


# Factors Influencing the Dissemination of Tweets at the American College of Surgeons Clinical Congress 2018

The American Surgeon  
2021, Vol. 87(4) 520–526  
© The Author(s) 2020  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/0003134820950680  
journals.sagepub.com/home/asu  


Stephen P. Sharp, MD<sup>1\*</sup>, Douglas G. Mackenzie, MD<sup>2\*</sup>, David S.Y. Ong, PhD<sup>3\*</sup>,  
Paschalia M. Mountziaris, PhD<sup>4</sup>, Heather J. Logghe, MD<sup>5</sup>, Paula Ferrada, MD<sup>6</sup>, and  
Steven D. Wexner, PhD<sup>1</sup>

## Abstract

**Background:** Social media is increasingly used in surgery, facilitating the dissemination of knowledge. Social media can potentially aid networking, education, and information exchange. This study explored the impact of tweet components and tweeter characteristics during a large surgical congress to inform recommendations for optimizing social media use at future surgical conferences.

**Methods:** Twitter activity was monitored during the American College of Surgeons Clinical Congress 2018 using NodeXL to extract tweets containing the conference hashtag #ACSCC18 (or #ACSCC2018). Multivariable logistic regression analysis was performed to identify independent predictors of retweet activity, also testing for multicollinearity and interactions among variables.

**Results:** There were 4386 tweets that contained #ACSCC18 (or #ACSCC2018) posted from 1023 Twitter accounts. A larger group of Twitter accounts just retweeted. Other Twitter accounts with a stake in the conference neither tweeted nor retweeted. In a multivariable analysis of original tweets, the following were all independently associated with retweets, in decreasing order of effect size: mention of other tweeters, multimedia, inclusion of other hashtags, and the number of followers. In contrast with other conferences, the inclusion of a weblink (URL)—for example, link to paper or blog—was not associated with retweets.

**Discussion:** This study helps understand social media impact at surgical conferences. Engage by tweeting and retweeting. Mention other tweeters, add multimedia, include congress hashtags and topic-specific hashtags, and build your followers. Although not associated with retweet activity in this study, the inclusion of URLs can still contribute in substantiating the disseminated content based on findings at other conferences.

## Keywords

surgical conference, social media, dissemination

## Introduction

Social media provides a platform for sharing and discussing advances at surgical congresses and for networking within the surgical community and beyond. Conference tweets potentially have a reach far beyond the congress hall, with information, including new research findings, disseminated and explored further by tweets and subsequent retweets and replies.

Previous studies of surgical tweeting have described the nature of tweeting around individual surgical topics (eg, plastic surgery and colorectal surgery),<sup>1,2</sup> the pattern of tweeting at surgical conferences, including surgical oncology<sup>3</sup> and urology,<sup>4</sup> and the replies that occur beyond the conference hashtag.<sup>5</sup> However, research findings from clinical conferences differ about the most important

<sup>1</sup>Department of Colorectal Surgery, Cleveland Clinic Florida, Weston, FL, USA

<sup>2</sup>Department of General Practice, NHS Education for Scotland, Edinburgh, Midlothian, UK

<sup>3</sup>Department of Medical Microbiology and Infection Control, Franciscus Gasthuis & Vlietland, Rotterdam, The Netherlands

<sup>4</sup>Department of Plastic Surgery, University of Texas MD Anderson Cancer Center, Houston, TX, USA

<sup>5</sup>Department of Surgery, Thomas Jefferson University, Philadelphia, PA, USA

<sup>6</sup>Department of Surgery and Trauma, Virginia Commonwealth University, Richmond, VA, USA

\*Authors contributed equally to the work.

### Corresponding Author:

Douglas G. Mackenzie, MD, NHS Education for Scotland, 102 Westport, Edinburgh, EH3 9DN, Midlothian, UK.  
Email: gm@nhs.net

components of a tweet in terms of dissemination (retweeting). Mitchell et al<sup>6</sup> found that including a link to further information on the internet (Uniform Resource Locator [URL]) and the topic of the tweet (eg, *Clostridium difficile*) had the most impact on the number of retweets at infectious diseases conferences, while including an image did not. In contrast, Cevik et al<sup>7</sup> found that using multimedia, URL or hashtags, and mentioning other Twitter account(s) had the most impact. The general advice about conference tweeting from Twitter itself<sup>8</sup> is in line with the findings of Cevik et al.<sup>7</sup> The influencers on retweeting during surgical conferences have not been studied previously.

