The media landscape of COVID-19 treatments: An observation of influence

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Submitted to: Journal of Medical Internet Research
on: May 10, 2020

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Abstract

Background: Individuals with large followings can influence public opinion and behaviours, especially during a pandemic. Recently, Donald Trump (DT) endorsed the use of unproven therapies, with a death attributed to the wrongful ingestion of a chloroquine-containing compound.

Objective: We investigated his speeches, his twitter, Google searches and purchases, Amazon purchases, and TV airtime for hydroxychloroquine, chloroquine, azithromycin, and remdesivir.

Methods: Twitter sourcing was catalogued with Factba.se, and analytics, both past and present, was analyzed with TweetBinder to assess average analytics of key metrics. Time spent discussing the unverified treatments on America's five largest TV stations was catalogued with The Global Database of Events, Language, and Tone, and his speech transcripts were assessed from White House briefings. Google searching and shopping trends was analyzed with google trends. Amazon purchases were assessed Helium 10.

Results: Over March 1st to April 30th, DT tweeted 11 times unproven therapies, mentioning them 65 times in White House briefings, especially touting hydroxychloroquine and chloroquine. These tweets were 300% above his statistical average impression. Following them, at least 2% of airtime on conservative networks, and continuous mentioning of treatment modalities like azithromycin, was seen on stations like Fox News. Google searches and purchases increased following his first mentions on March 19th, and again with his tweeting on March 21st. The same is true for all medications on Amazon, with purchases like hydroxychloroquine increasing by 200%.

Conclusions: Individuals in position of power can sway public purchasing, resulting in undesired effects when the claims are unverified. Public health officials must work to dissuade unproven treatments for COVID-19. Clinical Trial: Not applicable

(JMIR Preprints 10/05/2020:20044)
DOI: https://doi.org/10.2196/preprints.20044

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Introduction

Numerous treatments have been suggested for the novel coronavirus disease (COVID-19), with only remdesivir recently showing some potential efficacy and later approval on May 1st, 2020 [1]. Other therapies, such as hydroxychloroquine, chloroquine, and azithromycin, remain unproven, though they have been praised by numerous figures such as United States President Donald J Trump.

Previous studies have shown that individuals with high influence, a term which means either a large social capital or political power [26], can affect public decisions and purchasing power [2]. Moreover, with many of these figures using social media to disseminate information, there is the ability to affect content, sentiment, and public attention generally [25]. Donald J Trump is one such individual who has previously influenced behaviour due to his high social presence online and his political capital as President of the United States [27].

In 2020 during the early days of the COVID-19 pandemic, there was a focus on uninvestigated therapies, especially by Donald J Trump. It became increasingly clear, however, some therapies such as hydroxychloroquine had numerous concerns. It was shown to produce conduction disturbances and fatal arrhythmias, [3] that the supply of hydroxychloroquine may decrease for approved conditions like rheumatoid arthritis, [4] and chloroquine is similar to chloroquine products that are used as aquarium cleaners, which themselves may be toxic if ingested in large quantities [5]. One such death has occurred due to ingestion of chloroquine products [6].

A recent article noted that there was an influx of searches of hydroxychloroquine and chloroquine respectively after being tweeted by United States President Donald J Trump [7]; however, they did not investigate all therapies initially suggested in the US, nor note purchasing amount on Google, Amazon, or the TV airtime with each respective medication. They did not also associate Donald J. Trump's speaking and tweeting, two avenues where his reach is in the millions, which would better show a relation between his influence and the impact it has on his supporters and others alike.

We therefore investigated the relation between Donald J Trump's advocacy for yet unproven treatment, the media landscape, and how these coalesced into behavioural changes in individuals. We analyzed the time spent discussing hydroxychloroquine, chloroquine, azithromycin, and remdesivir on the five largest American TV stations, the total online searches and general purchasing on Google and Amazon, and the twitter statistics and fallout of Donald J Trump's advocacy of these therapies.

Methods

Twitter

Tweets were catalogued for *hydroxychloroquine, chloroquine, azithromycin,* and *remdesivir.* Factba.se was used to note if any posts were archived or otherwise hidden by Donald J Trump [8]. TweetBinder was used to assess average analytics of key metrics, such as likes, retweets, or comments [9]. It further aggregated of all tweets and creates averages of the longitudinal tweeting pattern.

Television

Time spent discussing each treatment on television for was recorded for the five largest American viewed TV stations: CNN, CSPAN, Fox News, MSNBC, and BBC News. The Global Database of Events, Language, and Tone (GDELT) was used to note total monitored airtime of each station, as well as white house briefings, for the days March 1st to April 30th, 2020-10]. The data was composed into percent of airtime in 15 second blocks, which is the maximum the software can crawl its historical database. No manual crawling of the television airtimes or news headings was performed.

