Tweet This #Toxicology2.0

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Published online: 1 January 2014
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The pervasiveness of social media is irrefutable. Social media is an umbrella term referring to blogs, podcasts, micro-blogging, wikis, and online videos to name a few. There are over one billion Facebook members and 500 million Twitter users [1]. One hundred hours of YouTube videos are uploaded every minute [2]. The media, law enforcement, and educational institutions have already recognized and begun to harness the potential of social media. Within only 8 mins of the Boston Marathon bombing, the Boston Globe sent out its first tweet announcing the explosions [3]. A missing Saudi Arabian teenager was found in just 3 hrs after a tweet with a mere 300 followers, thanks to the exponential power of re-tweeting [4]. Countless other examples exist from political campaigns driven by twitter to small businesses connecting with unprecedented numbers of customers. The field of medical toxicology possesses many unique qualities that make it ideal to maximize this new and powerful resource.

Before I proceed, we need to address the elephant in the (figurative) room. Most physicians hear the term social media and immediately tune out. Perhaps it is because they see no immediate connection between medicine and the endless parade of baby pictures and celebrity self-promotion that social media has become synonymous with. Social media, however, is no longer exclusively a voyeuristic tool of narcissistic screenagers. It is a powerful platform that is being leveraged to advance higher education, patient care, and the bedside application of scientific research.

Education

The doubling time of medical knowledge in 1950 was estimated to be 50 years and projected in 2020 to be 73 days [5].

A resident who begins my 6-year training program in Emergency Medicine and Toxicology in 2020 will experience 25 doublings of medical knowledge before completing fellowship. Can the current model of passive didactics sustain this colossal growth in knowledge? Prober and Heath suggest in their proposal for revising medical education that it is time for a flipped classroom, a lecture hall without walls [6]. Trailblazer and Life in the Fast Lane blogger, Dr. Mike Cadogan, accepted this challenge and started Free Open Access Meducation (FOAM) (#FOAMed, #FOAMtox). It utilizes social media to facilitate lifelong learning and interactive education [7]. This movement is designed to keep pace with the ever-increasing knowledge pool physicians are expected to maintain. It capitalizes on the key social media characteristics of convenience, ease of use, expansive reach, and customization to make education available to anyone, anywhere, anytime. This application is one that we can learn, develop, and grow from, tailoring it to fit the needs of toxicology. For example, while it is not feasible to attend every toxicology conference, it is possible to have the content delivered to your phone for instant access. Imagine a classroom where the traditional lecture is augmented by a constant stream of twitter comments and questions, allowing a level of interaction that could not otherwise be attained. The ease with which social media allows for the delivery of knowledge to a learner is unparalleled by traditional methods. Our willingness to participate in social media may be the only rate-limiting factor.

Patient Care

The American College of Medical Toxicology (ACMT) has over 500 members that are spread across the nation. Many toxicologists practice in settings where they are the only experts at their institution. Toxicology is arguably one of the most rapidly shifting specialties, its face ever changing with

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new designer drugs, not yet reported toxicities, and rare exposures. Social media may be the way to most effectively and quickly link our geographically diverse specialty. It can serve as a platform to share our collective patient care experiences. ACMT established a forum in 2006 with this exact goal in mind. As of October 28th, 2013, the ACMT's Management Questions forum had 130 unique posts in just less than 7 years. There was an average of 1.75 comments per post; however, 47 posts had 0 comments [8]. Can we do better? Consider this contrasting example. A well-known leader in emergency medicine recently posted a clinical case for management and discussion via twitter. Within 1 h of posting, there were 67 tweets in response and within 5 h, there were 184 tweets from over 25 users [9]. The utility of social media to enhance accessibility to expert consultation and, subsequently, improve patient care cannot be underestimated.

Knowledge Translation

The slow transition of research findings to bedside practice is a well-known problem in medicine. There are many barriers to physician implementation of novel treatments, such as awareness, acceptance, applicability, agreement, ability, and adherence [10]. Toxicologists know this first hand, as it relates to our recommendations for the use of novel antidote therapies that are not yet accepted by mainstream medicine. Numerous studies have demonstrated that poison center recommendations are often not followed [11, 12]. This may be partially due to unfamiliarity with infrequently used antidotes and limited access to primary toxicology literature. In this respect, social media can further connect us and allow dissemination of information to those outside of the toxicology community. Furthermore, many of the barriers mentioned previously may diminish through the use of social media. Medical research is only as powerful as its reach, and now, we have a tool to maximize its dissemination. Each of the top ten medical journals by impact factor already have established Twitter accounts and use them to provide introductions and links to articles among other things [13]. Social media can also decrease the delay to post publication critique (i.e., letters to the editor), expert expressions of approval and community agreement on value. If we can utilize social media to decrease the time to acceptance of new ideas through open, real-time discussions about scientific findings, we will make great strides towards decreasing the translational gap.

Questions

While the potential for social media is vast, its limitations also deserve recognition. User-generated content is one of the greatest strengths of social media, but also an often cited

criticism. There is no standardized quality control process prior to posting, and physicians worry that patients will get misinformation or delay medical care based on Internet advice. There is also the concern that novice learners will not be able to discern fact from opinion when perusing blogs, podcasts, or tweets to augment knowledge. Beyond the issues surrounding quality of information, there remain numerous questions on how to regulate physician professionalism, maintain patient privacy, and address the digital divide in access to social media.

The Future

Researchers are already exploring the use social media for epidemiologic surveillance, toxic vigilance, augmentation of research enrollment, and behavior modification in drug abuse [14, 15]. We have only begun to harness the power of social media as it pertains to toxicology. It is a vast, underutilized tool that has the potential to transform, expand, and improve our field. Social media applications are infinite and only limited by our vision and participation.

Acknowledgments The author would like to thank Drs. Amandeep Cheema and Christine Murphy for their assistance with this editorial.

Source of Funding None

Conflict of Interest None

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