The aims of this study, using the American College of Surgeons Clinical Congress in Boston, MA, USA, October 21-25, 2018 (#ACSCC18), were (1) to describe the tweets and potential influencers tweeting, retweeting, and/or mentioned in congress tweets and (2) to assess factors contributing to the dissemination of tweets.

## Methods

Tweets were extracted using NodeXL,<sup>9</sup> a Microsoft Excel extension that provides access to the Twitter Application Programming Interface and obtains information about individual tweets, retweets, mentions of tweeters, and details about the accounts that tweeted, retweeted, and/or were mentioned. Data for #ACSCC18 (and #ACSCC2018) were extracted for the 5 days of the congress (October 21-25, 2018, universal coordinated time).<sup>10</sup> This period was selected because the number of tweets posted by hour fell rapidly after the congress finished (n = 151 tweets posted using either hashtag in the 10 days following the congress). Information about tweets, retweets, and mentions, and the relevant accounts using either hashtag were extracted from the NodeXL data, in Excel, excluding replies when identifying “mentions” of other Twitter accounts.<sup>2,3,11</sup> These data were used to identify the main contributors and potential influencers at the congress, grouping the contributions into mutually exclusive categories based on tweeting, retweeting, and mentions in the body of tweets. The main hashtags were identified by extracting hashtag data from individual tweets.

The most shared tweets for each day were listed in a Wakelet summary, selected on the basis of the number of retweets received during the congress, aiming for 50 and 60 tweets per day of the congress (less on the shorter first and final days).<sup>12</sup> In producing a conference summary, it is necessary to watch out for commercial and/or spam content, to avoid promoting such posts, but such material was not in evidence for this congress.

Univariable and multivariable analyses were performed to explore the association between tweet components and tweet dissemination. While it is possible for an

individual Twitter account to obtain a measure of the number of potential views (“impressions”) of their own tweets and other measures of interactions (eg, profile and media views, URL, and hashtag clicks), this information is not available to others. No attempt has been made to estimate tweet “impressions” (eg, using Symplur health care hashtags)<sup>13</sup> as such figures are typically gross overestimates. Proxy measures of potential impact are therefore required. The number of retweets achieved is widely used as an outcome measure in social media analysis as it is readily available in social network analysis and provides information about the wider dissemination of a tweet.<sup>6,7</sup> Tweets that quoted another tweet (n = 730) were excluded because at that time Twitter displayed the quoted tweet rather than any images included in the quoting tweet. Replies (n = 535) were also excluded because these are only seen by the user replied to and mutual followers, unless searched for specifically. Of these excluded tweets, n = 35 were both replies and quoting tweets. Possible predictors of retweets were explored initially in univariable analysis. Variables of interest were inclusion of media (image(s) or video), mention of other tweeter(s), use of hashtags other than the congress hashtags (#ACSCC18 or #ACSCC2018), link to other information on the web (URL), and the number of followers of a Twitter user. Multivariable logistic regression analysis was performed using the R software package<sup>14</sup> to identify independent predictors of retweet activity, also testing for multicollinearity and interactions among included variables. A *P* value of <0.05 was considered to be statistically significant.

