



Social Media Behavior and Attitudes of US Physicians: Implications for Continuing Education Providers

January 2017

A Clinical Care Options (CCO) White Paper

Social media is making greater inroads into both the formal and informal education that physicians seek out and receive online. In a recent survey conducted by CCO, more than 50% of the US physician learners stated they have accessed social media for professional purposes, and among those, 61% have used it to learn about and access new CME opportunities. Meanwhile, CME activities are becoming better integrated with social media via alerts about activities, posting of news and clinical information, and related opinions and advice. However, not all physicians use social media for education or other purposes related to their occupation, citing concerns and barriers such as privacy, appropriateness, and time constraints as reasons for abstaining. In this white paper, we outline key points of interest to the CME community, and propose an approach to further the integration of social media with CME that is pragmatic, is practical, and takes into account the need for further research and innovation as online CME evolves.

How Social Media is Changing Physician Education

It has been 20 years since the first so-called social media platforms emerged online, allowing users to share content and opinions while interacting with other participants in ways that were never before possible. Today, social media is part of the everyday fabric of society, from Millennials who are “digital natives” (ie, they have had computers since the crib) to members of the Greatest Generation, who remember life without TV but now might use Facebook to remain connected with their great grandchildren. Eight years ago, only 24% of Americans had a social media profile; today, that number has ballooned to 78%.^[1]

Physicians are no different from the average online citizen; they have taken to social media just like everyone else. What is unique, however, is how the education of physicians is being transformed via social media, sometimes in subtle ways and sometimes in ways that are transformative. Today, a well-timed tweet can help direct a physician to conference coverage or spur participation in a new certified online activity. Clinicians who are active on social media sites report that they not only appreciate finding relevant medical information but also enjoy the ongoing opportunities to

engage directly with peers and experts to learn how that information applies to clinical practice.^[2]

Social media platforms can be the delivery mechanism for an educational activity, but in some respects, participating in the social media platform is itself becoming the education. Participants can learn by tracking other participants’ statements, queries, and responses; they can provide their own ideas or treatment approaches and get immediate feedback; and in many cases, they can receive near instantaneous fulfillment of tailored responses related to a specific gap in their ability to diagnose or treat a patient.

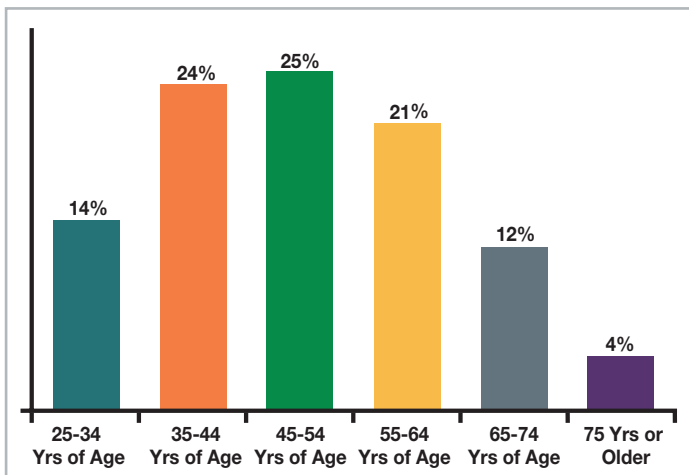
Social media networks are the conduit that allows physicians to create these “personal learning networks”^[3]—that is, a constellation of people and resources that can be accessed to answer very specific queries related to patient care. For example, some physicians are connecting with one another through social media groups, particularly on Facebook, establishing bonds and connections that facilitate not only networking and socialization but also the sharing of information that helps group members diagnose and treat challenging cases. Most of these communities are built around a forum where physicians can share knowledge relevant to their specialty and discuss professional issues with like-minded peers whom they consider credible.^[4]

U.S. Physician Survey: Social Media

With that backdrop, CCO sought to study the evolution and adoption of social media and its utility in medical education among our physician membership. We sought to take stock of current social media utilization and trends. We also wanted to listen carefully to our physician learners in order to understand how medical educators could fine-tune and evolve existing social media initiative and, of importance, do so in a way that is sensitive to physicians' concerns about privacy and appropriateness of social media for professional purposes. The results, as described in this white paper, were eye-opening and may have important implications for the CME community at large.

