

Scientific Article

Tweet for the cure: A snapshot of Twitter usage by 3 U.S. oncologic professional societies

Sachin R. Jhawar MD ^a, Vinay Prabhu MD ^b, Matthew S. Katz MD ^c,
Sabin B. Motwani MD ^{a,d,*}

^a Rutgers Cancer Institute of New Jersey, Department of Radiation Oncology, Robert Wood Johnson Medical School, Rutgers University, New Brunswick, New Jersey

^b Department of Radiology, New York University Langone Medical Center, New York, New York

^c Department of Radiation Medicine, Lowell General Hospital, Lowell, Massachusetts

^d Department of Radiation Oncology, New Jersey Medical School, Rutgers University, Newark, New Jersey

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Abstract

Purpose: Medical societies are incorporating Twitter to communicate with their members and connect with patients. This study compares the online presence of 3 major oncologic societies.

Methods and materials: All available tweets in 2014 by the American Society for Radiation Oncology (ASTRO), American Society of Clinical Oncology (ASCO), and Society of Surgical Oncology (SSO) were collected. We analyzed whether posts were original content or retweets. The monthly tweet rate was followed to assess trends. We created 2 new metrics, supporter ratio and tweet density, to correlate online presence and engagement with offline membership breadth. The supporter ratio is the number of people following the organization divided by the number of registered members of each society. The tweet density is the total number of posts divided by the number of registered members of each society.

Results: In February 2015, ASCO, ASTRO, and SSO had 36,385; 10,899; and 2721 members, respectively. ASCO's Twitter handle had 33,974 followers, with a supporter ratio of 0.93. A total of 2563 original tweets and 1416 retweets were estimated, which represents a tweet density of 0.11. @ASTRO_org had 5445 followers and a supporter ratio of 0.50. In 2014, ASTRO posted 415 original content tweets and 9 retweets, with a tweet density of 0.039. SSO had a supporter ratio of 0.91 on the basis of 2481 followers. In 2014, SSO posted 207 original tweets and 190 retweets, with a tweet density of 0.15. An increase in tweets and retweets was seen during the month of each society's annual meeting. ASTRO's 61% increase in September 2014 was smaller than SSO's 462% and ASCO's 84%.

Conclusion: ASTRO's use of Twitter lags behind ASCO and SSO. Although all 3 societies show increased Twitter use during their annual meetings, they should work toward more meaningful

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* Corresponding author. Department of Radiation Oncology, Rutgers Robert Wood Johnson Medical School, Rutgers Cancer Institute of New Jersey, Clinical Director of, Radiation Oncology, Rutgers New Jersey Medical School, 195 Little Albany Street, New Brunswick, NJ 08901-1914.

E-mail address: motwansa@cinj.rutgers.edu (S.B. Motwani).

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engagement throughout the year. The new metrics of tweet density and supporter ratio will serve as benchmarks for member engagement in future studies.

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Introduction

The prevalence of social networking sites has raised the question of how online technologies are used in health care. The Pew Research Institute reported that 72% of adult Americans had looked online for health information in the last year.¹ The National Cancer Institute Health Information Trends Survey in 2007 showed that after doctors and government health agencies, the Internet is the third most trusted health information source. Moreover, it is perceived to be more trustworthy than traditional mass media.²

Social networking sites allow real-time communication and collaboration of information, ideas, and opinions via the Internet.³ Founded in 2006, Twitter (www.twitter.com) is a micro-blogging platform that allows for the exchange of short posts of 140 characters, called tweets. Users interact with each other through updates, direct messaging, replies, and retweeting, which is the reposting of specific messages. The platform allows for posts via the Twitter website, mobile updates, and third-party Twitter clients.⁴ Twitter is a well-known social networking site that has continued to gain popularity as one of the most visited sites on the Internet, with 313 million active monthly users and 500 million tweets posted per day as of June 2016.⁵⁻⁷ Per the most recent statistics, Twitter is the ninth most popular website in the world and the seventh most popular website in the United States, with popularity defined on the basis of the number of active daily users and page views over the last 3 months.⁷

