Examining the Use of a Social Media Campaign to Increase Engagement for the American Heart Association 2017 Resuscitation Science Symposium

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Background—The Resuscitation Science Symposium (ReSS) is the dedicated international forum for resuscitation science at the American Heart Association’s Scientific Sessions. In an attempt to increase curated content and social media presence during ReSS 2017, the Journal of the American Heart Association (JAHA) coordinated an inaugural social media campaign.

Methods and Results—Before ReSS, 8 resuscitation science professionals were recruited from a convenience sample of attendees at ReSS 2017. Each blogger was assigned to either a morning or an afternoon session, responsible for “live tweeting” with the associated hashtags #ReSS17 and #AHA17. Twitter analytics from the 8 bloggers were collected from November 10 to 13, 2017. The primary outcome was Twitter impressions. Secondary outcomes included Twitter engagement and Twitter engagement rate. In total, 8 bloggers (63% male) generated 591 tweets that garnered 261 050 impressions, 8013 engagements, 928 retweets, 1653 likes, 292 hashtag clicks, and a median engagement rate of 2.4%. Total engagement, likes, and hashtag clicks were highest on day 2; total impressions were highest on day 3, and retweets were highest on day 4. Total impressions were highly correlated with the total number of tweets ($r=0.87$; $P=0.005$) and baseline number of Twitter followers for each blogger ($r=0.78$; $P=0.02$).

Conclusion—In this inaugural social media campaign for the 2017 American Heart Association ReSS, the degree of online engagement with this content by end users was quite good when evaluated by social media standards. Benchmarks for end-user interactions in the scientific community are undefined and will require further study. (J Am Heart Assoc. 2018;7:e008710. DOI: 10.1161/JAHA.118.008710.)

Key Words: blogging • cardiopulmonary resuscitation • resuscitation • science communication • scientific publishing • social media • Twitter
Clinical Perspective

What Is New?

- This study emphasized the feasibility of a conference-based social media campaign to achieve a broad reach in promoting desired resuscitation science messaging.
- The engagement rate (median 2.4%) was quite high compared to social media standards.

What Are the Clinical Implications?

- Live tweeting during scientific conferences has the potential to increase science dissemination to other clinicians, researchers, scientists, and patients who may be unable to attend.
- These results suggest that when one is planning a social media campaign during a scientific conference, recruiting personnel with both an established social media presence and a commitment to generate a certain volume of content may be key factors to achieve a broader reach.

Methods

The data, analytic methods, and study materials will be made available to other researchers for purposes of reproducing the results or replicating the procedure. Materials will be maintained by the first author and released on request.

Before ReSS, 8 resuscitation science professionals were recruited to serve as official ReSS volunteer “bloggers” to post Twitter comments during conference proceedings. Bloggers were selected from a convenience sample of attendees at ReSS 2017 based on their use of social media (Twitter) and interest in participating.

Each blogger was assigned to either a morning or an afternoon session, responsible for both “live-tweeting” during the sessions and composing a written summary of the session for a JAHA blog post. Bloggers associated the hashtags #ReSS17 and #AHA17 with the live-tweeting campaign and tagged JAHA and AHA Meetings Twitter handles as character counts permitted (@JAHA_AHA and @AHAMeetings). JAHA promoted the live tweeting on its Twitter account both before and during the conference, and morning announcements were made throughout the conference to notify attendees of this initiative (Figure 1).

We collected Twitter analytics from the 8 bloggers from November 10 to 13, 2017, including a priori definitions of the following as defined by Twitter:

- Impressions: Times a user is served a tweet in timeline or search results (ie, person-views)
- Engagements: Total number of times a user interacted with a tweet. Clicks anywhere on the tweet, including retweets, replies, follows, likes, links, cards, hashtags, embedded media, username, profile photo, or tweet expansion
- Engagement rate: Number of engagements divided by total number of impressions
- Hashtag clicks: Clicks on hashtag(s) in the tweet
- Likes: Times a user liked the tweet
- Retweets: Times a user retweeted the tweet
- Followers: Number of other users following a given user

The primary outcome was Twitter impressions (number of times that Twitter users saw a given tweet), representing the overall reach of the social media campaign. Secondary outcomes included Twitter engagements (number of times that Twitter users interacted with a given tweet) and Twitter engagement rate (number of engagements divided by total number of impressions).