To learn more about the social media behaviors and attitudes of the learner population, a 29-question survey was sent to US physicians who are members of the Clinical Care Options (CCO) Web site. More than 200 responses were received. Survey respondents tended to be mid-career, with 25% reporting they were in the range of 45-54 years of age, although many younger and older physicians responded as well (Figure 1).

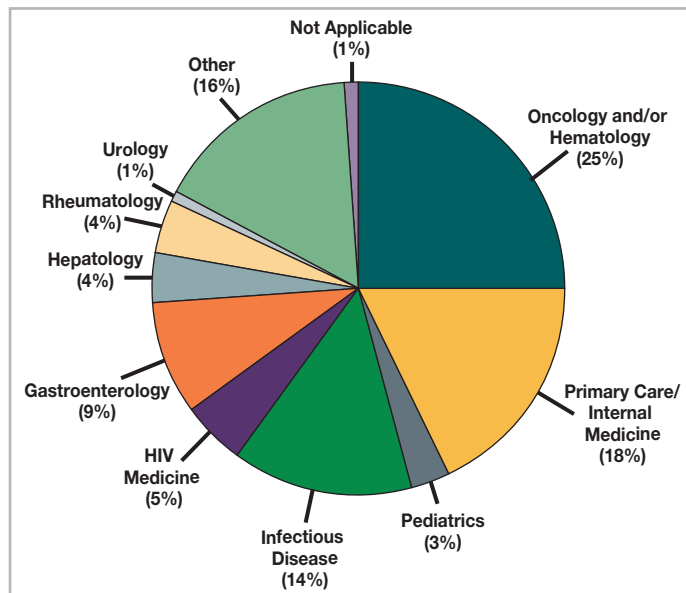
Figure 1. Survey respondents by age.



Respondents reported a wide variety of specialties, reflecting the diverse CCO membership attracted through specialty-specific portals. The largest group was hematology/oncology, which accounted for 25% of the overall survey takers (Figure 2) and represents one of the most rapidly changing medical specialties. Approximately one third of the physicians indicated their practice setting as an academic medical center, whereas the rest reported a variety of community (and some public/government) affiliations. Most work in an urban practice setting (65%), and others worked in suburban (26%) and rural (5%) settings.

The survey sample also skewed more heavily male, at 63% of respondents, which has been seen in other surveys and may in part reflect the demographic breakdown to be expected given the age range of respondents; that is, male physicians tend to be overrepresented in older age ranges.^[5]

Figure 2. Survey respondents by specialty.



Social Media Usage: Personal vs Professional

One key point evaluated through the study was how many physician members use social media for *personal engagement vs occupational or professional purposes*, such as accessing CME, seeking medical/conference information and news, or engaging in discussions with colleagues.

Overall, 71% of physicians reported using social media for personal reasons, with women more likely to use it in this manner compared with men (76% vs 68%, respectively); usage was very high among 25-34 year olds (90%) and, as might be expected, trended downward for older age groups. Even among physicians 65 years of age or older, however, usage was still fairly high at 56%.

More than one half (54%) also use social media professionally, with use again skewing more heavily to younger members (63% of 25-34 year olds). In fact, there seems to be somewhat of a “digital divide” in the learner population, with 64% of 25-44 year olds reporting using social media in this way vs just 48% of those 45 years of age or older (Table).