Google

Google searches were indexed from March 1st to April 30th, 2020 with Google Trends, focusing on United Stated [11]. The words *hydroxychloroquine, chloroquine, azithromycin, remdesivir,* and *covid treatment* were catalogued, along with their purchasing patterns on Google. These were also done in combination, however the results for that period were not large enough to show. The results obtained provided were proportional patterns of searches, rather than exact amounts, given Google's data agreement [28].

Amazon

Amazon purchasing was indexed with the words *hydroxychloroquine, chloroquine, azithromycin,* and *remdesivir.* Search volume was assessed using Helium 10 [12]. Estimated purchasing amounts are calculated using ahrefs [13].

Data Analysis

Data was analyzed with Microsoft Excel. This includes aggregating the data, cataloging it, and formatting it with key points such as Donald J Trump's first press conference on March 19th,

2020 or his numerous tweeting days.

The wide variety of sampling, the numerous software-defined metrics, and ways of measuring outcomes as gross estimates and proportions, instead of true samples, does not lend itself to statistical analysis [29]. The key assumption of transitivity, which assumes no important differences in the distribution of either potential effect modifiers or sampling techniques (e.g how individual comparison of price points between Google vs Amazon), would be high for the indirect comparisons.

Results

Twitter

Table 1 notes the Twitter characteristics of United States President Donald J Trump. It shows that Donald J Trump focused on hydroxychloroquine mostly, both tweeting his own tweets (such as those on March 21st) and retweeting others who supported his claim of its efficacy. These included news articles, such as the tweet on April 4th, 2020, most (4/6) of which were from Fox News.

With an average proportion of likes of nearly 100,000 and average retweets of 20,000 according to TweetBinder [14], his March 21st, 2020 tweet first advocating for the use of hydroxychloroquine and azithromycin is among his most popular at 385,700 likes and 103,200 retweets, with a potential estimated impression reach, that is the number of potential views on the individual tweet by users, of 78,800,580.

TV Mentions and Broadcasts

Table 2 notes mentions of COVID-19 treatments during White House Briefings. He mentions hydroxychloroquine 37 times totally, most frequently on April 4th, 2020 (9 times); chloroquine 12 times totally, most frequently on March 19th, 2020(7 times); azithromycin 8 times totally, most frequently on March 19th, 2020 (3 times, and while mentioning hydroxychloroquine); and remdesivir 8 times, most frequently on March 19th, 2020 (4 times).

Figure 1 displays the television airtime of the treatments. Chloroquine (Figure 1, A) peaked on March 24th, 2020 following the chloroquine death, for Fox News (0.59%), MSNBC (0.78%), and CNN (0.61%). Hydroxychloroquine (Figure 1, B) peaked in television airtime following Donald J Trump's pro-tweet on April 4th on Fox News 1.94% (April 4th) and 2.46% (April 6th), while peaking on CNN on April 22 (2.88%). Fox News was one of the single television networks to continual give coverage to azithromycin (Figure 1, C), with it peaking at 0.45% on April 7th. Remdesivir (Figure 1, D) did not register on any news organization until April 30th, following the decision by the FDA to

approve on May 1st [15]. At this point, it peaked comparatively. COVID-19 treatments have been increasing in coverage by all networks, especially after the March 19th press conference.

Google and Amazon

Searches on Google and purchasing (Figure 2, A) of chloroquine peaked at March 19th, 2020, and then a second peak on March 23rd 2020, following the story of chloroquine-poisoning. Hydroxychloroquine followed a similar trend, though there is a second peak on April 4th when Donald J Trump retweeted a studying discussing hydroxychloroquine's apparent efficacy. COVID-19 treatments (Figure 1, E) peak in searches largely coincided with his March 19th White House briefing, with the three peaks correlating with his tweet history found in table 1 (March 19th, March 21st, and April 4th).

Amazon purchases (Figure 3) show a peak of purchases in all three after the March 19th Donald J Trump White House briefing. This increase is seen in various forms of the medication, whether that be via book for azithromycin [16], which increased by 10 sales, herbal elements claiming to have hydroxychloroquine as an active element [17], which increased by an estimated 50 sales, or texts on alternative chloroquine containing compounds like chloroquine phosphate, which increased by an estimated 30 sales [18]. Secondary peaks in hydroxychloroquine are seen after the April 4th tweet.