## Results

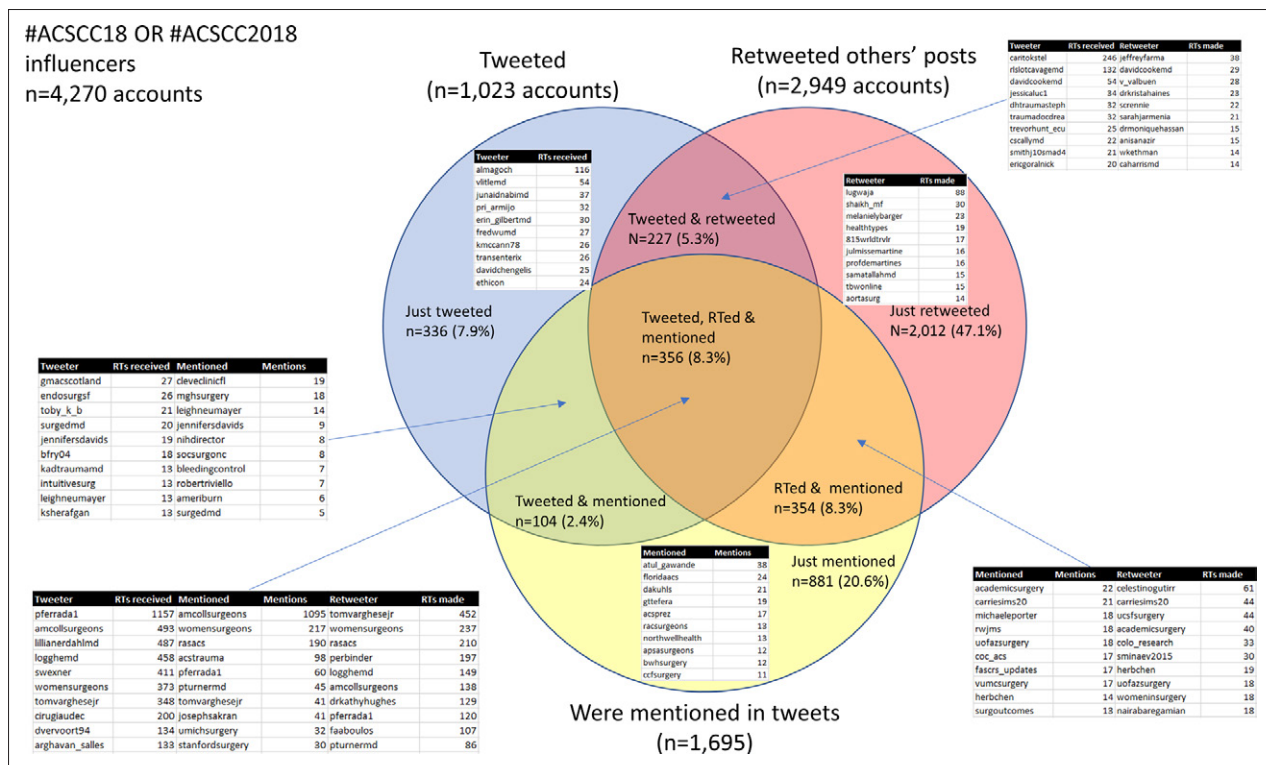
Searching for #ACSCC18 and #ACSCC2018 hashtags, there were 4386 tweets posted between October 21 and 25, 2018 inclusive, by 1023 tweeters, with 12617 retweets. Overall, 190 tweeters (19%) received 80% of retweets with 2440 (56%) tweets, while 242 (24%) tweeters received no retweets with 378 (9%) tweets. The #ACSCC18 hashtag was used in 3633 tweets (83%), #ACSCC2018 in 681 tweets (16%), and both hashtags in 72 tweets (2%). While a majority—629 tweeters (61%)—used only the official hashtag, 166 tweeters (16%) used just #ACSCC2018, and 228 tweeters (22%) used both hashtags at different times during the congress. Univariable analysis demonstrated that including the official hashtag—#ACSCC18—was associated with more retweets.

The top 20 tweeters based on the number of retweets received are listed in Table 1. The potential “influencers” of #ACSCC18/ #ACSCC2018 are shown in the Venn diagram in Figure 1. Tweeters posted original content. Retweeters shared others’ tweets. Accounts “mentioned” in the body of

**Table I.** Top 20 Tweeters Using #ACSCC18 and/or #ACSCC2018 Hashtags, Ranked by the Number of Retweets Received.<sup>10</sup>

