# Heliyon

# Influenza vaccination discourse in major Canadian news media, 2017−2018

**Blake Murdoch, Timothy Caulfield**[*]

*Health Law Institute, University of Alberta Faculty of Law, Edmonton, Alberta, Canada*

[*] Corresponding author.

E-mail address: caulfield@ualberta.ca (T. Caulfield).

## Abstract

Influenza vaccine uptake is less-than-ideal in many jurisdictions, including Canada. In this study we sought to assess news articles relating to influenza vaccination by major Canadian newspapers during a six-month period relatively congruent to the seasonal influenza outbreak for 2017−2018. We identified 116 unique articles published between August 16, 2017 and February 15, 2018, then developed and applied a coding frame to them.

Influenza vaccination was portrayed primarily positively (74.14%), sometimes negatively (14.66%), and occasionally neutrally (11.21%). Articles were most commonly focused on news about the prevalence, or amount of harm/death caused by, the influenza virus (31.03%), or on public announcements primarily concerning influenza vaccination (17.24%). Benefits of influenza vaccination were often stated (59.48%), most commonly including reduction in disease (47.41%) and protection of vulnerable individuals (26.72%). Issues or problems with influenza vaccination were also often stated (55.17%), most commonly relating to low or non-effectiveness of the vaccine (43.10%). Most articles stated that people should get vaccinated (65.52%).

Canadian newspaper articles generally support the scientific consensus that influenza vaccination is a highly positive intervention. Nonetheless, a clear picture of the true value of influenza vaccination may sometimes be missing in articles focusing on low effectiveness and lacking any mention of vaccination's positive value. Overall, we can reasonably conclude that, in Canada,

misinformation and antivaccination rhetoric are coming primarily from sources other than newspapers.

Keywords: Public health, Vaccines

# 1. Introduction

Influenza vaccine uptake is less-than-ideal in many jurisdictions including Canada, and myths and false beliefs have been correlated with this low uptake [1, 2, 3, 4, 5, 6]. Record numbers of pediatric influenza deaths have been reported in the United States for the 2017−2018 season [7], with high death tolls also occurring in parts of Canada [8, 9]. Common false beliefs include, for example, the idea that the vaccine can give you influenza, the concept of immune system overload [10], concerns about vaccines causing autism, concern about side effects and doubts as to influenza vaccines' effectiveness [1, 11]. Research has demonstrated that media representations exhibiting false balance between pro and anti-vaccination camps [12], regardless of the overwhelming evidence base in support of vaccination [13], can strongly influence readers' intention to vaccinate themselves or their children [14]. This confusion can potentially be compounded by anti-vaccination rhetoric that is present online, through social media or via advertising by naturopaths and other alternative medicine practitioners [15, 16]. Mass media, such as television and newspapers, has been identified as one of the most important sources of influenza vaccination information for the general public [17]. A study of Ontarian newspaper articles from 2001 to 2010 about the seasonal flu vaccine found a positive correlation between risk messaging in the articles and actual vaccination rates [18]. Recent research has also shown that online sources, such as websites found through Google searches, often recommend non-evidence-based practices in articles discussing influenza prevention [19].

The goal of this study was to explore how the topic of influenza vaccination was portrayed by Canadian newspapers during a six-month period relatively congruent to the seasonal influenza outbreak for 2017−2018. Specifically, we sought to determine the overall portrayal of influenza vaccination (positively, negatively, or neutrally), the presence or absence of important information, as well as which key messages or themes were dominant.

# 2. Methods

In order to create a sample of news articles for analysis, we undertook a systematic search on Factiva for the six month time period of August 16, 2017 to February 15, 2018. Factiva is a news source database owned by Dow Jones in which elaborate search inquiries can be performed and corresponding text—in this case, articles—can be downloaded. Search terms included any of the following phrases:

"influenza vaccination", "flu vaccination", "influenza vaccine", "flu shot" or "influenza shot". In Canada, newspaper readership data can be found on the recently established Vividata database [20]. Because we were looking for articles with a relatively wide reach to Canadian audiences, we limited the search results to the 40 most popular newspapers in Canada by audience and reach, as reported by Vividata in their fourth quarter 2015 report [17]. After accounting for Factiva search limitations, 31 source selections were made and the search was performed on February 15, 2018. Duplicate articles were excluded, leaving 157 remaining. Forty one of these were excluded as they did not both mention influenza vaccination and have influenza as a main topic, leaving a final data set of n = 116. These articles were downloaded in text form — only text was analyzed.

