

**DSC 510: Case Study Report 2**  
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**1. How is social media being used in medicine and healthcare?**

The internet and social media platforms are disrupting traditional means of medical information dissemination and health-related interactions, leading to both great opportunities and risks (Dijkstra et al., 2018). Social media can be broadly defined as any website or application that enables individuals to create content and share it with others in a social network. These platforms include social media giants like Twitter, Facebook, YouTube as well as smaller blogs and digital publishing operations. A comprehensive systematic review of the ways in which social media is being used in public health and medicine was compiled by Giustini et al. in 2018. Among the many ways social media is being leveraged, the authors focused on how it is being used to provide information, provide answers to medical questions, facilitate dialogue between patients and health professions, collect data on patient experiences and opinions, to aid in health interventions, for health promotion and education, to reduce illness stigma, and to serve as a platform for online consultations (Giustini et al., 2018, p. 2).

The effective use of social media in medicine and healthcare may also benefit the movement for more rapid progress in evidence-based medicine. Chan et al. suggest (2018) that social media is leading the new types of medical scholars. They define these types as critical clinicians who provide appraisal of studies and ideas, translational teachers who collaborate with scientists to expertly communicate new findings using the latest social media technologies, and interactive investigators who not only produce knowledge but engage with the public (Chan et al., 2018, p. 3). Beyond these types of digital health scholars, it is clear that social media is driving increased access to medical information among the general public and facilitating conversations around health that would not otherwise be possible. Interestingly, a 2018 article by Parwani et al. (2018) on social media's impact on cardiovascular medicine found that in addition to providing a means for clinicians to communicate their findings and engage with peers, there was a potential for these platforms to be leveraged to facilitate conferences digitally instead of in-person. Indeed we are now living in a world where this opportunity to communicate and collaborate digitally is absolutely necessary and possible thanks to technologies like social media.

**2. What other ways do you think we can use social media in medical research and healthcare?**

Beyond the methods listed above, there are opportunities to leverage social media to identify new public health challenges. One such public health challenge, is to determine the impact of social media itself on our behaviors and emotions. Multiple research studies have now linked increased social media usage to poor sleep, anxiety, depression and low self-esteem, particularly among teens (Shense, 2018; Woods, 2016). Using the platforms driving these negative health outcomes, to study these health outcomes seems a bit backwards, but it may also provide insights that will enable us to mitigate further harm. For all the great benefits of

social media for health communication, it is important that the harms do not outweigh these benefits.

### **3. Are there harms in using social media in medicine?**

While the benefits of social media in medicine are great, there are a number of troubling effects of this novel form of communication. Particularly concerning is the low barrier to entry provided by social media platforms. While this helps with the speed of information dissemination, it comes at the expense of the editorial oversight and peer-review that traditional sources of medical research have had (Chan et al., 2018, p. 2). While some blogs have adopted peer-review style publishing, many still do not. Even among reputable publishers, like Springer Nature, that do use peer-review, problems with fake reviews from author-suggested reviewers have arisen (Callaway, 2015). This means that there is a risk of spurious research and dubious peer-review being presented in the social media space. There is also concern over the outsize influence of popular social media content producers in shaping new entrants to the field (Chan et al., 2018, p. 2). If incorrect information is not amended, it can negatively impact health outcomes - though the same could be said of any medical publication.

This problem becomes particularly apparent when it comes to medical information presented online to the general public regarding diet and supplementation. For example, Soleymani & Shapiro question whether the public's current infatuation with biotin supplementation is being driven by social media, and whether this is based on scientific evidence of biotin's effectiveness (2017). They argue that its popularity is not backed up by sufficient clinical evidence supporting its efficacy. John & Lipner argue the same point in the *Journal of Cutaneous Medicine and Surgery* (2019), while adding that this is a concern given that the FDA has recently warned that biotin supplementation can interfere with laboratory tests. A quick glance at the top 5 most viewed YouTube videos for the word "biotin" show they have between 1.2 and 3.4 million views each. This is driving massive self-prescription of biotin, before clinical evidence has deemed it worthwhile. This, I believe, is symptomatic of the harms that can arise with faster, more open access to medical information.

### **4. How can natural language processing and text mining can be used to leverage the unstructured data in social media?**

There are plenty of opportunities to leverage natural language processing and text mining techniques on unstructured or non-relational data in social media. To narrow the scope of this question, I will focus on social media NLP and TM opportunities as they pertain to health and medicine. To the extent that we must respect anonymity and sensitive medical information, public posts on social media platforms can be mined for understanding the health, behavior, thoughts, and emotions of the public. The ability to analyze or ingest this content may provide healthcare professionals with additional insights or tools to improve health outcomes. Also apparent is the capacity to use Twitter and other platforms to engage in scientific debate and root out false information (Pershad et al., 2018). Perhaps natural language processing and text mining could facilitate this process of identifying social media content that may need expert review to prevent the spread of false information or to have doctors peer-review each other's posts. Just as current election posts are being flagged on Twitter, perhaps healthcare related posts could be flagged for review by trusted medical sources.

In terms of better leveraging NLP and TM, hiring more data analysts/scientists with NLP and TM skills or upskilling existing healthcare employees with the help of online courses could help NLP and TM become more widely used. Having these employees available could then prove beneficial to the direct work of researchers, doctors, and other healthcare professionals. This falls in line with the thinking of Chan et al. (2018) on the need for a new generation of versatile digital health scholars and clinicians to advance evidence-based medicine.

**5. What other statistical or data science methodologies could be use to analyze social media and other types of unstructured data? How? Give some examples.**

In their systematic review of systematic reviews of social media in public health and medicine Giustini et al. (2018) demonstrated some more statistical or analytical methodologies for evaluating medical text data and word frequency for thematic understanding. There are opportunities to leverage computer vision to collect information for research studies. Say put out a call for data on social media and have individuals submit photos that could be parsed using computer vision, this could lead to more robust datasets for medical researchers. For example you could conduct research studies within a social media platform with participant permission. An idea I had recently to support compliance with medical prescriptions would be to use computer vision to check off that an individual has taken their pills on time and could integrate with messaging systems to inform doctors or researchers about compliance.

**References**

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