The role of Twitter in the health arena has been previously studied. Twitter proved useful in monitoring the spread of the swine flu (H1N1) outbreak⁴ and studying and identifying the misuse of antibiotics.⁸ Furthermore, Twitter use has been shown to improve the quality of life of patients with chronic conditions by providing a medium for conversations among specific patient groups and offering relevant, targeted information to health care workers.⁹ Realizing the power that it holds for disseminating information to patients,¹⁰ some subspecialties have studied social networking sites to determine the type of information that is available to patients,¹¹ assess the quality of the information available,¹² and evaluate advertising in their field.¹³ All of these studies highlight Twitter as a powerful tool for connecting patients and potential patients with physicians and health care leaders.¹⁰ Social media use by professional societies may be helpful to counteract the potential for distortion of science and health news.¹⁴ A survey of cancer patients specifically showed

that almost two thirds of patients look online for information about their disease.¹⁵

To better understand the use of social media by professional oncologic societies, our aim was to analyze the patterns of Twitter use by the American Society for Clinical Oncology (ASCO), the American Society for Radiation Oncology (ASTRO), the Society of Surgical Oncology (SSO), and their followers.

Methods and materials

Study design

We used a prospective, qualitative content analysis methodology to analyze publicly available tweets that were posted to the Twitter website by ASCO, ASTRO, and SSO.⁶ These 3 societies were chosen because they represent the 3 major modalities of cancer treatment. Attempts were made to contact each society's social media department to get a copy of every tweet or retweet posted by the society. This information is available only to the owner of each handle by direct request to Twitter. Because this information was not available to us from all of the societies, we used tweets available online for all of the societies to maintain a consistent methodology. It is important to note that the loss of a number of tweets is possible when using this method. Timelines can be updated, and certain tweets can be deleted over time, explaining a loss of tweets. We used third-party websites and went to each individual society timeline, which acts as a homepage for the Twitter handle (eg, @ASCO), and manually counted all available tweets and retweets (Fig 1). Not every timeline can show a full year's worth of tweets using this method. Only a maximum of 1500 results on Twitter and 3200 tweets for third-party websites was available. These websites can vary depending on how frequently tweets are posted. No attempts were made to contact or interact with users.

Data set and sampling

This study did not meet the criteria for human subject research and was not submitted to our institutional review board because all data used were publicly available. The membership departments of ASTRO, ASCO, and SSO were contacted and provided the number of members in



Figure 1 An example of a homepage for a Twitter handle.

each society. We then searched Twitter to assess background information with regard to each individual groups' activity, including the date its account was founded, the number of followers, and the tweets that were available for the 2014 calendar year. We obtained the number of followers for calculations in mid-February of 2015. Using Twitter, we retrospectively collected all available tweets posted by @ASTRO_org, @ASCO, and @SocSurgOnc in 2014. These tweets were available from each society's homepage on Twitter. We evaluated whether each tweet was original content or a retweet. Tweet volume was followed over time to assess trends and tweeting patterns relative to major events. We obtained all of ASTRO's and SSO's tweets, but only 7 months of data were available online for ASCO.

To estimate changes over time, we assessed the total number of tweets and the number of followers of the Twitter handles 1 year later in February 2016. By subtracting the total number of tweets from February 2015, we estimated the number of tweets in the previous calendar year. We once again contacted the membership departments of all 3 groups. Although we were only able to obtain new membership data from ASTRO, we noted that the percent change in membership (−4%) was small enough that we could assume that membership had remained approximately stable for the other societies. Therefore, we used the above data to estimate a new supporter ratio and tweet density using the previous year's membership numbers when we were unable to obtain new data.

Development of novel metrics

Although the number of followers and tweet volume provided a simple comparison of the breadth of readership and the activity of the individual group, we created and evaluated 2 new metrics to better understand engagement and activity relative to the size of the individual organizations. We defined the supporter ratio as the number of people following the organization divided by the number of registered members of each society to better quantify member engagement online. To quantify the activity of the group itself relative to its membership, we calculated the tweet density, defined as the total number of posts divided by the number of registered members of each society.