Discussion

This study is the first to show the media landscape of COVID-19 therapies prior to their approval or complete disregard. It shows that there was a substantial increase in otherwise unpurchased and unsearched terms by the general public following the backing of United States President Donald J Trump, both correlating with his discussion in press conferences and on his personal social media advocating for the hydroxychloroquine and chloroquine cures. Conservative outlets provided the most airtime to the treatments hydroxychloroquine and chloroquine, with liberal media outlets peaking airtime of the therapies only after the chloroquine-induced death. Much of the purchasing of these products mirrors these increases in search and airtime following both the March 19th, 2020 initial touting of the therapies, then after the subsequent social media endorsements on Twitter by Donald J Trump. The most evidenced treatment on small preliminary studies prior to its largescale testing for COVID-19, remdesivir, had the least coverage time from all stations until just before it's emergency approval on May 1st, 2020. Donald J Trump has not advocated for its use publicly, besides the initial press conference on March 19th where all the suggested treatments were

outlined.

In unknown medical situations, there is a delicacy required in determining the best treatments. Previous studies have shown that individuals are susceptible to easy claims and conspiracy without appropriate evidence [23], and once these inauthentic claims are given momentum, they are hard to dissuade [24]. For this reason, individuals often seek influential figures for guidance and knowledge [19]. Providing assurances in yet unverified claims or treatment is dangerous, given that the medications have numerous side effect profiles. Recent trials have in fact been halted over their general risk in the case of hydroxychloroquine [20]. Additionally, their utility for approved conditions such as malaria has been compromised due to limited access and hoarding [21].

Efforts need to be made to prevent further harm. In some instances, this has occurred. Google has decreased access to links that sell chloroquine, whereas Amazon has removed links to chloroquine phosphate and put corona virus information on associated links. This is only true, however, of the American version of the website, where other domains such as .ca still provides easy purchasing of such substitutes [22]. More must be done by public health individuals to advocate for safer, evidenced-based approaches. One example is on Twitter, where there are recent abilities to flag COVID-19 misinformation and take down the post, which has occurred to Donald J Trump twice after April 30th regarding nonfactual hydroxychloroquine claims [27].

There are limitations in this study, however. The estimated purchases and searches by Google and Amazon are both estimates, indicated by external providers rather than the services themselves. Given the limited data access, however, these estimates are the best available to third party providers and researchers.

Still, this study is first study to look directly at purchasing behaviours of individuals and the media landscape promoted following Donald J Trump’s endorsement. Future studies will look at searches and purchasing of certain key words, such as masks, UV, and disinfectants.

References

1. Wang, Y., Zhang, D., Du, G., Du, R., Zhao, J., & Jin, Y. et al. (2020). Remdesivir in adults with severe COVID-19: a randomised, double-blind, placebo-controlled, multicentre trial. The Lancet. doi: 10.1016/s0140-6736(20)31022-9

2. Cao, P., Meister, S., & Klante, O. (2014). How Social Media Influence Apparel Purchasing Behavior. Marketing Review St. Gallen, 31(6), 77-86. doi: 10.1365/s11621-014-0427-y

3. Roos, J., Aubry, M., & Edwards, W. (2002). Chloroquine cardiotoxicity. Cardiovascular Pathology, 11(5), 277-283. doi: 10.1016/s1054-8807(02)00118-7

4. Morris, S., Wasko, M., Antohe, J., Sartorius, J., Kirchner, H., Dancea, S., & Bili, A. (2011). Hydroxychloroquine use associated with improvement in lipid profiles in rheumatoid arthritis patients. Arthritis Care & Research, 63(4), 530-534. doi: 10.1002/acr.20393

5. Bruno Mégarbane (2020): Chloroquine and hydroxychloroquine to treat COVID-19: between hope and caution, Clinical Toxicology, DOI: 10.1080/15563650.2020.1748194

6. Theresa Waldrop, C. (2020). Fearing coronavirus, Arizona man dies after taking a form of chloroquine used in aquariums. Retrieved 6 May 2020, from https://www.cnn.com/2020/03/23/health/arizona-coronavirus-chloroquine-death/index.html

7. Liu, M., Caputi, T., Dredze, M., Kesselheim, A., & Ayers, J. (2020). Internet Searches for Unproven COVID-19 Therapies in the United States. JAMA Internal Medicine. doi: 10.1001/jamainternmed.2020.1764

8. Donald Trump Unabridged - Speeches, Tweets, Interviews. (2020). Retrieved 6 May 2020, from https://factba.se/

9. Twitter Hashtag tracking tool - Tweet Binder, the real Twitter impact. (2020). Retrieved 6 May 2020, from https://www.tweetbinder.com/

10. GDELT Summary: Television Explorer. (2020). Retrieved 6 May 2020, from https://api.gdeltproject.org/api/v2/summary/summary?d=iatv&t=summary

11. Google Trends. (2020). Retrieved 6 May 2020, from https://trends.google.com/trends/?geo=US

12. Insanely Powerful Tools For Amazon Sellers - Helium 10. (2020). Retrieved 6 May 2020, from https://www.helium10.com/

13. Keywords Explorer by Ahrefs: Discover Keyword Ideas and Analyze SEO Metrics. (2020). Retrieved 6 May 2020, from https://ahrefs.com/keywords-explorer

