Politicians' Response on COVID-19-Related Topics: An Examination of Physician and Non-Physician Tweets of the 116th United States Congress

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Abstract:

In times of a public health crisis like the COVID-19 pandemic, effective and accurate communication by elected officials is imperative, particularly for those officials with a healthcare background. This thesis attempts to characterize the online behavior of members of the United States 116th Congress during the pandemic, with an emphasis on those who are physicians or other doctoral-level healthcare professionals.

Social media has become an important form of communication, with Twitter being one of the leading social media sites. Twitter outputs of 527 members of the 116th United States Congress between January 1, 2020 and August 17, 2020 were analyzed. Of the 527 members of Congress, 26 (5%) possess a doctoral-level healthcare professional background and 17 (65%) of those hold an M.D. 23 (88%) of those are Republican, and 25 (96%) of them are male. Advocacy for mask wearing by the public as well rates of dissemination of COVID-19-related medical misinformation among members of Congress was examined. Medical misinformation included advocacy for off-trial use of therapies or preventative measures not recommended at that time by either the Centers for Disease Control (CDC) or the Food and Drug Administration (FDA).

With respect to advocacy for appropriate face-covering utilization following CDC guidance: Non-physician members of Congress were significantly more likely to advocate for mask usage than physician members of Congress. Republican members of Congress were more likely to promote or share posts with medical misinformation than their Democratic counterparts. Given that almost all of healthcare-professionals in Congress were affiliated with the Republican party, medical misinformation was disproportionately promoted by healthcare-professional members of Congress compared to those without a healthcare background. Physician-members of Congress had higher rates of social media posts with content relating to medical misinformation, at a rate greater than baseline partisan divides would suggest.

Collectively, these results highlight a profoundly disappointing pandemic response among elected officials with healthcare backgrounds. As members of the elected Congress and leaders that people look up to, they have the moral obligation to their constituents, the people at large and the Hippocratic oath they swore to keep. Elected officials should restore the trust in science and use their platform and background to help keep the population safe, healthy, and informed.

Background:

Social Media, as defined by Adreas Kaplan and Michael Hanalin (2010), "is a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content." Trisha Dowerah Baruah (2012) simplifies this to mean the use of mobile technologies and web-based applications to make dialogue more interactive. Use of the World Wide Web as a platform to disseminate information and to engage in conversation began to gain popularity in 2005/2006 (Kaplan). It was at this point that Facebook and Twitter were both launched. While there are many types of platforms that have come out of the Social Media category, such as web-based journals (blogs), social networking sites, user appraisal sites, and content-generating and -sharing sites, all have changed communication. They have allowed for communication with a larger community of like-minded people or those with common interests, even if they are far apart. Furthermore, it has become a crisis management communication tool, and a source of information (Baruah, 4-8). This last way has influenced public health officials and public officers to begin to use it more.

Use of Social Media in Public Health:

With its growing use by the public, social media became a platform that the public health community had to take advantage of. Interestingly, in a cross-sectional study of state public health departments (SHD) done by Thackeray, Neiger, Smith and Van Wagenen (2012), sixty percent have a social media application account, of which 86% use Twitter. A primary reason social media is used is that it is felt to be a more-effective way of informing the public, as seen in the CDC explanation as to why they use social media: "[It is to] provide users with access to credible, science-based health information when, where, and how you want it. A variety of social media tools are used to reinforce and personalize messages, reach new audiences, and build a

communication infrastructure based on open information exchange" (Social Media Tools). Other reasons public health organizations use social media include enhancing their public image, engaging in dialogue with the public and broadening the organization's reach.

There are many types of information that a public health organization may want to relay to the public, both health and non-health related. In their study about state health departments Thackeray and her colleagues found that most (79.7%) of tweets of state health departments were related to health while 14.1 % was non-health related and 6.2% was undeterminable. They found that "the health-related tweets focused on general areas of staying healthy (39.7%), diseases and conditions (26.2%), environmental health (8%), injury, violence, and safety (5.4%), emergency preparedness and response (4.6%), other diverse areas (16.1%)" (Thackery et. al). Daniel Scanfeld and his colleagues also found that social media, specifically Twitter, was an effective way to give the public informal medical advice and opinions. This is why in 2011, following a rise in social media use seen by the government, the CDC began using Twitter to inform people about diseases, and even to add to their disease databases (Mangro, 154). Not only does social media allow public health organizations to inform the public on a variety of topics, it also allows them to tailor the information that people receive. The public uses social media platforms to discuss topics that they are interested in or are relevant to them. Therefore, as Rebecca Schein and colleagues write, "[u]sing social media applications, it is possible to track an individual's health-related discourse and automatically tailor and deliver relevant health messages to them at the moment they are seeking information or chatting about a health issue" (Schein). People use social media to discuss what they find interesting and what is going on around them, meaning it is possible to see what people are interested in and target the information they see to information that is more relevant to them. This makes social media a

more effective route of communication to give the public information. But using social media to educate people by targeted information also leads to a gap in public health knowledge as some people are not receiving all information. Daniel Scanfeld and colleagues found this to be the case when studying Twitter usage as a method to educate the population about antibiotic resistance. They found that there was a gap in the public's knowledge of resistance to antibiotics, because some people did not see tweets about it or found incorrect information. (Scanfeld).

