploring how members of the Alberta public, organizations and health care professionals express wellness, in relation to children

by

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A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science

In
Health Policy Research

Public Health Sciences
University of Alberta

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ABSTRACT

The October 2013 release of the *Alberta Strategic Approach to Wellness - Health for All…. Wellness for Life*, indicated that the Government of Alberta wanted to engage Albertans in conversations about wellness. Therefore, the objective of this thesis was to ascertain how Albertans express wellness in their social media technology conversations, and in particular, what dimensions of wellness they commonly express with respect to children's wellness.

This study explored the social media technology conversations generated by Albertans using Twitter™ and the content of Alberta on-line news media and on-line blog articles that had a focus on children's wellness. The content analysis of Twitter™ data was made possible through use of the computer program NodeXL™, and the creation of an additional computer program, referred to in this study as the Hamman Program. The latter was designed specifically to streamline the process of identifying Alberta generated Twitter™ data.

The findings of this study have led to a deeper understanding of public conversations around children's wellness, the possibilities of social media research, and how the study of social media technology conversations can contribute to government policy agenda setting.

PREFACE

This thesis is an original work by Patricia Martz. No part of this thesis has been previously published.

DEDICATION

This thesis is dedicated to my two amazing chi'dults, Jacob and Laura. I cannot imagine what my life would be like without you two. Thank you for your endless support and for always believing in me as I follow my dreams. My wish for you both is to never stop following your dreams and to always believe in yourself.

"Promise me you'll always remember: You're braver than you believe, and stronger than you seem, and smarter than you think." ― A.A. Milne

ACKNOWLDEGEMENTS

I owe a great deal of thanks to a number of people who have helped me accomplish this thesis. I truly admit that I would not have been able to complete this project without the guidance and support of the following colleagues and friends.

Thank you to Professor Devidas Menon, my primary thesis advisor, who took a chance on my knowledge, skills and abilities to complete a master's degree. I am grateful for your continued support and patience throughout my course work and especially as I struggled to settle on a thesis topic. From topics that involved policy work around grain product processing, sodium content in foods, governance structures of advisory committees and finally social media technology conversations, your dedication to me as a student, encouragement and goodwill never faltered. I have learned so much more than policy development from you.

Thank you to Dr. Tania Stafinski, who had a dual role of advisor and co-researcher, for providing highly reflective questions that helped me frame my thinking around the research, methodology and discussion. Your suggestions for revisions challenged me to learn much more about what I thought I had already learned. Your advice and guidance made the process of conducting this research an enjoyable and enlightening experience. The time and energy you have spent helping me will never go unappreciated.

Thank you to my external reader, Dr. Jackie Street, for your contributions to this study and guidance throughout this past year. You always made me feel like my research was unique.

Thank you to my external examiner, Dr. Don Philippon, for your helpful and detailed comments, and for especially guiding me to find the positive in the past work of others.

I am indebted to Leigh-Ann Topfer and Lynne Lacombe, who both assisted me with my literature search. Thank you.

Thank you to Hamman Samuel for the creation of the *Hamman Program* which saved many hours of manually checking Twitter™ addresses; it was a pleasure to work with you.

And finally, thank you to my family, friends, work colleagues and classmates, for all you have done to make my life easier as I worked through this project. I couldn't have done it without you!

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CHAPTER 1: Introduction

A Focus on Wellness

Alberta's Strategic Approach to Wellness – Health for All….Wellness for Life, was released in October 2013 (1), signalling to Albertans that the government intends to engage them in discussions on wellness. However, a record of such discussions has yet to be found.

In the province of Alberta, Canada, Albertan's interest in wellness/well-being can be traced over the past 26 years via publicly available reports. Often, while not specifically stated in all reports, it could be assumed that reference to Albertans would be inclusive of children's wellness/well-being.

In 1989, the Alberta government released the *Rainbow Report: Our Vision for Health Volume III – Premier's Commission on Future Health Care for Albertans – Final Report December 1989* (2), providing a summary of Albertan's input from 14 town hall meetings, a public hearing in which 68 organizations presented briefs, and two works shops - one each for youth and seniors. Of the 1,000 comments received during the 14 town hall meetings, seven specifically referred to the importance of well-being/wellness. Nine mentions of wellness were included in the 68 briefs presented at the public hearing, and two mentions were generated at the seniors' workshops. Recommendation 1.0 of the Rainbow Report asked that the Government of Alberta allocate an additional one per cent of the Alberta Health overall operating budget to health promotion and illness/injury prevention (2). This could be inferred to be inclusive of well-being. In it was a 2001 Final Report of the Advocate for a Healthy Alberta, included as an appendix to the Rainbow Report (2), acknowledging that it was 'absolutely' (2) essential that governments and

communities focus their efforts on improving the social determinants of health in order to improve the well-being of a population.

In 1991, Alberta established the Premier's Advisory Council on Health and in 1993 *Health Goals for* Alberta (3) was released. The report identified nine population health approach goals. Of particular interest are: goal one, "To increase the number of years of good health by reducing illnesses, injuries, and premature deaths and improving well-being", goal three, "To include a health perspective in public policy", and goal five, "To live in strong, supportive and healthy families and communities" (3). Strategies for achieving these goals were not mentioned. No publicly available evidence (including through provincial government websites) indicating that these new initiatives were implemented to support such population health approach goals could be found.

In 1993, the "Alberta Health Planning Secretariat" was tasked with consulting Albertans on how to make Alberta's health services system more accountable and affordable (4). *Public Round Tables on Health* were held throughout Alberta in 10 locations and attended by 5,000 Albertans. In the summary section of the document *Starting Points: Recommendations for Creating A More Accountable and Affordable Health System*, *December, 1993 – Alberta Health Planning Secretariat,* Albertans identified wellness/well-being as important, as indicated by the following statements: "immediate emphasis must be placed on teaching consumers to stay well…."; "Our current health system promotes an image to the consumer of illness-treatment. The result is that we go to the hospital or the doctor when we are ill, rarely do we learn how to stay well"; "we need to enhance the development, implementation and funding of wellness promotion";

"wellness promotion must become a regional responsibility"; "regions should also consider providing wellness information through social service agencies and Alberta schools"; "the result will be healthier consumers who are more accountable for their well-being, and who reduce health costs by using the system less" (4).

Eight years later, in December 2001, *A Framework for Reform – Report of the Premier's Advisory Council on Health*, was released. Ten recommendations for health care reform were proposed (5). The first reform was about staying healthy, and was stated to be 'at the heart' of the council's recommendations. This focus was supported by eight recommendations, with three recommendations specifically supportive of children's wellness: having a strong commitment to the education of children and youth; supporting children who live in poverty; and strengthening health education in schools (5). This report invited all Albertans to review and discuss the proposed recommendations, and to take action.

In, 2009, a Minister's Advisory Committee on Health (MACH) was tasked with examining Alberta's health legislation in preparation for the development of an Alberta Health Act (6). From October 9, 2009, to November 30, 2009, almost 3,200 Albertans were engaged in discussions on Alberta's health legislation. In January, 2010, *A Foundation for Alberta's Health System* was presented to the Minister of Health. It contains four recommendations. Recommendation number one, Articulate a Set of Principles That Must Be Sustained and Maintained Throughout Alberta's Health System, recommends that the principles should be based on five concepts, one of which relates to wellness and public health (6).

Following the release of *A Foundation for Alberta's Health System*, *PUTTING PEOPLE FIRST PART ONE RECOMMENDATIONS FOR AN ALBERTA HEALTH ACT* (Part One) and *PUTTING PEOPLE FIRST PART TWO A SUMMARY OF ALBERTANS' VIEWS* (Part Two), were released in September 2010 (7, 8). Part One contains 15 recommendations outlining what should be included in the Alberta Health Act, and Part Two contains a summary of Albertans' views. Both of these documents contain the results from the MACH involving Albertans in a series of consultations. It included 29 workshops (that took place in 23 communities), two targeted engagements (one with all 12 of Alberta Health Services' Health Advisory Councils and another with health stakeholders such as physicians and nurses) and an internet-based survey, which collected 1,500 responses from Albertans. In all, 3,000 Albertans were involved (7, 8). Albertans were asked to consider seven principles with respect to Alberta's health system. The fifth principle asked Albertans to "Be focused on wellness and public health" (8), which is a direct result of Part One, recommendation two, stating that the Alberta Health Act should "reflect a view of health that gives a greater focus to wellness" (7).

Because Part Two did not define "many or several participants" it was not possible to ascertain how many of the 3,000 Albertans' supported the "views" quoted throughout the report. However, Albertans were asked to have a focus on wellness. Therefore, it is important to consider some of the views included in Part Two in order to provide context for recommendation two, such as: "wellness and prevention should be emphasized…principles were more about the treatment of illness and should give equal emphasis to wellness and quality of life…health promotion, healthy living and prevention are so important that wellness should stand on its own, as a core value of the health system…bringing about a much needed shift in the health system'' and "…a more

holistic view of health needs to be encouraged…recognize the significance of the social determinants of health and the need to consider these in making decisions…[and] the need for alignment among government ministries in other policy areas, such as education and the environment" (8). When specifically asked about an Alberta patient charter, the following views were included: "Many people felt that a charter should not only be built around patients, but reflect the broader partnerships and relationships in health…individuals, families, communities, health professionals, the health system and the government each have important roles…the document should be called a health charter…this would better reflect a health system that supports wellness and works to prevent, and not just treat, illness and injury" and "several participants observed that the ability to make healthy choices is impacted by a range of factors such as education, employment and income, and access to public transportation" and "…achieving better health [wellness] outcomes for Albertans will require greater policy alignments across Alberta government ministries and agencies. Health [wellness] is impacted by economic, fiscal and broad social policy, not just health policy" (8). Thus, when Albertans were asked to have a focus on wellness they made the connection between wellness and the social determinants of health.

On November 18, 2010, Bill 17, the Alberta Health Act 2010, was proclaimed and passed by the Alberta Legislative Assembly on November 30, 2010. It came into effect on January 1, 2011 (9). The Alberta Health Act acknowledges "that the health, wellness and quality of life of Albertans are influenced by their economic, social, cultural, physical and spiritual context". Further "policies, organizations, operations and decisions about Alberta's health system should be guided and measured and sustained consistent with the following principles", one of which is

"that decisions made across the health system are based on the best available evidence and a holistic view of health and wellness" (10).

Three years later, in March 2014, Alberta's Health Charter was released in support of the Alberta Health Act (11). The Alberta Health Charter makes a commitment that when Albertans interact with the health system they will "receive information on the health system and education about healthy living and wellness". In addition, " as [they] work to be a healthy citizen [they can] expect that …when economic, fiscal and social policies are being developed by the Alberta government, the impact of those policies on public health, wellness and prevention will be considered, and steps [will be] taken to ensure that public policy is healthy [wellness] policy" (11).

Alberta's Strategic Approach to Wellness – Health for All….Wellness for Life (1) document does not discuss the results of public engagements with Albertans since 1989, which, collectively, identified wellness as fundamental to the health of Albertans. However its' release could be viewed by Albertans as an opportunity to seek their input on an Alberta action plan that addresses wellness in response to Albertans' wellness requests gathered during the public consultations on the Alberta Health Act.

Defining Wellness/Well-being

A literature search, using Google™ was undertaken to find a universally accepted definition for wellness, or well-being. This literature search revealed that wellness/well-being is interpreted in

different ways and defined from various perspectives. This includes how the term well-being is used in Alberta government publications (12).

In 1948, The World Health Organization (WHO) defined wellness using a holistic definition of health - "a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity" (13). The National Wellness Institute defines wellness as "an active process through which people become aware of, and make choices toward, a more successful existence" (14). The Government of British Columbia (BC) funded the University of Victoria to develop *The BC Atlas of Wellness*; which included a review of the literature between 1977- 2007 related to defining wellness (15). The review concluded that wellness is typically viewed from a holistic perspective and shown to have seven key dimensions that can be briefly summarized as follows: "physical - encompasses activity, nutrition and self-care; emotional/psychological - positive outcomes are a result of events and experience in life and how one copes with stressors; social - the degree and quality of interactions with others, the community and nature; intellectual - viewed as how one engages in creative and stimulating activities and the use of resources to expand knowledge; spiritual - ones' beliefs and values and are not related to ones' religion; however they may overlap with ones' religious beliefs; occupational - the level of satisfaction one gains from paid work and volunteer engagements; and environmental - the balance between home and work life and ones' relationship with nature and community resources" (15).

Let's Talk Wellness, an Alberta Government website landing page accessed from January 2015 through to May 2015, defines wellness as "something that we build together with our families,

communities, schools and workplaces, in our parks and playgrounds, the places we live, the air we breathe and the choices we make" (16).

Overall, wellness is represented as more than the absence of illness. How an individual experiences the seven dimensions of wellness is directly related to how the social determinants of health affect their health and wellness. For example, an individual with a chronic disease, such as diabetes type 2, who has appropriate supports in place to meet their physical, social and personal health practices, may respond "I'm well thank you!", to the question, "How are you?" In contrast, an individual who is chronic disease free, but experiencing poor social supports and poverty, may respond, "Not well", when asked the same question.

Children and Wellness/Well-being

Reflecting on a famous quote of Nelson Mandela's, "*Our children are our greatest treasure. They are our future…"* (17), and the importance of wellness' contribution towards health, it could be stated that a child's wellness/well-being should be a focus of any society when looking at how to contribute towards the wellness of a population.

Achieving wellness in children is recognized as important in Canada. In September of 2000 Federal, Provincial and Territorial (F/P/T) First Ministers (Premiers) agreed to support the well-being of children with the signing of the Early Childhood Development (ECD) Agreement, indicating that governments have a responsibility when it comes to children's wellness (18). The agreement commits F/P/T First Ministers to report regularly to Canadians on a set of agreed upon indicators of children's well-being. These include: physical health and motor development;

emotional health; and social health and competence, initially for children from birth to five years of age and later, in 2011, expanding to include children from six to nine years of age (18). Upon reviewing ECD published reports, it is apparent that while the public provides answers to targeted survey questions about their child's health, it is not possible to ascertain whether or not the public is engaged in discussions about their child's wellness. It is clear that the ECD data are derived from surveys such as the Canadian Community Health Survey, a cross-sectional survey that collects information related to health status, health care utilization and health determinants for the Canadian population (19). Data contained in the ECD reports are quantitative and specific to P/T reporting of birth weight, infant mortality, motor and social development, and family and community related measures. The government of Alberta's *Interactive Health Data Application* (IHDA) website provides information on Albertan's health status and determinants of health, specific to age categories (20). IHDA data on children's health can be retrieved for rates of immunization, infectious diseases, injury and mortality. However, data are not provided for wellness related indicators such as emotional/psychological development, social development or intellectual development.

Alberta's Children Wellness/Well-being Initiatives

A review of the Government of Alberta ministry websites with a primary connection to children (Health, Education and Human Services) and the Alberta Health Services' website revealed that there are a number of Government-funded initiatives supporting wellness/well-being, particularly related to children. Many have been evaluated, generating results that indicated investing in children has positive effects on children's wellness. In addition to these child focused initiatives, the Alberta government released the *Alberta's Social Policy Framework* (Framework), in

February 2013, "providing a foundation for identifying what social policy can do for Albertans, including children" (21). The development of the Framework and the subsequent work that followed its release are well documented on the Government of Alberta, Human Services website. Of importance to note is the inclusion of a child poverty reduction strategy.