14. Donald Trump on Twitter - 2009 / 2020 analysis. (2020). Retrieved 6 May 2020, from https://www.tweetbinder.com/blog/trump-twitter/

15. Coronavirus (COVID-19) Update: FDA Issues Emergency Use Authorization for Potential COVID-19 Treatment. (2020). Retrieved 6 May 2020, from https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-issues-emergency-use-authorization-potential-covid-19-treatment

16. (2020). Retrieved 6 May 2020, from https://www.amazon.com/dp/3659189243

17. (2020). Retrieved 6 May 2020, from https://www.amazon.com/dp/B00HXQZRA2

18. (2020). Retrieved 6 May 2020, from https://www.amazon.com/dp/1984235532

19. Lipsman, A., Mudd, G., Rich, M., & Bruich, S. (2012). The Power of "Like". Journal Of Advertising Research, 52(1), 40-52. doi: 10.2501/jar-52-1-040-052

20. Touret, F., & de Lamballerie, X. (2020). Of chloroquine and COVID-19. Antiviral Research, 177, 104762. doi: 10.1016/j.antiviral.2020.104762

21. Martins-Filho, P., Carvalho, A., de Melo, EM., Mendes, ML., Santos, V. (2020). The "unbridled race" for using chloroquine and hydroxychloroquine to prevent or treat COVID-19 leads to shortages for patients with chronic inflammatory conditions and malaria in Brazil. CMAJ. Retrieved 6 May 2020, from https://www.cmaj.ca/content/unbridled-race-using-chloroquine-and-hydroxychloroquine-prevent-or-treat-covid-19-leads

22. Amazon.ca: chloroquine phosphate: Pet Supplies. (2020). Retrieved 6 May 2020, from https://www.amazon.ca/s?k=chloroquine+phosphate&i=pets&dc&qid=1588730174&ref=sr_nr_i_9

23. Lobato, Emilio, Jorge Mendoza, Valerie Sims, and Matthew Chin. 2014. "Examining The Relationship Between Conspiracy Theories, Paranormal Beliefs, And Pseudoscience Acceptance Among A University Population". Applied Cognitive Psychology 28 (5): 617-625. doi:10.1002/acp.3042.

24. Bishop, Felicity L., Eric E. Jacobson, Jessica R. Shaw, and Ted J. Kaptchuk. 2012. "Scientific Tools, Fake Treatments, Or Triggers For Psychological Healing: How Clinical Trial Participants Conceptualise Placebos". Social Science & Medicine 74 (5): 767-774. doi:10.1016/j.socscimed.2011.11.020.

25. Chew, Cynthia, and Gunther Eysenbach. 2010. "Pandemics In The Age Of Twitter: Content Analysis Of Tweets During The 2009 H1N1 Outbreak". Plos ONE 5 (11): e14118. doi:10.1371/journal.pone.0014118.

26. Schoorman, F David, Mayer, Roger, Davis, James. "Social Influence, Social Interaction, And Social Psychology In The Study Of Trust - Proquest". Academy of Management. 1996. 21, 2: 337-339.
27. "Twitter Flags Trump Tweet With Fact-Checking Label For First Time". 2020. Cbsnews.Com. https://www.cbsnews.com/news/twitter-adds-fact-check-warning-trump-tweets/.
28. "Privacy Policy – Privacy & Terms – Google". 2020. Policies.Google.Com. https://policies.google.com/privacy?hl=en-US.
29. Cumming G. Understanding The New Statistics: Effect Sizes, Confidence Intervals, and Meta-Analysis. Routledge; 2017. 536.

Figures and Tables

Hydroxychloroquine						
Mentions	Date	URL	Retweet from other	Retweet self	Retweets	Likes
1	18-Apr	https://twitter.com/realdonaldtrump/status/1251587393955729412	1	0	12600	30500
2	10-Apr	https://twitter.com/realdonaldtrump/status/1248586394311761920	1	0	5800	16900
3	04-Apr	https://twitter.com/realdonaldtrump/status/1246627587289382918	1	0	7800	21600
4	04-Apr	https://twitter.com/realdonaldtrump/status/1246458783548702726	1	0	11300	28200
5	23-Mar	https://twitter.com/realdonaldtrump/status/1242302644498108416	1	0	9100	23700
6	21-Mar	https://twitter.com/realdonaldtrump/status/1241579259249991684	0	1	103200	385700
7	21-Mar	https://twitter.com/realdonaldtrump/status/1241398266941657093	1	0	27300	53900
8	21-Mar	https://twitter.com/realdonaldtrump/status/1241367239900778501	0	0	103200	385700
Azithromycin						
1	21-Mar	https://twitter.com/realdonaldtrump/status/1241579259249991684	0	1	103200	385700
2	21-Mar	https://twitter.com/realdonaldtrump/status/1241398266941657093	1	0	27300	53900
3	21-Mar	https://twitter.com/realdonaldtrump/status/1241367239900778501	0	0	103200	385700
Chloroquine						
0	N/A	0	0	0	0	0
Remdesivir						
0	N/A	0	0	0	0	0

