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Social Media Engagement and the Critical Care Medicine Community

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Abstract

Over the last decade, social media has transformed how we communicate in the medical community. Microblogging through platforms such as Twitter has made social media a vehicle for succinct, targeted, and innovative dissemination of content in critical care medicine. Common uses of social media in medicine include dissemination of information, knowledge acquisition, professional networking, and patient advocacy. Social media engagement at conferences represents all of these categories and is often the first time health-care providers are introduced to Twitter. Most of the major critical care medicine conferences, journals, and societies leverage social media for education, research, and advocacy, and social media users can tailor the inflow of content based on their own interests. From these interactions, networks and communities are built within critical care medicine and beyond, overcoming the barriers of physical proximity. In this review, we summarize the history and current status of health-care social media as it relates to critical care medicine and provide a primer for those new to health-care social media with a focus on Twitter, one of the most popular microblogging platforms.

Keywords

critical care medicine, social media, communication, medical education, Twitter

Background and History

Over the last decade, social media has augmented and transformed how we communicate in the medical community.[1,2] Merriam-Webster defines social media simply as "forms of electronic communication through which users create online communities to share information, ideas, personal messages."[3] Social media initially came to popularity as a means of communicating with friends, family, and potential employers (MySpace and LinkedIn) in the early 2000s. However, the role of social media over the past decade has rapidly expanded to informing, educating, and promoting knowledge exchange between different stakeholders within health care[4]—commonly termed health-care communication and social media (Twitter hashtag: #hcsm, abbreviated as HCSM in this review). Statistics on HCSM provide strong evidence that it has a significant role in the day-to-day interactions of patients, health-care providers, hospitals, advocacy groups, and industry. For example, 65% of physicians utilize some form of social media for professional reasons.[5,6] In addition, 32% of US social media users post about the health experiences of their friends and family, and 27% of patients post about their own health-related experiences on social media.[7] Increasing numbers of hospitals are developing social media policies for their employees and utilizing social media as an important way to build relationships within their community, educate the public on important health-care issues, and disseminate research achievements.

Understanding how social media impacts critical care medicine requires an understanding of how computer-assisted learning (CAL) has evolved over the past several decades. It has been over 70 years since the development of the first general-purpose electronic computer, the Electronic Numerical Integrator and Computer.[8] The first commercially available computers were used primarily in business for payroll and accounting. The National Institutes of Health (NIH) and other stakeholders began considering learning applications for

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medicine using digital computers in the 1950s, and a report describing the use of a computer in accurate prediction and development of differential diagnoses for hematologic diseases was published in 1961.[8,9] The CAL began to gain traction in the 1960s and 1970s with the introduction of a wide variety of resources and tools including those targeted to critical care medicine.[10] Beginning in the 1990s, health-care literature was electronically translated in the form of CD-ROMs for books that allowed exchange of large quantities of data (650 MB) in a portable, economical, and easily reproducible manner. Also in the 1990s, UpToDate began to offer collated medical information online as a clinical decision support resource.[11] PubMed revolutionized how medical knowledge was accessed—for the first time, the MEDLINE database of references and abstracts was accessible to the general online user in a matter of seconds.[12] With time, journals gained online presence and allowed customizable online experience, including the ability to save articles of interest and build personal digital libraries. In 2001, the strategy of crowdsourcing and the altruism of "free" information were combined to build what is now the largest encyclopedia in the world, Wikipedia. Today, there are a number of crowdsourced repositories being used in health care, such as WikiEM.[13]

Targeted information dissemination was a challenge identified early in medicine. The prevalent method of creating listservs and mailing lists was initially effective for this purpose but was fraught with issues, such as difficulty in searching for previously shared content, inability to selectively engage with or mute conversations, and lack of enhanced user functions such as tagging, routing, and highlighting e-mails of interest. Internet mailing lists used by critical care professionals included the pediatric critical care list, critical care medicine mailing list, and anesthesia and intensive care list. Medical blogs, both personal and curated, were able to create a dedicated audience that helped medical professionals self-select the information they were consuming online and laid out the initial frame work for building online communities. Blogging in medicine was brought to the mainstream in 2004 and 2009, respectively, blogs like KevinMD.com and The Incidental Economist (theincidentaleconomist.com), which have a widespread and dedicated following with a multitude of contributors from different backgrounds. The propagation of free open access in medical publishing simultaneously reached heights with a number of journals choosing to be fully open access or share featured articles at no cost. The NIH Public Access Policy implementing the Consolidated Appropriations Act of 2008 required that all NIH-funded research be made publically available on the National Library of Medicine's PubMed Central and bolstered the open-access model of sharing research findings.