We tabulated the baseline number of Twitter followers and tweet-level analytics for all bloggers, and blogger-level aggregate analytics for their respective tweets. Categorical variables are reported as counts (percentages), and continuous variables as either mean (standard deviation) or median (interquartile range). We estimated pairwise Pearson correlation coefficients for the blogger-level aggregate number of impressions, engagements, tweets generated, baseline Twitter followers, and absolute increase in Twitter followers for each blogger. The Kruskal-Wallis test identified differences in Twitter analytics among the bloggers. Linear regression modeling assessed for variables associated with the blogger-level aggregate engagement rate with a priori selected candidate variables: blogger sex, baseline number of blogger Twitter followers, absolute increase in number of Twitter followers during the conference, and number of tweets.

Example tweets included the following:

(1) Data from oral research presentations and plenary sessions (Figure 2A):

Deakin: Only 40% of adults and 55% of children in US receive Bystander CPR in US. @JAHA_AHA #ReSS17 #AHA17
Fruits of the labor in Chicago: doubling bystander CPR rate! Utstein survival=34% #ReSS2017 @JAHA_AHA.
Dr Spaite: Trauma literature considers the “golden hour” or “golden 15 minutes.” Neurons start dying at 4 minutes #ReSS2017 @JAHA_AHA.

(2) Inspirational quotes from plenary session speakers (Figure 2B):

Dr Peter Kudenchuk: Good ALS has to be built on great BLS. #ReSS17 #AHA17 #HighQualityCPR #CPRsaveslives

(3) Session announcements (Figure 2C):

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Journal of the American Heart Association
I’ll be live-tweeting the EMS Mechanical CPR session starting at 12:15 PST (3:15 EST)! Happy to ask any questions for those who can’t be here. #ReSS17 #AHA17 @JAHA_AHA

The perfect panel on SCA...physicians, patient, family member, rehab specialist and researchers—it takes a village to improve survivorship from cardiac arrest. #ReSS17 @JAHA_AHA.

(4) Commentary based on information presented during the sessions (Figure 2D):

That’s a wrap for the joint AHA/Japanese Circulation Society Session. Take-aways: community engagement matters (get out of the ivory tower); bystander CPR matters; public access defibrillation matters; telephone CPR matters. #ReSS17 @JAHA_AHA

Super cool! You CAN change culture and in doing so save lives. #pcas @UPittCCAS @callaway3 @ritty_pcas_md

Tweets were also analyzed based on count and weighted percentage using NVivo 11 (QSR International, Victoria, Australia). Similar words and stemmed words (ie, CPR, cpr, #cpr; patient, patients) were grouped together. Prepositions and words fewer than 3 letters in length were removed from analysis, as well as all Twitter handles (ie, @JAHA_AHA) and conference-related hashtags (#ReSS17 and #AHA17).

Results

The November 2017 ReSS conference, which took place in Anaheim, CA, was attended by over 500 attendees over 3.5 days. Eight bloggers (63% male) live-tweeted 26.25 hours of ReSS content, including 8 hours of concurrently scheduled sessions. Median (interquartile range) assigned hours for each blogger were 4.0 (3.25-4.375) hours. In total, bloggers generated 591 tweets (22.5 tweets/content hour) that garnered 261 050 impressions, 8013 engagements, 928 retweets, 1653 likes, and 292 hashtag clicks (Table 1). In addition, @JAHA_AHA specifically posted 14 tweets related to the social media campaign, accounting for an additional 10 659 impressions, 141 engagements, 23 retweets, 54 likes, and 11 hashtag clicks (K. Sullivan, unpublished data, 2018). Twitter engagement by end users was typically higher during days 2 to 4 of the conference with the total number of...
maximum tweets reaching 199 on day 3 (Table 2). Total engagement, likes and hashtag clicks were highest on day 2; total impressions were highest on day 3, and retweets were highest on day 4 (Table 2). Bloggers gained a median 20 (interquartile range 16-29) Twitter followers over the duration of the conference (Table 1).

