

Social Media Engagement With Cancer Awareness Campaigns Declined During the 2016 U.S. Presidential Election

Emily K. Vraga , Jacek R. Radzikowski, Anthony Stefanidis, Arie Croitoru, Andrew T. Crooks, Paul L. Delamater, Dieter Pfoser, and Kathryn H. Jacobsen 

Cancer awareness campaigns compete with other health and social issues for public attention. We examined whether public engagement with breast cancer and prostate cancer declined in 2016 during the U.S. presidential election compared to 2015 on Twitter and Google Trends. We found that attention to breast cancer and prostate cancer declined in 2016 before the election as compared to 2015 in Twitter posts and Google searches. The findings suggest that cancer information seeking behavior, passive exposure to health communication, and active participation in social media about cancer all decreased during the peak weeks of the 2016 election season. Future health promotion initiatives and information dissemination efforts will benefit from monitoring the major issues garnering social media attention and then adjusting their timing or communication strategies to ensure that public engagement with their key policy messages remains strong when emerging news stories capture public interest.

KEY WORDS: Twitter, breast cancer, prostate cancer

Introduction

Health education and awareness campaigns for cancer and other diseases increasingly use social media as part of strategic communication efforts to reach targeted communities (Bravo & Hoffman-Goetz, 2017; Patel, Chang, Greysen, & Chopra, 2015; Sedrak, Cohen, Merchant, & Schapira, 2016; Burton, Giraud-Carrier, Rollins, & Draper, 2013). Two prominent examples of these initiatives are National Breast Cancer Awareness Month (NBCAM), in October, and Movember, which promotes men's health and prostate cancer awareness in November. Previous studies have quantified the substantial Internet traffic and media attention generated by these campaigns (Jacobsen & Jacobsen, 2011; Thackeray et al., 2013). While some criticism has been raised about the emphasis on fundraising and on expressions of support such as wearing pink or growing a mustache that do not promote

specific health behaviors (Attai et al., 2015; Bravo & Hoffman-Goetz, 2015), the campaigns may be effective at encouraging preventative behaviors like seeking clinical screenings, at least in the early stages of a campaign (Jacobsen & Jacobsen, 2011) and providing information and social support to cancer patients (Attai et al., 2015; Friedman et al., 2016). Moreover, these campaigns are valuable in keeping cancer at the forefront of public awareness. Unlike other campaigns targeting affected communities, NBCAM and Movember attempt to reach and engage with the broader public (Bravo & Hoffman-Goetz, 2015).

However, as these health awareness campaigns represent an effort to reach beyond influenced communities and engage with the general public, they face the challenge of competing for the public's attention with numerous other social, political, health, and science issues (Weng, Flammini, Vespignani, & Menczer, 2012). Unlike the practically boundless dissemination bandwidth of social media, public attention is a limited resource (Jang & Pasek, 2015; Rogstad, 2016). Moreover, public engagement, which we define as intentional consumption or expressive behaviors with regards to a topic—such as searching for more information or posting online about a topic—is an even higher bar to achieve than attention (Chen et al., 2015; Men & Tsai, 2013; Vraga, Anderson, Kotcher, & Maibach, 2015). Previous research suggests that the format of information on social media can affect audience engagement with the message (Strekalova & Krieger, 2017). We expand on this theorizing to suggest that competition with other issues is also critical for gaining or losing public engagement.

In 2016, these two prominent cancer awareness campaigns, long tied to specific calendar months, happened to coincide with the final weeks of a very competitive U.S. general election season. Many Americans now engage in political discussions and advocacy in the online environment, and the growth in online political activity in the United States has occurred alongside a polarization of the policy environment (Pew Research Center, 2016b), including greater diversity in perspectives about health policies (Clemons, McBeth, & Kusko, 2012). The 2016 presidential election was uniquely engaging, with nearly half of American adults reporting that they accessed information about the campaign through social media (Pew Research Center, 2016b). The candidates also frequently utilized these sites as part of their communication and outreach strategies. By May 2016, Donald Trump and Hillary Clinton, the two major party nominees, were posting an average of 11 or 12 times per day on Twitter (Pew Research Center, 2016a), while in the week prior to the 2016 election (November 1–8), Trump tweeted an average of 11 times per day and Clinton tweeted roughly 31 times per day (Davis, 2017).