The HCSM encompasses a tremendous variety of formats, and several examples are listed by category in Table 1. Microblogging brought the best of online interaction together and placed it at the users' fingertips. A microblog is a social media site to which users make short and frequent posts. Microblogs differ from traditional blogs in that they encourage sharing (also known as "posting") with brevity. Most microblogging sites were built for smartphone use and harnessed the power of portability for an enhanced user experience. Integrating smartphones with character-limited expression, microblogs became a vehicle for succinct, targeted, and innovative dissemination of content. Although there are numerous microblogging platforms, Twitter is the most prominently used in HCSM.[14] Medical professionals have used the platform for a variety of activities culminating in the latest transformation of knowledge sharing in medicine: Free Open Access Meducation (Twitter hashtag #FOAM).[15] The objective of the #FOAM movement is to integrate the best in technology, software design, teaching tools, educators, and ideas and disseminate them free of restrictions from academic groups, organizations, journals, institution, companies, and research groups.

Table 1. Social media formats and examples.

Social Media Format	Examples
Microblogging/Social networking	Twitter, Facebook, Instagram, Snapchat, Reddit, Google+
Blogs	Mayo Clinic, KevinMD, Gomerblog, PulmCCM, PedsCCM
Professional networking sites	LinkedIn, Sermo
Thematic networking sites	23andMe, including healthcare-specific sites, eg, Doc2Doc, Doctor's Hangout
Crowdsourced knowledge aggregation	Wikipedia, Wikisurgery, WikiEM
Media-sharing sites	YouTube, Slideshare
File-sharing services	Dropbox, Google Drive
Collaborative working platforms	Google docs, Asana
Physician rating websites	Healthgrades, RateMDs
On the go digital learning platforms	SMACC podcasts, ATS webinars
Applications	Read by Qx, Browzine

Abbreviations: CCM, critical care medicine; SMACC, Social Media and Critical Care; ATS, American Thoracic Society.

Social Media and the Critical Care Medicine Community

Social media as a communication platform has several applications, and the most common uses in HCSM include (1) dissemination of information, (2) knowledge acquisition, (3) professional networking, and (4) patient advocacy/communication. Many medical specialties such as radiology and emergency medicine integrated these applications early on with the ease and availability of platforms such as Twitter, even conducting research investigating the benefits of HCSM for their own professional communities.[16,17] However, critical care medicine as a specialty has just recently gained significant momentum in a social media movement within our own community. Although social media engagement may have known potential benefits for critical care medicine professionals,

Table 2. Commonly used Twitter terminology.

Twitter Terminology	Definition
Handle	User's name (@username)—conveys an identity
Follower(s)	Users who follow one's account
Hashtag	Hashtags (#) create searchable content on Twitter that is searchable beyond one's own followers
Favorite	Users can "like" a tweet—this is represented by a small heart on the tweet
Tweet	An original post shared on Twitter, restricted to 280 characters
Retweet	Retweet (RT) allows one to share another user's tweet
Modified tweet	Modified tweet (MT) is used with one modifies another user's tweet
Mention	Another user can be mentioned in a tweet by including their handle (@username)
Reply	This creates a conversation with another user's tweet
Direct message	Direct message (DM) are private messages to other users

significant barriers including overwhelming amounts of information and threats to professionalism and productivity must be overcome for adoption to occur.[18]

