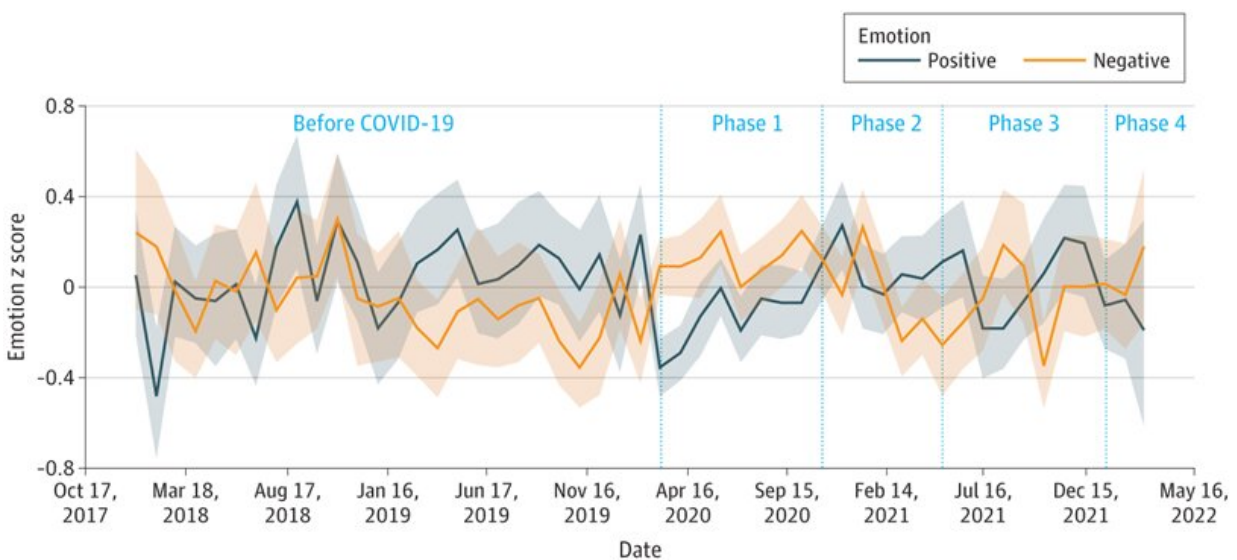# Tweets showed increasing loneliness among emergency medicine doctors during COVID-19: Study

June 1 2023

Positive and Negative Language Sentiment Across Phases of the COVID-19 Pandemic. Graph shows *z* scores for positive and negative emotions over time. Solid lines denote mean values, and shaded areas denote 95% CIs. Credit: *JAMA Network Open* (2023). DOI: 10.1001/jamanetworkopen.2023.12708

Expressions of loneliness and depression from emergency medicine doctors increased consistently on social media as the COVID-19 pandemic wore on, according to a new *JAMA Network Open* study by researchers at the Perelman School of Medicine and the School of

Engineering and Applied Sciences at the University of Pennsylvania.

Using artificial intelligence to process Twitter posts from nearly 500 emergency medicine (EM) physicians, the study team found that mentions of these feelings—along with anxiety and anger—went from relatively rare before the pandemic to common after COVID-19 became widespread in the United States in March 2020.

"The consistent and real rise of loneliness among emergency medicine physicians was shocking, and I'd hypothesize that this may have been true across medicine at large," said co-lead author Anish Agarwal, MD, the chief wellness officer for Emergency Medicine and deputy director for the Penn Medicine Center for Digital Health.

"The surgeon general recently highlighted an epidemic of loneliness in America, and this seems to really indicate that it doesn't spare health care workers. If anything, this issue has been potentially worse within medicine and, in a field so affected by burnout and emotional strain, we believe this gives us another lens to explore these problems in the future."

Amid the worst of COVID-19, many physicians, particularly those on the front lines in emergency departments, opened up on social media about what they were seeing every day. At a time when there was some mystery—and disinformation—about a disease circling the globe, physicians became more prominent online. This influx of attention and posts, therefore, provided a trove of data that could be studied to better understand shifts going on in the profession as a whole during the crisis.

Agarwal, co-lead author Sharath Guntuku, Ph.D., an assistant professor of Computer and Information Science and a Senior Fellow in the Leonard Davis Institute of Health Economics at Penn, and their fellow researchers used machine learning techniques to assess themes and

specific language relating to emotions in the public tweets of emergency medicine physicians, stretching from 2018 to 2022.

The Twitter accounts they pulled data from belonged to doctors working in counties with the highest COVID-19 case loads, including New York, Maricopa, Ariz., and Los Angeles. Information from tweets were broken up into pre- and post-pandemic segments, with March 2020 as the dividing line.

Agarwal and Guntuku's study showed that negative emotions and themes were expressed much more often amid the pandemic, and positive themes took a significant dive. The expressions of loneliness in physician tweets increased by as much as 17% during the two years of COVID-19 pandemic they analyzed, compared to the two years prior.

Similar increases were observed with expressions of anger and anxiety, though they reverted roughly toward pre-pandemic levels eventually. Loneliness and depression appeared to have remained elevated at the end of the study's observed time period, though they weren't quite at their peaks.

The study also provided insights into how much COVID-19 dominated emergency medicine clinicians' thoughts after March 2020. The top five themes in the pre-pandemic period were "free open-access medical education in emergency medicine," "residency education," "gun violence," "quality improvement in health care," and "resident professional societies."

However, since the pandemic started, the top themes identified were "healthy behaviors," "pandemic response," and "vaccines and vaccination." Even those that may not be directly related to health care had clear ties to the pandemic, as "unstable housing and homelessness" and "emotional support for others," were top concerns during the height

of COVID-19's spread.

Seeing these trends and building a system in which the general mood of an entire industry can be taken could be key to fighting burnout that is hitting every level of health systems across the nation.

"The ability to measure these changes, using language on social media, provides an opportunity to address the underlying challenges and potentially intervene to improve the well-being of our healthcare workforce," Guntuku said.

Agarwal emphasized that what they found shows a need to "invest in social connectedness" of health care workers of all stripes.

"We likely need to reinforce mentorship, connection, and career growth across the board," Agarwal said. "It's a challenging field—no one denies that—and, to get through, it takes a village. Let's rebuild and sustain that village."

More information: Anish K. Agarwal et al, Investigating Social Media to Evaluate Emergency Medicine Physicians' Emotional Well-being During COVID-19, *JAMA Network Open* (2023). DOI: 10.1001/jamanetworkopen.2023.12708

Provided by Perelman School of Medicine at the University of Pennsylvania