Contributing Towards an Understanding of Wellness in Alberta

Since 1989, public engagement on the topic of health care have indicated that the Alberta public, organizations and health related professionals want wellness to be a component of health. With an interest in knowing how best to contribute towards an understanding of how to engage members of the Alberta public on the topic of wellness, it would be important to know how Albertans express wellness in their conversations, what dimensions of wellness are commonly expressed, and in particular, how they converse about wellness as it relates to children. However, there is a gap in this knowledge area. This thesis aims to filling such a gap. This study utilizes social media to ascertain how members of the Alberta public, organizations and health related professionals, express wellness in conversations, and, in particular, wellness as it relates to children. Wellness will be defined using its known seven dimensions, as defined in *The BC Atlas of Wellness* (15).

Assessing Alberta Public Views via Social Media Technology

As of April 2015, there are an estimated 1.44 billion monthly active users (22) of Facebook™ and 302 million monthly active users (23) of Twitter™. Both Facebook™ and Twitter™ are free on-line social networking services. In a September 2013 Huffington Post comparison of Facebook™ versus Twitter™, it was noted that the major use of Facebook™ is to archive

important moments in an individual's life which are then shared with their 'friends'. In contrast, the majority of Twitter™ users microblog, putting information out into the public realm that does not require being a 'friend' to access it (24).

Eighty-five percent of the world's population now has access to mobile phones (25), and the use of mobile phones to access the Internet surpassed that of personal computers as of February 2014 (26). With increased access to the Internet there has been an increase in the use of social media technology to connect with, and share with others information about personal lives, as well as thoughts and views on topics of interest. This sharing of information is of interest to scholars, corporations, politicians, journalists, and governments (27), and has resulted in the increased volume of published research on the various uses of social media technology and what it can reveal about human behaviour. More recently, utilizing Facebook™ and Twitter™ have become a standard practice of governments around the world (28), with both platforms used to spread important public messages and engage the public on important topics in a transparent way (29).

Specifically looking at Twitter™ use by Albertans, a January 2015 Forum Research Inc. poll (Forum Poll™) found that 25% of Canadians 18 years to 64 years of age use Twitter™, and of that 25%, 23% of Albertans 18 years to 64 years of age were Twitter™ users (30). Using demographic statistics for Alberta from the Government of Alberta Interactive Health Data Application website for the population of Albertans 18 – 64 years of age (31), approximately 1.4M Albertans, 18-64 years of age are Twitter™ users.

An on-line search, completed in December 2014 and detailed in the methods section revealed that the majority of research analyzing thoughts and views on how the public and parents/caregivers/adults discuss children's wellness through social media focuses on sharing information through blogs. Blogs are defined by the on-line Oxford Dictionary as a website/web page that an individual or an organization regularly updates on topics of interest using a conversational style of writing (32). Given that blogs focus on a specific topic, they are ideally suited for observational studies specific to that topic area. Later, in March 2015, the University of Michigan, C.S. Mott Children's Hospital released the results of their national poll on children's health, titled *Parents on Social Media: Likes and Dislikes of Sharenting (Sharenting)* (33). Sharenting is the practice of a parent regularly using social media to communicate detailed information about their child (34). The Sharenting national poll highlighted that parents found sharing on social media was a way to make them feel connected and that they use social media to share or seek advice on such topics as children's sleep, eating tips, discipline, out of home care and behaviour (33).

Research that involves monitoring social media technology, such as Twitter™, reviewing on-line news media and blog articles' and their associated comment sections, is a relatively new area. The methods used to extract this publicly available data are dependent on the source of the data. As an example, Twitter™ data extractions are facilitated by computer programs developed specifically to interact with Twitter's™ program structure, and the data are provided in a spreadsheet format that can then be coded during the qualitative content analysis (QCA). There are also computer programs available that will assist with the QCA. In comparison, on-line news media and blog article content requires multiple steps before the content can be analyzed. The

first step in analyzing on-line news media and blog articles requires the manual extraction of the articles' content into a format, such as a spreadsheet, followed by the manual coding and analysis or importation of the data into a computer application that facilitates the content analysis for QCA. The selection of computer applications to extract and analyze data from social media technology is dependent on the type of data being analyzed, ease of use and cost.

Social media technology is for the most part available publicly. Therefore, it facilitates real-time research on topics of interest. As an example, social media research can target a community of on-line social media users and rapidly extract and analyse the conversations (data) generated by this community's interactions. Social media research requires few resources and can be undertaken without the permission from the targeted community of users. The ethics around the use of social media technology is controversial. In 2013, Moreno et al completed a review of the common ethical risks associated with social media research (35). Given that current research protocols provide 'little-to-no guidance' (35) for researchers to follow, the default appears to be that the researcher is under no obligation to advise the poster that they will be using and analysing the posted material (35). Of all the social media technologies, Twitter's™ privacy policy specifically states that by agreeing to the terms of service you are agreeing to "share [your] information with the world"; Twitter™ does provide privacy setting options (35). The only available data to indicate how many Twitter™ users change their default setting to private is a 2008 study by Krishnamurthy and Wills (36). Given that Twitter™ microblogging encourages the building of a network of followers, less than one per cent of Twitter™ users make their default setting private (36). In contrast, Facebook™ users are becoming increasingly more private as they gain an understanding of how their personal information is being shared (37).

Evidence suggests that social media technology has provided a means of communicating and delivering public interventions (38). However, acceptance of social media research is still questionable. The book, *Social Media in Social Research: Blogs on Blurring the Boundaries* is a compilation of blogs representing the experiences and/or views of 50 social media academics, researchers, and stakeholders from around the world (39). Some of these blogs raised issues related to social media data research. Specifically, if social media research is to be considered as a new research approach, then validity of this research needs to take into consideration:

1. The "approaches, tools, considerations and adjustments one social media researcher used", and how it compares and contrasts to the work of another social media researcher.
2. That Twitter™ research looking at conversations is conducted with a "limited understanding of how best to work with the spatial and linguistic contexts in which the information was produced". To-date there is no universally accepted standard of analyzing linguistic Twitter™ content.
3. The term social implies socially connecting with others in-person, or not being isolated. However use of social media technology is typically an isolated function and therefore the user is actually being anti-social. Should the research be considered as the study of "anti-social media" research?
4. How many individuals, when they sign up to use any social media technology, such as Twitter™ or Facebook™, actually read the *Terms of Service* agreement? This is an important consideration in reference to "the meaning of consent to research participation". (39)

Accessing and extracting social media technology data have the potential to provide insights into public views on the topic of wellness as it relates to children. This thesis will examine whether analysis of social media technology data (the nature of publicly expressed conversations on children's wellness) can provide information that makes a contribution toward the provision of baseline data, prior to government engaging the public for their views on children's wellness. To-date, social media technology data analysis has been used in public health research to study connections or ties between users and within communities of users around topics of interest. Researchers have also examined whether the use of social media technology is an effective way to disseminate public health messaging, particularly to monitor and control disease outbreaks (40, 41, and 42).

Alberta's Strategic Approach to Wellness highlights the health issues that are affecting Alberta's children, such as increasing rates of obesity which predisposes them to "preventable diseases such as diabetes and heart disease, as well as kidney failure and some types of cancer" (1). And while this same document states that "we all have a role in creating wellness", (1) it is the role of the provincial government to implement policies that protect our health and wellness. It is particularly important that government engages a wide section of society during the agenda setting stage of policy development. This ensures government policy development is transparent and supported by those who will benefit from the policy. In the agenda stage of policy development, issues are identified and then assessed against competing issues in order to decide which issues deserve the most attention, given that there are typically multiple policy issues that require government action within a four year election period.

This research, and the methods utilized, could be used to propose methods for gauging the Alberta public's thoughts and views on the topics of wellness, inclusive of the seven dimensions, or on additional topics of interest to the public, government and non-government organizations at the agenda setting stage of a proposed policy. Data extracted from social media technology can be analysed in real time (or near real time), resulting in cost savings in time and resources.

OVERALL PURPOSE

The following research questions will be used to understand how members of the Alberta public, organizations and health related professionals express wellness in their conversations using social media, as defined by the seven dimensions (15), and when they do so, which dimensions of wellness were expressed in relation to children.

1. To what extent do the members of the Alberta public, organizations and health related professionals focus on wellness, in relation to children's wellness, in their conversations using the social media platform Twitter™?
2. To what extent is children's wellness discussed in major on-line news media and blogs across the province?
3. Do members of the Alberta public, organizations and health professionals respond to on-line news media articles and blogs that are focused on wellness, by commenting, recommending, sharing, liking or tweeting/re-tweeting, the on-line news media article or blog?
4. For the number of conversations about children's wellness identified at each time period, how do the trends over time vary between different social media technologies?

5. What dimensions of children's wellness are most commonly expressed by members of the Alberta public, organizations and health related professionals, using the social media technologies Twitter™, on-line news media articles and on-line blog articles?

CHAPTER 2: Methodology

The research methods used in this study were:

1. Literature review to determine the extent of information available publicly on how members of the public, organizations and health care professionals use social media technology to discuss wellness and its' different dimensions, related to children.

2. Social media technology data analysis to explore whether and how the Alberta public express their views and thoughts on wellness and its' different dimensions, related to children. For this study, child (children) was defined using the Oxford University Press definition; "a young human being below the age of puberty or below the legal age of majority" (43). For this study, wellness was defined using the associated seven dimensions: physical; emotional/psychological; intellectual; social; spiritual; occupational; and environmental (15).

1. Literature Review

1.1 Literature search

A systematic search for relevant scholarly papers was conducted using a structured search strategy. The search strategy combined controlled vocabulary terms Medical Subject Headings (MeSH) and keywords related to social media with those related to well-being and the seven dimensions of wellness described above. For 'social media', MeSH terms included: social media, blogging, and electronic mail, and keywords included Twitter, blog, and Facebook. For 'well-being', MeSH terms, such as health, personal satisfaction, and happiness, and keywords, such as wellness, wellbeing/well-being, and healthy communities were used. MeSH terms and keywords were, in part, identified through pearl-growing, in which keywords and subject descriptors associated with known relevant citations are compiled. The search strategy was

applied to PubMed and MEDLINE. Searches were limited to English language papers published in the last five years (i.e., between January 2009 and December 2014). To identify relevant grey literature, Internet searches using the same keywords, applied to the Google® search engine, with the top three pages assessed for relevant research. Electronic searches were supplemented with manual searches of reference lists of relevant papers. Results of all searches were imported into a Reference Manager® database to remove duplicate citations.

1.2. Selection of papers for inclusion in the review

Citations were scanned independently by two researchers using pre-defined inclusion criteria which included:

- Social media (SM) research: Twitter, Facebook, Blogs, and On-line news media
- Research specific to SM and public conversations about wellness, in relation to children's wellness
- Observational research
- Research focused on the dimensions of wellness, and specific to children

Potentially relevant citations comprised those discussing how social media is used to talk about wellness of children, as defined by the seven dimensions of wellness. The two researchers met to compare results. The degree of agreement between researchers was assessed using the Kappa statistic. Discrepancies were resolved through discussion.

1.3. Extraction of information from selected papers

Data from selected papers was extracted manually, using a standard data extraction form that included the following information: author; country; purpose of the paper; type of study; type of social media technology studied; method(s) used to analyze the social media data; dimension(s) of wellness studied; whose communication was studied, the public, parent or caregiver; age of children discussed; findings; and limitations. To assess the reliability of the data collected, a second researcher independently extracted information from a 10 % sample of the papers. Once again, the researchers compared the results and resolved any discrepancies through discussion.

Data extracted were entered into tables for analysis.

1.4. Analysis of data

The data were analyzed qualitatively. Specifically, included papers were reviewed to identify themes related to children's wellness that were mentioned. Additionally, the papers were analyzed to determine whether those themes and how they were discussed varied by wellness dimension, geographic location and source of social media technology. The frequency with which themes appeared and any relationships among them were then recorded.

2. Social Media Study

An observational, time series, comparison study design was used to explore the Alberta public's use of social media to express wellness and its dimensions, specifically related to children. While the qualitative analysis is mainly inductive in its approach, capturing themes and patterns emerging from the data, a deductive approach was also used to analyze the social media data according to the theoretical framework of the seven dimensions of wellness.

The following research questions were addressed through this social media analysis:

1. To what extent do the members of the Alberta public, organizations and health related professionals focus on wellness, in relation to children's wellness, in their conversations using the social media platform Twitter™?
2. To what extent is children's wellness discussed in major on-line news media and blogs across the province?
3. Do members of the Alberta public, organizations and health professionals respond to on-line news media articles and blogs that are focused on wellness, by commenting, recommending, sharing, liking or tweeting/re-tweeting, the on-line news media article or blog?
4. For the number of conversations about children's wellness identified at each time period, how do the trends over time vary between different social media technologies?
5. What dimensions of children's wellness are most commonly expressed by members of the Alberta public, organizations and health related professionals, using the social media technologies Twitter™, on-line news media articles and on-line blog articles?

Alberta social media technology data was collected on three occasions:
October 25, 2014, January 24th, 2015 and February 25, 2015.The following sources of social media technology were used: Twitter™ user's comments; on-line news media articles from the cities of Medicine Hat, Red Deer, Edmonton, Calgary and Grande Prairie, located under the news media's website ribbon tabs of Opinions, Letters to Editor, News Room, Local Blogs, Local Life/Lifestyle, as well as the news media's associated Twitter™ and Facebook posts; and from additional on-line Alberta blogs (see Table 2.3) that were identified as having a focus on parenting and children. These on-line Alberta blogs were located through a Google® search

using the key words blog, parenting, children mom, and dad, as well as following up on a list of Alberta's "top 10 best mama bloggers" (44), a title that was identified through the aforementioned Google® search.

Twitter™ was preferred over Facebook™ because of the greater public availability of Twitter™ users' posts (called 'tweets'), compared to Facebook™ users' posts, which are typically only available to 'friends'. Twitter™ tweets, which are limited to 140 characters of text, or text and links to on-line media images/videos, were, therefore, selected for inclusion in this research. In addition, advantage was taken of two public events expected to generate Alberta Twitter™ data that could be associated with children's wellness, specific to the dimension of emotional/psychological wellness:

- Pink Shirt Day, originally organized in 2007 by two Nova Scotia, Canada, students to bring awareness to stop bullying in schools (45). This day is now recognized nationally and took place this year on February 25, 2015; and
- Bill 10, the Act to Amend the Alberta Bill of Rights to Protect our Children (to allow students to form gay-straight alliances in schools), announced on March 10, 2015 (46).

The analysis of the two separate extractions of Twitter™ conversations, Pink Shirt Day and Bill 10, was used to compare and contrast the Twitter™ data extracted in the time series, 87 open word and hashtag searches. Specifically they facilitated a comparison of the ability of the *Hamman Program* to identify Alberta (geographic) conversations from a national event and a provincial event to the data extracted using the 87 words and hashtags. A second comparison was conducted using the Pink Shirt Day and Bill 10 relevant Alberta generated conversations to

assess language/word usage in relation to the dimension of emotional/psychological wellness. These results were then used to compare the language/word usage for the dimension of emotional/psychological wellness in the data extracted using the 87 words and hashtags.