While it is important to give the community better access to medical knowledge, the online forum brings rise to a difficulty. Not only are the public health organizations informing the public, but others can do so as well. Since anyone can post on social media regardless of their credentials, there are more ways for false information to pick up traction. As Jonathan Swift said, “Falsehood flies, and the Truth comes limping after it” (Swift) This then requires public health organizations to effectively combat this misinformation, which can be difficult on social media platforms (Schein). Another stumbling block that public health organizations face when using social media platforms as ways to circulate information is the pace at which messaging is approved at government-controlled agencies. Generally, government agency posts have an approval process, which delays posting. This posting delay means that the information is often not relevant by the time it is posted, which is another factor in the public being misinformed. The long review process means that people will search in other places for the information and could therefore be misinformed (ibid).

A systematic review done by Aizhan Tursunbayeva, Massimo Franco and Claudia Paglari regarding social media use in public health found that the main reasons public health organizations use social media platforms are for transparency and accountability, and Democratic participation and engagement. Transparency and accountability is where the

government is open with the public regarding its operations in hopes to build trust and create accountability for itself, while Democratic participation and engagement is where organizations use social media to allow for the input of the public in the decision-making process and to open a dialogue regarding policy development and implementation (Bertot). One study reviewed by Turshunbayeva showed that higher patient satisfaction scores correlated with hospitals' use of social media. A different study showed that using social media to be more transparent with the public when resolving issues can help the organization's image in the public eye (Turshunbayeva). Rebecca Schein found the same thing in her literature review: "user-generated content and feedback systems" [could be used to] improve loyalty and trust in organizations and confidence in information" (Schein). In regard to Democratic participation and engagement, Turshunbayeva explains that using social media in this manner "allowed stakeholders to voice opposition or support for proposed health legislation or reforms, whilst enabling public health organizations to listen" to and understand their views, as well as to disseminate information about the proposals in question." Since there has been a rise in use of social media by the public, public health organizations have had to adapt to meet people where they are and figure out how social media can benefit their organization.

Social Media Use by Government

Just as the public health sphere has had to adapt to use social media, so have other public officials, such as elected officials. The adoption of social media by the government was slow. Government use of social media picked up by 2009, as seen by the fact that the federal government felt it important enough to produce guidelines on effective use of social media (Khan, 63), but as Michael Margro explains in his paper, the government was still hesitant to use social media in the beginning because of the digital divide. In 2009, 25% of Americans still did

not have access to the internet and therefore government officials did not see much success in using social media (Mangro, 152). A study done by Adel Aladwani from 2015 seemed to show just this, as she found that the average age of Twitter accounts for public officials in her study was about 2.5 years. She not only equates this to the slow start to social media use in general, but also to the lag of government organizations' adoption of cutting-edge technologies.

Another reason for the jump in social media usage in government around that time could have been the Open Government Initiative of 2009, signed by President Barack Obama, which changed the default data for government information to open and machine-readable. This executive order was signed because President Obama wanted to promote transparency and openness. The Obama Administration's primary use for social media was to enable trust between the people and government, which they did by prompting openness and transparency (153). Another goal President Obama had was to enhance citizen engagement with the government, and he believed that the best way to achieve this was through a policy of transparency and openness (Snead, 57). Using social media can enhance citizen engagement because it "can be empowering to its users as it gives them a platform to speak. It allows anyone with access to the Internet the ability to inexpensively publish or broadcast information, effectively Democratizing media" (Bertot, 266).

Interestingly, members of Congress did initially not use Twitter to be open with the public about its operations. In a study done looking at how Congress uses Twitter that analyzed and categorized the tweets of all 504 members of Congress in 2013 that had active verified Twitter accounts, Libby Hemphill and her colleagues found that "providing information is the most common action accomplished in officials' tweets (41%), followed by positioning (22%), narrative (7%), thanking (2%), and requesting action (1%)." Using social media to provide

information and to do so quickly is seen by the campaigns of President Obama and Howard Dean (Mangro, 151). While government agencies, such as state health departments, must follow alengthy review process before posting on social media, members of Congress do not. The quickness of social media is another advantage that has caused the government to adopt the use of social media: At the tip of their fingers, the government has a way to reach the public (Bertot, 266). While the specific reason the government uses social media may be different depending on the year or the person, the rise in the number of public officials on social media sites shows that there is at least some importance to using social media.