As a result, we expected that public engagement with the 2016 general election would displace online engagement with both NBCAM and Movember compared to previous years. We theorized that this decline would be particularly pronounced for NBCAM, which occurred before the presidential election on November 8, 2016, and that for Movember engagement with prostate cancer would rebound after the election as compared to 2015. In this analysis, we tested these assumptions using

two metrics of public engagement: the number of posts on Twitter and the number of Google searches. We hypothesized that engagement with these two campaigns declined in 2016 compared to 2015 as public interest was captivated by one of the most contentious political seasons in modern history.

Materials and Methods

We accessed the Twitter application program interface (API) to collect tweets mentioning any of the keywords commonly associated with the two campaigns in Twitter (see Table 1). This resulted in 5,223,182 tweets associated with the breast cancer terms of Table 1, and 1,495,919 tweets associated with the prostate cancer terms of Table 1, for the period September 1, 2015 through December 1, 2016. Within these tweets, we filtered the data set to only examine tweets that contain any mention of “breast” and “cancer” in the same tweet (4,852,789 tweets) for the breast cancer campaign or mention either “prostate” or “Movember” (1,430,973 tweets) for the prostate cancer campaign. This period comprises the two campaign months (October and November) in both 2015 and 2016, and the in-between period. These dedicated months are of great importance to the overall awareness campaigns, as Twitter traffic during the designated cancer awareness months dwarfs the overall traffic for the rest of the year (Figures 1a and 1b).

We used Google Trends to examine the relative distribution of various searches initiated in the United States between January 1, 2015, and December 31, 2016. Google Trends assigns a score of 100 to the week with the greatest number of searches for a particular term in a selected time period, and the number of searches for that term in all other weeks is reported as a percentage of the highest week. The number of hits is not provided. For each key search term, we identified the week with the peak number of hits during the 2-year period, and then identified the relative strength of the highest peak for the other year. All searches were limited to users located in the United States. We also used the Election Buzz tool (<http://elections.ap.org/buzz>), launched by the Associated Press in partnership with Google and Twitter, which summarizes Twitter posts related to the two primary

Table 1. Keywords for Twitter API Search for Breast Cancer and Prostate Cancer Campaigns

Breast Cancer	Prostate Cancer
Breast cancer	Prostate cancer
Pinkribbonwalk2015	Prostatecancer
Breastcancer	Blue cure
Pink ribbon	Bluecure
Pinkribbon	Movember
AdvancedBC	
AmericanCancerSociety	
Bcastrength	
Bcaware	
Bckills	
Nflpink	