Table 1. Twitter characteristics Donald J Trump mentioning hydroxychloroquine, chloroquine, chloroquine, and remdesivir, key metrics of retweets, likes, and whether the tweets were retweets or self-composed tweets by Donald J Trump

	Mentions on TV			
	Hydroxychloroquine	Chloroquine	Azithromycin	Remdesivir
19-Mar	4	7	3	4
21-Mar	3	0	0	1
23-Mar	2	0	0	0
27-Mar	1	1	1	0
29-Mar	1	0	0	0
31-Mar	4	2	0	0
01-Apr	1	1	0	1
04-Apr	9	0	0	0
05-Apr	3	0	0	1
06-Apr	1	0	0	0
07-Apr	3	0	1	0
08-Apr	1	0	0	0
09-Apr	1	0	1	0
10-Apr	2	0	1	0
13-Apr	1	1	1	1
TOTAL	37	12	8	8

Table 2. Dates of Donald J Trump's mention of unproven therapies during televised appearances.

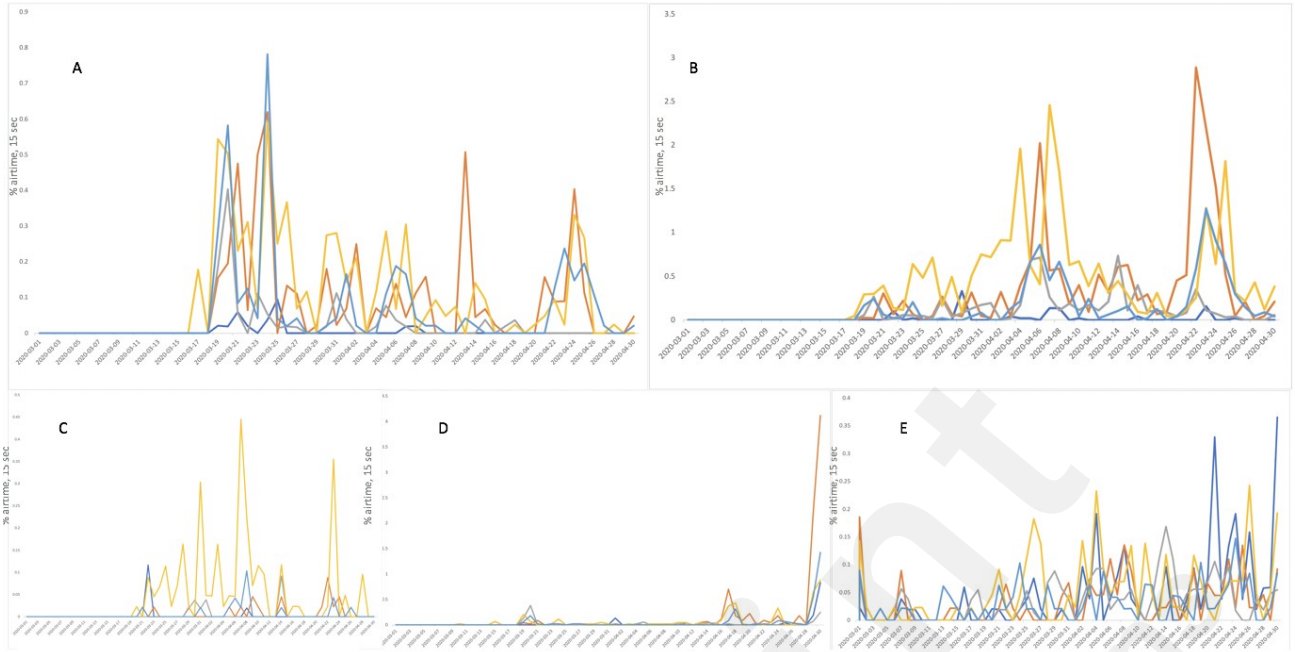


Figure 1. TV airtime of keywords every day between March 1st and April 30th, 2020 airing least 15 seconds. Dark blue is BBC News, orange is CNN, grey is CSPAN, yellow is Fox News, and light blue is MSNBC. A is the term ‘chloroquine’; B is the term ‘hydroxychloroquine’; C is ‘azithromycin’; D is ‘remdesivir’; and E is ‘covid treatment’.