Mask Wearing

Every time a person breathes there are tiny particles that are expelled from their mouths, which is why on April 1, 2020, the CDC put out their first statement to the public recommending the use of masks when they leave their homes. While there have not been any randomized controlled trials on masks wearing stopping the spread of the virus, there is data to show that wearing a mask can help curb infection rates and keep people healthy. The reason that a mask would work is due to the virus mode of transmission. Covid-19 spreads through respiratory droplets and contact transmission, and the use of a mask has been shown to reduce the transmission of respiratory droplets (Elkenberry). Covid-19 is not the first respiratory infection where mask wearing has been used. As Abrar A Chughti explains, in the 20th century, cloth masks were used by healthcare workers to protect themselves, and they saw low instances of respiratory infection in those that wore 2-3 layer cloth masks. This shows that wearing a mask can prevent the spread of respiratory illness such as covid-19.

There are many types of masks that people can wear; N95s and KN95s, surgical masks, and cloth masks. The hypothesis of most studies looking at the efficacy of masks are looking to

see if any of the masks reduce how many particles are emitted, how far respiratory particles travel and how large the particles emitted are if a mask is worn. N95 masks are masks that have been approved by NIOSH that are capable of "filter[ing] out at least 95% of very small (0.3 micron) particles" (Personal Protective Equipment). KN95 masks are masks that are certified by other agencies, not in the United States, as also filtering out 95% of particles in the environment. In a study done by Sima Asadi and her colleagues it was found that "surgical masks and unvented KN95s reduce outward transmission by 90-74% respectively." Most people did not have access to N95s, KN95s, or surgical masks, as there was a shortage of personal Protective equipment at the beginning of the pandemic, so when the CDC announced that the public should be wearing masks, they were advocating that people should wear cloth masks.

While studies have shown that cloth masks are less effective that does mean that they do not work at all. Suresh Sharma and his colleagues compared cloth masks and surgical masks and found that cloth masks were 35% less effective and 50% less effective vs N95. Similarly, in cohort study in China, infection by living with a family member who tested positive was curbed by 79% when the initial case and the family members wore masks (Wang). In a natural experiment during the pandemic, counties in Kansas that did not have a mask mandate saw their cases continue to rise while the ones that did implement a mask mandate saw a decline (Van Dyke). Thirteen of the twenty-four counties had a mask mandate along with other mitigation strategies such as stay-at-home orders. The same decrease in coronavirus cases was seen in 15 other states and DC that had a mask mandate (Van Dyke).

The efficacy of a mask is based on many things, such as the airflow, steadiness of the pattern of flow, frequency of respiration, relative humidity, charge of particles, temperature and loading time. Other things that can affect the mask filtration which have been studied quite a bit

are the inherent properties of the mask itself such as chemical compound, thickness, and other characteristics of the fiber itself. Many studies have been done to test what is the most effective fabric to use for a cloth mask. As Sharma and his colleagues found, multilayered cloth masks provided 38% filtration against small particles (.08-.22μm), while handkerchiefs were only 2% effective when single layered or 13% effective when quadruple layered (Sharma). Another study found that cotton, natural silk and chiffon offer protection above 50% against particles 10nm-6μm (Kohda). That study also found that a four-layer silk mask is most efficacious with protection of over 85% in the 10m to 6μm range. Combined use of fabrics such as cloth with chiffon or silk can raise the efficacy of filtration of even aerosol particles due to both the electrostatic and filtering effects by both types of masks (Kohda).

While cloth masks can be very protective, there are some reasons that in practice they are not always as effective. A mask that is leaking out of the sides can cause a reduction of protection by 50% (Sharma). Most people do not wear masks that fit well and are tight against the face like masks should be, so the efficacy of cloth masks is lower than other masks because they are easier to wear improperly. Not only is the efficacy lowered by improperly fitted masks, but people run the risk of self-contamination because they will be touching it more often if it does not fit (Kähler). The particles that are in the air can settle on the mask, and then a person with an ill-fitting mask will touch the mask with the virus on it to try and fix the fit. The person might then touch their face or other parts of their body, therefore contaminating themselves with the virus. Other reason that cloth masks are not as effective was found in a study looking at the microscopic structure of cloth masks, which “showed that repeated washing and drying may reduce the quality of the cloth mask by almost 20% after four such cycles” (Modol). Lastly, wearing masks often causes people to speak louder so that they can be heard even with the mask

on and this gives a higher velocity to the particles, which can lead to more spread of the virus (Asadi).