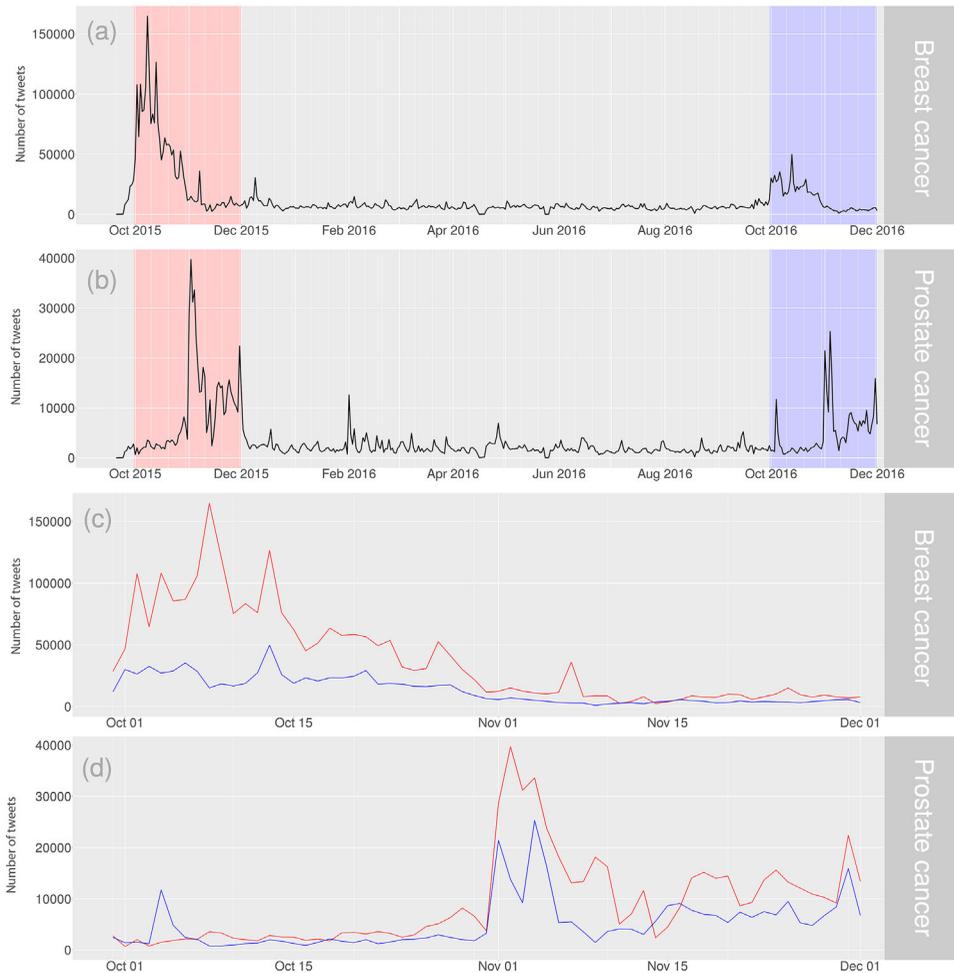


Figure 1. Twitter Traffic about Breast Cancer (a) and Prostate Cancer (b) in the Period October 2015–November 2016, and Comparison of October and November Traffic in 2015 and 2016 for Breast Cancer (c) and Prostate Cancer (d). All 2015 Data are Shown in Red and All 2016 Data are Shown in Blue.

candidates as the aggregate of references to candidate names, policy issues, and current events related to them.

Since no individuals were recruited for the study, and this was therefore not human subjects research, the project was exempt from review by an institutional review board.

Results

Although Twitter's quarterly reports to shareholders state that the number of active Twitter users grew between the third quarters of 2015 and 2016, Twitter traffic related to both cancer awareness campaigns decreased from

2015 to 2016 (Figures 1c and 1d). The comparison shows a substantial decline in the number of tweets about breast cancer, with the number of tweets in October 2016 only 33.4 percent of the number of tweets in October 2015. For the prostate cancer campaign, the number of tweets from the start of the month through 2 days after the election on November 8 (November 1–10) in 2016 was 44.7 percent of 2015 levels, while the number for remainder of the month (November 11–30) was 63.1 percent of 2015 levels, suggesting that engagement with the prostate cancer campaign on Twitter rebounded somewhat after the election, although it was still lower than the previous year. Although breast cancer traffic was substantially higher than prostate cancer traffic in both years, both campaigns showed a similar drop in Twitter traffic from 2015 to 2016 during the U.S. general election, when engagement with political issues and candidates was likely at its height as the election neared.

The Election Buzz website showed that the average daily overall volume of election conversation on Twitter in October 2016 was more than 10 times greater than the corresponding average in October 2015 (205.39 compared to 20.33, respectively). In contrast, the overall growth in Twitter traffic from 2015 to 2016 was only 6.2 percent. A total of 448,800 tweets were posted per minute in 2016 compared to 422,340 tweets per minute in 2015 (Allen, 2017).