Table. Self-Reported Use of Social Media for CME and Other Occupational/Professional Purposes

	Aged 25-44 Yrs		Aged 45+ Yrs	
	n	%	n	%
Yes	52	64	59	48
No	25	32	63	52
Unsure	4	5	2	2

This social media age gap was even more dramatic in a survey of Canadian oncologists reported in the *Journal of Oncology Practice*, with social media use at 93% for respondents aged 25-34 years and just 39% for those aged 45-54 years.^[6] The authors warned that such a dramatic rift could lead to “critical gaps in communication, collaboration, and mentorship.”^[7]

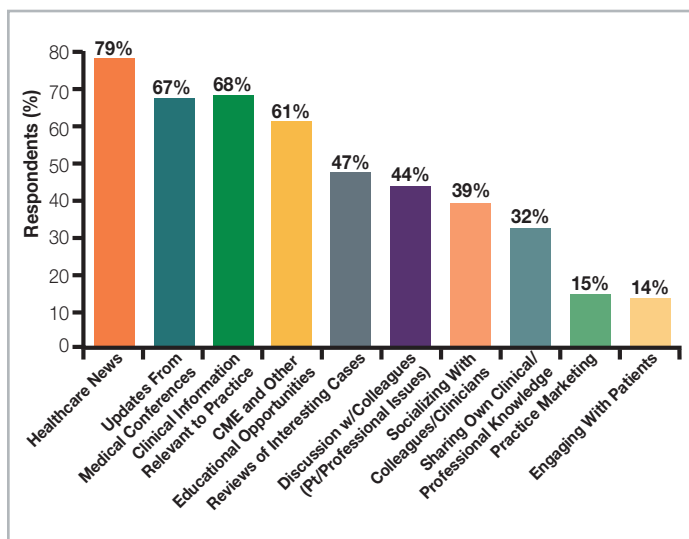
In addition, we observed a significant gender difference whereby 67% of our female respondents reported occupational social media use compared with just 46% of male respondents. At first glance, this should not be surprising as, in the population at large, women have traditionally been more likely to use social media than men. However, this social media gender gap has now narrowed to the point where men today are participating in social media almost as frequently as women,^[8] but hints of differential participation by gender remain in these data.

Professional use of social media by physicians varies by platform. Facebook, the most popular platform, skews more toward personal use: Among those physicians in the survey who said they do frequent social media, 46% reported they used Facebook for personal reasons, only 3% used it strictly for professional purposes, but a fairly substantial 29% said they use it for both. LinkedIn, the networking site designed for business, is frequented by 67% of social media-savvy physicians, most of whom (not surprisingly) cite professional reasons for using it. Twitter, although not as popular overall, has a respectable number of physicians who report using it for professional purposes.

What Do Physicians Get From Social Media, Professionally?

The clear winners are news, conference updates, CME notifications, and other *passive* forms of participation. Although many people mistakenly believe that social media is defined by social interaction,

Figure 3. Professional benefits of social media as reported by physicians.



the vast majority of social media use is all about passively consuming news feeds and browsing friends’ profiles rather than sharing or promoting original content.^[9] Moreover, the informal “90-9-1 Rule” for online communities states that 90% of users “lurk” and never contribute, 9% occasionally contribute, and 1% account for the vast majority of contributions.^[10]

This study reflects that rule of thumb, to some degree. A full 61% of our study participants said they used social media to find out about new CME opportunities, 66% cited medical conference information as a key benefit, and 79% said reading healthcare news was a key part of their social media experience. By contrast, discussion, sharing, and networking activities ranked much lower (Figure 3).

Content is not randomly dumped into social networks for physicians to stumble upon. It is fairly well established now that the most powerful forms of social media “advertising” are recommendations from a friend or trusted colleague.^[11] The same principle applies to the recommendation of clinical content. One physician who responded to the survey put it this way: “Sometimes on Twitter, or via my personal use of Facebook (by being friends with people I went to medical school/residence/fellowship with), I’ll find interesting articles, especially regarding the more policy/social/general news aspects of medicine.”