Total impressions were highly correlated with the total number of tweets ($r=0.87; P=0.005$) and baseline number of Twitter followers for each blogger ($r=0.78; P=0.02$). Total engagements did not correlate with any other variables. Engagement rate was not associated with any candidate variables in univariate or adjusted linear regression modeling.

The tweet with the most impressions (5469) and Hashtag clicks (22) was tweeted on Friday November 10, 2017 (Figure 3A):

Just landed in LAX from Philadelphia and headed to #AHA17!! #ReSS17 @JAHA_AHA

The tweet with the most engagements (227) was posted on the same day (Figure 3B):

Super cool! You CAN change culture and in doing so save lives. #pcas @UPittCCAS @billary3 @britty_pcas_nd

Hans van Schuppen @HansvanSchuppen

In Holland, an AED is placed before ambulance arrival in 66% of all out-of-hospital cardiac arrest cases. One-month survival is around 25% (total, all initial rhythms). The AED is getting so familiar in society, it even got its...
Table 1. Blogger Characteristics, Tweet-Level Analytics for Each Blogger, and Blogger-Level Aggregate Twitter Analytics

| P Value | Total | Blogger 1 | Blogger 2 | Blogger 3 | Blogger 4 | Blogger 5 | Blogger 6 | Blogger 7 | Blogger 8 |
|---------|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sex     |       | Male      | Female    | Male      | Female    | Male      | Male      | Male      | Female    |
| Disciplines | EMS/ Investigator | PhD/ Investigator | Physician/ Investigator | Epidemiology/ Investigator | Physician/ Investigator | Physician/ Investigator | Physician/ Investigator | Nurse/ Investigator |
| Tweets (n) | 591  | 52   | 45   | 154   | 56   | 27   | 54   | 83   | 119   |
| Conference hours assigned (n) | 26.25 | 4.0 | 4.5 | 3.25 | 3.25 | 2.5 | 4.25 | 4.5 | n/a |
| Baseline followers (n) | 4011 | 271 | 230 | 329 | 267 | 192 | 25 | 236 | 2262 |
| Profile views (n) | 946 | 139 | 54 | 133 | 293 | 57 | 89 | 38 | 143 |
| Followers, net change (n) | 183 | +21 | +18 | +15 | +34 | +16 | +23 | +16 | +40 |
| Impressions |       |       |       |       |       |       |       |       |       |
| Median (IQR) | 342  | 20 (207-543) | 473 (323-678) | 342 (246-587) | 303 (97-451) | 413 (318-584) | 468 (228-722) | 369 (241-532) | 299 (228-433) |
| Total (n) | 264  | 395 | 21 | 235 | 49 | 573 | 15  | 655 | 26 |
| Engagements |       |       |       |       |       |       |       |       |       |
| Median (IQR) | 7  | 12 (3-15) | 11 (5-18) | 5 (2-10) | 13 (6-20) | 12 (6-20) | 8 (3-17) | 6 (3-11) | 6 (2-21) |
| Total (n) | 8062 | 1185 | 765 | 1205 | 1170 | 499 | 766 | 768 | 1735 |
| Retweets |       |       |       |       |       |       |       |       |       |
| Median (IQR) | 1  | 1 (0-2) | 1 (1-2) | 1 (1-3) | 1 (0-1) | 1 (1-2) | 2 (1-4) | 1 (1-2) | 1 (0-2) |
| Total (n) | 931 | 95 | 92 | 162 | 106 | 66 | 113 | 133 | 161 |
| Likes |       |       |       |       |       |       |       |       |       |
| Median (IQR) | 2  | 2 (1-3) | 2 (1-5) | 3 (1-5) | 1 (0-2) | 3 (1-4) | 3 (2-4) | 1 (1-3) | 1 (0-2) |
| Total (n) | 1668 | 187 | 174 | 233 | 226 | 89 | 141 | 137 | 481 |
| Hashtag clicks |       |       |       |       |       |       |       |       |       |
| Median (IQR) | 0  | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) | 0 (0-0) |
| Total (n) | 296 | 55 | 17 | 40 | 59 | 5 | 21 | 32 | 63 |
| Engagement rate (%) |       |       |       |       |       |       |       |       |       |
| Median (IQR) | 2.4% | 2.6% (1.4-4.2%) | 2.9% (1.5-4.9%) | 2.9% (2.0-4.5%) | 2.0% (1.1-4.6%) | 2.9% (1.8-4.9%) | 2.4% (1.5-4.0%) | 2.2% (1.4-3.5%) | 2.1% (1.0-4.1%) |