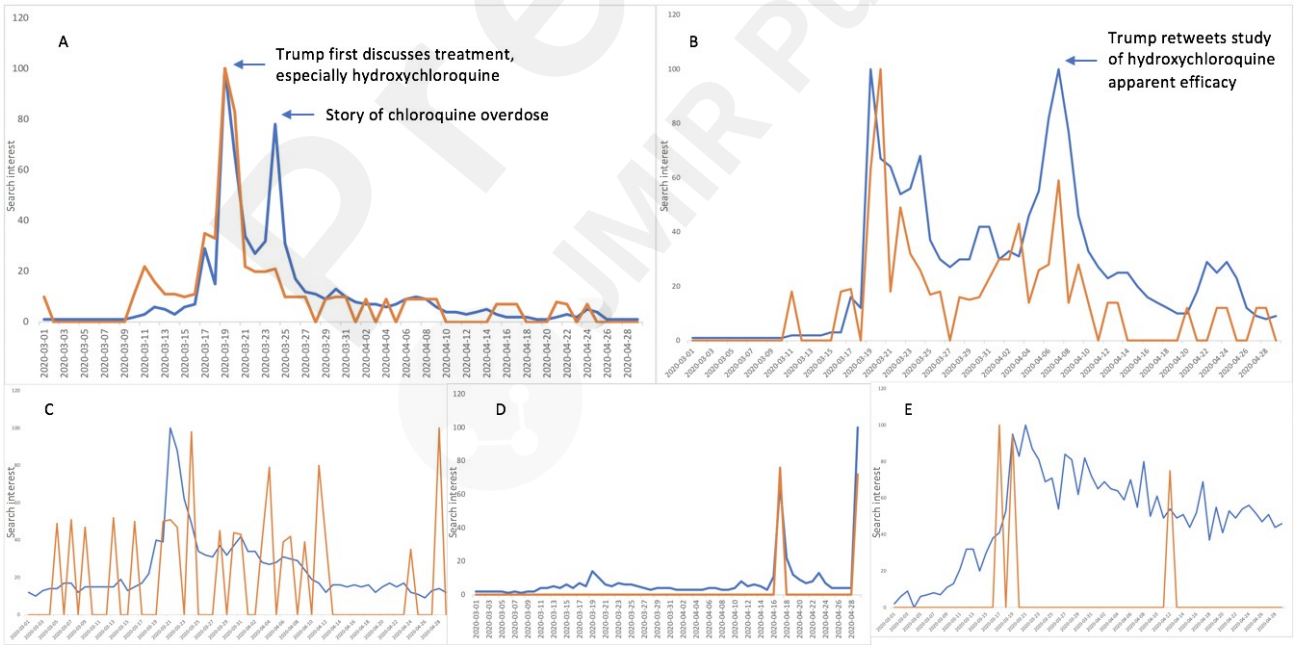


Figure 2. Google searching (blue line) and purchasing (orange line) of key treatments endorsed by Donald J Trump. A is the term ‘chloroquine’; B is the term ‘hydroxychloroquine’; C is ‘azithromycin’; D is ‘remdesivir’; and E is ‘covid treatment’.