2.1 Extracting Twitter™ data

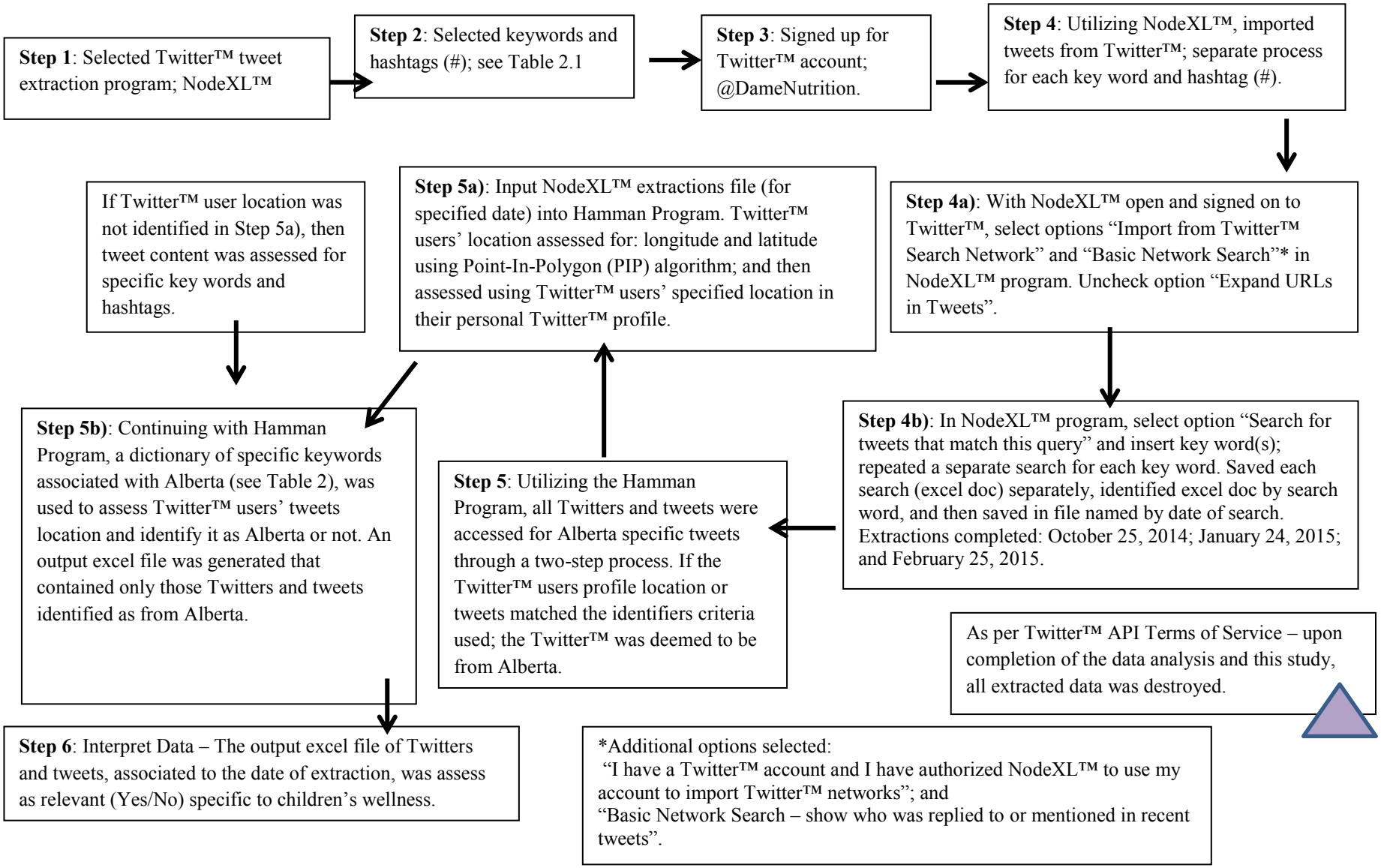
Using NodeXL™, social media Twitter™ data were first extracted using words associated with the dimensions of wellness and children (see Table 2.1) on dates specified previously. NodeXL™ is a free, open-source template for Microsoft® Excel® that makes it easy to explore Twitter™ data, and is available through the Social Media Research Foundation (47). The data from the NodeXL™ extraction were assessed for Alberta content (see Table 2.2) using the *Hamman Program*, designed specifically to identify Alberta Twitter™ users. The *Hamman Program* was developed for this study by a computer consultant at the University of Alberta. This program automated what would be a laborious task for researcher(s) to manually analyze each Twitter™ user's profile, for the total data extracted, in order to identify the Alberta Twitter™ users. In addition, a manual analysis of each of the Twitter™ user's profiles, for the final Twitter™ data deemed relevant for the dimension(s) of wellness was used to validate the accuracy of the *Hamman Program.* This manual analysis also facilitated the identification of the Twitter™ user for conversations deemed relevant as an individual, organization or health related professional when noted in the Twitter™ user's profile. These results were then exported into output tables for analysis.

Twitter™ makes available a random sampling of tweets for free for a content subject search via Twitter™ Application Programming Interface (API) (48). Twitter™ does not disclose how it selects the random sample of data which is a limitation discussed under limitations. **N**odeXL™,

in turn, accesses Twitter™ API and uses a default extraction, rate limiting of 1,500 tweets for a request; this default was changed to 18,000 tweets per request on February 16, 2015. NodeXL™ identifies Twitter™ users and their tweet(s), as well as the user's geographic longitude and latitude, and location, if users make it available. In order to identify as many Alberta Twitter™ users and their tweet(s) and streamline the manual process of assessing each Twitter™ user's profile (a possible 130,500 tweets (1,500 tweets times 87 key search words/hashtags, for each time in the time series)). The *Hamman Program* identifies Alberta Twitter™ users and their tweet(s) in the NodeXL™ extractions.

The following diagram outlines the steps taken to extract and analyze Twitter™ data.

Diagram 2.1 - Twitter™ Data Extraction and Assessment Process



Additional information on how to use NodeXL™ can be located at www.smrfoundation.org

Table 2.1 – List of Words and Hashtags used in "Search for tweets that match this query"

wellness	kids	#wellkids	#wellinfants	#kidhealth	babies
#wellness	#kids	infant	infant health	kids health	#babies
child	parenthood	infants	#infanthealth	#kidshealth	new babies
#child	#parenthood	#infant	child play	child health	#new babies
well child	happy kid	#infants	#childplay	#childhealth	#newbabies
well-being	#happykid	happy infant	childs play	childs health	happy babies
#well-being	happy kids	#happyinfant	#childsplay	#childshealth	#happy babies
#wellchild	#happykids	happy infants	child development	baby health	#happybabies
#happychild	well kid	#happyinfants	#childdevelopment	#babyhealth	kid play
happy child	well kids	well infant	childs development	babies health	#kidsplay
kid	#wellkid	well infants	#childsdevelopment	#babies health	kids play
#kid	#well kids	#wellinfant	kid health	#babieshealth	#kids play
#physical & #wellness	#emotional/ #psychological & #wellness	#social & #wellness	#intellectual & #wellness	#spiritual & #wellness	#occupational & #wellness
		#environmental & #wellness			

Table 2.2 – Specific Key Words and Hashtags Associated with Alberta

Edmonton	Calgary	Red Deer	Grande Prairie	Medicine Hat	Alberta
YEG / #YEG	YYC / #YYC	YQF / YQF	YQU / #YQU	YXH / YXH	AB / #AB
EDM / EDM	cityofcalgary	reddeer	gpab / #gpab	MH / #MH	Alb / #Alb
	#cityofcalgary	#reddeer	GP / #GP	medhat	Alta / #Alta
	cowtown	RD / #RD		#medhat	#Alberta
	#cowtown	#wellnessalberta		#youralberta	
Top 10 Hashtags used in Alberta*		#ableg	#aotdr	#abhealth	#abpoli
#abcancer	#abhealthpcldr	#pcldr	#pcaa	#health	#news

*Top ten hastags/# most used in Alberta tweets were identified by accessing www.politwitter.ca on October 15, 2014. While not identified as top ten hashtags, #wellnessalberta and #youralberta were also included given that they were noted to be used in news media article's comments.

For public events that could be associated with children's wellness, the words and hashtags used in "Search for tweets that match this query" were: Pink Shirt Day and #PinkShirtDay; and Bill 10 and #Bill10. These searches were conducted on the specific dates associated with these events, February 25, 2015 and March 10, 2015, and analyzed separately. Pink Shirt Day

/#PinkShirtDay, and Bill 10/#Bill10, both focused on emotional/psychological wellness/well-being.

2.2 Extracting data from on-line media articles and on-line blog articles

The number of social media user's on-line comments made in response to on-line Alberta media articles and on-line Alberta blog articles focusing on children's wellness were manually extracted from on-line postings and formatted into a spread sheet for analysis. Media articles and on-line blog content extraction used the same words as previously listed in Table 2.1 and Table 2.2. Sources of on-line news media articles were selected from cities based on their geographic location to be representative of the north (Grande Prairie), central (Red Deer) and south (Medicine Hat) sectors of the province and inclusive of the two major cities (Edmonton and Calgary). On-line Alberta blog content and any associated comments were focused on those Alberta blog websites specific to family/children, listed in Table 2.3. The following diagram outlines the steps taken to extract and analyze the on-line news media data and blog data.

Diagram 2.2: On-line News Media and On-line Blog Data Extraction

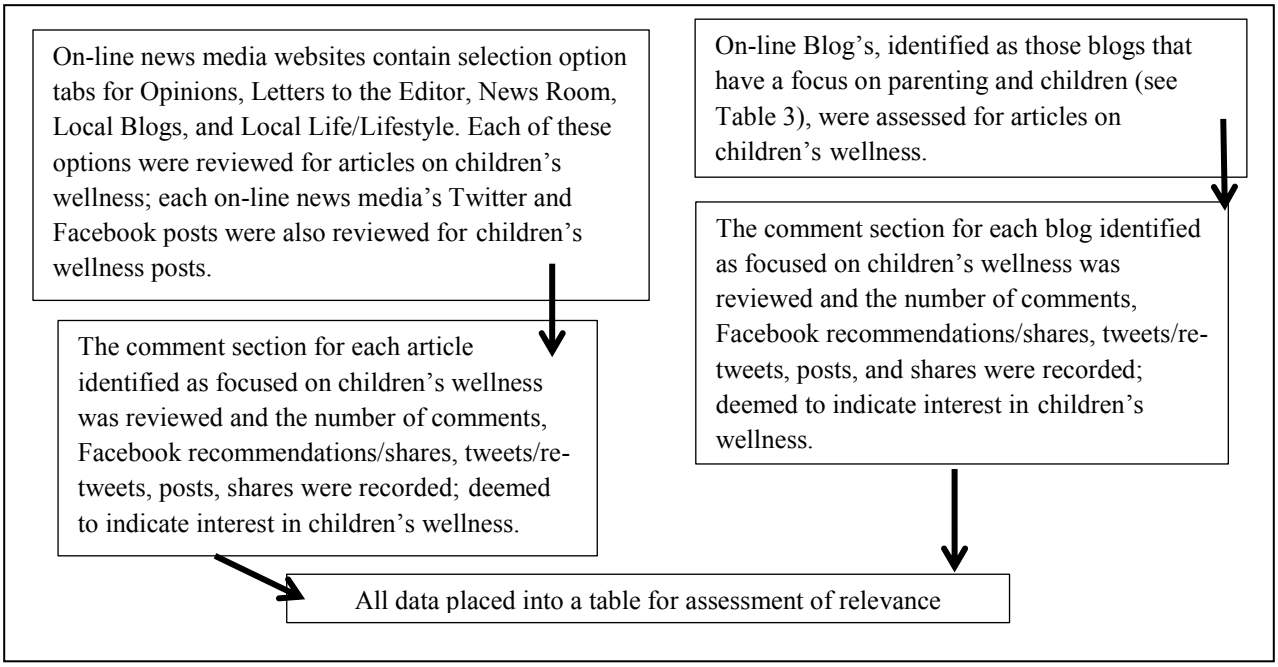


Table 2.3 – Identified Alberta On-line Blogs

1.	Modern Mama
2.	City and Baby
3.	Merry About Town
4.	Deliberate Mom
5.	The Chaos and the Clutter
6.	My Organized Chaos
7.	Peek Thru Our Window

2.3 Analyzing the social media data from Twitter™, on-line news media articles and on-line blog articles

The data from these sources were analyzed qualitatively and quantitatively in order to address the five research questions stated above. All data from the first time point (October 25, 2014) were coded manually by two researchers (the student and a member of the thesis committee). First, researchers independently scanned tweets, media articles, and blogs for relevance, yes (Y)/no (N), and then met to compare results. Relevant items were those that related to children and well-being, wellness or health. The degree of agreement between researchers was assessed using the Kappa statistic (K). Discrepancies were resolved through discussion.

Relevant tweets, media articles, and blogs were then coded separately for the seven dimensions of wellness. Table 2.4 provides the structure for the analysis and an iterative approach was used. Specifically, chunks of information within each tweet/media article/blog, as well as associated links to websites, news media articles, on-line magazine articles and pictures, were then themed, sub-themed and sub-sub themed based on conversation content (words, word phrases, hashtags, associated pictures and links). As new themes emerged, tweets/media articles/blogs previously themed were re-assessed to ensure that no themes were missed. These

themes were subsequently mapped onto the seven dimensions of wellness, and the tweets/media articles/blogs were revisited to determine the extent to which themes assigned to each item were captured by the dimensions. The two researchers met to compare their findings. Once again, discrepancies were resolved through discussion. Quantitative analyses were then conducted, as described below, to determine the rates at which references to children's wellness, in relation to the seven dimensions of wellness, appeared in the set of data.

1. To what extent do the members of the Alberta public, organizations and health related professionals focus on wellness, in relations to children's wellness, in their conversations using the social media platform Twitter™?

   For each of the three dates on which the data were collected, the number of items which contained a reference to children's wellness was determined. This was divided by the total number of items extracted for each time to obtain a measure of the extent.

2. To what extent is children's wellness discussed in major on-line news media and blogs across the province?

   For each of the three dates on which the data were collected, the number of on-line news media articles and blog articles, which contained a reference to children's wellness, was determined.

3. Do members of the Alberta public, organizations and health professionals respond to on-line news media articles and blog articles that are focused on wellness, by commenting, recommending, sharing, liking or tweeting/re-tweeting the on-line news media article or blog article?

News media articles and blogs containing a reference to children's wellness were reviewed to assess the number of comments, recommending, sharing, liking, or tweeting/re-tweeting they each contained.

4. For the number of conversations about children's wellness identified at each time period, how do the trends over time vary between different social media technologies?

   The change in extent of expressions about children's wellness at different time points was examined.

5. What dimensions of children's wellness are most commonly expressed by members of the Alberta public, organizations and health related professionals, using the social media technologies Twitter™, on-line news media articles and on-line blog articles?

   For the items identified as containing children's wellness content, the frequency with which each of the seven dimensions of wellness was involved was calculated using the coding for the seven dimensions of wellness listed in Table 2.4.

Table 2.4 – Dimension Coding

P	Physical	Sp	Spiritual
E/P	Emotional/Psychological	O	Occupational
S	Social	E	Environmental
I	Intellectual		

CODING INSTRUCTIONS

Twitter™ Data - Relevant: Y (yes) or N (no)

Dimension of Wellness: refer to table 2.4

Tweet example*:

Sally enjoying art show #happykid #childplay #happymom http://t.co/zpqXTVy6zABk

*note: Tweet's content and link have been created for demonstration purposes.

Step 1

- Assess tweet words and hashtags for content specific to children's wellness and identify content theme.

Sally (daughter or mother's name) enjoying (having fun/pleasurable) art show (intellectual, education) #happykid (child is expressing happiness) #childplay (child is playing) #happymom (child is having fun/is happy and it makes mom happy)

Result – tweet is relevant for children's wellness = Yes

Step 2

- Assess content of link, if provided in tweet. Re-assess content theme, create sub-theme/sub-sub theme for content.