The decline in engagement with the breast and prostate cancer campaigns before the presidential election was also reflected in Internet searches. Google Trends shows that searches in the United States for “breast cancer” peaked in popularity in the first week of October in both 2015 and 2016. However, the peak week in October 2016 for breast cancer was only 78 percent of the interest level in 2015. For “Movember,” the first week of November was the peak week in both 2015 and 2016. The peak in November 2016 for Movember was only 62 percent of the interest level in 2015. By contrast, searches for “election” peaked the second week of November in 2016, with searches in 2015 peaking at 5 percent of the 2016 peak. Google searches for “cancer” in the United States between October 1 and November 30, 2015, were three times more common than searches for “election.” By contrast, during the same 2 months in 2016, searches for “election” were four times more common than searches for “cancer.” These observations align with the Election Buzz tool showing that search traffic about the election remained relatively low until October of 2016 and then grew dramatically through the election on November 8.

Table 2 shows the result of Google Trends searches for several cancer awareness months and for prominent national holidays in 2015 and 2016. Searches for cancer campaigns and national holidays was relatively consistent across both years until the fall of 2016, where searches about cancer campaigns and special days (like Halloween) were noticeably lower in 2016 than in 2015.

Table 2. Google Trends Results for the Relative Number of Searches in the U.S. During the Peak Week of Searches in 2015 and in 2016

Search Term	Awareness Month/Date	2015	2016	Peak Week
American heart month	February	90	100	Early February
Wear red day	February (1st Friday)	100	87	Early February
Colon cancer	March	99	100	Early March
Mother's day	May (2nd Sunday)	98	100	Mid May
Memorial day	May (last Monday)	87	100	Late May
Father's day	June (3rd Sunday)	94	100	Late June
Independence day	July 4	93	100	Early July
Labor day	September (1st Monday)	100	99	Early September
Prostate cancer	September	79	100	No clear trend
Breast cancer	October	100	78	Early October
Breast cancer awareness month	October	100	31	Early October
Columbus day	October (2nd Monday)	100	92	Mid October
Halloween	October 31	100	69	Late October
Movember	November	100	62	Early November
American diabetes month	November	100	82	Early November
Lung cancer	November	100	85	November
Pancreatic cancer	November	100	98	Mid November
Election	November (2nd Tuesday)	5	100	Early November
Thanksgiving	November (4th Thursday)	95	100	Late November
World AIDS day	December 1	100	79	Early December
Christmas	December 25	100	75	Late December

Note: Rows marked in light gray indicate events for which the number of searches in 2016 was less than 90% of the number of searches in 2015. Rows marked in dark gray denote events for which the number of searchers in 2015 was more than 90% of the number of searches in 2016. February 1, 2016, was the date of the Iowa caucuses, the first primaries.

Discussion

Twitter-based cancer communication campaigns have often received praise for raising public awareness and encouraging support for affected individuals and their families and friends (Bravo & Hoffman-Goetz, 2017; Jacobsen & Jacobsen, 2011; Sedrak et al., 2016; Thackeray et al., 2013), but the success or failure of these campaigns may depend in part on the issues they are competing against for public attention and engagement. In 2016, engagement with the U.S. presidential campaign likely drove a sharp decline in online communication about both breast and prostate cancer. Across Twitter traffic and Google searches, we observed a substantial decline in references to breast cancer during NBCAM 2016 as compared to the previous year. This decline was also observed for references to prostate cancer in the pre-election days of November during the Movember campaign. That deficit rebounded somewhat after the election, although the levels of interest on Twitter did not achieve parity with the previous year, likely as the first week of the campaign tends to drive the most traffic. The large rise in tweets about the election in 2016 compared to the limited growth in overall traffic suggests that political content displaced tweets about other topics in Twitter in October 2016.