While scientists believe that mask wearing is a safe and effective way to slow the spread it is not to be done alone. It should be used in conjunction with other methods, such as physical distancing. As one study showed, a cloth masks doesn't stop particles from exiting all together, but it does keep them traveling as far, so if physical distance is maintained then it will help stop the spread because the disease particles cannot contaminate others (Kähler). Overall, masks are a harmless method that can stop the spread even just a little, and when dealing with a worldwide pandemic that has killed so many, every little help counts.

Hydroxychloroquine as a treatment for Coronavirus

Hydroxychloroquine and chloroquine are drugs that have been used for many years to treat many diseases and used prophylactically. Some of the most common uses for hydroxychloroquine and chloroquine are as antimalarial drugs and to treat rheumatic disease. But recently there have been studies on the possible use of them for other reasons. When Covid-19 first became widespread, there were very few treatments that could be used to help a person who had contracted the virus. One treatment that has become widely debated is the use of hydroxychloroquine and/or chloroquine with or without Azithromycin.

Hydroxychloroquine and chloroquine's effects on the immune system have been studied before. Hydroxychloroquine and chloroquine prevent viral replication by changing the pH of a cell and therefore prevent the virus from entering into the cell, in turn not allowing the virus to replicate and infect the patient. Additionally, it was found that chloroquine can inhibit enzymes that aid in viral infectivity (Savarino). Due to their unique properties, studies were performed when SARS CoV broke out testing hydroxychloroquine and chloroquine's effectiveness against

it. One study found that the virus was repelled away from the cell because the ACE2 receptor's terminal glycosylation was impaired (Sinha). Therefore, when sequencing was done on SARS CoV-2 and it was found that SARS CoV-2 uses the same ACE2 receptor for cell entry, it seemed to point in the direction that using hydroxychloroquine to treat Covid-19 would be helpful (ibid). In vitro studies performed testing hydroxychloroquine and chloroquine suggested their prophylactic use could be beneficial, with one study showing that hydroxychloroquine was more effective than chloroquine (Yao).

Following these successful in vitro studies, many scientists began testing hydroxychloroquine and chloroquine use in vivo. In China, 20 clinical studies were done and one study from 100 patients found that chloroquine use helped reduce pneumonia exacerbations, reduce the length of symptoms and reducing delay of viral clearance more than the control group (Gao). Another small study done by French scientists found that when comparing the 20 patients that they treated with hydroxychloroquine to the 16 patients in the control group, the hydroxychloroquine was effective in lowering the viral load in the body as tested by a PCR (Gautret). They also found that when they added azithromycin to the treatment plan of those receiving hydroxychloroquine, the virus was eliminated even quicker (ibid). These studies done with small sample sizes were the first to be published and caused people to start to advocate for hydroxychloroquine, chloroquine, and azithromycin's use in treating the novel coronavirus.

Many other clinical trials and studies were performed following the release of these positive results studies, but the results of the later studies were not consistent with the earlier studies. One retrospective study done on veterans with Covid-19 found that hydroxychloroquine with and without azithromycin led to a longer hospital stay than those who were not treated with any of them (Magagnoli). In another study done by looking at self-assessed symptom survey of

Covid-19 patients who received hydroxychloroquine and those that received a placebo found that 24% of the hydroxychloroquine participants, and 30% of placebo participants continued to have symptoms 14 days after beginning their treatments (Skipper). Another randomized clinical trial done with 504 patients with mild to moderate Covid-19 found that, when compared to standard care, patients who received hydroxychloroquine or hydroxychloroquine and azithromycin did not have an improved clinical status 15 days after starting treatment. They also found that patients who received hydroxychloroquine or hydroxychloroquine and azithromycin more frequently had longer corrected QT intervals and higher liver enzyme levels (Cavalcanti). Another study looking at mortality rates found that those who were given hydroxychloroquine did not have any lower rates of mortality than those who did not receive it (Linsell). Furthermore, in an observational study done looking at patients with a positive Covid-19 test result in New York–Presbyterian Hospital (NYP)–Columbia University Irving Medical Center (CUIMC). They found that administering hydroxychloroquine was not associated with a greatly lowered risk or with an increased risk (Geleris).

Overall, the data for the use of hydroxychloroquine to treat the novel coronavirus is not clear one way or the other. Promotion of it's use by the media caused a shortage of the drugs for people that use them to treat diseases that they are known to be effective against like systemic lupus erythematosus and rheumatoid arthritis (Yazdany). Furthermore, there have been studies that have shown some negative side effects, and so with the little data to support hydroxychloroquine use to treat SARS CoV-2, the risk of taking the drugs away from people for whom it is necessary, the bad outweighs the good. Therefore, hydroxychloroquine and chloroquine should only be used for clinical trials to treat SARS CoV-2.