Twitter is a microblogging social network providing a platform for users to create and share content (post tweets, pictures, links to articles, and so on) in a format that limits the number of characters.[19] A summary of commonly used Twitter terms is provided in Table 2. Users follow the accounts of colleagues, medical organizations, medical journals, and so on to curate content from those parties in real time. As a platform, Twitter provides the user the ability to share (retweet) or acknowledge (favorite) the content of another user's tweet. These engagements can provide endorsement of a message or offer differing opinions—resulting in a conversation that can be viewed by other users. An "impression" is an indicator of overall exposure a tweet receives. This parameter reflects the amount of times a post (tweet) has been delivered to other users' Twitter feeds. In general, the more impressions a tweet garners, the more individuals are likely to view the tweet. Taking into account a user's total number of tweets, followers, and engagements, one can get a sense of that user's activity, reach, and popularity.[20] In the following sections, we delve into feasible and efficient applications of social media as they pertain to critical care medicine, with a specific focus on the use of Twitter.

Digital Conference Attendance: "Live-Tweeting the Meeting"

One of the most common ways in which health-care providers are first introduced to Twitter is at conferences. An increasing number of health-care conferences will have attendees who are "live-tweeting" or sharing content presented by speakers or panels in real time using conference-specific hashtags (ie, #ATS2017, #CCC47, #CHEST2017, #PCCC17, #dasSMACC, #WFPICCS18). Social media engagement at conferences represents all the categories of common use: dissemination of information, knowledge acquisition, professional networking, and patient advocacy. Most of the major critical care medicine organizations leverage social media to live tweet, stream, or later provide webinars and podcasts of their annual meetings. Often, society members who are part of a social media taskforce will be designated as social media ambassadors to facilitate effective content sharing. For example, in addition to the conference hashtag for the 2018 Society for Critical Care Medicine Annual Congress (#CCC47), there were session-specific hashtags for certain sessions expected to be of wide interest and heavily attended (ie, #SoMeICU, #ICUOB, #CritCareWomen, #SurvivingSepsis).

Substantial literature exists from different specialties published on the topic of "Tweeting the Meeting."[21,22] A 2017 study demonstrated a significant increase in Twitter usage at 4 major critical care conferences.[23] A most recent example of social media impact and momentum in the critical care conference setting is the 2018 SCCM Congress (#CCC47), which garnered over 75 million impressions over the course of the conference with 19,269 tweets and 2,454 unique participants who posted on Twitter, an increase of over 200% from the previous year (symplur.com). The Social Media and Critical Care (SMACC) meeting is an international emergency and critical care medicine conference originating in the #FOAM community, and last year's conference (#dasSMACC) resulted in over 115 million impressions from 61,388 tweets and 6,228 participants.

Dissemination of information occurs when conference attendees share relevant content, observations, and perspectives through tweets or other social media platforms. Knowledge acquisition occurs when any participant, including those following the conference hashtag from home, views and engages with content including photos of slides, links to papers discussed, and live streams from conference attendees and organizers. Very often, those attending the conference will engage with these digital or "distance" attendees in real time which creates a rich and enhanced experience involving more individuals beyond in-person attendees.

Research Dissemination and Keeping Up With the Literature

Social media has fundamentally changed how research is disseminated and consumed. Several critical care journals are leveraging social media to easily disseminate up-to-date information and promote global knowledge acquisition on popular social media platforms, including Twitter.[24-26] Following real-time updates from specific journal accounts can simplify the process of keeping up to date with the recent literature relevant to a user's practice. Journals may disseminate published articles from the most recent issue or articles "ahead-of-print" via these platforms, with some even featuring articles free to view without subscription.

For researchers, evidence suggests that highly tweeted articles are more likely to be cited.[27,28] Additionally, many

journals such as *Pediatric Critical Care Medicine* are now requiring submission of a tweet with all manuscript submissions, which is peer reviewed for content and messaging.[29] Engaging authors in formulation of tweets not only enables the researchers themselves to suggest the best messaging or "take-home" for their own study but can also introduce new users to social media as a means of research dissemination.

Disseminating research through social media may not only lead to increased citations but also can have higher impact on clinical practice. Given the heterogeneity of critical care providers on social media, the reach of specific publications can be expanded beyond a specific journal's audience. An article about intensive care unit (ICU) sedation, for example, may be relevant not only to physicians but also to nurses and pharmacists. Use of discipline-based hashtags (ie, #nurses, #pharmacists) in addition to content hashtags (#sedation) can broaden the scope and reach of the study beyond regular readers of that journal and capture the attention of other stakeholders.