EMS indicates emergency medical services; IQR, interquartile range; n, number.
In Anaheim, running through my oral & getting super excited abt tweeting @AHAMeetings aha17 #ress17, #womeninre-sus; @Penn_CRS scicomm

The tweet with the most retweets (15) was posted on Saturday November 11, 2017 (Figure 3C):
Only 10% of Alaskan 911 callers refuse to do telephone CPR. The secret? “Tell, don’t ask” #ReSS17 @JAHA_AHA

The tweet with the most likes (28) was posted on Saturday November 11, 2017 (Figure 3D):
“a good mentor opens the door and encourages you to walk through that glass ceiling... choose your mentor wisely; use them wisely, be respectful; give them credit” @JAHA_AHA @AHAMeetings #ress17 #womeninresus #aha17 #truth

Additionally, we examined word use in the tweets posted by the 8-bloggers. The acronym “CPR” was tweeted the highest number of times by count and weighted percentage (n=84, 1.16%), followed by “resuscitation” (n=48, 0.66%) and “patients” (n=47, 0.65%; see Figure 4).

**Discussion**

In this inaugural Twitter campaign, a small volunteer group of resuscitation science professionals generated hundreds of tweets that achieved hundreds of thousands of person-views. Views per tweet increased from day 1 to days 2 to 4. The scope of this reach was directly correlated with the volume of tweets produced and the number of Twitter followers for each blogger. Although the prevalence of end-user Twitter engagement per day was relatively low, the engagement rate (median 2.4%) was quite high when evaluated by social media standards.6 In marketing, Twitter engagement measures consumer interaction with a particular message and is commonly associated with brand

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**Table 2. Tweet-Level Analytics for Each Conference Day**

|                         | Total (n=26.25 hours) | Day 1 (n=3.0 hours) | Day 2 (n=7.75 hours) | Day 3 (n=7.75 hours) | Day 4 (n=7.75 hours) |
|-------------------------|-----------------------|---------------------|----------------------|----------------------|----------------------|
| **Tweets**              |                       |                     |                      |                      |                      |
| Total (n)               | 591                   | 27                  | 173                  | 199                  | 192                  |
| Per content hour        | 22.5/h                | 9.0/h               | 22.3/h               | 25.7/h               | 24.8/h               |
| **Impressions**         |                       |                     |                      |                      |                      |
| Median (IQR)            | 342 (207-543)         | 165 (93-545)        | 344 (165-580)        | 365 (242-522)        | 322 (218-518)        |
| Total (n)               | 264 395               | 19 909              | 79 666               | 85 579               | 79 241               |
| Per content hour        | 10 072.2              | 6636.3              | 10 279.5             | 11 042.5             | 10 224.6             |
| **Engagements**         |                       |                     |                      |                      |                      |
| Median (IQR)            | 7 (3-15)              | 5 (2-12)            | 8 (4-18)             | 6 (3-14)             | 8 (4-14)             |
| Total (n)               | 8062                  | 668                 | 2820                 | 2157                 | 2417                 |
| Per content hour        | 307.1                 | 222.7               | 363.9                | 278.3                | 311.9                |
| **Retweets**            |                       |                     |                      |                      |                      |
| Median (IQR)            | 1 (0-2)               | 0 (0-1)             | 1 (0-2)              | 1 (1-2)              | 1 (1-2)              |
| Total (n)               | 931                   | 21                  | 268                  | 290                  | 352                  |
| Per content hour        | 35.5                  | 7.0                 | 34.6                 | 37.4                 | 45.4                 |
| **Likes**               |                       |                     |                      |                      |                      |
| Median (IQR)            | 2 (1-3)               | 2 (0-5)             | 2 (1-5)              | 1 (0-3)              | 2 (1-4)              |
| Total (n)               | 1668                  | 139                 | 595                  | 454                  | 480                  |
| Per content hour        | 63.5                  | 46.3                | 76.8                 | 58.6                 | 61.9                 |
| **Hashtag clicks**      |                       |                     |                      |                      |                      |
| Median (IQR)            | 0 (0-0)               | 0 (0-0)             | 0 (0-1)              | 0 (0-0)              | 0 (0-0)              |
| Total (n)               | 296                   | 48                  | 105                  | 87                   | 56                   |
| Per content hour        | 11.3                  | 16.0                | 13.5                 | 11.2                 | 7.2                  |
| **Engagement rate**     |                       |                     |                      |                      |                      |
| Median (IQR)            | 2.4% (1.4-4.2%)       | 2.6% (1.2-4.9%)     | 2.9% (1.6-5.2%)      | 1.9% (1.0-3.4%)      | 2.5% (1.5-4.2%)      |