A coding frame, i.e. a framework for analyzing the content on the articles and converting it to numerical data for analysis, was developed using both inductive and deductive methods. That is to say, a draft frame containing certain coding categories we sought to assess was applied to a sample of articles from the data set, and upon review, the coding was altered to reflect, and thus accurately identify, common themes or components of the articles. Content and tone analyses were then performed using the finalized coding frame [21]. The contents of the coding framework can be found in the tables presented in the Results section.

Assessment of the tone of portrayal of influenza vaccination was based on the presence and analysis of benefits versus concerns. An article predominantly recommending influenza vaccination, or predominantly detailing or stressing its benefits, efficacy or importance was coded as "positive." This sometimes included articles where issues or problems with vaccination were also mentioned but were dismissed as invalid or insufficient reasons to affect a positive recommendation to vaccinate. An article predominantly recommending against influenza vaccination, or predominantly detailing or stressing its issues, problems, ineffectiveness or unimportance was coded as "negative." Articles were coded "neutral" if the positive and negative representations or discussion of influenza vaccination were detailed in equal measure, or if a definitive emphasis on either side could not be determined.

One team member coded all 116 articles and a second coded 25 randomly selected articles (21.55%) to determine reliability of coding. Inter-coder agreement was calculated using methods from Miles and Huberman that calculate agreement as total agreements/(total agreements + disagreements) [22]. There was substantial agreement (>95%) for all coding questions (see Supplementary Materials.xlsx file for details).

## 3. Results

The frequency of article publication by date mostly increased between August 2017 and February 2018, peaking from December to February (see Table 1). Influenza

**Table 1.** Date of publication.

| Date | # | % of 116 |
|---|---|---|
| Aug 16-Sept 15, 2017 | 3 | 2.59% |
| Sept 16-Oct 15, 2017 | 11 | 9.48% |
| Oct 16-Nov 15, 2017 | 21 | 18.10% |
| Nov 16-Dec 15, 2017 | 18 | 15.52% |
| Dec 16 2017−Jan 15, 2018 | 31 | 26.72% |
| Jan 16-Feb 15, 2018 | 32 | 27.59% |
| Total | 116 | 100.00% |

vaccination was portrayed primarily positively (74.14%), sometimes negatively (14.66%), and occasionally neutrally (11.21%) (see Fig. 1).

Articles were most commonly focused on news about the prevalence of, or amount of harm/death caused by, the influenza virus (31.03%), or on public announcements primarily concerning influenza vaccination (17.24%) (see Table 2). Scientific studies relating to influenza vaccination (8.62%), rates of vaccination (6.90%) and personal stories about influenza (5.17%) were also common focuses. The "Other" coding category comprised 25% of responses, and within that category notable article types included flu and health-
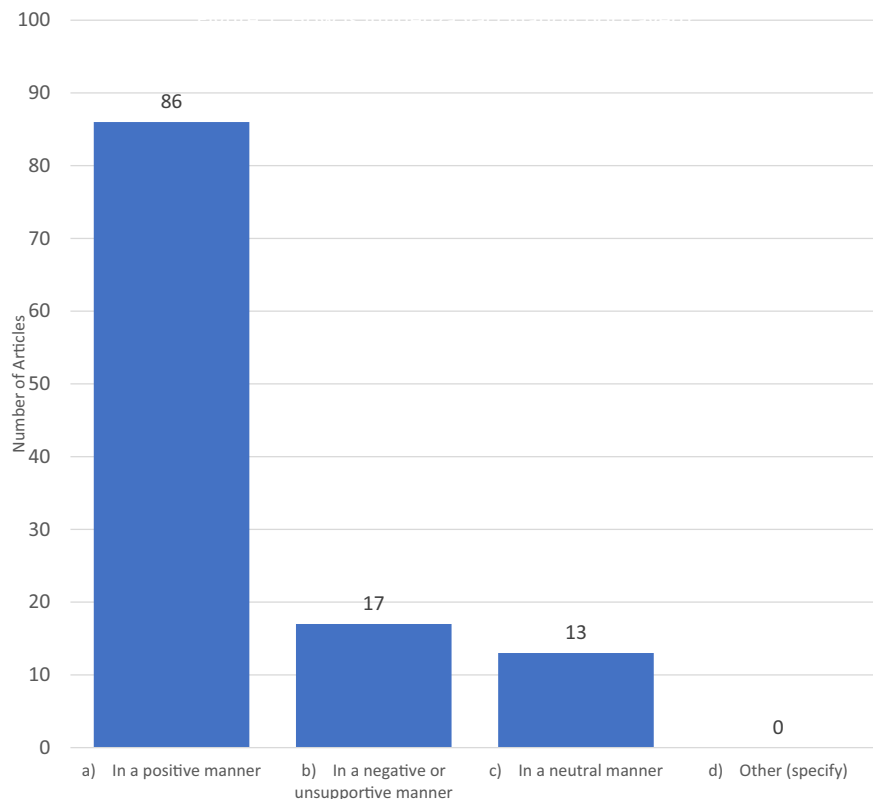


