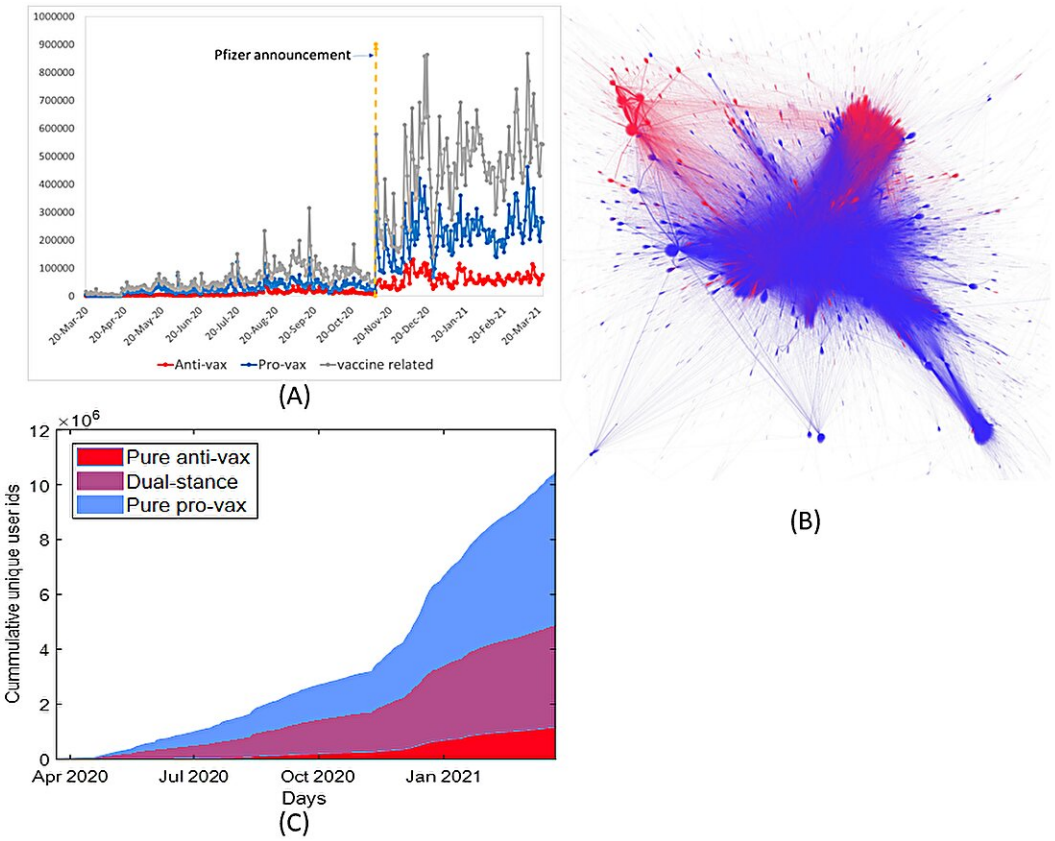
Sea of pro-vax tweets drown out anti-vax memes, new study shows

August 9 2023, by Emma Chadwick



One year of COVID-19 vaccine tweets, from March 20, 2020, to March 23, 2021, are analyzed in this study. The tweets are classified into antivax and provax tweets through natural language processing–based stance detection. A 10-fold increase in vaccine-related tweets is observed after November 9, 2020, when Pfizer announced the results of their preliminary analysis [32]. (A) Time series of total COVID-19 vaccine–related tweets from March 2020 to March 2021 and its breakdown into antivax and provax tweets. (B) The network of users on Twitter, with directed links to the retweeting users from the users who

posted the original tweet. Blue and red links represent a provax and antivax retweet, respectively, whereas violet links represent both provax and antivax tweets originated by one user and retweeted by the other user. Retweets classified as neutral or irrelevant are not included. (C) The number of unique user IDs throughout the year for pure antivax, dual-stance, and pure provax groups steadily increased, with a higher rate of increase in the postvaccine period. Credit: *Journal of Medical Internet Research* (2023). DOI: 10.2196/45069

Pro-vaccination tweets outnumbered anti-vax sentiment almost four to one, in new research that canvassed a whopping 75 million COVID-19 comments on Twitter at the height of the global pandemic.

Shattering public perception that anti-vax messaging ruled the airwaves, the collaborative study—led by the University of Melbourne in partnership with Curtin University and published today in the *Journal of Medical Internet Research*—assessed vaccination-related tweets between March 2020 and March 2021.

Study co-author Dr. Mengbin "Ben" Ye, from the Center for Optimization and Decision Science within Curtin's School of Electrical Engineering, Computing and Mathematical Sciences, said pro-vax discussion significantly dominated anti-vax discussion in contrast to public perceptions.

"We used a language detection algorithm to classify tweets as 'anti-vax' or 'pro-vax' and examined the main topics of discourse using sophisticated machine learning techniques," Dr. Ye said.

"Among 75 million tweets in total, 37 million—or almost half—were pro-vaccination, far outnumbering anti-vaccination tweets at 10 million. The remaining 28 million tweets were vaccination-related but classified

as neutral, neither anti-vax or pro-vax."

Dr. Ye said the study aimed to compare views expressed by both sides of the vaccination debate, their respective activity patterns, and how the commentary correlated with vaccine-related events.

"While pro-vax tweets overwhelmingly focused on tracking the vaccine developments over time, anti-vax tweets involved a large dose of falsehoods, including conspiracies. Jokes and memes dominated anti-vaccination sentiment despite some anti-vax tweets expressing genuine concerns," Dr. Ye said.

One of the most surprising findings was the large number of people, who held a "dual-stance," sending out tweets that were both pro-vax and anti-vax during the study period.

They were also some of the most active: 85% of anti-vax and 66% of pro-vax tweets came from people who posted both pro-vaccination and anti-vaccination tweets during the observation period.

"Discovering these dual-stance users was unexpected and quite puzzling," Dr. Ye said.

"It took us a while to understand this phenomenon. Contrary to general perception, anti-vax discussion was often carried out by users who also posted tweets in support of COVID-19 vaccines.

"The presence of dual-stance users is very encouraging, suggesting there is room for genuine dialog with users who opposed vaccines over social media.

"We believe the changing views of some of these users can be attributed to the huge uncertainty and concern among the general public during the

first year of the pandemic."

Dr. Ye said the study of 75 million English-language tweets provided a greater understanding of the public's feelings toward vaccinations, underlined the substantial amount of misinformation on social media and difficulty dealing with it, and highlighted the need for future studies to examine the role of memes and humor in driving online social media activities.

More information: Zainab Zaidi et al, Topics in Antivax and Provax Discourse: Yearlong Synoptic Study of COVID-19 Vaccine Tweets, *Journal of Medical Internet Research* (2023). DOI: 10.2196/45069

Provided by Curtin University