Tweeter	Retweets received	Tweets posted	% of RTs received	Number of tweets in wakelet summary	Followers
pferrada1	1157	16	9.2	5	15102
amcollsurgeons	493	151	3.9	13	43446
lillianerdahlmd	487	45	3.9	9	5014
logghemd	458	29	3.6	4	15413
swexner	411	236	3.3	12	10901
womensurgeons	373	88	3.0	15	20651
tomvarghesejr	348	36	2.8	10	14996
caritokstel	246	5	1.9	1	178
cirugiaudec <sup>a</sup>	200	4	1.6	1	246
dvervoort94	134	18	1.1	5	2584
arghavan_salles	133	19	1.1	4	3627
rlslotcavagemd	132	60	1.0	1	248
afifikulaylat	119	14	0.9	5	2220
almagoch	116	6	0.9	4	6158
josephsakran	106	30	0.8	4	28320
shelbybergs	105	3	0.8	1	72
jsuliburk	101	80	0.8	1	3502
pturnermd	98	29	0.8	4	5125
krchhabra	91	5	0.7	2	1965
seanlangenfeld	85	9	0.7	4	1306

<sup>a</sup>Changed name subsequently to @CirugiaUdC.



**Figure I.** Potential “influencers” in #ACSCC18/#ACSCC2018 tweets.<sup>10</sup>

**Table 2.** Factors Associated With Retweets in Multivariable Analysis.<sup>a,10</sup>

Tweet characteristic	Odds ratio (95% CI)	
	Univariable logistic regression analysis	Multivariable logistic regression analysis
Inclusion of media (video or picture)	1.70 (1.42-2.02)	1.88 (1.51-2.33)
Mention of other tweeters	3.06 (2.61-3.59)	3.34 (2.83-3.94)
Inclusion of other hashtags	1.27 (1.10-1.47)	1.32 (1.13-1.54)
Inclusion of URL	0.87 (0.69-1.08)	1.03 (0.78-1.36)
The number of followers (per 100 increase)	1.001 (1.001-1.002)	1.004 (1.003-1.005)

<sup>a</sup>Outcome measure = retweet (yes/no).

**Table 3.** The 10 Most Commonly Used Hashtags Other Than #ACSCC18 and/or #ACSCC2018.<sup>10</sup>

Hashtag	Number of tweets (N = 4386)	Notes
#AWSatACS	293	Association of Women Surgeons at American College of Surgeons
#cc18selfie	103	Clinical congress “selfies”
#globalsurgery	101	
#ilooklikeasurgeon	100	
#surgery	88	
#aws2018	86	Association of Women Surgeons
#some4surgery	79	
#surgtweeting	57	
#sytyco18	56	“So you think you can operate” skills session
#colorectalsurgery	54	

tweets made up the third category in the Venn diagram. Of the 4270 accounts posting, disseminating or mentioned in #ACSCC18/#ACSCC2018 tweets, accounts that either just retweeted or were just mentioned made up the majority (67.7% of accounts). The remaining third of accounts tweeted and/or retweeted. An influential minority of tweeters in the middle of the figure (n = 356 accounts) tweeted, retweeted and were mentioned by other tweeters.

In the multivariable analysis, 3156 tweets by 874 tweeters were analyzed. The use of multimedia (video or picture), mentioning of other tweeters, the use of other hashtags, and the number of followers were all independently associated with retweets (Table 2). There was no multicollinearity among independent variables.

Inspecting the most shared tweets in the Wakelet summary,<sup>12</sup> the tweets included a wide range of topics covered during the congress, from plenary sessions to workshops and from the scientific and clinical to social and celebratory (eg, graduations), and demonstrated the strong networking and support provided through the Association of Women Surgeons (AWS). Using data on hashtags from the NodeXL report, and searching for the hashtags in individual tweets posted during the congress

days, the 10 most used hashtags other than #ACSCC18 and/or #ACSCC2018 are listed in Table 3 and mirror the themes covered in the most popular tweets, with 3 of the 10 hashtags including the AWS acronym or the related #ilooklikeasurgeon hashtag.