CME-Focused and Physician-Focused Social Media Sites

Clinically focused social networks like Doximity, SERMO, and QuantiaMD have offered CME in various forms. For example, Doximity offers *AMA PRA Category 1 Credit* to clinicians who read CME-eligible articles and submit a credit claim request. QuantiaMD offers access to a library of online CME programs produced and accredited by third parties. HealthTap, a smaller and somewhat lesser known network, offers CME credit to physicians who collaboratively discuss and solve challenging medical cases in a “Global Rounds” virtual space.

Although most of the physicians in the survey do not regularly use these clinically focused social networks, many have at least tried them, and small subsets of physicians who do access social media are regular users of SERMO (23%), Doximity (24%), and QuantiaMD (20%). Keep in mind, however, that one half of the physicians in the survey said that they did not access social media at all for professional purposes, and therefore, the actual percentage of physicians who regularly use these services likely is much smaller.

Regarding those physicians who have not used social media professionally, a substantial minority stated they had interest in trying some in the near future, particularly those with a clinical focus, such as Doximity (39%), SERMO (30%), and QuantiaMD (26%), which were ranked much higher than Facebook (16%) and Twitter (7%).

What have you learned via social media?

Based on physician responses to the CCO Social Media Survey

- Blood pressure management in the elderly
- The method to morcellate fibroids in a bag
- Current updates on the Zika virus
- Resistant bacteria
- Just read about the new quadrivalent flu vaccine
- The validity of liquid biopsy
- Learning the astrocytes in brain take glucose actively
- Perceptions related to pre-exposure prophylaxis
- Updates on newer regimens for HIV
- ASCO abstract updates/comments
- Upcoming conferences and local meetings
- New clinical guidelines
- Potentially better treatments based on clinical experience
- Treatment options that may be useful for palliation
- Upcoming new drug approvals
- Treatment of a rare side effect

Twitter, Medical Conferences, and Journal Clubs

Physician advocates of Twitter say the platform, which is based on the sharing of brief “tweets” limited to 140 characters, is ideal for networking and education.^[12] One of the most significant developments in social media–driven physician learning is the use of Twitter to rapidly and broadly disseminate the results of key studies and other developments that occur at medical conferences. The short, rapid-fire nature of the tweet makes it ideally suited to conference updates from attendees and CME providers alike.

Tweet volume during conferences has increased in recent years. For example, tweet volume surged 83% from the 2011 to 2012 American Society of Clinical Oncology (ASCO) meeting.^[13] Moreover, the demographics of those tweeting about meetings have shifted: In 2012, biotech analysts were the primary tweeters at the American Urological Association, but by 2013, urologists themselves had taken over the top spot.^[14]

Twitter use in the CCO survey of physicians skewed toward the mid-career physicians (aged 45-54 years), of whom 87% reported using it for personal or professional reasons compared with 50% of those aged 25-34 years. When asked whether they follow major medical conferences via Twitter, 52% of the 45-54 year olds said they followed tweets and/or tweeted themselves compared with 37% overall. These data suggest that approximately one third of physicians use Twitter as a means of keeping abreast with medical conference updates.

Twitter has also made waves for its use as a vehicle for virtual journal clubs,^[15] allowing for dramatically expanded participation compared with a traditional journal club, longer time to dissect and discuss a paper in depth, and insights from a wide variety of international participants and even the authors themselves. However, such usage still seems experimental and, in some cases, has not produced the hoped-for results. For example, our physicians said:

- *“Once a year, we have a Twitter chat to disseminate information but find that it does not reach enough [people] or the right people.”*
- *“I’ve tried to have a ‘professional’ Twitter and Instagram to share thoughts and articles, but it’s slow going. Mostly because it takes not an insignificant amount of time to curate meaningful things to post, and I am still very busy with training. It’s most useful to follow at conferences.”*

Barriers: Physician Concerns and Institutional Barriers

Resistance to social media is tied to specific barriers related to professional and patient issues. The most commonly cited reasons why physicians do not use social media platforms are concerns about personal privacy (48%) and concerns about patient confidentiality (47%), although some said they did not have enough time, did not think it was appropriate, or simply were not interested. Institutional barriers are an additional consideration; one physician stated that the hospital does not allow use of social media, whereas another reported only using a confidential university system to respond to patients’ questions and to provide lab results.