**Fig. 1.** How is influenza vaccination portrayed?. This figure shows the distribution of overall portrayal of influenza vaccination in the sample.

**Table 2.** What is the main focus or topic of the article?.

| Focus or Topic | # | % of 116 |
|---|---|---|
| News about the prevalence of, or amount of harm/death caused by, influenza virus | 36 | 31.03% |
| Information or discussion about a public announcement primarily concerning influenza vaccination | 20 | 17.24% |
| Information or discussion about a scientific study relevant primarily to influenza vaccination | 10 | 8.62% |
| News about rates of vaccination | 8 | 6.90% |
| A personal story or event concerning named individuals, focused primarily on influenza | 6 | 5.17% |
| A personal story or event concerning named individuals, focused primarily on influenza vaccination | 3 | 2.59% |
| Information or discussion about a scientific study relevant primarily to influenza | 2 | 1.72% |
| Information or discussion about a public announcement primarily concerning influenza | 2 | 1.72% |
| Other (specify) | 29 | 25.00% |
| Total | 116 | 100.00% |

related editorials (5 articles), articles about the history of influenza vaccine development (3), and columns making dietary suggestions to help with influenza (3).

Benefits of influenza vaccination were stated in 59.48% of the articles. The most common stated benefits include reduction in disease (47.41%) and protecting vulnerable people in society (26.72%) (see Table 3). Benefits were not stated in 40.52% of articles.

Issues or problems with influenza vaccination were stated in 55.17% of the articles, the most common being low or non-effectiveness (43.10%) and an inability to accurately predict and target seasonal strains of a virus (20.69%) (see Table 4).

Table 5 shows a breakdown of articles, accounting for their overall portrayal of influenza vaccination relative to statements made about both benefits and issues or problems with influenza vaccination.

**Table 3.** If benefits of influenza vaccination are stated, what benefits are stated? Select all that apply.

| Benefit Stated | # | % of 116 |
|---|---|---|
| Reduction in disease | 55 | 47.41% |
| Protecting vulnerable people in society | 31 | 26.72% |
| Reduction in death | 9 | 7.76% |
| Reduction in hospitalization | 8 | 6.90% |
| Increase in herd immunity | 5 | 4.31% |
| Other (Specify) | 12 | 10.34% |
| Benefits are not stated | 47 | 40.52% |
| Total | 167 | 143.97% |

**Table 4.** If issues or problems with influenza vaccination are stated, what issues or problems are stated? Select all that apply.

| Issue or Problem Stated | # | % of 116 |
|---|---|---|
| Low effectiveness or non-effective (people who vaccinate often get influenza regardless) | 50 | 43.10% |
| Inability to accurately predict and target seasonal strains of a virus | 24 | 20.69% |
| Potential for harm from the vaccine | 2 | 1.72% |
| Herd immunity is not real | 0 | 0.00% |
| Encroachment on autonomy rights | 0 | 0.00% |
| Concentration of power with government or corporations | 0 | 0.00% |
| Other (specify) | 8 | 6.90% |
| Issues or problems are not stated | 52 | 44.83% |
| Total | 136 | 117.24% |

The articles often included quotations or citations of the perspectives of various health authorities and/or members of the public. Table 6 shows a breakdown of the types of individuals quoted or paraphrased in the articles and frequency of presentation of their perspectives. Representatives of government institutions, mostly of regional, provincial or national health authorities, were most commonly provided a voice. The "Other" category included article authors when the article was an editorial.