Although the number of citations an article accrues (ie, h-index) is the traditionally accepted metric to gauge impact of publications, newer metrics incorporating social media scholarship are being incorporated into journal websites and also being utilized at some institutions as metrics for academic promotion.[30] Altmetric is a system that tracks the attention that research outputs receive online, pulling data from social media networks, including Twitter, Facebook, and others. Moving forward, Altmetric scores may be increasingly used as an alternative measure of scholarly impact, providing a richer understanding of how research is being used by broader communities.[31]

Additional examples of critical care medicine journals leveraging social media to disseminate research include the *CHEST* journal hosting Twitter chats[32] (#pulmcc) on medical topics such as asthma and the American Thoracic Society (ATS) Critical Care Community (@ATSCritCare) moderating virtual journal clubs featuring *ATS* journal articles. Participants who virtually attend a conference, Twitter chats, or journal clubs often have shared interest, leading to continued conversations and networking.

Medical Education

There is no question that social media uptake and engagement is highest among younger physicians, and the current generation of trainees are unique in the ways in which they learn and the environment in which they train.[33] Training in a time where the Internet is central to information gathering, residents and critical care medicine fellows are tasked with processing massive amounts of information to care for complex patients in a rapidly changing and fast-paced field. As such, the use of social media in graduate medical education is growing, with more residency and fellowship programs establishing an online presence. Social media engagement by training programs can enhance their own trainees' learning experience by sharing curated content specific to their training needs, including clinical teaching points and evidence-based medicine.[33] For example, several pediatric critical care fellowship programs (ie. @JHPICUFellows, @MottPICU, @UVA_PICU, @ACHPRPICU) are utilizing Twitter to share pediatric content, which benefits not only their own trainees but also any Twitter user following that account. Additionally, social media presence may be advantageous for resident and fellow recruitment given that a majority of applicants are utilizing social media sites to learn about training programs.[33,34]

Professional Networking and Community Building

An integral application of social media for the critical care community is to provide a venue for professional networking and community building. Similar to in-person interactions at large medical conferences or meetings, social media platforms provide those interested in critical care medicine the ability to interact with colleagues and experts, despite lack of physical proximity.[32] From these interactions, networks and communities are built and can lead to fruitful collaborations. The collaborations initiated on a social media platform may result in ventures into medical education, academic pursuits, or new research projects. Additionally, as the barrier of geographical location is overcome, opportunities for international interaction become feasible across both low- and high-resource settings. Moreover, these networks and communities can be truly interdisciplinary, embracing all health-care stakeholders including patients.[35,36] Community-specific hashtags are useful tools to facilitate cohorting of conversations relevant to that community and can be registered online through the Healthcare Hashtag Project (symplur.com) for data tracking. Currently registered and popular hashtags in critical care medicine include #Pulmcc, #CriticalCare, #PedsICU, and #ICURehab.

Patient Engagement and Education

The ability to reach beyond the walls of a hospital or conference venue and interact with patients is powerful and often understated. Collaborative advocacy is an important benefit of utilizing social media, providing a foundation for dialogue between critical care providers, researchers, and patients. Many public health campaigns have gained traction on social media platforms, including #WorldSepsisDay[37] and World Delirium Awareness Day (#WDAD2018). In these examples, sharing content relevant to the early detection of sepsis and delirium increases awareness among both practitioners and the general public for these important public health issues, in addition to heightened attention by potential funding agencies. Furthermore, researchers are increasingly using crowdsourcing to actively solicit patients' input and involvement into clinical trials.[38-41] Although this method may not be as common in critical care medicine compared to outpatient settings due to unexpected nature of ICU admission, 1 potential example is utilizing social media platforms for recruitment of intensive care survivors in the study of post-intensive care syndrome. Finally, critical care medicine as a field can only benefit from

Table 3. Twitter usernames/handles for critical care journals.