  Link may provide a picture, news media article or blog article. What does the picture express, or what is the news media article or blog article content about? Some news media articles and blogs may also contain a picture.

Sally refers to the child in the picture and the person taking the picture must be the mom (#happymom). Picture is taken at an art show. The child is therefore learning about art and is physically active expressing her idea of how the woman in the picture was perhaps dancing. Sally is enjoying herself (#happykid, #childplay).

Step 3

- Combine assessments from Step 1 and Step 2 to assess dimension(s) of wellness.

The child is physically active = Physical wellness (P); the child is learning = Intellectual wellness (I); the child is in a public place and is comfortable expressing herself = Emotional/psychological (E/P). Tweet is coded P, I and E/P

On-line News Media Data - Relevant: Y (yes) or N (no)

Dimension of Wellness: refer to table 2.4

On-line News Media Article example*:

*note: This on-line news media article has been developed for this study, and parts of the article (49) have been extracted from the website www.naturalearning.org**.** The following disclaimer is Included:

> Disclaimer: The material contained in this InfoSheet was produced by the Natural Learning Initiative (NLI) for informational purposes only. InfoSheets are not intended to guide construction or installation of items. In no event will NLI be liable for any loss or damage (including without limitation, indirect or consequential loss or damage) from the use of or reliance on this material.

Edmonton Herald – LIFESTYLE & ENTERTAINMENT

Why Focus on Naturalizing Outdoor Learning Environments in Childcare? Today's children and families often have limited opportunities to connect with the natural environment. Richard Louv called this phenomenon, 'nature-deficit disorder' in his book, The Last Child in the Woods, and opened the nation's eyes to the developmental effects that nature has on our children. Louv documented how modern family life has changed dramatically in the last two decades. Children spend more time viewing television and playing video games on computers than they do being physically active outside. In the past decade, the benefits of connecting to nature have been well documented in numerous scientific research studies and publications. Collectively, this body of research shows that children's social, psychological, academic and physical health is positively impacted when they have daily contact with nature.

Children Need "Vitamin G" (G for "green") to capture nature's role as a necessary ingredient for a healthy life. Evidence suggests that, like a vitamin, contact with nature and green environments is needed in frequent, regular doses.

Step 1

- Assess on-line news media article for content specific to children's wellness. Theme the content.

Article is about connecting with the natural environment and the development effects that nature has on a child. This article references children's social, psychological, academic and physical health and how a child is positively impacted when they have daily contact with nature.

Result – Article is relevant for children's wellness = Yes

Step 2

- Assess content for links or pictures, if provided in the article. Re-assess the theme content, sub-theme if need be.

No links provided. Picture is of children playing outdoors.

Step 3

- Combine assessments from Step 1 and Step 2 to assess dimension(s) of wellness. May require sub-sub theme.

This article is discussing the importance of nature = Environment (E) to a child's development in reference to social, psychological, academic and physical health = Social (S), Emotional/Psychological (E/P), Intellectual (I) and Physical (P).

On-line Blog Data - Relevant: Y (yes) or N (no)

Dimension of Wellness: refer to table 2.4

On-line Blog Article example*:

*note: The article and content has been created for demonstration purposes.

MomKnowsAll www.momknowsall.ab/-**blog/mom-knows-all**

What Does Limit Mean? Who can we ask?

If Health Canada can't define it, how do we teach it to our children?
For the record, I was once a kid, so I am well aware of what foods kids prefer. As adults, most of us still prefer to have foods identified in the purple box marked "Eat Well" on the back of *Eating Well with Canada's Food Guide*, http://nutrition.uwo.ca/pdf/foodguide.pdf. The message Health Canada is delivering is to "limit foods and beverages….such as cakes and pastries, chocolate and candies, cookies…..fruit flavoured drinks, soft drinks…" etc. The most recent statistics available, from a Canadian Community Health Survey, Cycle 2.2 (2004), http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/cchs_focus-volet_escc-eng.php indicate that Canadian's greatest portion of their calories, consumed as between meal snacks, are coming from these 'limit' foods (41.5%). Given that the data is self-reported, this number could even be higher. It's also likely why obesity rates are escalating. Ok, so I'm making an assumption here because so far there's only a proven association with obesity and the consumption of sugar sweetened beverages.

When Health Canada lets us know that children need regular physical activity because it's essential for healthy growth and development, we all know what to do, right? Get active. But when Health Canada tells us to 'limit' foods and beverage high in calories, fat, sugar and salt…..how's a Mom supposed to teach a child if she doesn't know what it means? Does limit mean no more than two cookies a day or a week? Does limit mean two cookies on Monday, a soft drink on Tuesday, a bowl of ice cream on Wednesday, a chocolate bar on Thursday...need I continue?

I'm thinking that we should be asking Health Canada to answer this question. What do you say? You can ask Health Canada by emailing them at: Info@hc-sc.gc.ca or by phone at 1-866-225-0709

Step 1

- Assess the article content for children's wellness content. Assess content for theme.

This blog article discusses teaching children healthy eating and also discusses the importance of regular physical activity for children.

Result – Article is relevant for children's wellness = Yes

Step 2

- Assess links or pictures provided in the article. Assess content for theme, may require a sub-theme.

This article has links: Canada's Food Guide which provides recommendations for foods to eat to be healthy, age references are inclusive of children; and Canadian statistics for consumption of

foods by categories. This article also contains a picture of a child smiling at a jar of cookies. The child's facial expression is one of joy, therefore emotional/psychological.

Step 3

- Combine assessments from Step 1 and Step 2 to assess dimension(s) of wellness. Re-assess theme, create sub theme or sub-sub theme.

This article is discussing the importance of healthy eating and physical activity in children – Physical (P) as well as teaching children = Intellectual (I), with the addition of emotional/psychological (E/P) for the picture.

CHAPTER 3: Results

A systematic search for relevant scholarly papers of PubMed and MEDLINE, as well as the grey literature search using Google® search engine, resulted in the identification of 578 references of which only five met the study's inclusion criteria (refer to Diagram 3.1 PRISMA Flow Diagram, Table 3.1 and Table 3.2).

The following summarizes the five studies that met the inclusion criteria:

- Harris et al., looked at Twitter data using the hashtag #childhoodobesity, with a focus on how health communication is used for the dissemination of evidence-based public health information (50).
- Terbeck and Chesterman reviewed parent conversations found in online forums that expressed the lack of medical diagnosis of ADHD in their children, parent's distrust of these medical consultations and their dissatisfaction with health services. The researchers then proposed methods of improving the medical consultations by encouraging medical professionals to be aware of the information parents are using to form their child's diagnosis (51).
- Finlay and Krueger's study looked at sudden infant death syndrome (SIDS) parent conversations on memorial websites to understand how parents express themselves during their grieving process and what benefits they receive from this public expression. They concluded that health professionals should consider memorial websites, as a support service method, as having potential benefits to contribute towards improvements in a grieving individuals' mental health (52).

- Barr and McLeod assessed the conversations of children who had a disabled sibling by accessing data from an Internet support site. They then proposed how health professionals can develop strategies for family-centred interventions that would support the health of the non-disabled child (53).
- Eriksson and Salzmann-Erikson's study looked at fathers' conversations focused on the caring of their children by analyzing data extracted from a father-based online forum. Recommendations were for the need to have traditional health care support, currently biased towards mothers, consider father's online forums as a compliment to traditional health care due to the benefit father's gain from reciprocal sharing of their concerns (54).

Across all five studies that met the inclusion criteria, there was a lack of data on user's demographics, especially sociodemographics. In addition, few studies presented comparison data from which to draw conclusions. Whether research ethics approval was sought varied, and in most of the studies, researchers indicated that ethics approval was not required since social media data were publically available and social media users have no expectations of privacy.

The grey literature review revealed that social media research related to health, identified when searching for wellness utilizing words and/or a hashtags, focuses on the use of a single word or hashtag. Examples from the grey literature review were the studies done by Harris et al (50), Gruzd et al (55), and Yoon and Bakken (56), who each used one term or hashtag, #childhoodobesity, #olympics, and physical activity, respectively. Neither the systematic nor grey literature searches revealed social media research that set out to identify conversations from social media users in one geographic location, without using a targeted intervention.

None of the studies identified examined on-line news media specific to children's wellness. The social media research methods for extracting and analysing data varied over the five years searched. Studies explored various components of social media technology data, such as patterns of conversation, meaning behind those conversations, who initiated and led them, and whether the content appeared to be factual or based on scientific evidence, in order to better understand how social media data could be used to support public health goals and initiatives.

Overall description of included social media

The extraction of Twitter™ tweets on October 25, 2014, January 24, 2015, and February 25, 2015, using NodeXL™, resulted in a total of 169,016 samplings of tweets (50,946+47,699+70,371). After selecting tweets generated from Alberta users, 1208 (183+372+653) remained. Alberta users included members of the Alberta public, organizations and health professions. Of these 1208 tweets, 30.4% ((107+146+114)/1208) were deemed relevant since tweet content expressed one or more dimensions of wellness related to children (refer to Tables 3.3, 3.4 and 3.5). The Kappa score was 0.88, indicating 'excellent' agreement between researchers who assessed tweets for relevance. The 367 relevant tweets were generated by 198 unique Twitter™ users (112 individuals and 86 health-related businesses). Of the 112 individuals, 27 of these individuals had a wellness related profession listed in their on-line profile.

Twitter™ tweets deemed relevant, 'yes', had words, #hashtags and links assessed to determine relevance (refer to Table 3.4). For example, the tweet "These little people are my world #kids #hockey #yeg #hockeymom http://t.co/ywBXi5tUTk" was assessed as a 'yes', given that this

tweet's content was about a female adult taking two children to a hockey game in Edmonton, and contained a picture of two children with smiles on their faces. Each tweet conversation deemed relevant was then assessed for the dimension(s) of wellness. All relevant tweet conversations corresponded to one or more of four of the seven dimensions of wellness: Physical (P), Emotional/Psychological E/P), Intellectual (I), and Social (S). Refer to Table 3.5 for examples of the results for the dimensions of wellness coding process. As an example, the tweet "As a responsible parent, you take an active role in your child's health. You prepare healthy meals and you see... http://t.co/QNDjoUDyVW", was deemed to be a conversation about children's physical wellness (dimension) because feeding children healthy food contributes to a healthy body. The link also referred to an article on feeding children healthy foods and how doing so creates healthy children.

Results for the Canadian, national representative data for Pink Shirt Day/#PinkShirtDay Twitter™ tweet samplings extracted on February 25th, 2015:

- 3,220 tweets were extracted; 110 were identified from Alberta, and 90% of the Twitter™ users in this data set contained identifying location data in their profiles or conversations;
- 55% of the 110 tweets were deemed relevant for children's wellness (45% were relevant to an adult's wellness only). Of the 55% of relevant tweets for children's wellness, 100% were deemed relevant for the dimension of emotional/psychological (refer to Table 3.6).

Results for the Alberta representative data for Bill 10/#Bill10, Twitter™ tweet samplings, extracted on March 10, 2015:

- 364 tweets were extracted; 309 were identified from Alberta; and 87% of the Twitter™ users in this data set contained identifying location data in their profiles or conversation;
- 99% of the 309 tweets were found to be relevant for children's wellness. Of the 99% of tweets, 100% were deemed relevant for the dimension of emotional/psychological (refer to Table 3.6).

A total of 30 on-line news media articles specifically focussing on children's wellness were extracted from five Alberta newspaper organizations. In addition, six on-line blogs were extracted: three on October 25, 2014, three on January 24, 2015 and none on February 25, 2015 (refer to Tables 3.7 and 3.8). The degree of agreement between researchers on which media articles and blogs were relevant was considered excellent; Kappa score 0. 91. Only the relevant on-line news media articles and blogs were recorded and assessed for dimensions of wellness (refer to Tables 3.09 and 3.10). All relevant media article and blogs corresponded to one or more of four of the seven dimensions of wellness: Physical (P), Emotional/Psychological E/P), Intellectual (I), and Social (S). Refer to Table 3.5 for examples of the results for the dimensions of wellness coding process. Each of the on-line news media articles and blogs was assessed for the number of comments, recommending, sharing, and tweet/re-tweets (refer to Table 3.11).

Information from extracted social media addressing each of the research objectives is presented below.

Results by Objectives

1. To what extent do the members of the Alberta public, organizations and health related professionals (Albertans) focus on wellness, in relation to children's wellness, in their conversations using the social media platform Twitter™?

Of the 169,016 sampling of tweets extracted on October 24, 2014, January 24, 2015, and February 25, 2015, 0.7% were authored by Albertans. Of those, 30.4% were identified as relevant. Based on an estimated 1.4M Alberta Twitter™ users, the 1,208 sample deemed generated from Alberta Twitter™ users, and 367 deemed relevant, it can be stated with 95% confidence that the error attributable to sampling is +/- 5.11%.

During the February 25, 2015, extraction of Twitter™ data, a change in the NodeXL™ rate limited was observed. On February 19, 2015, it increased from 1,500 tweets per extraction request to 18,000. This was noted with the first word searched, 'wellness', and corrected by manually changing the rate limit to 1,500 for each of the remaining word and hashtag search extractions (refer to Table 3.12). It was deemed that this error in extraction did not affect the relevant results since the total relevant tweet extractions for each time period were, nine, zero and seven, respectively (refer to Table 3.13).

Some examples of the words and hashtags that identified more Twitter™ tweets associated with children's wellness, as well as words and tweets commonly located in relevant tweets, were kids, child, #childhealth, #happykids, wellness, and youth, happy and mental health (refer to Table 3.3 and Diagram 3.2).

2. To what extent is children's wellness discussed in major on-line news media and blogs across the province?

Each of the eight on-line news media sources provides articles under the headings of: Opinions; Letters to Editor; News Room; Local Blogs; Local Life/Lifestyle; Twitter™ and Facebook™, equating to seven possible areas where news media articles for children's wellness could be found. It is acknowledged that it is possible to have more than one article under each on-line news media heading, but, for the purpose of this study, it was assumed that the total possible on-line news media articles that could be extracted would be 56, one for each time period, October 25, 2014, January 24, 2015, and February 25, 2015, seven articles, one for each of the headings, for each of the eight on-line news media sources (refer to Table 3.14). Using the exact number of on-line news media articles extracted for each time period (refer to Table 3.15), 12.5%, 30% and 11% of articles had a focus on children's wellness, respectively. Wellness articles included such topics as the importance of play in a child's life, assisting a hockey player diagnosed with leukemia, creating healthy habits in kids, and keeping the junk food out of your child's life. Of the seven blogs assessed for the three time periods, only the October and January time periods produced blog content, and 43% were related to children's wellness for each of these time periods (refer to Table 3.14). On-line blog child wellness content included topics such as rules to create health habits in children, taking back control of parenting children, and the importance of teaching children kind speech.

3. Do members of the Alberta public, organizations and health professionals respond to on-line news media articles and blogs that are focused on wellness, by commenting, recommending, sharing, liking or tweeting/re-tweeting the on-line news media article or on-line blog article?

The mode (most frequent) result of responding to on-line news media articles and on-line blog articles focusing on children's wellness was zero for all options: comments, recommend, share, like, and/or tweet/re-tweet tabs (refer to Tables 3.7, 3.8 and 3.11). There were two outliers in which the on-line news media articles each generated a large volume of recommend/share(s) that were inconsistent with the remainder of data collected in this area; one with a value of 437 and one a value of 216. Both of these were on-line news media articles, one about baby OR (operating room) cancelled twice (in Edmonton, Alberta), and the other about a Calgary, Alberta baby making medical history, having undergone a two-part heart operation in Edmonton, Alberta.