Results

As of mid-February 2015, ASCO had a membership of 36,385 people. The Twitter handle, @ASCO, was founded in February 2009. At the time of the original query, @ASCO had 33,974 followers, with a supporter ratio of 0.93 (Fig 2) and an all-time total of 12,496 tweets. The search mechanism on Twitter only allows a certain number of consecutive recent tweets to be visible. At the time of this study, only 7 months of data, from June to December 2014, were accessible. In that time frame, @ASCO posted 1495 original tweets (Fig 3a) and 826 retweets (Fig 3b). Extrapolated to

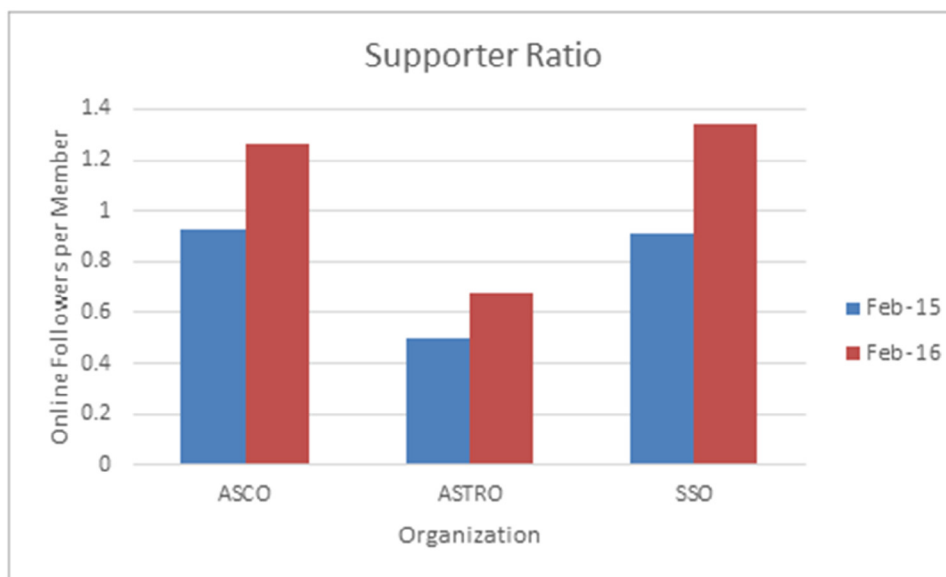


Figure 2 The supporter ratio for each society represents the number of online followers of the society's Twitter handle relative to the official membership of that society. "The Big 3" societies all showed an increase in supporter ratio from 2015 to 2016.

account for the entire year, 2563 original tweets and 1416 retweets would have occurred, which represents a tweet density of 0.11 (Fig 4). An 84% spike in tweets correlates with ASCO's 50th Annual Meeting from May 30 to June 3, 2014, which can be seen at the beginning of the available data in Fig 4a. When reassessed in February 2016, there were 16,412 tweets (approximately 3916 new tweets) and 45,998 followers. Using the old membership data from the previous year, per the aforementioned methods, we estimated a new ASCO supporter ratio of 1.26, which represents an approximately 35% increase in the previous year. The new estimate for ASCO tweet density remained constant at 0.11.

In comparison, ASTRO had 10,899 members at the same time point in February 2015. @ASTRO_org was founded in April 2009 and had 5445 followers as of mid-February 2015. At that time, @ASTRO_org had posted a total of 2206 tweets. The group had a supporter ratio of 0.50 (Fig 2). In 2014, @ASTRO_org posted a total of 415 original content tweets (Fig 3a) and 9 retweets (Fig 3b). This represents a tweet density of 0.039 tweets per member (Fig 4). As in the case of ASCO, there was a small spike at the time of ASTRO's 56th Annual Conference from September 14 to 17, 2014. When reassessed in February 2016, there were 2689 tweets (approximately 483 new tweets) and 7102 followers. Using the new membership data provided by ASTRO for 2015 (10,453 new members), we estimated a new ASTRO supporter ratio of 0.68, which represents an approximately 36% increase in the previous year. The new estimate for ASTRO tweet density was 0.046, representing an 18% increase.