**Table 5.** Article portrayal of influenza vaccination in relation to statements about benefits and issues/problems with influenza vaccination (number of articles).

| | Portrayal of Influenza Vaccination | | |
|---|---|---|---|
| | Positive | Negative | Neutral |
| **Benefits of Influenza Vaccination** | | | |
| Reduction in disease | 55 | 0 | 0 |
| Protecting vulnerable people in society | 31 | 0 | 0 |
| Reduction in death | 9 | 0 | 0 |
| Reduction in hospitalization | 8 | 0 | 0 |
| Increase in herd immunity | 5 | 0 | 0 |
| Other (Specify) | 10 | 2 | 0 |
| **Issues or Problems with Influenza Vaccination** | | | |
| Low effectiveness or non-effective (people who vaccinate often get influenza regardless) | 37 | 12 | 1 |
| Inability to accurately predict and target seasonal strains of a virus | 14 | 10 | 0 |
| Potential for harm from the vaccine | 2 | 0 | 0 |
| Other (specify) | 8 | 0 | 0 |

**Table 6.** Summary of types of individuals quoted or paraphrased in articles.

| Individual's primary role, as presented by the article | Total instances of type of individual | Number of articles featuring type of individual |
|---|---|---|
| Representative of Government Institution | 86 | 63 |
| Health Professional | 20 | 18 |
| Scientist or Expert | 24 | 23 |
| Patient | 1 | 1 |
| Family of Patient/Deceased | 10 | 9 |
| Other | 16 | 14 |
| Total | 157 | - |

Fig. 2 shows the results of multiple coding questions that required a "Yes" or "No" response. Statements were commonly made suggesting influenza vaccines are effective (63.79%) and necessary or important (55.17%), occasionally (18.10%) made suggesting they are ineffective, and rarely made suggesting they are safe (5.90%) or harmful/potentially harmful (1.72%). Most of the articles stated that people should get the influenza vaccine (65.52%). None of the articles mentioned mandatory vaccination, and none made statements suggesting that influenza vaccination is unnecessary or unimportant.

## 4. Discussion

In our sample, Canadian newspapers mostly presented influenza vaccination in a positive light. Given the well-established beneficial effects of influenza vaccination in reducing incidences of disease and death [23, 24], it is reassuring to see that the articles generally support the scientific consensus that it is a highly positive intervention. Given that representatives of government institutions, including public health authorities, were by far the most commonly quoted or paraphrased individuals, the positive portrayal is logical.

Nonetheless, a significant number of articles portrayed influenza vaccination negatively.

These largely focused on the low effectiveness (or ineffectiveness, as sometimes stated) of the vaccine developed during the season, while also failing to make any positive counterpoint, such as that the vaccine still offers the best available protection and/or that it remains a valuable public health intervention (regardless of its less than ideal effectiveness). In this sense, the negative articles were viewed as negative mostly because they omitted to state any positive aspects of the vaccine and not because they explicitly referenced harms. That is to say, several negative articles positioned the influenza vaccine as an intervention that was simply unlikely to work. Only two articles included suggestions that influenza vaccination could cause harm (both citing a controversial study in *Vaccine* relating to miscarriage while
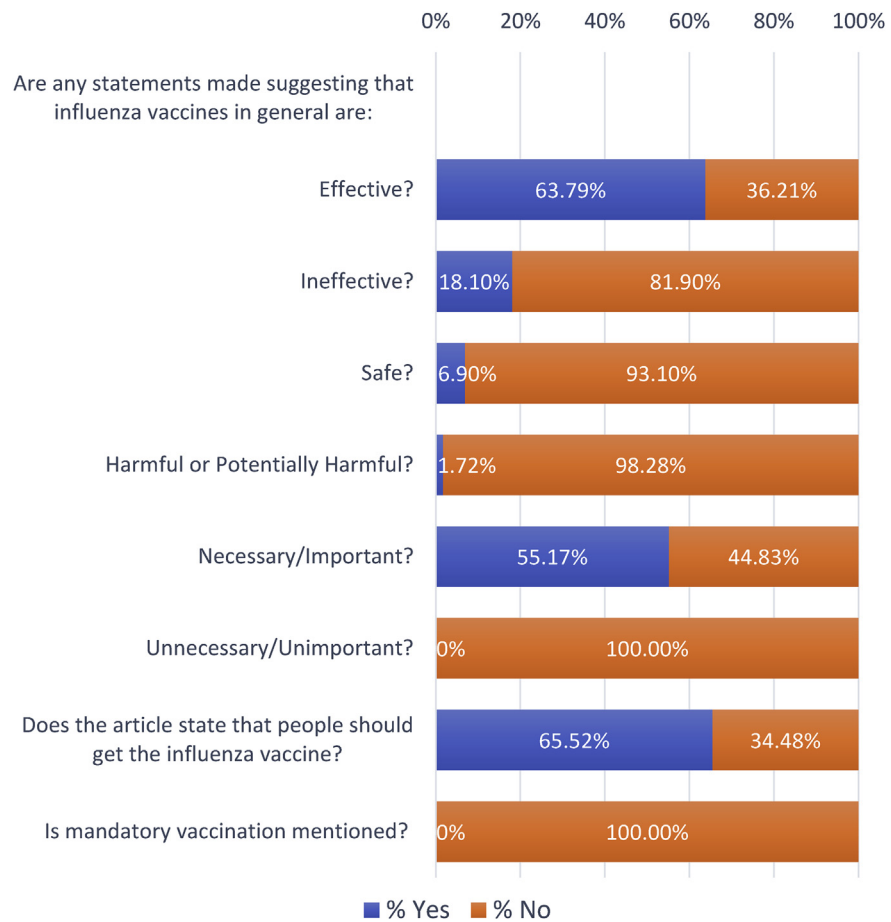
**Fig. 2.** Results of Binary Coding Questions, n = 116. This figure shows the results for multiple coding questions that required a "Yes" or "No" response.