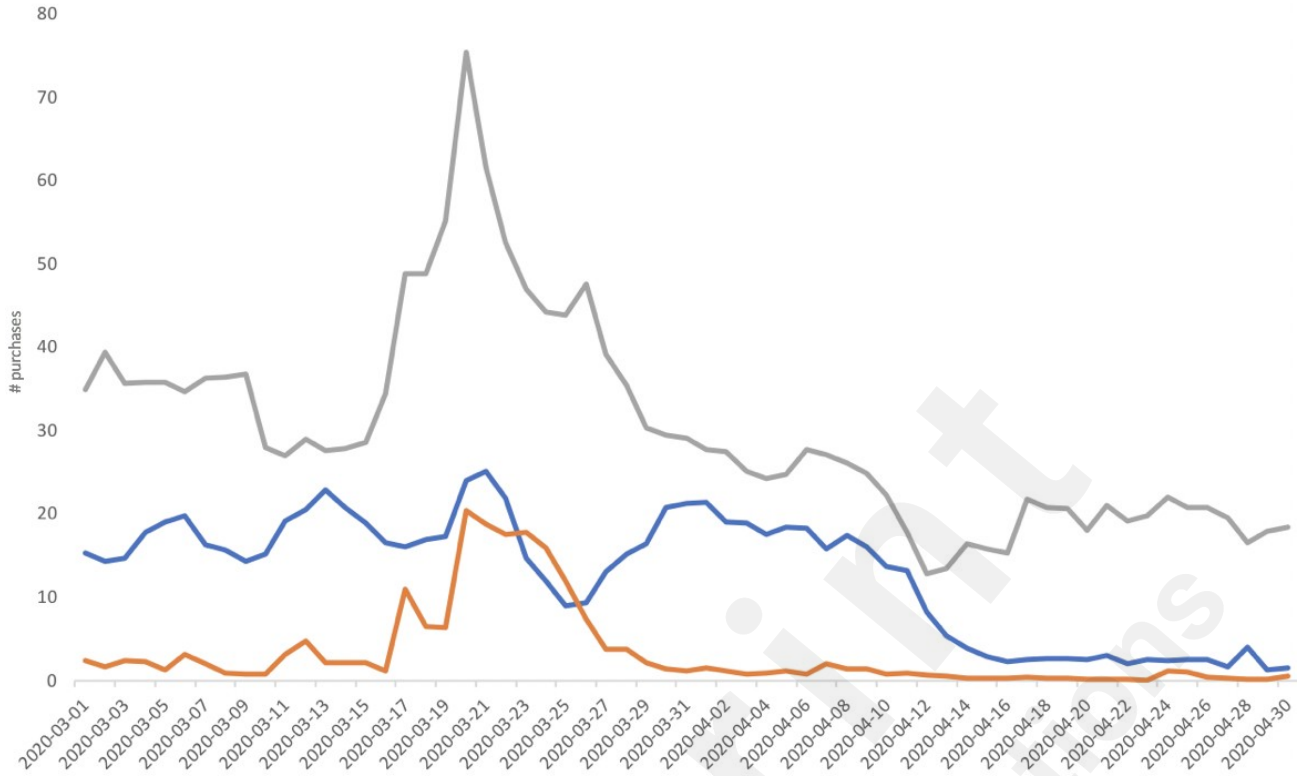


Figure 3. Amazon purchasing of alternate therapies between March 1st and April 30th. Grey is hydroxychloroquine, blue is azithromycin, and orange is chloroquine.

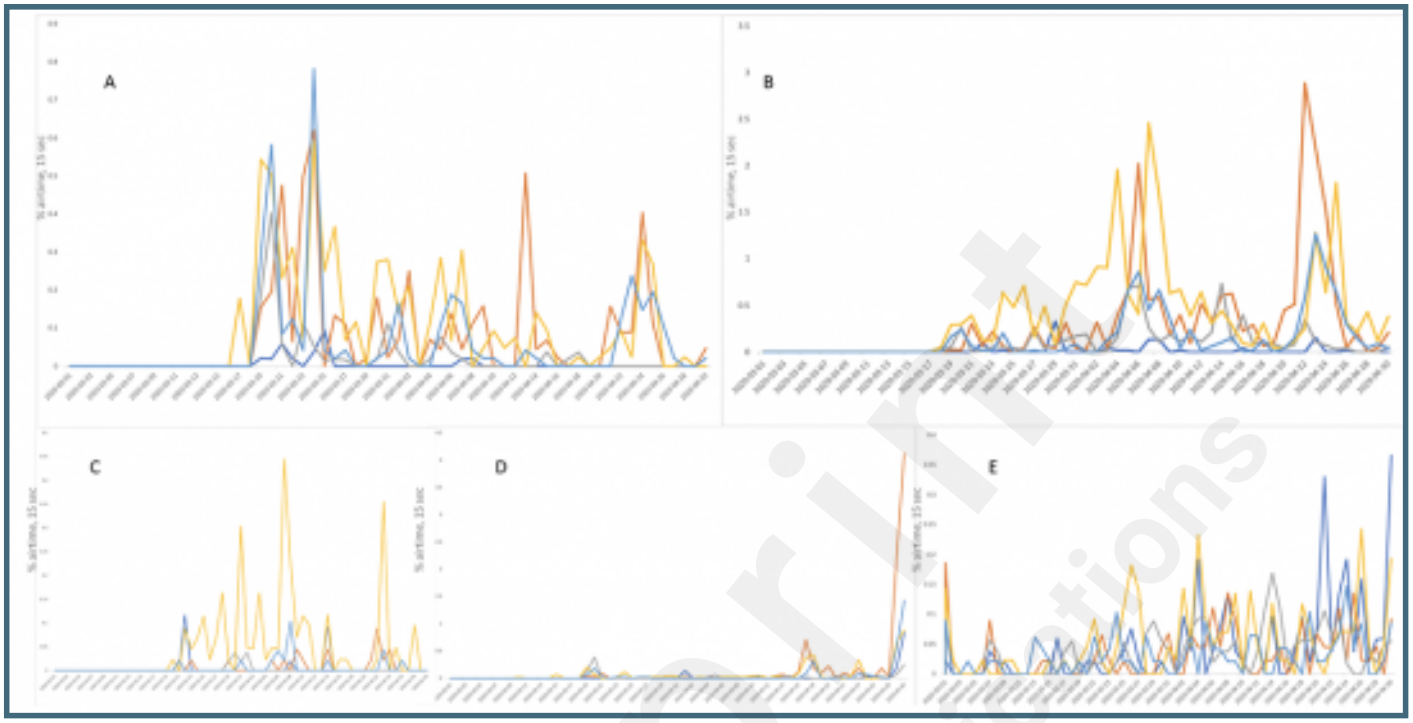
Supplementary Files

Reviewer comments with responses, Sept 19.
URL: https://asset.jmir.pub/assets/250487a5e7e7c0f263535dd644821627.docx