As of February 2015, SSO had a membership of 2721 people. Its handle, @SocSurgOnc, was founded in December

2011, which is 2 years after the founding of the other 2 societies' accounts. With a supporter ratio of 0.91 based on 2481 followers (Fig 2), @SocSurgOnc had posted a total of 942 tweets since its inception. In 2014, it posted 207 original tweets (Fig 3a) and 190 retweets (Fig 3b), with a tweet density of 0.15 (Fig 4). During the time of its 67th Annual Meeting from March 12 to 15, 2015, there was a 462% spike in activity for the account (Fig 2). When reassessed in February 2016, there were 1297 tweets (approximately 355 new tweets) and 3637 followers. Using the old membership data from the previous year, as per the methods described earlier, we estimated a new SSO supporter ratio of 1.34, which represents an approximately 47% increase in the previous year. The new estimate for SSO tweet density slightly decreased to 0.13.

Discussion

Our study represents the first social media analysis of all assessable tweets made in a year by the 3 major oncologic societies, with a focus on the amount of engagement each society makes with its members. Importantly, we introduce new metrics to assess an organizations' reach (total number of unique users who see the tweets) and engagement on social media relative to its registered membership. These metrics will require validation but may be used in future studies to set baseline expectations in terms of followers and tweets to assess how societies and organizations are doing in engaging their members.

Prior to this study, the size of an organization may have been posited as a reason for higher engagement, with an organization needing to reach a certain critical mass. We

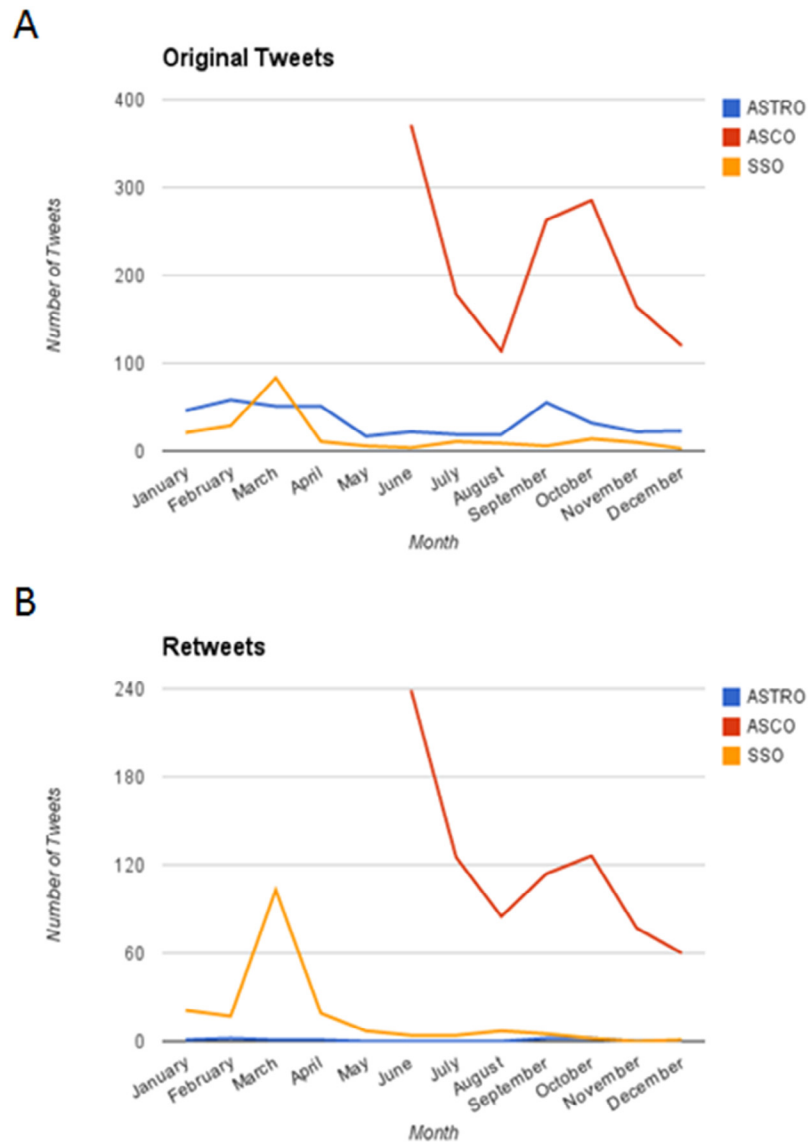


Figure 3 The available original tweets (A) and retweets (B) for each society per month in the 2014 calendar year. Each society showed an increase in the number of tweets during its national meeting (*).