4. For the number of conversations about children's wellness identified at each time period, how do the trends over time vary between different social media technologies?

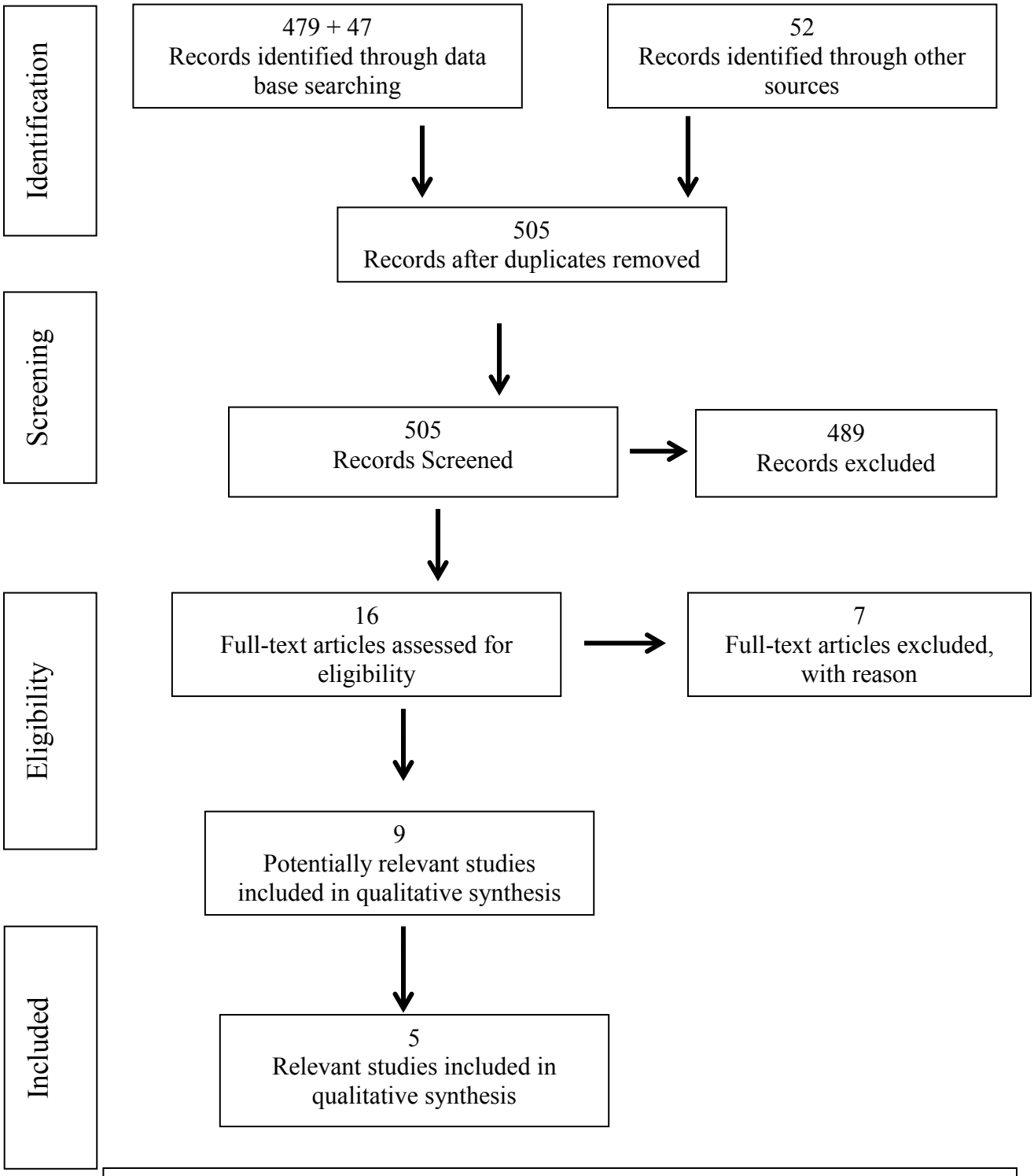
Twitter™ users' expressed conversations, specific to children's wellness, decreased over the three extraction periods, 58%, 39%, and 17%, respectively. The January time period had the largest volume of relevant on-line news media articles, at 30%, with October and February at 12.5% and 11%, respectively. Forty-three percent of the on-line blogs for October and January were deemed to have children's wellness content, with February containing no content specific to children's wellness (refer to Table 3.16).

5. What dimensions of children's wellness are most commonly expressed by members of the Alberta public, organizations and health professionals, using the social media technologies Twitter™, on-line news media articles and on-line blog articles?

For both the Twitter™ and on-line news media articles from which data was extracted, physical and emotional/psychological dimensions were the top two dimensions commonly expressed. The third and fourth dimensions for Twitter™ and on-lines news media articles that expressed content for children's wellness were social and intellectual wellness respectively. This pattern changed for on-line blog articles, with the top two dimensions of wellness from which data were extracted being emotional/psychological and intellectual, followed by physical wellness as the third expressed dimension of wellness coded, and social wellness as the fourth. Based on the results, the dimensions of spiritual, occupational and environmental were not represented in expressed conversation specific to children's wellness (refer to Tables 3.17, 3.18 and 3.19).

Tables and Figures

Diagram 3.1 - PRISMA Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred *Reporting Items* for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. Doi:10.1371/journal.pmed1000097

Table 3.1 – Results of Systematic Literature Search - Included

Author (s)	Country	Purpose of the paper	Type of study	Type of social media technology studied (FB, Twitter, Blogs, new media, etc.)	Method(s) used to analyse the social media data	Dimension(s) of wellness studied	Who's communication was studied: the public, parent, or caregiver	Age of children discussed	Findings	Limitations/ Issues
Communication About Childhood Obesity on Twitter										
Harris, J.K., Moreland-Russell, S., Tabak, R., Ruhr, L.R., Maier, R.C. (2014)	USA	To better understand Twitter use in health communications among the public and public health professionals about childhood obesity.	Observational	Twitter	Analysed tweets containing the hashtag #childhoodobesity. Tweets coded for content; Twitter users classified by sector and health focus; data collected on the network of followers' connections among the tweeters.	Physical	"All" tweets sent by the public, parent, caregiver and health professional in June 2013.	Not listed	1110 tweets were collected from 576 unique Twitter users: 65.6% individuals vs 32.9% organizations. Tweets focused on: individual behaviour > environment or policy. Few gov't and educational tweeters. More likely to be followed than private individuals. Authors concluded: Opportunity to better disseminate evidence-based information to a broad audience and Public Health could make sure the content of tweets are scientific/ evidence based.	Researchers stated that "all" tweets were captured for June 2013. However Twitter does not disclose the method it uses to select the sample of tweets that are extracted other than it provides tweets that use the keyword/ #hashtag searched.
Parents, ADHD and the internet - Attention Deficit and Hyperactivity Disorders										
Terbeck, S., Chesterman, L.P. (2012)	UK	Potential impact of using the internet on medical consultations by analysing the attitudes, attributions,	Observational	International internet forums discussing ADHD	44,600 posts from 5 popular international forums (UK, USA, Canada and Germany) were identified using Google search engine. Messages	Physical - Emotional/ psychological	Parent	2 – 16 years	Average age of child that parents were concerned about, 6.2 years, more messages about boys vs girls, more parents consulted more than one specialist,	Parents who accepted that their child did not have ADHD may have been less likely to have visited an online forum

		and emotional responses of parents who have been informed by specialists that their child does not have ADHD and to examine the nature of the feedback they obtained from members of online internet support groups.			were chosen based on whether they were from parents who suspected their child to have ADHS – confined to those whose child had been assessed by a specialist and were informed no ADHD. From these posts 91 posts were studied and all replies (396). Quantitative content analysis and developed a categorical system for the initial messages. Independently rated by the authors and then categorized by consensus.				95.6% of parents reported that they did not believe the professional's opinion that their child did not have ADHD. 83.3% of parents expressed a desire to have had a diagnosis of ADHD. 95.3% parents were unhappy with the diagnosis. "I can't cope anymore, my child wears me out". Of the replies 87.6% were negative towards the professional's judgement, empathising with the parent.	than those who were dissatisfied. There was insufficient information obtained in the internet message to be certain about the quality of the diagnosis being made.
A Space for Mothers: Grief as Identity Construction on Memorial Websites Created by SIDS parents										
Finlay, C.J., Krueger, G., (2011)	USA	An attempt to analyze the motivations of the site creators as manifested in their on-line projects. To begin an inquiry into cultural and personal meaning making on the Internet	Observational	On-line review of memorial websites, included link pages and comment sections.	Online internet ethnographic approach. Located websites via a Google search using query terms such as "SIDS memorial". Analyze the construction, presentation, and sharing of SIDS memorial websites (amateur websites that exist outside of today's popular social networks). What purpose do these websites serve? What trajectories they assume.	Physical	Parent	Infants	Memorial websites constructed by SIDS parents help in meaning and identity reconstruction after loss. Majority of the websites were authored by the mother. The description of the baby is at the core, emphasized the health and normalcy of the infant. Internet is a valuable tool for 'likes' to connect, peer to peer connections. Visitor's messages	Updates are inconsistent. Some sites hadn't been touched in years.

									suggest that visiting the sites reinforces their own well-being and reminds them of their own fortunate circumstances.	
They never see how hard it is to be me: Siblings' observations of strangers, peers and family										
Barr, J., McLeod, S (2010)	AUS	To understand a sibling's complex interactions with others in their lives when they have a disabled sibling in their family.	Observational	On-line website	676 contributions to children's Internet sibling support site were extracted. Thematic analysis of content.	Emotional/psychological	Sibling "Although my family loves me they don't have a lot of time for me".	Not stated	Importance of family well-being. Focus in the family tends to be on the disabled child.	No comparison with siblings who have no disabled sibling.
Supporting a caring fatherhood in cyberspace, an analysis of communication about caring with an online forum for fathers										
Eriksson, H., Salzmann-Erikson, M (2013)	Sweden	To describe communication about caring activities for infants among men who visited an internet-based forum for fathers and to elaborate on the dimensions of support available in the forum	An archival and cross-sectional observational forum study. 'nethnography'. (studying social interaction on-line).	Online arena – public site that requires no registration to access the posts and an active forum. Located using search engine Google	Posts were gathered sequentially top-down. Data were gathered from the top thread down working backwards through the sequence of discussions; gathered simultaneously by both researchers. Analytic memos were written. 200 threads were analyzed. Links and pictures were excluded.	Physical - Emotional/psychological	Fathers	Infants	Personal growth the men experienced as a result of engaging in care-giving. Fathers who were present for their infant. Concern for child's well-being and shared feelings of joy and distress in everyday life was recurrent in the supportive communication.	Impossible to fully describe or give a sociodemographic overview of the posters

Table 3.2 – Results of Systematic Literature Search – Excluded

Author(s)	Country	Title	Reason Excluded
DeGroot, J.M., Carmack, H.J. (2013)	USA	*It May Not Be Pretty, But It's Honest: Examining Parental Grief on the Callapitter Blog*	Case study
Cheng, S.T., Chan, T.W.S., Li, G.H.K., Leung, E.M.F. (2014)	Hong Kong	*Childlessness and Subjective Well-being in Chinese Widowed Persons*	Cross-Sectional Case Study. Questionnaire used.
Dahle, H.G., Homer, C.S.E., (2013)	AUS	Motherbirth or childbirth? A prospective analysis of vaginal birth after caesarean blogs	Not about children
Badger, K., Royse, D., Moore, K. (2011)	USA	What's in a Story? A Text Analysis of Burn Survivors' Web-Posted Narratives - Social Work in Health Care.	No content discussed about children.

Table 3.3 - Twitter™ Extraction Results for Wellness in Children

Key word(s) used	Oct 25 2014	Number Specific to AB	Relevant	Jan 24 2015	Number Specific to AB	Relevant	Feb 25 2015	Number Specific to AB	Relevant
wellness	1127	19	9	1116	20	0	20,157	205	7
#wellness	1059	7	4	1104	3	0	1117	7	0
child	1050	2	1	1119	3	1	1165	4	0
#child	1086	6	5	1049	8	7	1089	4	0
well child	1204	2	1	1126	2	1	1163	2	1
well-being	n/a*	0	0	1316	6	0	1125	6	0
#well-being	n/a*	0	0	127	2	2	1109	16	1
#wellchild	11	0	0	10	0	0	6	0	0
#happychild	141	0	0	86	0	0	182	1	0
happy child	1131	10	1	1064	0	0	1081	3	1
kid	1121	2	1	1170	2	0	1203	1	0
#kid	1059	3	0	1057	2	2	1065	4	0
kids	1187	2	2	1153	6	5	1158	2	2
#kids	1097	2	1	1067	3	3	1114	3	0
parenthood	1123	3	2	1207	0	0	1137	9	6
#parenthood	1178	2	2	1123	3	0	1184	8	6
happy kid	1053	2	0	1090	3	2	1099	4	3
#happykid	1027	3	1	262	0	0	1042	1	1
happy kids	1159	4	3	1194	5	2	1109	3	2
#happykids	597	4	4	357	12	11	1042	3	0
well kid	1120	1	1	1162	0	0	1240	0	0
well kids	1197	7	6	1210	5	2	1153	6	4
#wellkid	1	0	0	n/a*	0	0	n/a*	0	0

#well kids	n/a*	0	0	4	0	0	n/a*	0	0
#wellkids	n/a*	0	0	n/a*	0	0	n/a*	0	0
infant	1133	2	0	1141	2	1	1106	3	3
infants	1644	3	1	1108	2	0	1129	6	2
#infant	1218	2	0	1099	1	1	1096	2	1
#infants	969	1	1	346	0	0	393	0	0
happy infant	446	2	0	100	0	0	115	0	0
#happyinfant	1	0	0	n/a*	0	0	n/a*	0	0
happy infants	1034	1	0	95	0	0	211	0	0
#happyinfants	n/a*	0	0	n/a*	0	0	n/a*	0	0
well infant	304	0	0	217	0	0	162	2	1
well infants	67	1	1	64	0	0	1052	6	6
#wellinfant	n/a*	0	0	n/a*	0	0	n/a*	0	0
#wellinfants	n/a*	0	0	n/a*	0	0	n/a*	0	0
infant health	683	7	6	1064	2	2	1105	7	7
#infanthealth	7	0	0	18	0	0	11	0	0
child play	1111	8	2	1075	3	2	1051	9	2
#childplay	26	0	0	21	0	0	36	0	0
childs play	1252	3	0	2129	2	2	1434	1	0
#childsplay	2213	3	2	437	1	0	1159	0	0
child development	1078	3	2	1075	7	5	1104	1	0
#childdevelopment	261	3	3	195	0	0	306	0	0
childs development	106	0	0	220	5	5	110	1	1
#childsdevelopment	n/a*	0	0	n/a*	0	0	7	0	0
kid health	1139	2	2	1145	11	7	1173	6	4
#kidhealth	1000	0	0	8	0	0	4	0	0
kids health	1093	5	5	1149	6	3	1093	3	1
#kidshealth	1161	10	6	925	7	6	925	5	4
child health	1115	5	4	1095	13	12	1403	26	3
#childhealth	506	4	3	1035	37	37	454	5	0
childs health	594	8	8	981	7	7	590	1	1
#childshealth	n/a*	0	0	83	n/a*	0	2	0	0
baby health	1109	2	2	1057	4	1	1090	2	0
#babyhealth	171	2	1	25	0	0	28	0	0
babies health	1071	6	3	1095	3	2	1038	5	0
#babies health	108	0	0	167	1	1	119	0	0
#babieshealth	n/a*	0	0	2	0	0	n/a*	0	0
babies	1196	0	0	1169	1	0	1143	0	0
#babies	1153	0	0	1070	4	1	1122	1	0
new babies	1064	3	1	1105	2	1	1207	8	8
#new babies	110	0	0	43	0	0	108	0	0

#newbabies	87	0	0	70	1	1	47	0	0
happy babies	1284	4	1	1328	8	4	1421	1	1
#happy babies	157	1	1	99	1	1	120	1	0
#happybabies	47	0	0	20	0	0	15	0	0
kid play	1097	3	2	1150	4	3	1172	3	0
#kidsplay	63	0	0	243	140	0	354	232	18
kids play	1149	8	7	1115	3	3	1157	13	10
#kids play	1021	0	0	1048	9	0	1068	11	7
#physical and #wellness	18	0	0	26	0	0	42	0	0
#emotional/ #psychological &#wellness	26	0	0	28	0	0	18	0	0
#social and #wellness	34	0	0	41	0	0	26	0	0
#intellectual and #wellness	14	0	0	8	0	0	12	0	0
#spiritual and #wellness	48	0	0	53	0	0	51	0	0
#occupational and #wellness	n/a*	0	0	2	0	0	n/a*	0	0
#environmental and #wellness	30	0	0	24	0	0	32	0	0
	Oct 25 2014	Number Specific to AB	Relevant	Jan 24 2015	Number Specific to AB	Relevant	Feb 25 2015	Number Specific to AB	Relevant
Totals	50,946	183	107	47,699	372	146	70,371	653	114
Alberta tweets specific to children's wellness			**107**			**146**			**114**

*there are no people in that network [NodeXL response].