American Journal of Critical Care	@AACNme
American Journal of Respiratory and *Critical Care Medicine*	@ATSBlueEditor
CHEST	@accpchest
Critical Care	@Crit_Care
Critical Care Clinics	@CritCareClinics
Critical Care Medicine	@CritCareMed
ICU Management	@ICU_Management
Intensive Care Medicine	@yourICM
Lancet Respiratory	@LancetRespirMed
Pediatric Critical Care Medicine	@PedCritCareMed

increased recognition and understanding of the specialty by the general public to aid in philanthropic efforts to advance clinical care and research on a local, national, and global level.

Should Everyone in Critical Care Medicine Use Social Media Professionally?

Before we answer the question, we can learn from the perspectives of our colleagues in other specialties who are also paving the way for how HCSM is shaped in the 21st century. In a recent article on measuring success in social media in surgery,[31] Hogan and Winter wrote:

> Ours will be the generation proud to say we shifted the sands of educational deserts by open access and proliferation, seeding of data sharing, and watering grassroots in research-compromised environments . . . . Instant dissemination of contemporary surgical controversies on a truly global level drives improved (or at least reflective) health care for all. While a numerical assignment of value according to views, 'likes,' impressions or 'retweets' may seem meaningless to cynical, established academics, the impetus for universal improvement is self-evident . . . the best way to shift desert sands is to blow on them constantly (p. 259).

In this eloquent and insightful passage, the authors capture what we believe is the crux of social media engagement in all specialties of medicine. It is understood that not all intensivists are going to fully engage in social media on a daily basis—the seemingly constant barrage of information can be overwhelming for some. However, it is up to all of us to have an understanding of how social media is currently shaping health care and our field. As a starting point in the following section, we provide some basic tips to introduce the HCSM neophyte to the benefits of Twitter engagement.

Where Do I Start?

Open an account at Twitter.com and/or download the Twitter app on your smartphone. Choose a username, also known as a Twitter handle, that is short and meaningful (ie, the authors of this article are @SapnaKmd, @DrSeanBarnes, and @virenkaul). Twitter handles are not case sensitive. If you already have a Twitter account for personal tweets (family and politics), we highly recommend having a separate professional account. Upload a professional-appearing photo in your profile and provide a brief summary of your clinical/research interests.

"Follow" accounts of interest to you professionally. These may include critical care medicine journals (Table 3), organizations (Table 4), and people with shared clinical/research interests and leaders in the field. You will find new accounts to follow through the retweets of accounts you're currently following, progressively building your Twitter community.

Look at your Twitter feed at least once or twice a day (AM and PM) to stay up to date with content from the accounts you follow. As you begin to learn about Twitter and its use, its perfectly fine to "lurk"—which is actively listening without engaging or commenting. Lurking is an opportunity to learn about the flow of content on social media. If you start out following just a few accounts, your Twitter feed will be shorter and more manageable. Due to the rapid flow of information on Twitter, the half-life of a tweet is 24 minutes, with 75% of engagement occurring in the first 3 hours![42]

Table 4. Critical care medicine organization social media presence.

Organization	Twitter Handle	Instagram Account	Facebook Presence
American Association of Critical Care Nurses (AACN)	@AACNme	exceptionalnurses	Yes
American College of Chest Physicians (CHEST)	@accpchest	accpchest	Yes
American Thoracic Society (ATS): separate accounts for various assemblies, groups	@atscommunity	atscommunity	Yes
Australian and New Zealand Intensive Care Society	@anzics		Yes
European Society of Intensive Care Medicine	@ESICM		Yes
European Society of Paediatric and Neonatal Intensive Care (ESPNIC)	@ESPNIC_society		Yes
Intensive Care Network	@I_C_N	intensivecarenetwork	Yes
Intensive Care Society	@ICS_updates	ics_updates	Yes
Society of Critical Care Medicine (SCCM)	@sccm	criticalcaremedicine	Yes
The SMACC Team	@smaccteam	smaccteam	Yes
World Federation of Pediatric Intensive & Critical Care Societies (WFPICCS)	@WFPICCS		Yes

Abbreviation: SMACC, Social Media and Critical Care.

Figure 1. Example of retweeting by "quoting" a tweet.

As you get more comfortable with the flow of content, consider "retweeting" content of interest. There are 2 ways to retweet content—a simple retweet or "quoting" the tweet. Quoting gives you an opportunity to provide your own perspective about someone's tweet (Figure 1).

