

Study shows social media content may hold keys to important health information

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Language used in everyday social media posts may have a strong connection to an individual's health, according to new research from the Perelman School of Medicine at the University of Pennsylvania. In the first study of its kind, the new results suggest that not only are many adult Facebook and Twitter users willing to share their social media data and medical data for research purposes, but that by building a language databank, it may be possible to link social media content to health outcomes. Results of the study are published online today in the journal *BMJ Quality & Safety*.

"We don't often think of our [social media](#) content as data, but the language we use and the information we post may offer valuable insights into the relationship between our everyday lives and our [health](#)," said the study's senior author, Raina M. Merchant, MD, MSHP, director of the Social Media and Health Innovation Lab and an assistant professor of Emergency Medicine at Penn Medicine. "Finding ways to effectively harness and mine that data could prove to be a valuable source of information about how and why patients communicate about their health. There is a rich potential to identify health trends both in the general public and at the individual level, create education campaigns and interventions, and much more. One of the unique aspects of this data is the ability to link social media data with validated information from a health record."

In the study, patients visiting an Emergency Department were asked if they used social media, and if they would be willing to share their social

media data and electronic medical data with health researchers, for the purpose of building a research database. Similar to existing banks of genomic data, the research database of language and other social media data allows researchers to draw correlations between participants' online content and their health. More than 1,000 participants consented to share their social media and [medical data](#) over seven months. Analyzing content from as far back as 2009, the shared social media data consisted of nearly 1.4 million posts and tweets to Facebook and Twitter, comprising almost 12 million words.

"The social media and health data bank, which we are continuing to build, serves a valuable purpose in helping us think about health in new ways, some of which we haven't even begun to consider," Merchant said. "Just as genetic information is banked to track potential future health, previously unobservable social media postings—made up of words, language, and conversations—may also be banked from consenting individuals and evaluated for potential correlations with health and [health outcomes](#)."

Some of the information is explicit like "I forgot to take my water pill for my heart failure today," and others are more subtle like a series of photos with salty foods. Variations in word complexity could suggest cognitive decline, or a change in the number of words per post or network size might be indicative of a depressed mental status. Posted content could also reveal information about adherence to prescribed medications, new medical conditions, or health behaviors like exercise and diets.

The researchers also found that individuals with a given diagnosis in their electronic medical record were significantly more likely to use terms related to that diagnosis on Facebook than patients without that diagnosis in their electronic medical record. For example, among individuals diagnosed with abdominal pain, 21 percent used terms such

as "stomach pain" and "belly ache" on Facebook compared to eight percent of individuals without that diagnosis who used those terms.

"These findings suggests that social media is a promising avenue for exploring how patients conceptualize and communicate about their specific health issues," said Lyle Ungar, PhD, a professor of Computer Science at the University of Pennsylvania's School of Engineering and Applied Science, and a co-author on the study. "We see this as just the first of many studies to come examining the relationship between health and social media."

Merchant emphasized that attention to patient confidentiality was critically important for the research project. "All participants consented to having their data shared, and strict policies for protecting health record data were adhered to. The opportunity for studying new connections in social media and health is significant as we were able to collect patients' digital footprints in a way that is transparent and attentive to issues of patient privacy."

More information: Kevin A Padrez et al. "Linking social media and medical record data: a study of adults presenting to an academic, urban emergency department," *BMJ Quality & Safety* (2015). DOI: 10.1136/bmjqs-2015-004489

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