Table 3.4 – Examples of Yes (Y)/No (N) Coding for Tweets

Tweet	Y	N
These little people are my world #kids #hockey #yeg #hockeymom http://t.co/ywBXi5tUTk	X	
believe it or not... the doll that inspired Chucky in #childsplay http://t.co/wKZUCteEva		X
Here's one for the #parents !😄 #Parenthood #loveyourkids http://t.co/eYW3SVeD3R	X	
RT @CBCAlerts: #Mali health officials say many people exposed to #Ebola as two-year-old child with virus travelled by bus while showing sym…		X
Well, yesterday was a big day for our little family. Our last born is now #walking. A new adventure begins. #babies #milestones	X	
A great discussion about your child's emotional health is coming up Monday evening at The HUB Family Resource... http://t.co/QGoSrbm3Ft	X	

Table 3.5 Examples of the Results for the Process of Coding for the Dimensions of Wellness

	Content Theme 1	Content Theme 2	Research Themes	Research Themes	Words/hashtag/ links and pictures	Words/hashtag/link and pictures	Coded for one of the 7 Dimensions
Conversations related to	Research/ Sharing Research	Studies related to children's health	Infant health issues	Young Children Teenagers/Youth	reports and research in #Child and #Maternal Health Knowledge Update #midwives	ground-breaking research #child #health #family	
Dimension(s) noted in research	→		Physical (P)	Emotional/ Psychological (E/P) Intellectual (I)	Emotional/ Psychological (E/P) Intellectual (I)		
	Content Theme 1 →	**Sub Content Theme 2** →	**Sub-Sub Content Theme 3**	**Examples of Word/hashtag** ↓	**Examples of Word/hashtag** ↓	**Associated links to websites and pictures** ↓	↓
Conversations related to wellness – themed	Physical wellness in children	Safety Healthy eating Alternative therapies Screening/prevention of illness Access to care issues Exercise	Babies Children Vaccines; Preventive exams Encouraging parents to get their children to exercise	The majority of #poisonings; Colic in babies reduced with probiotics; Breaks my heart. Kid eating a bag of candy, still crying that they're hungry....Mom buys more candy and chips #starving 4 #nutrition #health;	Make eye exams part of your child's health routine; 3 Fun #Mindfulness exercises for #kids; #Kids who play outdoors solo, with pals more active than supervised peers;	News media articles, on-line magazine articles; blog articles, Instagram pictures, Facebook posts	Physical (P)
	Mental or emotional wellness in children	Awareness Where to get help Prevention		#child #psychiatry many symptoms overlap; Talk to me about how providing quality child care basically leads us to personal development and growth. It's like therapy;	my kid wakes up happy every morning; Mental health issues of children have been a hidden struggle for too long; redesign of the children's mental health system;	News media articles, on-line magazine articles; blog articles, Instagram pictures, Facebook posts	Emotional/ Psychological (E/P)
	Child development	Cognitive General topics, reading, art, plays (acting)	Baby; child; importance of play	Children growing up in a digital world; The best way to support your child's development? Let them lead the way; Talk to me about how providing quality child care basically leads us to personal development and growth. It's like therapy;	Nothing like teaching kids how to skate and watching them learn... Needed a little happy in my life; 3 Fun #Mindfulness exercises for #kids	News media articles, on-line magazine articles; blog articles, Instagram pictures, Facebook posts	Intellectual (I)
	Child, or parent/adult and child, socializing with family, friends, or out in public			Talk to me about how providing quality child care basically leads us to personal development and	#Kids who play outdoors solo, with pals more active than supervised peers;	News media articles, on-line magazine articles; blog articles, Instagram pictures, Facebook posts	Social (S)

				growth. It's like therapy;			
					Not identified		Occupational (O)
				Church, Lord	religion		Spiritual (Sp)
					Not identified		Environmental (E)
	Physical wellness of adult in relation to children	Sleep (lack of);		They need to invent a new word for moms with babies because "tired" doesn't cut it #zzz #pleasegotosleepbaby	I just spent last 4 hours dancing with hoops, balls, scarves and wings with my 3 year old; Encourage your child to #exercise it helps them think!	News media articles, on-line magazine articles; blog articles, Instagram pictures, Facebook posts	Physical (P)
	Emotional/psychological wellness of adults in relation to children	Joy; dealing with grief of a child; motivational self-development	Child succeeding; child happy; child playing/ socializing	#happy #somethingtolookforwardto #babies; That would make me a happy single mother who have done it all for my babies; Every so often my 17mos son old wakes up from his sleep. Him falling back asleep in my arms is one of the best feelings. #Parenthood; Breaks my heart. Kid eating a bag of candy, still crying that they're hungry....Mom buys more candy and chips #starving 4 #nutrition #health;	Nothing like teaching kids how to skate and watching them learn... Needed a little happy in my life; My beautiful babies. I love being an auntie :). #family #niece #nephew #happy #smiles; Happy dad moment: My kid likes sitting on my toolbox and watching me work on the house;	News media articles, on-line magazine articles; blog articles, Instagram pictures, Facebook posts	Emotional/ Psychological (E/P)
	Adult/parent education opportunities about children	How to/what to do to help a child to learn		Letting your #children pick the book; Encourage your child to #exercise - it helps them think! Happy dad moment: My kid likes sitting on my toolbox and watching me work on the house; A report card parents can use to assess how well their child's school addresses #bullying;	Tips to Help Your EARLY RISER #Sleep LATER in the Morning; Well, I just spent the last 4 hours dancing with hoops, balls, scarves and wings with my 3-5 year old	News media articles, on-line magazine articles; blog articles, Instagram pictures, Facebook posts	Intellectual (I)
	Parent/adult and child relationships	Spending time with children; sharing quotes; sharing advice; sharing childhood memories	Playing; participate in charitable events; participate in community wellness fairs	my world #kids #hockey #yeg #hockeymom; Out for lunch with mommy and auntie Mindy #cute #kid #love #5yrold	Well, I just spent the last 4 hours dancing with hoops, balls, scarves and wings with my 3-5 year old	News media articles, on-line magazine articles; blog articles, Instagram pictures, Facebook posts	Social (S)

Table 3.6 – Twitter™ Extraction Results for Targeted Interventions for Wellness in Children

Key Word/Hashtag	Date	Total Extracted	Alberta Specific	Relevant
#PinkShirtDay & Pink Shirt Day	Feb 25 - 2015	3230	110	55
#Bill10 & Bill 10	March 10 - 2015	364	309	307

Pink Shirt Day was created to bring awareness to stop bullying in schools and
Bill 10 was legislated in Alberta to allow students to form gay-straight alliances in schools.

Table 3.7 – Social Media Content Generated from On-line News Media Articles

On-line News Media Articles	Oct 24-2014	Jan 24- 2015	Feb 25 - 2015
Dominic's Journey with AML "One Bead"	Comments-4 FB Rec/shares-0 Re/Tweets - 0		
Women's Shelter in MH gets a boost from Coats for Kids.	Comments-0 FB likes – 0 RE/Tweets - 0		
Chris Salomons - "Street Tales" - Need to take back control in parenting.	Comments-0 FB Rec/Foll-0 RE/Tweets – 0		
The Toddler's not the Baby - "Dear Amy".	Comments-0 FB rec – 0 Re/Tweets – 0 Shares - 0		
AB baby boom causing crunch for hospitals.	Comments-7 FB Rec – 0 Re/Tweets – 7		
AB baby boom causing crunch for hospitals.	Comments – 4 Shares – 0 Likes – 0		
Baby OR cancelled twice.	Comment – 26 FB rec – 437 Re/Tweets – 8		
Delighted by Hatterland's Pirates of the Curry Bean.		Comments-0 FB rec – 0 Re/Tweets – 0	
Dominic's Journey with AML "One Bead".		Comments-5 FB – 0 Re/Tweets – 0	
Mad in the Hat - Alison Wonderland "Sassiness".		Comments-0 FB – 0 Re/Tweets – 0	
Child Chatter - "The Power of Play - six things you should know.		Comments – 0 FB – 0 Re/Tweets – 1	
CHHS Key Club - hosting concert in support of student mental health - Crescent Height High School		Comments – 0 FB – 0 Re/Tweets - 5	

Me Plus Three - Mom's sweet sleep still out of reach. Open letter to my well-rested family - Lindsay Brown-Sylvan Lake.		Comments – 0 FB – 0 Re/Tweets – 0	
Central Alberta helping hockey player diagnosed with leukemia.		Comments – 0 FB – 7 Re/Tweets – 13	
"Rules for Kids" Healthy habits start young.		Comments – 0 FB – 0 Re/Tweets - 1	
RDExpress re-tweeted: Sona MacNaughton @bibliogoddess - "Tt's so much fun"" - Babywearing ballet class.		Comments – 0 FB – 0 RE/Tweet - 3	
RDExpress re-twt JonWieler@wieler4RD "So make a rule in your home,keep the junk food out"-article in @Red Deer Express		Comments – 0 FB – 0 Tweet – 0	
Inuit author and storyteller tours GP schools.		Comments – 0 FB – 0 Re/Tweets - 0	
Mom's the Word: Five fresh perspectives for the New year.		Comments – 0 FB – 3 Re/Tweets – 7 Share – 3	
Many working poor struggle to pay Alberta's dental fees. Children worse off.		Comments – 0 FB – 0 Re/Tweet – 0	
Calgary baby makes medical history with two-part heart operation in Edmonton.		Comments – 1 FB – 216 Re/Tweets – 3	
Wear your jammies to Mary Lambert's Pajama Party (an event).		Comments – 0 FB – 0 Re/Tweets – 0	
News Room: First neonatal cardiac hybrid surgery in Western Canada.		Comments – 0 FB – 0 Re/Tweets - 3	
Twitter: First neonatal cardiac hybrid surgery in Western Canada		Comments – 0 FB – 0 Re/Tweets - 0	
Twitter Sea of Pink @ecole-Connaught - Bullying Fought Canada wide pinkshirtday			Comments – 0 FB – fav - 1
Opinions: Stripping Youth Rights-Feb 24-2015;			Comments – 0 FB – fav - 0
Opinions: Feb 20-2015; Funding Full Day Kindergarten cancelled			Comments – 0 FB – 0 Re/Tweets - 0
Calgary students disciplined after wearing apparent KKK robes #yyc;			Comments – 0 FB Rec – 0 Re/Tweets – 0 FB Likes - 0
Twitter: Day of the Pink: Anti-Bullying message hits Canada w/ Pink Parties across Calgary			Comments – 0 FB likes – 23 Re/Tweets - 12
Twitters: Take a look at some #PinkShirtDay photos from in and around Edmonton.			Comments – 0 Re/Tweets - 2
Yes/No coding for on-line News Media Articles – only those articles considered Y were extracted.			

Table 3.8 – Social Media Content Generated from On-line Blog Articles

On-Line Blog Articles	Oct 24-2014	Jan 24-2015	Feb 25-2015
Catching him in the act of being good.	Comments – 4 FB Shares – 44 Re/Tweets – 21		
Shine Blog Hope#22.	Comments – 21 FB – 0 Re/Tweets – 0 Google+1 - 0		
Unwrap a Smile with Kinder™	Comments – 0 FB Likes – 5 Tweets – 21 Share - 1		
Car seat tip.		Comments – 47 FB – 0 Re/Tweets - 0	
Homeschooling through grief.		Comments – 50 FB – 0 Re/Tweets - 0	
Word marbles - How to make and why "A fun way to teach your children the importance of kind speech.		Comments – 0 FB – 0 Re/Tweets - 0	
No blog content for February			0

Yes/No coding for Blogs – only those article considered Y were extracted

Table 3.9 - Examples of Coding Dimensions of Wellness in On-line News Media Articles

Source	Article	Dimension(s)	Article Content (sentences extracted – article not in full detail)
Red Deer Express	Rules for kids - healthy habits start young by Jack Wheeler	Physical (P)	Obesity rates are on the rise among children, and the facts are clear - overweight kids are more likely to become overweight adults. Attitudes toward food and nutrition start at an early age. By your words and actions, you set the stage for the eating habits your kids will carry into adulthood.
Red Deer Advocate	Street Tales – Need to take back control of parenting by Chris Salomons	Physical (P) Emotional/Psychological (E/P) Social (S) Intellectual (I)	Lately I have been focusing on children and how we raise them. What it boils down to is that in this world there are entities that want to control our children, and through them they want to control the adult population as well. …the whole social media system actually does nothing to promote a healthy lifestyle in that it takes away the face-to-face contact that we as humans actually need. Even the animal world teaches us that much. Although the majority of children are good, well behaved and energetic members of our community, there are an increasingly large number that live aimless because they are given no positive direction.

Table 3.10: Examples of Coding Dimensions of Wellness in On-Line Blog Articles

Source	Article	Dimension(s)	Article Content (sentences extracted – article not in full detail)
Merry About Town	Catching Him in the Act of Being Good By Mary Kuchle	Physical (P) Emotional/Psychological (E/P) Intellectual (I)	I'm trying my best to catch him in the act of being good instead of always focusing on the moments when he is exhibiting bad behaviour. School is not easy for Evan for a few different reasons. You see, he is who he is. Some of his behaviours he can help and some he can't. There isn't a button on his forehead that I can push to reboot his behaviour. Oh good lord I wish there was but there isn't. I can tell you that I've noticed that the more we talk about his good behaviour, the more good behaviour there is to talk about. Evan seems to be happier in his skin and less prone to think that we are only there to yell at him.
The Chaos and the Clutter	Word Marbles By Sharla Kostelyk	Emotional/Psychological (E/P) Intellectual (I) Social (S)	How to make and why. A fun way to teach your children the importance of kind speech.
Peek Thru Our Window	Unwrap a Smile with Kinder™ by Sami Nickerson	Emotional/Psychological (E/P)	While I love that the kids are back in school … Every moment we are together now is even more precious than it was before… This year I am a #KinderMom. A few special perks of the job are unwrapping smiles -- almost nothing is better than unwrapping a smile! Smiles come from spending time together.