Introduction:

SARS CoV-2, the virus that causes Covid-19 has affected the entire world ,with 3,024,785 deaths as of April 19, 2021 (Covid-19 Map). While the first diagnosed case on United states soil was January 2020 (Holshue), Americans had been hearing about the novel coronavirus since it was first discovered in Wuhan china in late 2019. In times of crisis, it only makes sense that the people turn to those elected officials they put in Congress for information on how to react to this virus that was sweeping the nation. In time of medical crisis, it only makes sense that people turn to those in Congress that were physicians and have the medical knowledge to see how they should be reacting during the pandemic. That is why the reaction of the 116th Congress during this pandemic was so important.

People receive their information from Congress in many ways, but one that many people chose is social media. Twitter, one of the leading social media platforms allows for constituents to hear what their elected officials have to say about the pandemic. That is why this study uses the tweets of the members of the 116th Congress with active Twitters to analyze how they reacted with a specific look at how the physicians reacted to the virus. There were two questions that were of specific interest. One, were members of Congress likely to advocate for mask wearing, specifically the physicians, and two, were members of Congress likely to spread or correct medical misinformation?

As seen above masks are a harmless way to probably slow the spread of the virus. So, on April 1st, the Centers for Disease Control and Prevention put out a statement explaining that they believed that anyone leaving their homes should be wearing a mask that fits to their face and covers their nose and mouth. Science has shown that wearing a mask can be helpful in stopping droplets from spreading as seen not only by data regarding coronavirus but even by the fact that surgeons wear masks during surgery to keep the field sterile. Therefore, physicians in Congress

should have the knowledge that wearing masks can be helpful for this virus. This study sought to discover if physicians in Congress used their knowledge of science and medicine with regards to mask wearing. This study searched Congressmembers' tweets from the first-time major disease authorities namely the CDC recommended wearing masks to see if Congress was likely to advocate for their constituents to wear masks.

During the pandemic, many people have been trying to find ways to treat this virus. There have been studies about the use of hydroxychloroquine and chloroquine to treat the virus which have come out with variable results. President Trump, to whom many look in a time of crisis, in a press briefing on April 24, 2020, talked about how he wondered how effective bleach solutions could be at killing the virus if they were used inside the body. This statement to anyone with medical knowledge is preposterous, as anyone with medical knowledge knows how toxic these solutions can be if ever ingested or injected. So, with much confusion about treatments for the virus it only makes sense for constituents to look to others with medical knowledge whom they trust and elected for answers. Therefore, this study looked from January 1st, 2020, the beginning of coronavirus in America, to see how likely Congress was to correct the misinformation by telling people not to use bleach in their bodies, or to not use a treatment that is still in its clinical trial stages, or how likely they were to say nothing, therefore allowing the misinformation to be passively spread, or how likely they were to spread the misinformation.

Methods:

Sample:

A list of Twitter handles of every Congress person who was in office as of August 9, 2020 was obtained from https://www.sbh4all.org/wp-content/uploads/2019/04/116th-Congress-Twitter-Handles.pdf . Each handle was checked to ensure that it was both verified and active.

One member of Congress, then-Representative, now Senator Roger Marshall, has a verified official Twitter account but there are no tweets posted to that account, so in that case his personal Twitter was used, which is verified, and on which he is active and posts about his politics often. For Representative Lacy Clay, what seems to be his Congressional account is not verified, so we used his personal Twitter account, which is verified and on which he tweets often and about his politics. Other representatives such as Greg Gianforte, Kweisi Mfume, Rob Bishop, Collin C. Peterson, and John Shimkus did not have an official office Twitter account or a campaign or personal Twitter account and therefore were excluded from the data all together. A total of 527 Twitter accounts are included in the present analysis.

Member of Congress coding:

Demographic characteristics of the members of Congress associated with each Twitter were obtained though their official government website. Characteristics included branch, either Representative or Senator, gender, and party affiliation (Democrat, Republican, Libertarian or independent). Members of Congress were then divided based on whether they were physicians or not (See tables 1-4). In order to conduct data analysis using SPSS, categorical variables such as branch, gender or party were assigned codes 1 or 0. For the party variable, Libertarians and Independents were coded as the party they caucus with. Senators Sanders and King caucus with Democrats and were therefore coded as 0 for Democrats, and Representative Justin Amash caucuses with the Republican party, so he was given a designation of 1 for Republican.

Identification of Relevant Tweets:

A programmer automated the gathering, storage, and initial querying of the tweets. Using Twitter's Application Programming Interface (API) a brief program was written that gathered tweets from the identified accounts of every member into a database. This yielded an

initial database of over 300,000 tweets in the period of interest. Using the keywords as a rough filter, tweets were downloaded that contained any of the words pertaining to each topic.