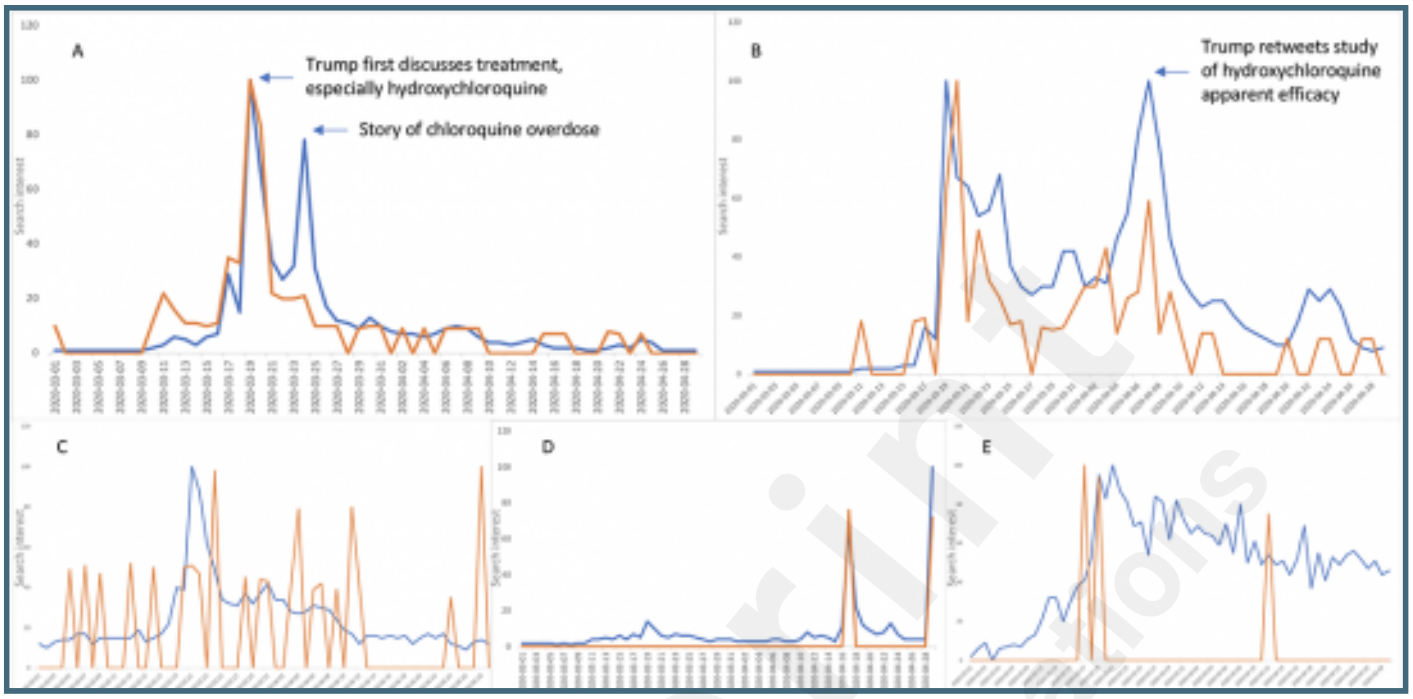
Tracked Changes Document, Sept 19.
URL: https://asset.jmir.pub/assets/d42396b3e7a05341e3a700813d39750f.docx

Figures

TV airtime of keywords every day for at least 15 seconds. Dark blue is BBC News, orange is CNN, grey is CSPAN, yellow is Fox News, and light blue is MSNBC. A is the term ‘chloroquine’; B is the term ‘hydroxychloroquine’; C is ‘azithromycin’; D is ‘remdesivir’; and E is ‘covid treatment’.



Google searching (blue line) and purchasing (orange line) of keywords. A is the term ‘chloroquine’; B is the term ‘hydroxychloroquine’; C is ‘azithromycin’; D is ‘remdesivir’; and E is ‘covid treatment’.



Amazon purchasing of alternate therapies. Grey is hydroxychloroquine, blue is azithromycin, and orange is chloroquine.