Limitations and Bias

Several limitations require conservative interpretation of the analysis. First, while we compiled a list of the most popular keywords commonly associated with breast and prostate cancer discussion for our Twitter search, this list is not exhaustive, and it is not uncommon in the fluid social media landscape for new terms to emerge as popular choices during the course of a year. However, we believe that it was important to maintain consistency in our keyword search to support the direct comparison of 2015 and 2016 data sets. Second, while our study suggests that the presidential election was the major distraction in 2016, a broader study of Twitter traffic overall would be required to explicitly attribute the reduced engagement with cancer topics in 2016 to the presidential election as opposed to other attention-grabbing issues. However, given the massive amount of social media content about the presidential campaign posted by the public and the media (Pew Research Center, 2016a, 2016b), political distractions are a highly likely explanation for the observed drop in engagement with community health initiatives in late 2016 compared to late 2015. This can be seen as the antithesis of the “Angelina Jolie effect,” in which celebrity disclosures of their own cancer experiences increase (temporarily) public engagement with cancer information and promote health-seeking behaviors like scheduling screening for early-stage cancers (Evans et al., 2014; Hurd, Augustson, Backinger, Deaton, & Bright, 2007; Jacobsen & Jacobsen, 2011). Public engagement with cancer campaigns appears to be notably fluid and responsive to competing interests that can advance or distract from ongoing health communication efforts.

We have no reason to suspect that 2015 was an abnormal year in terms of public engagement with cancer campaigns, but more research is needed to map fluctuations in public engagement over time and across contexts. It is also possible that public engagement with cancer campaigns is declining over time, but the sustained success of other health campaigns in 2016 makes this explanation less likely than an explanation focused on the distraction of the election season. Future research could also explore whether individual users are changing their focus, such as by tweeting about politics rather than health, or whether some users who in the past were active health promoters choose to reduce their engagement with social media during political seasons. Such research would help community health organizations develop more effective communication strategies for use during times of sociopolitical change.

Conclusion and Policy Implications

Communication about policy issues through social media is important not only for reaching citizens, but also for citizens being able to communicate with policymakers and influence health policies (Kapp, Hensel, & Schnoring, 2015; King et al., 2013). Social media provide a channel for individuals to

gather information about personal health problems, community health concerns, and national and international health issues, and social media also provide an opportunity for users to express their thoughts and feelings in a public forum (Griffiths et al., 2015). Many health-promotion organizations are attempting to use social media as part of their communication strategies, including using these tools to distribute messages intended to influence health policies. Public health agencies at local, state, and national levels also use social media as part of their plans for communicating health policies to citizens (Bartlett & Wurtz, 2015). The effectiveness of these various types of health communications is dependent on the message not just capturing the attention of members of the target audience but also leading those individuals to engage with the campaign and to change their behaviors in ways that lower their risk of adverse health outcomes.

Community health campaigns often struggle to effectively engage the public and maintain their message (Bravo & Hoffman-Goetz, 2015; Koskan et al., 2014). These types of health communication challenges are not limited to the United States, which was the focus of the analysis in this paper; they are common to countries across the globe. Understanding how public health education and promotion initiatives compete with other topics and groups on social media is an important precursor to answering calls to develop more effective health interventions that can be disseminated through social media (Koskan et al., 2014). The more engagement health policy issues can create, the more likely it is that those messages will influence the development, implementation, and enforcement of health policies. Future cancer education campaigns—and campaigns for other health issues and policies—will benefit from monitoring the broader issues producing social media engagement, and adjusting their timing or communication strategies to ensure that public engagement with their key messages remains strong even in a crowded social media marketplace.

Emily K. Vraga, PhD, is an assistant professor of communication at George Mason University. Her research focuses on how individuals respond to news and information about contentious political, scientific, and health issues, particularly when they encounter disagreement through digital media.

Jacek R. Radzikowski, MS, is a senior researcher with George Mason's Center for Geospatial Intelligence.

Anthony Stefanidis, PhD, is a professor of geography and geoinformation science at George Mason University.