For mask advocacy, the words “Mask,” “face,” and “cover,” were searched in the tweets. Those key words were chosen as they would pick up any tweet that a member of Congress made referencing wearing a face mask. Regarding medical misinformation, the keywords searched for were, malaria, hydroxychloroquine, Lysol, bleach, Clorox, disinfectant, azithromycin, treatment, and oxygen. Searching for at least one of these words in all tweets would identify any tweet that had to do with correcting medical misinformation, or the spread of it. Once tweets were identified, they were reviewed, and those that the researchers determined were not relevant were eliminated.

Mask Advocacy: Using those terms for mask, caused there to be a lot more tweets than were relevant. There were tweets that used those keywords, but in context unrelated to wearing a mask, or even coronavirus. For example, because we searched for face, we had tweets such as the following from Senator Gary Peters, “This is a historic day for LGBTQ+ rights and equality in this country. Nobody should face discrimination in the workplace or fear losing their job for who they are or who they love.” Tweets like these were removed from the count of tweets as it does not pertain to the research question. Similarly, when searching for the word “cover,” we got many tweets that did not pertain to mask wearing, such as tweets with “recover” or other uses of cover not talking about a face covering. And lastly with masks, we also had many tweets that used the word mask but not related to the public wearing masks to slow the spread of the virus. Some were talking about needing N95s for healthcare workers, discussed the production of masks, or used the word mask in a different context. All tweets with use of the word mask not related to the public wearing of masks were also excluded. The total number of tweets that had at

least one of these terms from April 1, 2020 to August 17, 2020 were 10,553. After discarding the tweets that did not pertain to the project, there were 3327 tweets remaining.

After combing through the tweets, each member was given a 1 if they posted a tweet advocating for the use of masks, 2 if they did not have any tweets relating to advocating for mask wearing, 3 if they retweeted something that advocated for mask wearing and a 4 if they wrote anything that was outwardly against wearing of masks (see table 5). We then recorded the date of the first tweet or retweet in this category, from April 1st, 2020. This date was chosen as it was the date the CDC began recommending mask wearing for the public to stop the spread of the virus.

Medical Misinformation: When looking for the tweets regarding spreading or correcting of medical misinformation, there were 435 tweets with any of the keywords that we searched. Some of the tweets were not relevant to our study as they were discussing malaria as a disease, such as this tweet by Representative Chris Coons "Global investments to #EndMalariaâ€"largely thanks to bipartisan U.S. leadership save nearly 600K lives a year compared to 2000 levels. With #COVID19 spreading to malaria-affected nations, urgent action is needed to continue saving lives & protect progress. #WorldMalariaDay https://t.co/HxlbZU1pnI." There were also tweets that were picked up from the key words that discussed treatments not related to Covid-19 and were therefore discarded. The sum of tweets that had any of the keywords searched in the period was 435, and after discarding the irrelevant tweets, there were 232 left.

When looking in this category, tweets dating from January 1, 2020 were searched as well, and each member was assigned a 1 if they tweeted something correcting the misinformation, 2 if they did not say anything correcting or spreading the misinformation, 3 if they retweeted

something that corrected misinformation, 4 if they wrote a tweet that spread misinformation, and 5 if they retweeted something that spread the misinformation (see table 6).

For both topics, the number of times a member of Congress tweeted in each were counted. When a person both retweeted and tweeted for a single topic, if they had more tweets than retweets for that topic, they were given a 1 and vice versa. Additionally, if a person was both pro and against in any given topic, they were categorized based on which way they tweeted more.

Data analysis:

Categories were combined to create dichotomous variables. Members of Congress who were assigned 1 or 3 in any category were combined into one group and any Congress person who was assigned a 2, 4, or 5 were placed in the other group. Chi-Square and Mann Whitney U tests were run to analyze relationships between categories.

Results:

Mask advocacy Analysis:

Members of Congress who tweeted or retweeted advocating for the wearing of masks were one category, and those who did not tweet anything, tweeted or retweeted a tweet against masks were put into the other category.

Mask advocacy: Using SPSS a Pearson Chi-Square analysis was run to determine whether certain groups were more likely to be outwardly pro mask or not. Statistically significant results for sex, party affiliation and medical degree were found. Females were more likely to outwardly advocate for wearing masks ($p=0.00$), Democrats were more likely to be pro masks ($p=0.000$), and physicians were more likely to say nothing or be anti-mask advocates ($p=0.015$) (see table 7). Since both physicians and Republicans were more likely to be anti-mask or say

nothing, and there are mostly Republican physicians, a Chi-Square analysis of Republican members of Congress who were physicians and mask usage was run but found no significant results. A Chi-Square analysis was not run-on Democratic physicians and mask advocacy because of the small number of those. Neither membership in the House of Representative nor the Senate had a statistically significant result regarding mask advocacy.

Timing of mask advocacy: To account for the effects of a member of Congress using Twitter less frequently than others, by not only counting the number of tweets in favor or against, but also calculating the proportion of tweets within that time period for each Congress person.