Some respondents were vocal about the reasons they have stayed away from social media, citing:

- Privacy (“ . . . that patients will learn about my private life, request to ‘friend you,’ etc”)
- Time constraints (“ . . . takes up too much time”)
- Lack of awareness and opportunity (“I am interested in participating in CME using social media, but I just have never had a chance”)
- Institutional barriers (“I wish our conservative academic health center allowed us to use more social media, but I believe HIPAA concerns and encryption concerns have not yet been addressed legally”)
- The desire to maintain boundaries (“Social media is for socializing. Prefer not to mix up”)

Red Alert: Social Media Notifications Are Great—for Some MDs

Clearly, one of the key uses of social media in the CME space is to disseminate information about newly available educational activities. The survey results suggest the message is getting through but only to some. More than one half (57%) of physicians said they had received a notification from some outlet, but only approximately 1 out of 10 physicians said they received such notifications through Facebook, and numbers for Twitter and LinkedIn were also in that range, whereas a fair number reported getting such notifications through QuantiaMD (34%) and Doximity (28%).

When physicians were asked if they recalled the specific notifications for any CME activities that they have received, their replies included:

- Advances in the diagnosis of pulmonary carcinoma
- Treatment options in type 2 diabetes
- Reducing cardiovascular risk in dyslipidemia
- Hepatitis C virus treatment
- HIV and infectious disease cases
- Irritable bowel syndrome
- Immunotherapy
- Targeted therapy for lung cancer
- Iron overload
- Management of multiple myeloma
- HIV pre-exposure prophylaxis
- Treatment of bacterial infections (Gram negative rods)
- New treatment options for psoriatic arthritis and ankylosing spondylitis

Patient Communication

Although email and patient portals are not social media, strictly speaking, the survey also explored how physician learners are interacting with, educating, and sharing content with patients through these platforms. Overall, 43% of learners said they do use email to communicate with patients. Notably, 55- to 64-year-old respondents of the survey seemed somewhat more likely than other age groups to use email in this manner (53%), and men were slightly more likely to report they had emailed patients vs women (46% vs 38%, respectively).

Midwestern physicians in the sample were less likely to email patients (29%), and of interest, there was a clear linear trend in email use favoring urban doctors (46% reported emailing patients vs 39% for suburban and 27% for rural). However, it is worth noting that most of the respondents were urban and suburban, with fewer rural physicians represented, so this subset analysis should be viewed as exploratory and hypothesis-generating.

Will Social Media Growth Continue?

Many physicians seem to have made up their mind about social media for education and/or other professional uses. Either they use it or they have a clear reason why they do not, such as privacy or time constraints. On the other hand, 29% of physicians stated there was “no particular reason . . . just have not used it.”

Could these physicians be social media converts, given the chance? There is indeed some evidence to suggest that physicians not accustomed to using social media for learning may start to favor it after being exposed to it in an educational context.

When program planners at Johns Hopkins Bayview Medical Center launched the residency-specific Twitter page @TEACHbayview, they found there was a significant increase in the use and frequency of Twitter for medical education over the ensuing 6 months.^[16] Like most residents today, the Bayview trainees were already heavy social media users, although only a minority used Twitter for medical education. Yet, after the launching and raising awareness of the Twitter page, the number of residents using Twitter for medical education weekly increased from 11% to 60%. The residents also developed more favorable attitudes toward social media-based medical education as a result of the intervention.

The missing link here is outcomes: Did this intervention have an appreciable impact on learning for these internal medicine residents? The authors did not measure it, and it remains an open question. Likewise, in a recent meta-analysis of 10 studies looking at how medical students use social networking sites for learning, none explored the impact of social media on academic performance.^[17]

Moreover, the data suggest that email use with patients may be specialty specific. For example, reported rates were 41% among infectious disease specialists and 52% among oncology specialists but only 29% among primary care physicians. However, the diversity of specialties represented in the survey makes it difficult to make cross-specialty comparisons with a large degree of confidence.