focusing on the fact that experts question the validity of its results) [25], and none of the articles explicitly presented influenza vaccination as unimportant. There was a distinct lack of content reflecting typical antivaccination attitudes and myths.

Specific benefits of vaccination were not stated in over 40% of the articles despite the fact that almost three quarters of the articles portrayed influenza positively (that is, made broadly positive representations and claims such as the idea that the vaccine was effective, but lacked specific details about how or why the vaccine was beneficial), suggesting that a clear picture of the true value of influenza vaccination may sometimes be missing in newspaper portrayals. It is possible that increased explanation of the reasons why vaccination is important to individuals and society could help readers to understand the extent of their positive impact and improve attitudes toward vaccination [26]. A common lack of supporting evidence or argumentation was also noted in a related 2011 study of the media campaign associated with the A/H1N1 mass vaccination program in Canada [27], indicating that article content may not have shifted significantly in Canada over the past seven years. The manner in which the benefits of vaccination are presented can have an impact on intention to

vaccinate [28]. Researchers and public health officials may wish to emphasize specific science-informed benefits when interacting with journalists, and to note the weight of evidence behind those benefits [18, 29].

Given the positive nature of representations of influenza vaccination in popular newspapers and the generally evidence-based perspectives presented, we can reasonably conclude that, in Canada, misinformation and antivaccination rhetoric are coming primarily from other sources [30]. There is concern that vaccination misinformation often spreads online through social media and alternative medicine marketing efforts [15, 31, 32, 33]. Recent research has shown the majority of American adults look online for health information [34], and further study of non-journalistic online sources of vaccine information and discourse would be beneficial.

This study has some limitations. The language of study was restricted to English, meaning relevant French language news articles from Québec and elsewhere in Canada were not analyzed. Additionally, the total data set was smaller than anticipated because there were a significant number of duplicate articles across publications.

Newspapers in Canada are highly supportive of influenza vaccination overall. Indeed, these media outlets are mostly aligned with the scientific and medical consensus on the topic, though exceptions were noted. Perhaps the biggest concern was that some articles focused on the low effectiveness of the seasonal vaccine relative to years past, without also mentioning the counterpoint that the vaccine was still the best available form of protection and would still save lives. While there is room to improve the comprehensiveness and accuracy of popular press reporting on influenza vaccination, it is clear that the main science and health communication concerns lie elsewhere.

## Declarations

### Author contribution statement

Blake Murdoch: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Timothy Caulfield: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

### Funding statement

## Competing interest statement

The authors declare no conflict of interest.

## Additional information

Supplementary content related to this article has been published online at https://doi.org/10.1016/j.heliyon.2018.e00970.