showed that ASCO and SSO had more engagement with their memberships on Twitter, with supporter ratios >0.9 and tweet density >0.10 , compared with ASTRO, which was not as prolific in its reach through social media. Although ASTRO adopted a Twitter handle at nearly the same time as ASCO and more than 2 years earlier than SSO, it did not post nearly as many tweets per member in the 2014 calendar year. Furthermore, ASTRO's reach, on the basis of the number of followers, was considerably smaller than ASCO's and SSO's relative to the size of the organization. ASTRO retweeted least often among its user base, which may explain the lower tweet density and supporter ratios and may lead to decreased engagement and impact.

All 3 societies increased both their rates of tweeting and retweeting during their annual meetings. This is a unique

time during which most members of the society are together and several new scientific findings are unveiled, representing a great time not only to endorse the work of colleagues but also to increase the public's view of the individual fields as a whole. However, Fig 3a also shows more activity by ASTRO in the early months, from January to April. Further inquiry into the content of these tweets revealed mostly job postings, which coincided with the interview season of senior residents.

For ASCO, ASTRO, and SSO, there was a change over time that became apparent with the rough estimates of our updated metrics based on the February 2016 data. The data showed growth in the supporter ratio of each society, with $>30\%$ growth for all 3, indicating that social media continues to become an even more important vehicle for

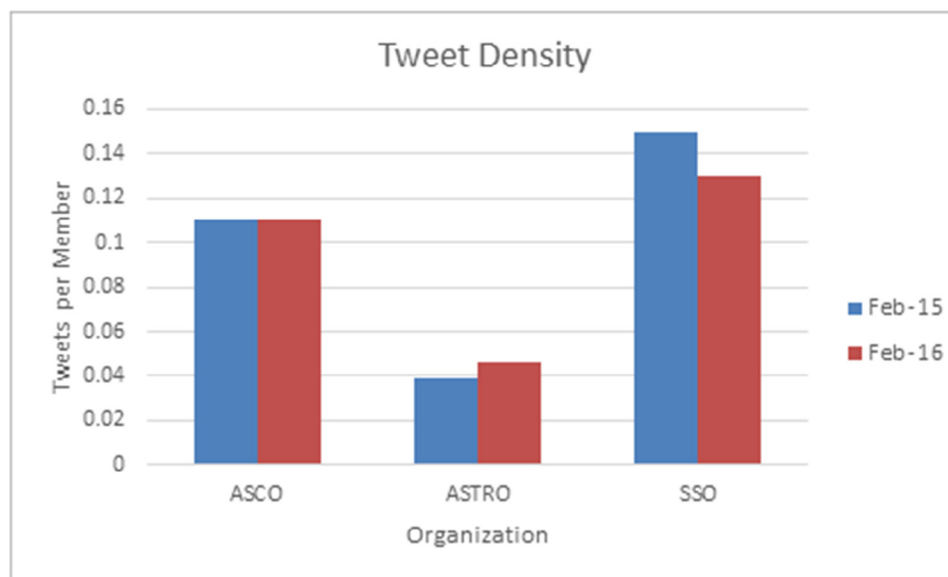


Figure 4 The tweet density for each society represents the number of tweets or re-tweets by the society’s twitter handle relative to the official membership of that society. This metric remained approximately stable for “The Big 3” societies.

information transmission. Rough estimates of tweet density showed that ASCO remained stable, SSO had a 13% drop, and ASTRO had an 18% increase.