In the people who did advocate mask wearing, independent Mann Whitney U tests were run to examine whether the timing of mask advocacy differed for membership (House or Senate), sex, party affiliation and medical status. There was a difference between the House and the Senate for the proportion of tweets that were pro masks ($p=0.01$), with House having a higher proportion of tweets that were advocating for mask wearing, and a difference between the House and the Senate for how long they took to advocated for mask wearing ($p=0.004$), with the Senate taking longer than the House to start advocating for mask wearing. Running the same test checking males vs females, there was a difference between men and women with respect to their proportion of tweets that were pro mask ($p=0.001$), with women having a higher proportion of tweets, but the difference in time it took for the male vs female members to begin advocating for masks was not significant. Examining party affiliation, there was a difference between the party in the proportion of tweets that were pro mask ($p=0.00$), with the Republican members of Congress having a lower proportion of their tweets advocating for mask wearing (see table 8). Lastly, running an independent Mann Whitney U test for physicians in Congress and those that

were not, there was no statistically significant difference between the groups with regard to the proportion of tweets that were pro mask, or how long it took them to tweet about masks.

Medical Misinformation analysis:

The category of members who retweeted tweets that tried to correct medical misinformation were combined with the category of those members that penned tweets trying to correct misinformation to create one category. The other category were members who didn't tweet anything regarding medical misinformation, those members who retweeted a tweet that spread misinformation, and those who posted their own tweet spreading misinformation. Running Pearson Chi-Square tests, there were statistically significant results when looking at party affiliation and physicians vs non physicians members of Congress. Republicans were more likely to spread misinformation by tweeting or retweeting about it ($p=0.00$) and the physicians in Congress were more likely to spread medical misinformation ($p=0.00$). When looking specifically at the Republican party, since most physicians in Congress are Republican, The Pearson Chi Square test also shows that the physicians within the Republican party are more likely to spread medical misinformation than the rest of their party ($p=.006$) (see table 9). There were no statistically significant results when running chi square tests looking at House or Senate, or sex.

Discussion

Mask Advocacy:

Female members of Congress being more likely to be pro masks was not surprising, as most female members are Democrats, with 105 of the 126 women in Congress being part of the Democratic party. Therefore, since the Democrats were more likely to be pro mask, it would follow suit that the women would be as well. Furthermore, it follows that doctors would be more

likely to say nothing, since more of the physicians were Republican and the Republican party was less likely to be pro mask wearing. Physicians in Congress did not deviate from party lines. As evidence confirms, masks can be an effective tool to stop the spread of the coronavirus and looking to see whether doctors used their medical knowledge shows that doctors did not rely on this knowledge but rather followed party lines. Although there are more Democrats than Republicans in the House of Representatives, and Democrats are more likely to advocate for mask wearing, members of the House of Representatives were not more likely to advocate for mask wearing than the Senate. Further analysis of this unexpected finding should be conducted to replicate and explore possible explanations for this result.

Medical Misinformation:

It makes sense that the physicians were more likely to spread medical misinformation than non-physician members, as most of the physicians are Republican, and the Republicans were statistically significantly more likely to spread misinformation as well. But interestingly, when looking at Republicans, the physicians were more likely to spread misinformation than the non-physicians, contrary to expectations. The use of hydroxychloroquine and chloroquine as a treatment for Covid-19 did not have enough convincing evidence and therefore physicians should not have been tweeting about using it as a treatment. Physicians should understand that just because it worked in a couple of cases does not mean that it should be widely used. Having a medical degree would give a Congress person more credibility regarding health information, so they should be particularly careful about spreading the misinformation and should have used their platform and credibility to correct the misinformation.

Conclusion

In times of crisis, it is only natural to look to those who are in power and are chosen to lead our country. This study looked to analyze the reaction of those whom the American people chose to be in power. Furthermore, this study sought to see whether those professionals in Congress with medical knowledge who swore to do no harm keep people safe. Did the medical professionals in Congress help the nation by encouraging their constituents to help contain he spread by wearing masks, or did they choose to stay silent? Did they abide by their moral obligation to do no harm and ensure that treatments in trial were not used widespread? The answer to both is that the physicians in Congress did not, they stayed along party lines instead of following their moral obligation to keep people safe. While this study was limited as there were only 26 physicians in Congress and most of them Republican, it was still very telling in seeing how the people entrusted by the nation used their platform and prior knowledge.