Arie Croitoru, PhD, is an associate professor of geoinformation science at George Mason University.

Andrew T. Crooks, PhD, is an associate professor of computational social science at George Mason University.

Paul L. Delamater, PhD, is an assistant professor in the Department of Geography and a fellow of the Carolina Population Center at the University of North Carolina at Chapel Hill.

Dieter Pfoser, PhD, is a professor at the Department of Geography and GeoInformation Science at George Mason University.

Kathryn H. Jacobsen, MPH, PhD, is a professor of epidemiology and global health at George Mason University.

Notes

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Corresponding Author: Emily Vraga, evraga@gmu.edu

References

- Allen, Robert. 2017. What happens online in 60 seconds? *Smart Insights*. <http://www.smartinsights.com/internet-marketing-statistics/happens-online-60-seconds/>. Accessed October 13, 2017.
- Attai, Deanna J., Michael S. Cowher, Mohammed Al-Hamadani, Jody M. Schoger, Alicia C. Staley, and Jeffrey Landercasper. 2015. "Twitter-Social Media Is an Effective Tool for Breast Cancer Patient Education and Support: Patient-Reported Outcomes by Survey." *Journal of Medical Internet Research* 17 (7): e188.
- Bartlett, Catherine, and Rebecca Wurtz. 2015. "Twitter and Public Health." *Journal of Public Health Management and Practice* 21: 375–83.
- Bravo, Caroline A., and Laurie Hoffman-Goetz. 2015. "Tweeting About Prostate and Testicular Cancers: Do Twitter Conversations and the 2013 Movember Canada Campaign Objectives Align." *Journal of Cancer Education* 31: 236–43.
- Bravo, Caroline A., and Laurie Hoffman-Goetz. 2017. "Social Media and Men's Health: A Content Analysis of Twitter Conversations During the 2013 Movember Campaigns in the United States, Canada, and the United Kingdom." *American Journal of Men's Health*. <https://doi.org/10.1177/1557988315617826>
- Chen, Zhenghao, Pang W. Koh, Philip L. Ritter, Kate Lorig, Erin O. Bantum, and Suchi Saria. 2015. "Dissecting an Online Intervention for Cancer Survivors: Four Exploratory Analyses of Internet Engagement and Its Effects on Health Status and Health Behaviors." *Health Education and Behavior* 42: 32–45.
- Clemons, Randy S., Mark K. McBeth, and Elizabeth Kusko. 2012. "Understanding the Role of Policy Narratives and the Public Policy Arena: Obesity as a Lesson in Public Policy Development." *World Medical & Health Policy* 4: 1–26.
- Davis, Jack. 2017. *Presidential Campaigns and Social Networks: How Clinton and Trump Used Facebook and Twitter During the 106 Election. Senior Theses and Capstone Projects*. [Online]. <http://scholar.dominican.edu/cgi/viewcontent.cgi?article=1087&context=senior-theses>. Accessed September 20, 2017.
- Evans, D. Gareth R., Julian Barwell, Diana M. Eccles, Amanda Collins, Louise Izatt, Chris Jacobs, and Alan Donaldson, et al. 2014. "The Angelina Jolie Effect: How High Celebrity Profile Can Have a Major Impact on Provision of Cancer Related Services." *Breast Cancer Research* 16: 442.
- Friedman, Daniela B., Andrea Gibson, William Torres, Jessica Irizarry, John Rodriguez, Weizhou Tang, and Kristie Kannaley. 2016. "Increasing Community Awareness About Alzheimer's Disease in Puerto Rico Through Coffee Shop Education and Social Media." *Journal of Community Health* 41: 1006–12.
- Griffiths, Frances, Tim Dobermann, Jonathan A. K. Cave, Margaret Thorogood, Samantha Johnson, Kavé Salamatian, Gomez Olive, X. Francis, and Jane Goudge. 2015. "The Impact of Online Social