## Acknowledgements

## References

[1] B. Nyhan, J. Reifler, Does correcting myths about the flu vaccine work? An experimental evaluation of the effects of corrective information, Vaccine 33 (3) (2015 Jan 9) 459−464.

[2] L.E. Smith, R.K. Webster, J. Weinman, R. Amlôt, J. Yiend, G.J. Rubin, Psychological factors associated with uptake of the childhood influenza vaccine and perception of post-vaccination side-effects: a cross-sectional survey in England, Vaccine 35 (15) (2017 Apr 4) 1936−1945.

[3] S. Rikin, V. Scott, S. Shea, P. LaRussa, M.S. Stockwell, Influenza vaccination beliefs and practices in elderly primary care patients, J. Commun. Health 43 (1) (2018 Feb 1) 201−206.

[4] S.B. Meyer, R. Lum, Explanations for not receiving the seasonal influenza vaccine: an Ontario Canada based survey, J. Health Commun. 22 (6) (2017 Jun 3) 506−514.

[5] N. Farmanara, L. Sherrard, È. Dubé, N.L. Gilbert, Determinants of non-vaccination against seasonal influenza in Canadian adults: findings from the 2015−2016 influenza immunization coverage survey, Can. J. Publ. Health (2018), 1-0.

[6] N.K. Vadlamudi, F. Marra, Influenza vaccine uptake among adults living with young children, J. Epidemiol. Res. 4 (1) (2018 Mar 25) 41.

[7] Centers for Disease Control and Prevention, CDC Reported Flu Deaths in Children Exceeds Seasonal High, 2018 Jun 8. https://www.cdc.gov/flu/spotlights/reported-flu-children-deaths.htm. (Accessed 14 June 2018).

[8] Government of Canada, FluWatch Report: May 13 to May 19, 2018 (Week 20), 2018 May 25. https://www.canada.ca/en/public-health/services/publications/diseases-conditions/fluwatch/2017-2018/week20-may-13-19-2018.html. (Accessed 14 June 2018).

[9] G. Benjamin, N.S., N.B. Flu-related Deaths Have More than Doubled This Year: Health Officials, Global News, 2018 May 18. https://globalnews.ca/news/4217974/maritimes-flu-related-deaths-have-more-than-doubled-this-year-health-officials/. (Accessed 14 June 2018).

[10] NHS, Myths about Children's Vaccines. NHS Choices, 2016 Jul 4. Available from: https://www.nhs.uk/conditions/vaccinations/myths-truths-kids-vaccines/. (Accessed 28 June 2018).

[11] H.G. Hollmeyer, F. Hayden, G. Poland, U. Buchholz, Influenza vaccination of health care workers in hospitals—a review of studies on attitudes and predictors, Vaccine 27 (30) (2009 Jun 19) 3935−3944.

[12] G. Dixon, C. Clarke, The effect of falsely balanced reporting of the autism−vaccine controversy on vaccine safety perceptions and behavioral intentions, Health Educ. Res. 28 (2) (2013 Apr 1) 352−359.

[13] R.M. Anderson, The impact of vaccination on the epidemiology of infectious diseases, in: The Vaccine Book, second ed., 2016, pp. 3−31.

[14] G.N. Dixon, C.E. Clarke, Heightening uncertainty around certain science: media coverage, false balance, and the autism-vaccine controversy, Sci. Commun. 35 (3) (2013 Jun) 358−382.

[15] T. Caulfield, A.R. Marcon, B. Murdoch, Injecting doubt: responding to the naturopathic anti-vaccination rhetoric, J. Law Biosci. 4 (2) (2017 Jun 20) 229−249.

[16] R. Buchanan, R.D. Beckett, Assessment of vaccination-related information for consumers available on Facebook®, Health Inf. Libr. J. 31 (3) (2014 Sep 1) 227−234.

[17] L.M. Gargano, N.L. Underwood, J.M. Sales, K. Seib, C. Morfaw, D. Murray, R.J. DiClemente, J.M. Hughes, Influence of sources of information about influenza vaccine on parental attitudes and adolescent vaccine receipt, Hum. Vaccines Immunother. 11 (7) (2015 Jul 3) 1641−1647.

[18] S.B. Meyer, S.K. Lu, L. Hoffman-Goetz, B. Smale, H. MacDougall, A.R. Pearce, A content analysis of newspaper coverage of the seasonal flu vaccine in Ontario, Canada, October 2001 to March 2011, J. Health Commun. 21 (10) (2016 Oct 2) 1088−1097.