## Discussion

This study quantifies and characterizes tweets and Twitter accounts using the conference hashtags for the American College of Surgeons Clinical Congress in October 2018. The results help understand surgical conference tweeting and lead to a number of recommendations to improve tweeting at future conferences. In common with other conferences,<sup>3,7</sup> only a minority of delegates tweeted and/or retweeted at ACSCC18 (Figure 1)—there were 12463 delegates at ACSCC18, including 8522 MD delegates and 1118 other professionals.<sup>15</sup> On Twitter, the largest group of contributors retweeted without tweeting their own content (“just retweeters”). The second largest group was mentioned in tweets posted by other accounts but did not tweet or retweet (“just mentioned”); this group included keynote speakers and other influential

individuals, professional colleges and associations, and other institutions including hospitals and clinical teams. Twitter accounts in both these categories, which combined represented over two-thirds of tweeters in the Venn diagram, potentially had contributions to make to congress tweeting. The *retweeters* could have posted their own responses to the content that they shared, using the congress hashtag to highlight their response, to contribute to the discussion, and potentially to provide peer review. The *mentioned* accounts could have responded to the tweets that mentioned them, or posted their own original content, tailoring this to their own contribution to the congress, including links to slides or papers for the keynote speakers, while including the congress hashtag. Similar arguments apply to the other categories shown in the Venn diagram. Engagement is important in social media as posting original content, retweeting, and mentioning other accounts all have a function in building knowledge and networks and will help build followers. Establishing a larger follower base both at surgical meetings and between meetings helps build a wider network and also appears to have an impact on retweeting as demonstrated in multivariable analysis.

The multivariable analysis shows an independent association among 4 variables and retweeting in decreasing order of effect: mention of other tweeters, inclusion of multimedia, inclusion of hashtag(s), and number of followers. These findings are plausible as tweets have a short period in which they are noticed in rapidly updating Twitter feeds.<sup>16</sup> Tweeters should use the tools at their disposal to increase the visibility of tweets. Specifically mentioning another tweeter in the text of tweet means that the other user will receive a notification unless they have turned off notifications. Multimedia tweets enhance the usual appeal of a tweet. A hashtag, especially the congress hashtag, will help others find content and can help define a network such as #AWSatACS. With 280 characters per tweet, it is feasible to include all these components in tweets. Adding a URL to a tweet takes up 23 characters. This study showed no association between URL and retweeting, but studies of other conferences have demonstrated a positive impact on retweeting.<sup>6,7</sup> Just as we would add a reference to a research paper, it makes sense to link points we make in a tweet to a blog or research paper. URLs are displayed in an abbreviated form by Twitter, and a carefully positioned URL should not interfere with the readability of a tweet. Some websites are set up to be displayed as an embedded object in a tweet; scrolling through the Wakelet summary provides some examples.<sup>12</sup>

Presenting work at a conference takes planning, and conference tweeting is the same. As illustrated in this study and analysis of other conferences,<sup>17,18</sup> “hashtag drift” is common and impacts on tweeting. Searching for

#ACSCC18 (official hashtag) will not find #ACSCC2018 (a relatively commonly used alternative) as Twitter search is very specific and not “fuzzy.” Similarly, a slightly adapted or mistyped hashtag will not be easily found and nor will a tweet that mentions the hosting organization but does not include the correct congress hashtag (see Supplementary Material). There are important differences between tweeting and ordinary speech: while we will adjust what we are hearing or reading to the context (eg, a mispronounced word, the first name of an important figure in a professional field), Twitter does not have such artificial intelligence built in, so terms used to help categorize a tweet must be carefully chosen and accurately typed.

Conference organizers could reduce the risk of hashtag drift by including the conference hashtag in all documentation, including confirmatory emails, websites, programs, posters, and slide templates. Success requires repetition and visual reminders during the conference. Individual delegates should go to the conference prepared, with URLs to a blog, paper, or video abstract to support the research they present. Knowledge of a keynote speaker’s work can also help when drafting tweets during their presentation—adding to the learning from their presentation, both for the tweeter and their followers. Speakers can share slide sets to allow clearer images to be shared in tweets and can schedule tweets to coincide with their presentation (eg, using Twitter’s TweetDeck).<sup>19</sup> Tweets from the ACSCC18 congress also illustrate the power of meeting up with people you know from Twitter in the real world, with a vivid record of images—personal and scientific—recorded in the Wakelet summary, including the networking through the Association of Women Surgeons at American College of Surgeons.<sup>12</sup> As with any social gathering, this requires careful planning ahead and scheduling into the wider program. Priming social media champions to post high quality and original content can add to the learning from a conference and aid dissemination of findings. These champions could be recruited from the central category of the Venn diagram and could be supported with social media training and access to conference materials ahead of the congress, to use during the meeting.