Patient portals are a similar story—at least on the surface. Overall, 44% of learners said they used portals to communicate with patients, almost identical to the proportion who use email. However, this time, the 55-64 year olds were much less likely to use portals for patient communication (34%), as were men (41% vs 49% for women). And in a reversal of the urban-to-rural trend seen in email, portal use was less frequently reported for urban physicians (40% vs 53% for suburban and 64% for rural).

It is also important to note that the survey did not evaluate the potential relationships among use of email for patient communication and clinicians' use of electronic medical records with patient portals or use of bidirectional apps such as WellDoc and others.

Limitations and Caveats

It is hard to study social media in a vacuum. In order to reach survey participants, an email was sent out to site members who have elected to receive emails from CCO. Because they are email users and they have opted in to these messages, the participants in this survey may represent established technology adopters who may be more inclined than others to be active online and, in particular, with social media. That said, email is very widespread today; moreover, there is no particular reason to think that the social media behaviors of physicians who have opted out of our survey emails would be different from those of physicians who have opted in to receive emails.

Although we believe the results of this survey are a reasonable surrogate for the attitudes and opinions of US physicians regarding social media, caution is warranted that the survey-taking population is not a general sample of US physicians but a sample of US physicians who are members of CCO. Finally, some of the demographic breakouts and other subsets described are by design based on smaller numbers of learners, and thus, should be viewed as hypothesis-generating rather than conclusive.

Recommendations

Based on current demographic trends and the results of this study, we recommend that CME planners, providers, and stakeholders seek out practical ways to incorporate proven social media tools and strategies into their educational programs to drive engagement, while considering new ways to evolve education through experimentation and innovation.

In particular, our recommendations are:

Think young. Thanks to high levels of social media adoption, younger physicians (such as residents and fellows) will more likely be the beneficiaries of CME-based social media initiatives. Mayo Clinic researchers found that younger CME course participants had more favorable attitudes toward social media, and as a result, they recommended course directors guide their efforts toward the “more youthful, technology-savvy CME participant”^[18]—keeping in mind that such strategies will only become more relevant as more Millennials enter the healthcare workforce.

Leverage and innovate. What is being done now that potentially could be done better or differently by using social media? Can a Facebook group be used to obtain a deeper assessment of educational needs? Is there an opportunity for obtaining postactivity follow-ups on Twitter? Social media experiments are a high-risk, but potentially high-reward, venture that could yield new insights on how to reach physicians, educate them, and measure the impact of education.

Content is key. We found that when our physician learners use social media, they are mainly seeking to absorb news and information and learn about new CME activities. That is in line with a broader survey of physicians showing that at work they used social media to keep up with healthcare news (40%), whereas there was somewhat less interest in discussion with peers (33%) and progressively less interest in using it for practice marketing (20%) and connecting with patients (7%).^[19] With that in mind, CME providers can meet the needs of physicians by making new activities and educational content readily accessible via social media feeds.

Allow for interaction. Content consumption dominates social media, but that does not diminish the social aspect. Remember that our study and others show that a sizeable chunk of social media-savvy physicians (at least one third) value the discussion opportunities that social media provides. Make it easy to share the content on social media. Consider taking it one step further and allow for discussion opportunities, such as CCO’s ClinicalThought™ platform, where we have made it easy for physicians to interact and discuss the latest data—with each other and with the experts themselves who are making news and helping put that news in clinical context.

Keep it relevant. A cardiologist is not necessarily going to be interested in best practices for treating psychiatric disorders—unless, perhaps, best practice involves drugs that may elevate the patient’s cardiovascular risk. Think about the audience when choosing content for social media feeds, but look for opportunities to think outside the box and use social media to deliver relevant education that the physician may otherwise not encounter.

Make it engaging. “Social” implies a group comprising individuals who speak with each other, not at each other. Develop a social media “voice” and tone^[20] that approximates conversation and is appropriate to your audience.