Table 3.11 – Total On-line News Media Articles and On-line Blog Articles Specific to Children's Wellness

Content specific to children's wellness	Oct 25 2014	Total comment sharing data from news media articles/blog identified	Jan 24 2015	Total comment sharing data from news media articles/blog identified	Feb 25 2015	Total comment sharing data from news media articles/blog identified
On-Line News Media Articles	7	Comments = 41 Facebook™ recommendations/ shares = 437(1) tweets/ re-tweets = 15 Google® Posts/ Shares = 3	17	Comments = 6 Facebook™ recommendations/ shares = 10, 216(1) tweets/ re-tweets = 35 Google® Posts/ Shares = 6	6	Comments = 0 Facebook™ recommendations/ shares = 30 tweets/ re-tweets = 12 Google® Posts/ Shares = 0
Blog Articles	3	Comments = 25 Facebook™ recommendations/ shares = 49 tweets/ re-tweets = 42 Google® Posts/ Shares = 1	3	Comments = 97 (2) Facebook™ recommendations/ shares = 0 tweets/ re-tweets = 0 Google® Posts/Shares = 0	0	Comments = 0 Facebook™ recommendations/ shares = 0 tweets/re-tweets = 0 Google® Posts/ Shares = 0

Note: (1) is in reference to there was only one article that contained that number of Facebook™ recommendations/shares

Table 3.12 – Alberta Twitter™ Tweets Specific to Children's Wellness

	Oct 25 2014	Number Specific to AB	Relevant	Jan 24 2015	Number Specific to AB	Relevant	Feb 25 2015	Number Specific to AB	Relevant
Totals	**50,946**	**183**	**107**	**47,699**	**372**	146	**70,371**	653	114
Alberta tweets specific to children's wellness			**107**			**146**			**114**

Footnote: NodeXL™ rate limit was changed on February 19, 2015 from 1500 tweets per extraction request to 18,000; this was discovered with the first word searched, wellness, and corrected for the remaining word and hashtag search extractions. However it was deemed that the increased data extracted did not result in an increase in the number of relevant content tweets, refer to Table 3.13 below.

Table 3.13 – Keyword Wellness Extraction Comparison

Keyword used	Oct 25 2014	Number Specific to AB	Relevant	Jan 24 2015	Number Specific to AB	Relevant	Feb 25 2015	Number Specific to AB	Relevant
wellness	1127	19	9	1116	20	0	20,157	205	7

Diagram 3.2 - Word Cloud Visualization: Top 1,000 Common Words and Hashtags Used in Twitter™ Conversations, in Relation to Children's Wellness

Visualization showing the words and hashtags that identified relevant tweets associated with children's wellness as well as associated words and hashtags found in relevant tweets. Larger fonts indicate the number of repeated times the word or hashtag was located.

Table 3.14 – Total Possible On-Line News Media Articles that Could Have Contained Content Related to Children's Wellness

News Media Source	Opinions	Letters to Editor	News Room	Local Blogs	Local Life/Lifestyle	Twitter &/or Facebook	Total
Edmonton Sun	1	1	1	1	1	1 + 1	7
Edmonton Journal	1	1	1	1	1	1 + 1	7
Calgary Sun	1	1	1	1	1	1 + 1	7
Calgary Herald	1	1	1	1	1	1 + 1	7
Medicine Hat News	1	1	1	1	1	1 + 1	7
Red Deer Advocate	1	1	1	1	1	1 + 1	7
Red Deer Express	1	1	1	1	1	1 + 1	7
Grande Prairie Herald	1	1	1	1	1	1 + 1	7
							56

Table 3.15 – Total On-line News Media Articles and On-line Blog Articles Specific to Children's Wellness

On-line News Media Article/Blog	Oct 25 2014	Jan 24 2015	Feb 25 2015	Totals
On-Line News Media Articles	7 (12.5%)	17 (30%)	6 (11%)	30
Blog Articles	3 (43%)	3 (43%)	0	6

Note: On-line News Media Articles: 7/56 = 12.5%; 17/56 = 30%; and 6/56 = 11%. There were 7 On-line Blog web-sites (Table 2.3-Methods Chapter) checked for each extraction date. Blog Articles: 3/7 = 43%.

Table 3.16 – Extent of Expressed Conversations over Time

	October 25, 2014	January 24, 2015	February 25, 2015
Tweets	107/183 = 58%	146/372 = 39%	114/653 = 17%
On-line News Media Articles	7 = 12.5%	17 = 30%	6 = 11%
On-line Blog Articles	3 = 43%	3 = 43%	0

Table 3.17 - Dimensions of Children's Wellness Commonly Discussed on the Social Media Platform Twitter™

Dimension	**Oct/2014** = 107		**Jan/2015** = 146		**Feb/2015** = 114		**Average Percent for Ranking**
	# of Tweets	%	# of Tweets	%	# of Tweets	%	
Physical = P	70	65%	52	36%	69	60%	53
Emotional/ Psychological=E/P	52	49%	86	59%	48	42%	50
Social = S	19	18%	13	9%	31	27%	18
Intellectual = I	20	19%	5	3%	2	3%	8
Spiritual = Sp	1	0.01%	0	0	1	0.01%	0
Occupational = O	0	0	0	0	0	0	0
Environmental = E	0	0	0	0	0	0	0

*Note: % will not add up to 100 as a tweet could contain more than one dimension of wellness.
Content of tweet was coded to one or more of the seven dimensions of wellness, in relation to children's wellness.

Table 3.18 - Dimensions of Children's Wellness Commonly Discussed in On-line News Media Articles

Dimension of Wellness	**October 25, 2014 = 7 articles**		**January 24, 2015 = 17 articles**		**February 25, 2015 = 6 articles**		**Average Percent for Ranking**
Physical	7	100%	12	71%	0	0	57
Emotional/Psychological	4	57%	9	53%	5	83%	64
Social	2	29%	9	53%	4	67%	49
Intellectual	1	14%	7	41%	5	83%	46
Spiritual	0	0	0	0	0	0	0
Occupational	0	0	0	0	0	0	0
Environmental	0	0	0	0	0	0	0

*Note: % will not add up to 100 as the news media article could contain more than one dimension of wellness.
Content of the news media article was coded to one or more of the seven dimensions of wellness, in relation to children's wellness.

Table 3.19 - Dimensions of Children's Wellness Commonly Discussed in On-line Blog Articles

Dimension of Wellness	**October 25, 2014 = 3 Blogs**		**January 24, 2015 = 3 Blogs**		**February 25, 2015 = 0 Blogs**	**Average Percent for Ranking**
Physical	2	67%	1	33%	no content	33
Emotional/Psychological	3	100%	2	67%	no content	55
Social	1	33%	1	33%	no content	22
Intellectual	2	67%	3	100%	no content	55
Spiritual	0	0	0	0	no content	0
Occupational	0	0	0	0	no content	0
Environmental	0	0	0	0	no content	0

*Note: % will not add up to 100 as a blog could contain more than one dimension of wellness.
Content of the blog was coded to one or more of the seven dimensions of wellness, in relation to children's wellness.

CHAPTER 4: Discussion

The Government of Alberta's wellness-focused document, *Alberta's Strategic Approach to Wellness – Health for All….Wellness for Life,* makes the case for shifting conversations about one's health, typically associated with health care services and the absence of injury or disease, to conversations about health and wellness to have a healthy population (1). The Government of Alberta stated that health conversations, inclusive of the dimensions of wellness, would facilitate a greater understanding among individuals and communities of what contributes to overall health and well-being (1). Using the aforementioned example provided in the Alberta Strategic Approach to Wellness, it could be said that social media research focused on conversations among individuals, organizations and health related professionals will continue to have a health care focus until there is acceptance of the importance of wellness to overall health. Future social media research focused on wellness could include what individuals and populations understand wellness to be and how they value the importance of wellness related to the social determinants of health unrelated to illness, disease or injury. Future social media research in Alberta with a focus on wellness could use the results of this study as baseline data. It is hypothesized that this baseline data could be used to compare the results of a Government of Alberta engagement of Alberta's 1.4M Twitter™ users, on-line news media readership and Alberta blogger readership in social media conversations discussing wellness. Having conversations with Albertans is an important component of public engagements that contribute to the agenda setting stage of policy development. Future social media conversations could provide valuable insight into Albertans views on wellness.

Main Findings of the Research

No published literature on the role of social media as a platform for discussing children's wellness defined by the seven dimensions of wellness (15) was found. Existing literature focuses on health issues, how best to utilize social media in the delivery of public health messaging and/or, how researching publically available conversation can lead to improvements in the provision of health care services.

Main Findings of the Social Media Study

This is the first study to assess dimensions of wellness in conversations by extracting Twitter™ data using multiple words and/or hashtags. The data generated was then assessed for jurisdictional location (Alberta) generated data, utilizing a computer program designed specifically for this study, *the Hamman Program.*

The study results pertaining to the social media platform Twitter™ indicate that while Albertans may not set out to intentionally focus their public conversations on children's wellness, many of their conversations are associated with children's wellness.

The majority of the content of on-line news media articles focussed on children's wellness. It was not associated with how children's wellness contributes towards an adult's wellness. News media articles tended to inform the reader of a particular event or situation, such as children enjoying an event at the local library. However, on-line blog content results aligned with the findings from the Twitter™ portion of the study; children contribute towards adult wellness. Blogs tended to be written by a parent focused on the writer's life, and the children in their lives.

Children's contribution to an adult's wellness is not a new finding. Holder and Coleman's 2007 paper stated that research focused on well-being looks at how children contribute towards parental happiness and satisfaction (57). In 2008, the government of New Brunswick released the results of their wellness consultations, *Wellness…we each have a role to play – Individuals, Communities, Stakeholders and Government, Final Report of the Select Committee on Wellness to the Second Session of the 56th Legislative Assembly of New Brunswick* (55). People from New Brunswick stated that the first step towards their province achieving wellness was to 'improve the wellness of our children' (58).

Given that this study indicates that the wellness of children contributes to the wellness of adults and the community, these findings could be incorporated into future Government of Alberta public engagement plans. One such opportunity would be when the Government of Alberta, as indicated in *Alberta's Strategic Approach to Wellness – Health for All….Wellness for Life* (1), begins public engagements on wellness. Supported by published research, social media engagement plans could include a focus on obtaining feedback from Albertans on what types of initiatives could be put in place to support children's wellness. One suggestion is the implementation of a provincial levy on sugar sweetened beverages (SSB). SSB are a known contributor to obesity (physical wellness) and the Alberta Policy Coalition for Chronic Disease Prevention has asked the Premier of Alberta to implement a SSB taxation levy (59). A social media engagement with Albertans could provide valuable insights to gauge Albertans receptiveness to a SSB taxation levy.

Albertans do not appear to respond to on-line news media articles and blogs that are focused on wellness, as evidenced by the low number of comments, recommendations, shares, likes or tweets/re-tweets of wellness-related the articles. These results are in agreement with the findings of Costera Meijer and Groot Kormelink's 2014 study that revealed that there is an overall reluctance to a) comment given that most users of social media do not want to open themselves up, through their expressed opinion, to public review, and b) the public is reluctant to recommend/share/like, tweet/re-tweet, given that they do not know who and how this information is tracked and used (60). Current research indicates that social media users are reluctant to provide a comment or click on the options share, like or tweet/re-tweet (60) in spaces referred to as 'virtual social spaces' (61). Future research utilizing social media to understand conversations on topics of interest should continue to be inclusive of monitoring social media user's responses in these virtual social spaces, in order to understand change, if any, over time. As more information is made available to the public on how social media data are being used by researchers and non-profit and for-profit organizations, it could be hypothesized that social media users may feel less reluctant to use these virtual social spaces that encourage interaction.

A comparison of the data collected from all three social media sources indicates that there is variation in the volume and content, of conversations of Albertans about children's wellness across social media technologies.

The variation in the volume of Twitter™ data is likely attributable to how Twitter™ API, which the program NodeXL™ utilizes, extracts and provides the data, a process that Twitter™ does not disclose (62). The González-Bailón, et al, study stated that Twitter's™ method of provision of

data introduces a measurement sampling error due to the coverage and representativeness of the messages returned by the API (62).

Canadian statistics for news media articles of interest and the volume of print coverage on children's issues were not available. While not specific to on-line news media, the Pew Research Centre reported in 2012 that the top four news media articles of interest to two-thirds of Americans were weather, breaking news, politics and crime. Articles covering arts, culture, and education were of minor interest (63). The only report available on the subject of print media coverage on children's issues was a 2005 UNICEF report that looked at national media coverage in Nepal (64). The top media coverage was for developmental issues, such as education and sports, followed by survival issues, inclusive of health, and then protection issues, such as abduction and abuse (64). No research was available to indicate that there was a particular time of year for on-line news media articles to focus on children's wellness.

Based on available news media research, the findings for the variation of on-line news media articles could be explained by first looking at the top media coverage areas for children and the ranking of media articles of interest to the Alberta readership. They indicate that topics covered align with the top media articles of interest in the UNICEF report (64), development, survival and protection of children. However, the majority of articles are only of minor interest to the readership, arts, culture and education. The next assessment step of the study findings needs to be inclusive of the time of year. The majority of the articles on children's wellness were identified in the January time frame and were focused on activities and events that took place indoors. It could be hypothesised that in Alberta, as January is a cold temperature month with

short daylight hours, there would be greater participation in indoor activities and events that provide opportunities for socialization, creating availability for a larger volume of news media coverage. Repeating this study at various times of the year could test this hypothesis. Notably, both on-line news media articles that generated the two outliers for recommends/shares, 437 and 216 respectively, contained news breaking content - baby OR (operating room) cancelled twice and a Calgary baby makes medical history with two-part heart operation in Edmonton.

Research indicates that for individuals who blog about their life, the motivation to continue to blog is contingent on the writer's personal outcome expectations and is positively affected by the feedback they received from readers (65). When searching for Alberta blogs that could have a focus on children's wellness, a 2011 article located on the blog site, *Modern Mama*, announced the top 10 mama bloggers of 2011 (44), based on readership voting. By October 2014, only half of the top 10 blogs remained active. The variation in the volume of blogs containing content on children's wellness may be reflective of blog writer's not meeting their personal expectations. They may have discovered that content writing on children's wellness was not of interest to their readership and, therefore, they focus their writing on content that is found interesting to others and generates feedback to the writer the form of a comment, share, like or tweet/re-tweet.

The variation in results for the volume of data available from the various social media sources, and the proposed differences for why these variations occurred, indicates that future social media research will need to continue to explore the differences between user-generated content, such as Twitter™ and on-line blogs, and content produced by traditional media, such as news media reproduced for the Internet. Continuing research in this area will facilitate an understanding of

how the sharing of personal thoughts and views evolves as the positive or negative association of using social media technology broadens (61). In particular, it could be hypothesized that blog articles on children's wellness may increase with greater societal awareness of the importance of wellness, which, in turn, encourages social media users to utilize virtual social spaces to provide positive feedback, indicating interest to the writers.