This analysis has a number of strengths and some limitations. Capturing a full record of tweeting and retweeting (where a hashtag was used) allowed a breakdown of contributions, identifying areas for development in future conferences. The multivariable analysis helped dissect the most important components of tweets at the congress but also identified a difference in tweeting compared with other clinical conferences, namely the lack of impact of inclusion of a URL. The analysis has not attempted to document the number of responses that did not use the hashtag(s). Some tweets (eg, a tweet on physician burnout and suicide) received dozens of replies and further

posts quoting the original tweet.<sup>20</sup> The majority of such responses did not use the congress hashtag, in common with other surgical conference tweeting.<sup>5</sup> The analysis therefore underestimates the total number of tweets and retweets related to the congress. Third-party social media analytical software does not capture replies and quoting tweets. Identifying such tweets would be very time consuming in a Twitter search for a conference of this size and was not deemed feasible for this study. Reading replies to the most popular tweets at the congress demonstrates that the vast majority of replies received relatively limited onward dissemination. Accordingly, this analysis captured the great majority of the most popular tweets from and about the congress.

This analysis has demonstrated the scale of tweeting at the American College of Surgeons Clinical Congress and has provided potential strategies to encourage more impactful tweeting at future surgical meetings based on these findings and observations from other clinical conferences.

When tweeting at a surgical conference, include the designated conference hashtag and other topics or network-specific hashtags that will help users find your tweet, include a relevant image, and mention other users who may be interested in the work. Consider adding a URL to your tweet if it helps substantiate points, on the basis of findings from other clinical conferences. Moreover, maximize involvement through tweeting original content and retweeting posts of other tweeters. Finally, conference organizers and presenters (speakers and posters) should include the conference hashtag in all conference materials and include reminders when presenting their work, so that others use the correct hashtag when tweeting about their work.

## Supplementary Materials

Further exploration of tweets during the 5 days of the congress was performed using Twitter.com in a standard internet browser. Searching for tweets that used the American College of Surgeons Twitter handle (@AmCollSurg), after excluding the 2 main hashtags (adding #ACSCC18 #ACSCC2018 to the search term) identified a further 403 tweets posted by 233 tweeters that mentioned @AmCollSurg in the body of the tweet. Many of the tweets were related to the congress (eg, mention of a congress speaker, image of slides or pictures of graduations). Tweet URLs for these tweets were extracted manually using Twitter.com in a standard internet browser on April 8, 2020, and imported using the tweet ID (19 characters at the end of the tweet URL) to extract the full details of these tweets and map their interactions using NodeXL (<https://nodexlgraphgallery.org/Pages/Graph.aspx?graphID=224576>).

Between October 21, 2018 and April 8, 2020, these tweets had received 1019 retweets. In total, 109 (46.8%) of these tweeters did not tweet otherwise using the congress hashtag. While 172 of these tweets used no hashtag, the rest included generic hashtags (eg, #surgery), hashtags that were related to a very specific aspect of the congress (eg, #AWSatACS), some of the hashtags associated but not specific to ACSCC18 (eg, #ilooklikeasurgeon), or incorrect or mistyped hashtags (most commonly #ACS2018 or #ACCSCC18). Further information is available in the NodeXL report (for reference, see URL above). These tweets were not analyzed further as they did not use #ACSCC18 or #ACSCC2018.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## References