- Networks on Health and Health Systems: A Scoping Review and Case Studies." *Policy & Internet* 7: 473–96.
- Hurd, Ami L., Erik M. Augustson, Cathy L. Backinger, Candace Deaton, and Mary Anne Bright. 2007. "The Impact of National ABC Promotion on 1-800-QUIT-NOW." *The Science of Health Promotion* 21: 481–83.
- Jacobsen, Grant D., and Kathryn H. Jacobsen. 2011. "Health Awareness Campaigns and Diagnoses Rates: Evidence From National Breast Cancer Awareness Month." *Journal of Health Economics* 30: 55–61.
- Jang, S. Mo, and Josh Pasek. 2015. "Assessing the Carrying Capacity of Twitter and Online News." *Mass Communication and Society* 18: 577–98.
- Kapp, Julie M., Brian Hensel, and Kyle T. Schnoring. 2015. "Is Twitter a Forum for Disseminating Research to Health Policy Makers?" *Annals of Epidemiology* 25: 833–37.
- King, Dominic, Daniel Ramirez-Cano, Felix Greaves, Ivo Vlaev, Steve Beales, and Ara Darzi. 2013. "Twitter and the Health Reforms in the English National Health Service." *Health Policy* 110: 291–97.
- Koskan, Alexis, Lynne Klasko, Stacy N. Davis, Clement K. Gwede, Kristen J. Wells, Ambuj Kumar, Natalia Lopez, and Cathy D. Meade. 2014. "Use and Taxonomy of Social Media in Cancer-Related Research: A Systematic Review." *American Journal of Public Health* 104: e20–37.
- Men, Linjuan Rita, and Wan-Hsiu Sunny Tsai. 2013. "Beyond Liking or Following: Understanding Public Engagement on Social Networking Sites in China." *Public Relations Review* 39: 13–22.
- Patel, Rajesh, Tammy Chang, S. Ryan Greysen, and Vineet Chopra. 2015. "Social Media Use in Chronic Disease: A Systematic Review and Novel Taxonomy." *American Journal of Medicine* 128: 1335–50.
- Pew Research Center. 2016a. *Election 2016: Campaigns as a Direct Source of News*. [Online]. <http://www.journalism.org/2016/07/18/candidates-differ-in-their-use-of-social-media-to-connect-with-the-public/>. Accessed September 20, 2017.
- . 2016b. *Social Media Update 2016*. [Online]. <http://www.pewinternet.org/2016/11/11/social-media-update-2016/>. Accessed September 20, 2017.
- Rogstad, Ingrid. 2016. "Is Twitter Just Rehashing? Intermedia Agenda-Setting Between Twitter and Mainstream Media." *Journal of Information Technology and Politics* 13: 142–58.
- Sedrak, Mina S., Roger B. Cohen, Raina M. Merchant, and Marilyn M. Schapira. 2016. "Cancer Communication in the Social Media Age." *JAMA Oncology* 2: 822–23.
- Strekalova, Yulia A., and Janice L. Krieger. 2017. "A Picture Really Is Worth a Thousand Words: Public Engagement with the National Cancer Institute on Social Media." *Journal of Cancer Education* 32: 155–57.
- Thackery, Rosemary, Scott H. Burton, Christophe Giraud-Carrier, Stephen Rollins, and Catherine R. Draper. 2013. "Using Twitter for Breast Cancer Prevention: An Analysis of Breast Cancer Awareness Month." *BMC Cancer* 13: 508–17.
- Vraga, Emily K., Ashley A. Anderson, John E. Kotcher, and Edward W. Maibach. 2015. "Issue-Specific Engagement: How Facebook Contributes to Opinion Leadership and Efficacy on Energy and Climate Issues." *Journal of Information Technology & Politics* 12: 200–18.
- Weng, Lilian, Alessandro Flammini, Alessandro Vespignani, and Filippo Menczer. 2012. "Competition Among Memes in a World with Limited Attention." *Scientific Reports* 2: 335.