There is an explicit understanding that parents and caregivers have a responsibility to guide and support the development of children into healthy independent adults. Activities such as providing children with nutritious food, playing with and engaging children in physical activity, reading or listening to music with a child, and involving children in family and community activities, are everyday activities in which adults interact with a child. Therefore, the study finding that the dimensions of physical, emotional/psychological, social and intellectual wellness, as common dimensions referred to in expressed conversations, would be in-line with the association of how an adult interacts with a child to guide and support their development.

The absence of conversations related to the occupational dimension may be explained by the definition of occupational wellness, "level of satisfaction one gains from paid work and volunteer engagements" (15) and that the study did not explore the words and hashtags youth, adolescent, and employment, which would be associated with occupational. The latter was an oversight of the researcher in not being inclusive of 'youth/adolescent' in children's wellness.

Spiritual wellness is defined as "ones' beliefs and values and is not related to ones' religion" (15). The search term 'spiritual' was explored. However, using the search terms 'religion',

‘church’ and ‘faith’ may have resulted in observations of conversations on spiritual wellness, in relation to beliefs and values given the general association of religion to spiritual (66). Spiritual wellness is highly valued among various cultures, especially among the Aboriginal culture, due to the spiritual connection to all aspects of their life (66). Increasing the list of search terms to include words such as ‘aboriginal’ and ‘indigenous peoples’ may have also increased results for conversations on spiritual wellness. It is also possible that spiritual wellness is personal and people may tend to keep their spirituality and beliefs private rather than risk criticism.

Environmental wellness, “the balance between home and work life and ones’ relationship with nature and community resources” (15) was not identified in conversations. This may be due to the omission of search terms associated with environment, such as ‘’ and ‘outdoors’, in addition to the time of year when the data were extracted. The non-identification of environmental wellness could also be explained by a possible lack of public understanding of how nature and community resources contribute to wellness. The American Public Health Association’s, *Policy Number 20137*, is founded on the principle that improved health and well-being can come from interacting outdoors with nature (67) and this policy outlines actions to be taken by public health, organizations and government to encourage greater use of nature and understanding of its importance.

It should be noted that while physical and intellectual wellness used expanded search terms ‘play’/’development’ content was generated with no expansion of words and hashtags used for the search terms ‘emotional’/’psychological’ and ‘social’. Future studies based on this work could consider expanded search terms in all seven dimensions of wellness.

Informing Public Policy

Since 1989, Albertans have identified wellness as fundamental to their health, as indicated in publically available Government of Alberta documents that correspond to four different engagements with Albertans, focused on how to improve health care in the province (2, 3, 5, 6, 7, 8, 9, 10, 11, and 12). To-date, with the exception of a 2013 announcement that the Government of Alberta intended to move forward with a strategic approach to wellness (1), there has been no public engagement focused on wellness in Alberta.

The results of this study indicate that this type of a study could move the strategic approach to wellness agenda forward by contributing to preliminary public policy work at the wellness agenda setting stage by incorporating the opinions and needs of stakeholders. The agenda setting stage is an important first step in government policy development when decisions are being made as to what gets on the government policy agenda and why.

Prior to using the results of this social media study, the methods used should be repeated by restricting the search terms to those words and hashtags that were found to generate the larger volume of conversations, and by adding additional search terms to include words and hashtags that may capture additional data, such as, but not limited to, youth, adolescents, volunteer, nature, outdoors, religion, church. Once checked, and if found reliable, the identification of the dimensions of children's wellness, contributing to Albertan's wellness, could be used as a baseline data to plan, monitor and evaluate future results from targeted public engagements on the topic of wellness. Baseline data is an integral part in evaluating the effectiveness of a project. Until there is more research to understand how well subject specific, expressed social media conversations are representative of in-person public engagements, used for the purpose of the

agenda identification stage of listening to stakeholders, social media research should be combined with other methods of collecting data. Methods could include participatory research and citizens' juries, which are accepted by academics and researchers to produce valid results (68, and 69).

The study design and methods used could be applied to any topic of interest to government or non-government organizations.

Informing Future Research

Research should continue to explore the use of social media to understand how publicly expressed conversations, the methods developed to extract these conversations (data), and the data extracted, can be analyzed in a reproducible and rigorous way. The finding from future research, utilizing social media technology, has the potential to make an important contribution towards the understanding of public conversations. A greater understanding of these social media generated public conversations will improve our understanding of public perspectives, values and beliefs, and it is hypothesized that this increased understanding can contribute to the development of public health policy that supports improvements in the health and wellness of populations.

Conclusion

This study provided evidence that an observational study of social media technologies, such as Twitter™ and on-line news media and blog articles, to assess the nature of public expressed conversations on children's wellness, can generate baseline data that contributes to an understanding of how to engage members of the Alberta public on the topic of wellness.

Limitations

This study had the following limitations:

1. Demographic limitation: Twitter™ users can self-identify their location in their profiles, and may use locations such as 'the moon' or 'the north pole', and therefore this study may not have captured all Alberta Twitter™ users, resulting in a lower total volume of Alberta specific Twitter™ data. This may have had an effect on the extent of relevant Twitter™ data generated for the three extraction periods as well as the observed dimensions of wellness. Twitter™ users who list their location as the moon or sun may have generated conversation with the dimensions of spiritual or environmental wellness. In addition, those users who do not list their location in profiles may also express conversations, in relation to the dimensions of children's wellness, differently; this again would have had an effect on the observed dimensions of wellness findings.
2. On-line news media limitation: This study did not look at the total available on-line news media sources for Alberta. Cities (sources) were instead selected by their geographic location to be representative of the north (Grande Prairie), central (Red Deer) and south (Medicine Hat) sectors of the province, as well as inclusive of the two major cities (Edmonton and Calgary), thought to be a representative sampling of Alberta. Therefore, the selection of cities based on location in Alberta resulted in having on-line media sources from cities that are not comparable in population size. Larger populations would have a greater variety of global representation and the major on-line news media providing coverage for these cities would be providing breaking news from a global perspective, which may or may not include coverage of children. On-line news media coverage for smaller cities may provide a greater opportunity for coverage of local topics of interest such as school and after school sporting events, which may have affected the study findings for the observed dimensions of wellness.

The study findings suggest that on-line news media content, associated with children's wellness, was higher in less populated cites. Therefore a measurement bias may have occurred for the extent of content generated for the three time periods which may also have had an effect on the observed dimensions of wellness.

3. The Twitter™ sampling used may not have been representative of the true universe of tweets from Alberta. Given that Twitter™ does not disclose how it generates data for a request, and only provides a sampling of the total available conversations associated with each word or #hashtag request (approximately 1%); it is not known how many other Albertans' conversations may have been omitted from this study. This limitation may have affected the observed patterns in volume of conversations extracted for the three time periods as well as the observed dimensions of wellness.
4. Expanding the search terms for children, to include youth and adolescents may result in the observation of additional Twitter™ data. Additional data may change the results for the dimensions of wellness observed.
5. Expanding the search terms for occupational, spiritual and environmental was omitted, unintentionally from this study. A wider search using additional words and hashtags for each of the aforementioned dimensions of wellness, may have resulted in the additional observation of social media technology data observed in Twitter™, on-line news media and blog articles for the three dimensions of wellness, occupational, spiritual and environmental. If these dimensions of wellness were observed, it may have affected the patterns in volume of conversations extracted for the three time periods as well as the observed dimensions of wellness.

6. Top ten hashtags/# most used in Alberta tweets were identified by accessing www.politwitter.ca on October 15, 2014, and incorporated into the *Hamman Program*; used to identify Alberta Twitter™ users for all three time periods. This is identified as a limitation noting that hashtags fluctuate over time depending on what is trending*. This may have affected the volume of Alberta conversations identified for the January and February time periods and therefore the study finding for the observed extent in volume of conversations over time, as well as the observed dimensions of wellness.

*Trending occurs when a large volume of people use the same word or hashtag (#) in their social media technology conversation in the same time frame. An example would be #PrenticeBlamesAlbertans, which became a popular hashtag used by Albertans on March 4, 2015, when then Premier Jim Prentice, during an afternoon radio show, indicated that Albertans were to blame for the economic situation in Alberta. This hashtag is no longer trending.

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APPENDIX A – Literature Search

PubMed (www.pubmed.gov; searched 9 Dec 2014)

Physical

#8 "Search ((#7)) AND (well-being OR wellness)", 15
#7 "Search (((#5)) AND (#6)) AND English[Language]", 16
#6 "Search ((#5)) AND (""2009/01/01""[Date - Entrez] : ""2014/12/09""[Date - Entrez])", 16
#5 "Search ((#4)) AND physical*", 18
#4 "Search (((#1)) AND ((#2) OR child*)) AND ""social media""", 289
#3 "Search ""social media""", 3085
#2 "Search (infant* or toddler)", 1068771
#1 "Search child*", 2164173

Emotional/Psychological

#8 "Search ((#7)) AND (well-being or wellness)", 3
#7 "Search (((#5)) AND (#6)) AND English[Language]", 4
#6 "Search ((#5)) AND (""2009/01/01""[Date - Entrez] : ""2014/12/09""[Date - Entrez])", 4
#5 "Search ((#4)) AND emotional*", 5
#4 "Search (((#1)) AND ((#2) or child*)) AND ""social media""", 289
#3 "Search ""social media""", 3085
#2 "Search (infant* OR toddler)", 1068771
#1 "Search child*", 2164173

#8,"Search ((#7)) AND (well-being OR wellness)", 12
#7,"Search (((#5)) AND (#6)) AND English[Language]", 15
#6,"Search ((#5)) AND (""2009/01/01""[Date - Entrez] : ""2014/12/09""[Date - Entrez])", 15
#5,"Search ((#4)) AND psychological", 17
#4,"Search (((#1)) AND ((#2) OR child*)) AND ""social media""", 289
#3,"Search ""social media""", 3085
#2,"Search (infant* OR toddler)", 1068771
#1,"Search child*", 2164173

Social Connection

#19 "Search ((#18)) AND (well-being OR wellness)", 3
#18 "Search ((#15)) AND English[Language]", 5
#17 "Search ((#15)) AND (""2009/01/01""[Date - Entrez] : ""2014/12/09""[Date - Entrez])", 5
#15 "Search ((#4)) AND social connection", 5
#4 "Search (((#1)) AND ((#2) OR child*)) AND ""social media""", 289
#3 "Search ""social media""", 3085
#2 "Search (infant* OR toddler)", 1068771
#1 "Search child*", 2164173

Social Relationship

#8 "Search ((#7)) AND (well-being OR wellness)", 8
#7 "Search (((#5)) AND (#6)) AND English[Language]", 13
#6 "Search ((#5)) AND (""2009/01/01""[Date - Entrez] : ""2014/12/09""[Date - Entrez])", 13
#5 "Search ((#4)) AND social relationship", 15
#4 "Search (((#1)) AND ((#2) OR child*)) AND ""social media""", 289
#3 "Search ""social media""", 3085
#2 "Search (infant* OR toddler)", 1068771
#1 "Search child*", 2164173

Intellectual

#8 "Search ((#7)) AND (well-being OR wellness)", 1
#7 "Search (((#5)) AND (#6)) AND English[Language]", 1
#6 "Search ((#5)) AND (""2009/01/01""[Date - Entrez] : ""2014/12/09""[Date - Entrez])", 1
#5 "Search ((#4)) AND intellectual*", 2
#4 "Search (((#1)) AND ((#2) OR child*)) AND ""social media""", 289
#3 "Search ""social media""", 3085
#2 "Search (infant* OR toddler)", 1068771
#1 "Search child*", 2164173

Spiritual

#8 "Search ((#7)) AND (well-being OR wellness)", 1
#7 "Search (((#5)) AND (#6)) AND English[Language]", 1
#6 "Search ((#5)) AND (""2001/01/01""[Date - Entrez] : ""2014/12/09""[Date - Entrez])", 1
#5 "Search ((((#1)) AND ((#2) OR child*)) AND (#3)) AND (#4)", 1
#4 "Search spiritual*", 14265
#3 "Search ""social media""", 3085
#2 "Search (infant* OR toddler)", 1068771
#1 "Search child*", 2164173

Environmental

#8 "Search ((#7)) AND (well-being OR wellness)", 3
#7 "Search (((#5)) AND (#6)) AND English[Language]", 4
#6 "Search ((#5)) AND (""2009/01/01""[Date - Entrez] : ""2014/12/09""[Date - Entrez])", 4
#5 "Search ((#4)) AND environmental*", 5
#4 "Search ((#1) AND ((#2) OR child*) AND ""social media"")", 289
#3 "Search ""social media""", 3085
#2 "Search (infant* OR toddler)", 1068771
#1 "Search child*", 2164173

Medline (In-Process and Other Non-Indexed Citations; Ovid; searched 14 Dec 2014)

1	exp Social Media/	1466
2	exp Internet/	54335
3	exp Blogging/	580
4	exp Electronic Mail/	1981
5	twitter.ti,ab.	569
6	tweet*.ti,ab.	286
7	facebook.ti,ab.	886
8	Youtube.ti,ab.	482
9	Google.ti,ab.	5008
10	blog.ti,ab.	299
11	blogging.ti,ab.	155
12	blogosphere.ti,ab.	32
13	text messag*.ti,ab.	1257
14	social network*.ti,ab.	8892
15	mobile technolog*.ti,ab.	516
16	wiki.ti,ab.	353
17	wikis.ti,ab.	128
18	hashtag*.ti,ab.	33
19	"web 2.0".ti,ab.	431
20	"web 3.0".ti,ab.	19
21	microblog*.ti,ab.	70
22	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21	70053
23	exp *Health Promotion/	37034
24	exp *Health Behavior/ or exp *Health/ or exp *Holistic Health/ or exp *Health Status/	247677

25	exp *Personal Satisfaction/	4901
26	exp *Happiness/	1359
27	exp *Environmental Health/	13680
28	exp *"Quality of Life"/	56741
29	wellness.ti,ab.	5133
30	wellbeing.ti,ab.	6401
31	well being.ti,ab.	43702
32	healthy cities.ti,ab.	202
33	healthy city.ti,ab.	79
34	healthy communities.ti,ab.	242
35	physical well*.ti,ab.	1574
36	emotional well*.ti,ab.	2673
37	(happy or happiness).ti,ab.	9784
38	psychological well*.ti,ab.	5908
39	quality of life.ti,ab.	163646
40	social well*.ti,ab.	1181
41	socialization.ti,ab.	4538
42	social skill*.ti,ab.	3520
43	intellectual well*.ti,ab.	5
44	aptitude*.ti,ab.	2281
45	spiritual well*.ti,ab.	754
46	religious.ti,ab.	16914
47	religion.ti,ab.	8262
48	faith.ti,ab.	4642
49	occupational well*.ti,ab.	29
50	school well*.ti,ab.	87
51	environmental well*.ti,ab.	13
52	nature.ti,ab.	316847
53	23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52	837355
54	22 and 53	7418
55	exp Child/	1608173
56	exp Infant/	971647
57	exp Parents/	77269
58	exp *Mothers/	17030
59	exp Fathers/	6629
60	child*.ti.	595810
61	infant*.ti.	160810

62	baby.ti.	7612
63	babies.ti.	5397
64	toddler*.ti.	2898
65	kid.ti.	560
66	kids.ti.	2024
67	parents.ti.	18508
68	mothers.ti.	20404
69	fathers.ti.	2446
70	55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69	2235240
71	22 and 54 and 70	806
72	limit 71 to (english language and yr="2010 -Current")	479