1. Søreide K. Numbers needed to tweet: social media and impact on surgery. *Eur J Surg Oncol.* 2019;45(2):292-295. doi:10.1016/j.ejso.2018.10.054
2. Grossman RC, Mackenzie DG, Keller DS, et al. #SoMe4Surgery: from inception to impact. *BMJ Innov.* 2020;6(2):72-82. doi:10.1136/bmjinnov-2019-000356
3. Søreide K, Mackenzie G, Polom K, Lorenzon L, Mohan H, Mayol J. Tweeting the meeting: quantitative and qualitative Twitter activity during the 38th ESSO conference. *Eur J Surg Oncol.* 2019;45(2):284-289. doi:10.1016/j.ejso.2018.11.020
4. Teoh JY-C, Mackenzie G, Tortolero L, Rivas JG, Yuen-Chun J, Smith M. Social media analytics: what you need to know as a urologist. *Eur Urol Focus.* 2020;6(3):434-436. doi:10.1016/j.euf.2019.08.005
5. Mackenzie G, Søreide K, Polom K, et al. Beyond the hashtag - an exploration of tweeting and replies at the European Society of Surgical Oncology 39th clinical conference (ESSO39). *Eur J Surg Oncol.* 2020;46(7):1377-1383. doi:10.1016/j.ejso.2020.02.018
6. Mitchell BG, Russo PL, Otter JA, Kiernan MA, Aveling L. What makes a Tweet fly? Analysis of Twitter messaging at four infection control conferences. *Infect Control Hosp Epidemiol.* 2017;38(11):1271-1276. doi:10.1017/ice.2017.170
7. Cevik M, Ong DSY, Mackenzie G. How scientists and physicians use Twitter during a medical Congress. *Clin Microbiol and Infec.* 2019;25(12):1561.e7-151561. doi:10.1016/j.cmi.2019.04.030

8. Business Twitter Blog. 6 things to Tweet when attending a conference. Accessed 6 November 2019. <https://business.twitter.com/en/blog/6-things-Tweet-when-attending-conference.html>
9. Social Media Research Foundation website. Accessed 6 November 2019. <https://www.smrfoundation.org/nodexl/>
10. #ACSCC18 OR #ACSCC2018 Twitter NodeXL SNA Map and Report for Tuesday, 30 October 2018 at 18:08 UTC. Accessed 8 June 2020. <http://nodexlgraphgallery.org/Pages/Graph.aspx?graphID=228918>
11. ScotPublicHealth blog. Monitoring health related activity on Twitter: Tips for individuals, organisations, campaigns and conference organisers. Accessed 6 November 2019. <https://scotpublichealth.com/2018/03/13/handing-over-the-reins-crowdsourcing-twitter-data-on-health-campaigns/>
12. #ACSCC18 OR #ACSCC2018 tweets 21-25 October 2018 – summary of conference using Wakelet. Accessed 6 November 2019. <https://wakelet.com/wake/92d33df1-f000-4cb5-bb56-d7da15f1a88a>
13. Symplur healthcare hashtags website. Accessed 9 April 2020. <https://www.symplur.com/healthcare-hashtags/>
14. R Project. Accessed 8 April 2020. <https://www.r-project.org/>
15. Personal communication from ACSCC conference organisers to Prof Steven Wexner (22/1/2020).
16. Bray B. When is my Tweet's prime of life? (A brief statistical interlude). Accessed 3 February 2020. Blog. <https://moz.com/blog/when-is-my-tweets-prime-of-life>
17. ATSS2018 – 18-23 May 2018 conference summary using Wakelet. Accessed 3 February 2020. <https://wakelet.com/wake/fd6ed711-1ebd-45de-8f3b-37862cd016b4>
18. Mackenzie DG, Gulati M, Gibson CM. A Look Back at ACC.19: The Impact of Twitter, Hashtag Drift and Confusion. Accessed 29 March 2020. *Cardiology Magazine of the American College of Cardiology* 2020 (March issue). <https://www.acc.org/latest-in-cardiology/articles/2020/03/26/12/42/acc19-impact-of-twitter-hashtag-drift-and-confusion>
19. Tweetdeck website. Accessed 3 February 2020. <https://tweetdeck.twitter.com/>
20. Tweet posted by Heather Logghe, MD. Accessed 6 November 2019. <https://twitter.com/logghemd/status/1055211961275813888>

Copyright of American Surgeon is the property of Southeastern Surgical Congress and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.