[19] A. Maki, R. Evans, P. Ghezzi, Bad news: analysis of the quality of information on influenza prevention returned by Google in English and Italian, Front. Immunol. 6 (2015 Dec 8) 616.

[20] Vividata. Vividata 2015 Q4 Readership and Product Database (PMB). http://vividata.ca/. (Accessed 11 June 2018).

[21] S. Elo, H. Kyngäs, The qualitative content analysis process, J. Adv. Nurs. 62 (1) (2008 Apr 1) 107−115.

[22] M.B. Miles, A.M. Huberman, Qualitative Data Analysis: an Expanded Sourcebook, second ed., Sage Publications, Thousand Oaks, CA, 1994.

[23] C. Reed, I.K. Kim, J.A. Singleton, S.S. Chaves, B. Flannery, L. Finelli, A. Fry, E. Burns, P. Gargiullo, D. Jernigan, N. Cox, Estimated influenza illnesses and hospitalizations averted by vaccination–United States, 2013−14 influenza season, MMWR Morb. Mortal. Wkly Rep. 63 (49) (2014 Dec) 1151−1154.

[24] B. Flannery, S.B. Reynolds, L. Blanton, T.A. Santibanez, A. O'Halloran, P.J. Lu, J. Chen, I.M. Foppa, P. Gargiullo, J. Bresee, J.A. Singleton, Influenza vaccine effectiveness against pediatric deaths: 2010−2014, Pediatrics 139 (5) (2017 May 1), e20164244.

[25] J.G. Donahue, B.A. Kieke, J.P. King, F. DeStefano, M.A. Mascola, S.A. Irving, T.C. Cheetham, J.M. Glanz, L.A. Jackson, N.P. Klein, A.L. Naleway, Association of spontaneous abortion with receipt of inactivated influenza vaccine containing H1N1pdm09 in 2010−11 and 2011−12, Vaccine 35 (40) (2017 Sep 25) 5314−5322.

[26] K.S. Hendrix, S.M. Finnell, G.D. Zimet, L.A. Sturm, K.A. Lane, S.M. Downs, Vaccine message framing and parents' intent to immunize their infants for MMR, Pediatrics 134 (3) (2014 Sep 1) e675−e683.

[27] C.M. Rachul, N.M. Ries, T. Caulfield, Canadian newspaper coverage of the A/H1N1 vaccine program, Revue Canadienne de Sante'e Publique (Can. J. Publ. Health) (2011 May 1) 200−203.

[28] K.S. Hendrix, S.M. Finnell, G.D. Zimet, L.A. Sturm, K.A. Lane, S.M. Downs, Vaccine message framing and parents' intent to immunize their infants for MMR, Pediatrics 134 (3) (2014 Sep 1) e675−e683.

[29] C.E. Clarke, et al., The influence of weight-of-evidence messages on (vaccine) attitudes: a sequential mediation model, J. Health Commun. 20 (11) (2015) 1302−1309.

[30] E. Dubé, D. Gagnon, M. Ouakki, J.A. Bettinger, M. Guay, S. Halperin, K. Wilson, J. Graham, H.O. Witteman, S. MacDonald, W. Fisher, Understanding vaccine hesitancy in Canada: results of a consultation study by the Canadian immunization research network, PLoS One 11 (6) (2016 Jun 3), e0156118.

[31] A. Kata, Anti-vaccine activists, Web 2.0, and the postmodern paradigm−An overview of tactics and tropes used online by the anti-vaccination movement, Vaccine 30 (25) (2012 May 28) 3778−3789.

[32] G.J. Kang, S.R. Ewing-Nelson, L. Mackey, J.T. Schlitt, A. Marathe, K.M. Abbas, S. Swarup, Semantic network analysis of vaccine sentiment in online social media, Vaccine 35 (29) (2017 Jun 22) 3621−3638.

[33] R.A. Stein, The golden age of anti-vaccine conspiracies, Germs 7 (4) (2017 Dec) 168.

[34] M. Remez, Majority of Adults Look Online for Health Information, Pew Research Center, 2013 Feb 1. http://www.pewresearch.org/fact-tank/2013/02/01/majority-of-adults-look-online-for-health-information/. (Accessed 18 June 2018).