IQR indicates interquartile range; n, number.
awareness and market penetration. The Twitter engagement rate considers the total number of followers and how much tweet interaction occurs (i.e., retweets, likes). It is unknown how many individual end users were reached by this campaign and whether standard Twitter engagement measures apply to the scientific community. However, our findings posit that the resuscitation community has a cohort of followers who are interested in the field and readily engaged in social media, allowing for the broader dissemination of resuscitation science.

Interestingly, the tweets with the most engagements and most impressions had no scientific or educational content. This is an area that will require further study; however, this may highlight the “social” component of social media. The tweets with the most engagement and most impressions were used to build awareness for the social media campaign and to engage the scientific conference audience, in turn building excitement for the campaign. Whether this increased the awareness and engagement of the social media campaign is unknown.

This effort emphasizes the feasibility of a conference-based social media campaign to achieve a broad reach in promoting desired messaging. Our data suggest that, in planning a social media campaign during a scientific conference, recruiting personnel with both an established social media presence and a commitment to generate a certain volume of content may be key factors to achieve a broader reach. However, other factors related to Twitter engagement and retweeting may need to be elucidated, including which Twitter accounts retweeted and the number of Twitter followers attributed to those accounts.

In addition to the actual engagement of additional followers, there are intangible benefits of such a social media campaign. Live tweeting comments about the latest resuscitation science research engaged many resuscitation professionals who were unable to attend the sessions. In addition, live tweeting during concurrent sessions allowed ReSS 2017 attendees in 1 session to learn about content presented during other sessions scheduled simultaneously.

Although bloggers were recruited on a volunteer basis, they did appear to receive some intangible benefits from this social media campaign. Their Twitter profile views and number of Twitter followers increased, denoting an increase in each blogger’s visibility and social media presence.
Social media has gained significant traction as a medical education tool, but use of social media to disseminate scientific conference proceedings is an emerging and understudied practice. Surveys demonstrate that social media has not been widely adopted by the scientific community, but investigators do perceive numerous potential advantages in disseminating and exchanging scientific content. A Scientist’s Guide to Social Media recognizes Twitter as the foremost platform for the scientific community and notes that the “easiest way to see the power of Twitter...is to follow a conference hashtag.” It remains to be seen if the reach and engagement of Twitter translates to knowledge acquisition.

Conclusions
In this inaugural social media campaign for the 2017 AHA ReSS, a small group of resuscitation science professionals generated written content that achieved an exponential number of views by end users. The degree of online engagement with this content by end users was quite good when evaluated by social media standards. Benchmarks for end-user interactions in the scientific community are undefined and will require further study.

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