Rethink learning measurement. One of the biggest challenges at the intersection of social media and CME is how to analyze the formal and informal learning that takes place as a physician participates in an activity or accesses the resources and people that make up his or her personal learning network. Li and colleagues^[21] have proposed a conceptual model for analyzing social media learning that has the potential to yield new insights. We are currently interested in our learners’ online interactions on our ClinicalThought™ expert-driven social media platform and think an analysis of learner comments and questions may help us quantify the informal learning that is taking place online.

Redefine metrics. Speaking of engagement, consider looking beyond the traditional measures of engagement to find data that tell the whole story behind the learner’s interaction with the content. How often is your CME content shared? How many learners do you reach with each social media interaction? How often are users commenting and interacting with one another?

Try social promotion. Given the demands on a physician's time and attention, it is sometimes a big challenge to get the word out to them on social media. The major platforms offer multiple ways to advertise, boost posts, and otherwise help highlight a specific message. A single promotion or small campaign could be deployed to test the waters and determine if such an approach spurs additional engagement among members of the target audience.

Social Media Tomorrow: Cautions, Caveats, and Optimism

As social media has come of age, it is not only integral to general social issues, but increasingly a part of physicians' professional lives. It is a particularly relevant tool for informal learning, for finding the CME activities most relevant to their clinical practice, and in some cases, such as CCO's ClinicalThought™ and *inPractice*® Training Program, social interaction is integral to the education itself.

But not all physicians are the same. An analysis of the attitudes and preferences of our US physician population reveals some strong opinions that we should keep in mind. Just as some physicians flock to it, some continue to be skeptical of combining structured CME activities with immersive, free-wheeling social media platforms that elicit concerns about privacy, appropriateness, patient confidentiality, and time constraints.

Therefore, we end this white paper not with an ebullient call to action that proclaims social media as the future of CME, but with a call to our CME colleagues to follow a path that walks a careful line between *practical integration and forward-thinking experimentation*. Our experience with social media, and our interactions with physicians, tell us that social media is a tool that can be judiciously used to help reach learners and enhance the learning experience.

We are excited by the promise of incorporating more social features into educational activities and making more content available via social media for those physicians who are plugged in and receptive to using Facebook, Twitter, and other platforms as adjuncts to their own "personal learning network"—that is to say, the informal web of people and resources that clinicians cultivate and access, not only through Web browsers and mobile devices, but also offline, in order to learn and provide the best patient care possible.

We are particularly excited to continue our exploration and incorporation of social features in the ClinicalThought™ expert-driven social media platform, the *inPractice*® point-of-care resource, and our *inPractice*® Training Program that offers collaborative opportunities for residents, fellows, and program directors. All the while, we are honing our social media strategy to offer more targeted content to learners who have followed us on the leading social media platforms and are planning new ways to experiment and innovate using social media to help make CME even more relevant to the practicing physician.

About Clinical Care Options

Clinical Care Options (CCO), a leader in the development of innovative, interactive, online, and live CME-certified CME programs and proprietary medical education technologies for healthcare professionals, creates and publishes original CME and information resources that are designed specifically for healthcare providers. CCO's educational programs are developed not only to provide the latest scientific information, but also to support the understanding, confidence, application, and competence of healthcare professional learners. In addition to the latest point-of-care resource, *inPractice*®, CCO provides a spectrum of live and online educational programs and formats.