As interactions with patients and peers via social media becomes more prevalent, it will be important for medical societies to work toward more activity, engagement, and impact on Twitter. Following the metrics of supporter ratio and tweet density that we introduced here can provide a way to track changes in engagement over time. Previous studies have shown downstream benefits of Twitter use by medical organization, including organization-sponsored tweet chats to increase audience size and reach. The Journal of the American College of Radiology showed that sponsored tweet chat sessions led to a 31.4% increase in traffic to the journal’s website articles and an increase in unique visits to the website.¹⁶ Twitter allows for cost-effective recruiting of difficult-to-reach populations who are not able to come to the hospital due to physical or financial constraints, with increased participation in health research and increased opportunity to effect health literacy.¹⁷⁻¹⁹ Local health departments have used Twitter to deliver one-way communications related to events and services, engage in conversations with their constituents, and encourage attendance at events.²⁰

A previous study by our group, which was updated at ASTRO’s 2015 Annual Meeting, assessed tweets that were related to radiation oncology–specific search terms and classification of individual tweets.^{21,22} The initial study showed that the majority of tweets fell into the category of “disseminating information.” Most of the links posted in these tweets came from “general media” sources, “personal blogs/sites,” and “elite news organizations” rather than “scholarly articles,” which calls into question the validity of the

information that is viewed by the general public. Furthermore, “MDs/residents/medical students” were the fourth highest contributors of tweets, after “businesses,” “special interest groups,” and “news organizations.” This was particularly worrisome because many Americans trust the health information that they receive on the Internet.²² If more credible medical sources became active on the site, Twitter could provide a singular opportunity for providing relevant, accurate information about oncology and for improving public knowledge with regard to oncology. “Sharing personal experiences” was the second most common tweet content, which further exemplifies that patients and their families could be actively engaged through social networking sites.

It is interesting to compare large oncology societies to large, single institutions, some of which have done an incredible job of cultivating a social media presence. At the time of this publication, for example, the Mayo Clinic Twitter handle (@MayoClinic), founded in April 2008, has 1.27 million followers and has posted almost 30,000 tweets. This single institution’s followers and activity on Twitter far eclipse any of the major oncology organizations. When considering only cancer institutes, the MD Anderson Cancer Center (@MDAndersonNews; founded in February 2008) has 47,500 followers and has posted >12,000 tweets. The Memorial Sloan Kettering Cancer Center (@sloan_kettering; founded in March 2009) has 38,700 followers and >8000 tweets. These institutions are of the same order of magnitude as the largest of the 3 oncologic societies in terms of followers and activity on Twitter, which allows them to shape the conversation as much as our oncology professional societies. Prabhu and Rosenkrantz stated that although there are benefits to large institutions owning and operating a Twitter account, it comes with increased demands on the time of one or multiple

individuals in terms of generating content and curating materials. Poignantly, they note that all posts must be in compliance with institutional policies, respect patient privacy, and maintain professional standards.²³

One of the major problems with using social media to disseminate information is in assuring that consumers draw information from the correct sources. There may be ways to curate health information on Twitter with cancer-specific hashtags, which can aggregate patients and health professionals to share in a more organized fashion.²⁴

These studies and our day-to-day experiences and interactions with patients confirm that social media is an increasingly important way in which we interact with patients. Our study shows that although ASCO, ASTRO, and SSO are gaining a larger following on Twitter, they are not necessarily taking full advantage of the breadth of their reach by disseminating important information to their consumers. Furthermore, they often pale in comparison to private health care institutions with regard to followers, tweets, or both. If they want to remain relevant in the realm of influence through social media, a large effort will need to be undertaken to increase engagement.

Conclusion

This study demonstrated the differences in the Twitter usage patterns of the 3 major oncology societies, as related to the size of the society and spikes in usage at the time of national meetings. Although this provides preliminary insights into usage patterns, it remains difficult to assess how this may influence health care decisions made by patients, health care workers, and advocates at this time. With the increasing use of Internet sources of health information, health care providers should increase their monitoring of the Internet for misinformation because almost 70% of U.S. adults look up health information on the Internet and 24% specifically go online to connect with other patients with health concerns similar to their own.²⁵ Further study is needed on the quality of information that is disseminated because much of it is coming from private institutions. These online social networking sites may be important in the future for communication between the medical community and the general public.

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