When you're ready, take the plunge with original tweets. You may make a simple comment, tweet the link to an interesting research article, or tweet a photo of a slide at a conference (use the conference hashtag!). Although the nuances of Twitter usage are beyond the scope of this article, there are excellent resources for general tweeting[43] and conference tweeting.[44]

What Are the "Don'ts" of Professional Twitter Usage in Health Care?

Don't ever give specific medical advice or try to diagnose online. Only post general information that will be beneficial and educational to other users and will bolster your credibility in your area(s) of interest.

Don't write about actual patients or cases. It is more difficult than expected to protect a person's identity even if identifying information is removed. To ensure patient privacy, never post cases, even if deidentified, online.

Don't ever sacrifice collegiality due to a difference of opinion. There are *many* opinions on Twitter, and its not worth sacrificing your reputation to engage in a noncollegial discourse.

Don't post information that could negatively impact your professional reputation. Although it may be tempting to post about personal "hot-button" issues such as politics, stick to tweets that reflect your views and practice in a positive light. This is another excellent reason to separate personal and professional accounts.

Don't post slides or content if the speakers asks for them not to be shared or specifies that a slide includes unpublished data. Often, speakers will show preliminary, unpublished data in their talks that they do not want widely disseminated before publication.

Don't forget to cite the source! Like academic writing, it is crucial and good social media etiquette to acknowledge the source of content. This can be done by including the author's twitter handle (if applicable) or simply their name. A common example arises at conferences—if you tweet a photo of a slide or an insight from a talk, be sure to acknowledge the speaker. Figure 2 shows examples for speakers with and without a

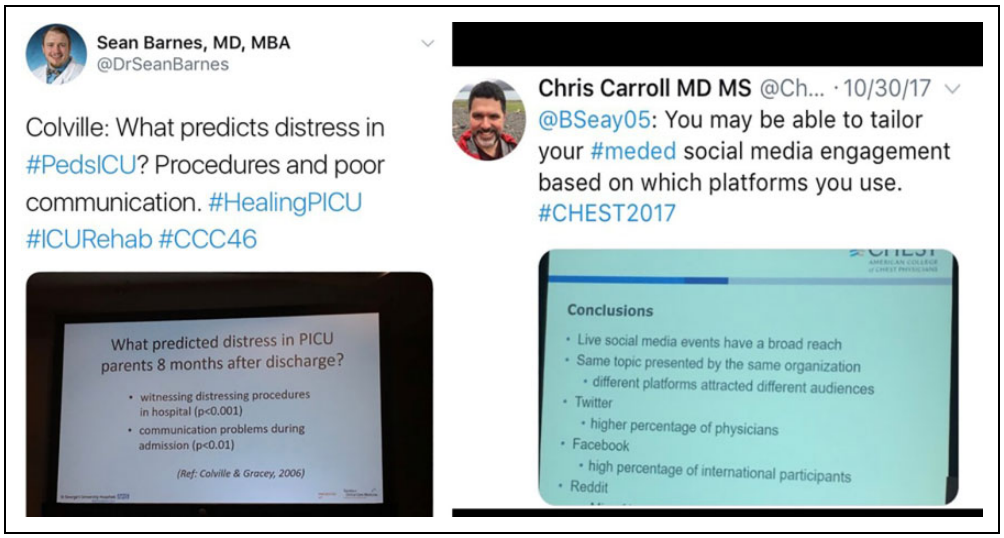

Figure 2. Examples of citing speakers when tweeting at conferences without (left) and with (right) Twitter handles.

twitter handle—note that the conference hashtag is included in the tweet.

Conclusions

Social media is making great strides as a method of knowledge translation, professional networking, and patient advocacy in the critical care community. Twitter may be a "low-hanging fruit" for those new to professional use of social media, and Twitter use at conferences is an excellent way to be introduced to the potential benefits of engagement. It is recognized that professional social media engagement may not resonate with every member of the critical care medicine community. However, it is imperative to have an understanding of how social media is shaping health care and our field now and into the future to continue to innovate in research, education, and patient advocacy in critical care medicine.

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