Table 1: Twitter accounts demographics by profession

Profession				
	Non Physicians		Physician	
	1	2	1	2
Sex (Male1 Female 2)	376/501 (75%)	125/501 (25%)	25/26 (96%)	1/26 (4%)
Party (Republican1 Democrat2)	226/501 (45%)	275/501 (55%)	23/26 (88%)	3/26 (12%)
Branch (House1 Senate2)	96/501 (19%)	405/501 (81%)	22/26 (85%)	4/26 (15%)

Table 2: Twitter accounts demographics by governmental branch

Branch				
	House of Representatives		Senate	
	1	2	1	2
Profession (Physician1 Nonphysician2)	22/527 (4%)	405/527 (77%)	4/100 (4%)	96/100 (96%)
Sex (Male1 Female 2)	327/527 (62%)	100/527 (19%)	74/100 (74%)	26/100 (26%)
Party (Republican1 Democrat2)	196/527 (37%)	231/527 (44%)	53/100 (53%)	47/100 (47%)

Table 3: Twitter Demographics by sex

Sex				
	Females		Males	
	1	2	1	2
Profession (Physician1 Nonphysician2)	1/127 (.8%)	125/126 (99%)	25/401 (6%)	376/401 (94%)
Party (Republican1 Democrat2)	21/126 (17%)	105/126 (83%)	228/401 (57%)	173/401 (43%)
Branch (House1 Senate2)	100/126 (79%)	26/126 (21%)	327/401 (82%)	74/401 (18%)

Table 4: Twitter Demographics by Party

Party				
	Republican		Democrat	
	1	2	1	2
Profession (Physician1 Nonphysician2)	23/249 (9%)	226/249 (91%)	3/278 (1%)	275/278 (99%)
Sex (Male1 Female 2)	228/249 (92%)	21/249 (8%)	173/278 (62%)	105/278 (38%)
Branch (House1 Senate2)	196/ 249 (79%)	53/249 (21%)	231/278 (83%)	47/278 (17%)

Table 5: Mask Advocacy tweets

Masks Advocacy				
	Tweeted/ retweeted pro	Retweeted Pro	No tweets	Tweet against
Physician	9/26 (35%)	3/26 (12%)	14/26 (54%)	0%
Non physician	293/501 (58%)	53/501 (11%)	153/501 (31%)	2/527 (0.4%)
Males	205/401 (51%)	44/401 (11%)	150/401 (37%)	2/401 (0.5%)
Female	97/126 (77%)	12/126 (10%)	17/126 (13%)	0%
Republicans	73/249 (29%)	31/249 (12%)	143/249 (57%)	2/249 (1%)
Democrats	229/278 (82%)	25/278 (9%)	24/278 (9%)	0%
House	235/427 (55%)	50/427 (12%)	140/427 (33%)	2/427 (0.5%)
Senate	67/100 (67%)	6/100 (6%)	27/100 (27%)	0%

Table 6: Medical misinformation tweets

Medical Misinformation					
	Tweeted Correcting	Retweeted Correcting	No tweets	Tweets spreading	Retweets Spreading
Physician	1/26 (4%)	0	21/26 (81%)	3/26 (12%)	1/26 (4%)
Non Physician	84/501 (17%)	16/501 (3%)	392/501 (78%)	8/501 (2%)	1/501 (0.2%)
Males	50/401 (12%)	13/401 (3%)	326/401 (81%)	10/401 (2%)	2/401 (0.5%)
Female	35/126 (28%)	3/126 (2%)	87/126 (69%)	1/127 (1%)	0
Republicans	3/249 (1%)	2/249 (1%)	231/249 (93%)	11/249 (4%)	2/249 (1%)
Democrats	82/278 (29%)	14/278 (5%)	182/278 (65%)	0	0
House	68/427 (16%)	15/427 (4%)	332/427 (78%)	10/427 (2%)	2/427 (0.5%)
Senate	17/100 (17%)	1/100 (1%)	81/100 (81%)	1/100 (1%)	0

Table 7: Mask Advocacy Chi-Square P Values

Mask Advocacy Chi-Square P values	
	P values*
Sex	P = 0.000
Party	P = 0.000
Physicians Vs Non Physicians	P = 0.015
Branch	P = 0.228
Physicians vs Non Physicians in Republican Party	P = 0.798

Table 8: Mask Advocacy Mann Whitney U Test P Values

Mask Advocacy Mann Whitney U Test P Values		
	P Value*	P Value**
Sex	P = 0.001	P = 0.154
Branch	P = 0.010	P = 0.004
Physicians vs Non Physicians	P = 0.692	P = 0.624
Party	P = 0.000	P = 0.167

* P value of Mann Whitney U test about proportion of tweets that were advocating for masks.

** P value of a Mann Whitney U test about distribution from Time till the first tweet after 4/1/20

Table 9: Medical Misinformation Chi-Square P Values

Medical Misinformation Chi-Square P Values	
	P - Value
Sex	P = 0.165
Branch	P = 0.293
Physicians vs Non	P = 0.000
Party	P = 0.000
Physicians vs Non Physicians in Republican Party	P = 0.006

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