CONTACT:

Andrew D. Bowser, ELS, CHCP
Director of Educational Strategy and Outcomes

Clinical Care Options
12001 Sunrise Valley Drive, Suite 300
Reston, VA 20191
646-258-2457
abowser@clinicaloptions.com
clinicaloptions.com

References

1. Percentage of U.S. population with a social media profile from 2008 to 2016. Available at: <https://www.statista.com/statistics/273476/percentage-of-us-population-with-a-social-media-profile/>. Accessed November 4, 2016.
2. Bautista N. Continuing medical education and social media for physicians: finding the right mix. Available at: <http://knowledgeplus.nejm.org/continuing-medical-education-and-social-media-for-physicians-finding-the-right-mix/>. Accessed November 4, 2016.
3. Martindale T, Dowdy M. Personal learning environments. Emerging technologies in distance education. Veletsianos A, Ed. 2010. Available at: http://www.aupress.ca/books/120177/ebook/99Z_Veletsianos_2010-Emerging_Technologies_in_Distance_Education.pdf. Accessed November 4, 2016.
4. Rolls K, Hansen M, Jackson D, Elliott D. How health care professionals use social media to create virtual communities: an integrative review. *J Med Internet Res*. 2016;18:e166.
5. Young A, Chaudhry HJ, Pei X, et al. A census of actively licensed physicians in the United States, 2014. Available at: <http://www.fsmb.org/media/default/pdf/census/2014census.pdf>. Accessed November 4, 2016.
6. Adilman R, Rajmohan Y, Trinkaus M, et al. Social media use amongst oncologists: results of a national physician survey. *J Clin Oncol*. 2014;32(May 20 suppl). Abstract e17519.
7. Adilman R, Rajmohan Y, Brooks E, et al. Social media use among physicians and trainees: results of a national medical oncology physician survey. *J Oncol Pract*. 2016;12:79-80.
8. Anderson M. Men catch up with women on overall social media use. August 28, 2015. Pew Research Center. Available at: <http://www.pewresearch.org/fact-tank/2015/08/28/men-catch-up-with-women-on-overall-social-media-use/>. Accessed November 4, 2016.
9. Hall JA. When is social media use social interaction? Defining mediated social interaction. *New Media & Society*. 2016. doi: 10.1177/1461444816660782.
10. Nielsen J. The 90-9-1 rule for participation inequality in social media and online communities. Available at: <https://www.nngroup.com/articles/participation-inequality/>. Accessed November 4, 2016.
11. McCaskill A. Recommendations from friends remain most credible form of advertising among consumers. Available at: <http://www.nielsen.com/ug/en/press-room/2015/recommendations-from-friends-remain-most-credible-form-of-advertising.html>. Accessed November 4, 2016.
12. Fuller MY, Allen TC. Let's have a Tweetup: the case for using Twitter professionally. *Arch Pathol Lab Med*. 2016;140:956-957.
13. Chaudhry A, Glodé LM, Gillman M, Miller RS. Trends in Twitter use by physicians at the American Society of Clinical Oncology annual meeting, 2010 and 2011. *J Oncol Pract*. 2012;8:173-178.
14. Matta R, Doiron C, Leveridge MJ. The dramatic increase in social media in urology. *J Urol*. 2014;192:494-498.
15. Leveridge MJ. The emerging role of social media in urology. *Rev Urol*. 2014;16:110-117.
16. Galiatsatos P, Porto-Carreiro F, Hayashi J, et al. The use of social media to supplement resident medical education - the SMART-ME initiative. *Med Educ Online*. 2016;21:29332.
17. Guraya SY. The usage of social networking sites by medical students for educational purposes: a meta-analysis and systematic review. *N Am J Med Sci*. 2016;8:268-278.
18. Wang AT, Sandhu NP, Wittich CM, et al. Using social media to improve continuing medical education: a survey of course participants. *Mayo Clin Proc*. 2012;87:1162-1170.
19. Gindin A. Report: physician adoption of social media. Available at: <https://www.meddatagroup.com/wp-content/uploads/MedDataGroup-Physician-Adoption-of-Social-Media-Q22014.pdf>. Accessed November 4, 2016.
20. Lee K. How to find your social media marketing voice: the best examples, questions and guides. Available at <https://blog.bufferapp.com/social-media-marketing-voice-and-tone>. Accessed November 4, 2016.
21. Li X, Gray K, Chang S, et al. A conceptual model for analysing informal learning in online social networks for health professionals. *Stud Health Technol Inform*. 2014;204:80-85.