EXAMINING USER ENGAGEMENT OF TOP 100 U.S. HOSPITALS ON TWITTER: THE ROLE OF DIALOGIC COMMUNICATION AND TOPICS

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ABSTRACT

EXAMINING USER ENGAGEMENT OF TOP 100 U.S. HOSPITALS ON TWITTER: THE ROLE OF DIALOGIC COMMUNICATION AND TOPICS

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Grounded in dialogic communication and the Health Belief Model, content analysis of 2,691 tweets from top 100 U.S. hospitals revealed the prevalence of conserving visitors and information of interest to stakeholders. Non-health related topics, general health information, and cure strategy were common. Most dialogic communication strategies were negatively associated with user engagement, whereas topics of non-health, causes of disease, and prevention positively influenced liking and retweeting.

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Table of Contents

List of Tables

Dedication

In the memory of my father Mukesh, my mother Pallavi, uncle Johnny, aunt Arlette and my supportive partner Siddharth. Before I started my journey I was not sure if I would be able to complete it. I used to wonder what I might be able to accomplish; now; I just want to thank you all for your love, support and encouragement throughout.

Introduction

Twitter has become one of the prominent online sources for health information and disease prevention, especially during major public health threats. Close to 90% of US adults have searched for health information on social media (Bishop, 2019). According to statistics provided by Hootsuite, the number of Twitter users is expected to grow to 497.48 million by the year 2025 (Hirose, 2022). Around 25% of Americans rely on Twitter to receive information updates and the percentage of users remain stable over the years (Odsbas, 2022). Consequently, Healthcare organizations increasingly maintain an active presence on Twitter to disseminate the newest scientific findings, increase their visibility (Ahmed et al., 2022), encourage preventive behaviors, and increase public engagement with health organizations (Park et al., 2016). Overall, more than half of US hospitals manage official accounts on Twitter to monitor online conversations and interact with stakeholders (Hawkins et al., 2015). Likewise, a recent study showed that 78% of over five hundred US hospitals specializing in heart and vascular services are active on Twitter. Among those active accounts, the amount of follower size and annual tweet rate was positively associated with favorable hospital rankings by the U.S. News and World Report (Ahmed et al., 2022). These findings demonstrate the beneficial aspects of Twitter in fulfilling critical health information needs and possibly contributing to the reputation of healthcare organizations.

Despite the proliferation of empirical studies documenting the use and diffusion of health information on Twitter, less is known about how U.S. hospitals communicate with different stakeholders on this platform. Undoubtedly, Twitter is a valuable asset to their day-to-day operations and communications strategies because of its ability to instantaneously disseminate information to a variety of audiences in a manner that differs greatly from other social networking websites. Yet Twitter remains a largely untapped resource in the hospital setting

despite the opportunities to revolutionize health care and create a competitive advantage for adopters (Burke et al., 2018). Those hospitals that have chosen to utilize Twitter frequently use it as a one-way marketing tool to share organizational news and services, general healthcare news, community events, success stories, and consumer outreach (Gomes & Coustasse, 2015). Other applications of Twitter in the hospital setting include improving customer service, increasing patient education, providing real-time experience, and enhancing behavioral outcomes such as encouraging preventive behavior (Bronstein et al., 2018). A systematic examination of how healthcare organizations provide regular updates and engage with the public on Twitter that is grounded in communication theories remains scarce.

The purpose of this thesis research is twofold. First, drawing from dialogic communication theory and the health belief model, I will examine how the top 100 U.S. hospitals employ varying communication strategies to provide health information on Twitter. Based on a content analysis of recent posts I will analyze the use of dialogic principles, and topics in organizations' owned posts. Second, I will perform multivariate statistics to explore how message-level and topic-level features influence the extent to which audiences engage with Twitter posts. The upcoming sections of this paper will provide an overview of how organizations utilize Twitter when communicating with their audience. Concepts of dialogic communication and health topics on Twitter will be discussed.

Literature Review

Close to 90% of US adults have searched for health information on social media (Bishop, 2019). Undoubtedly, Twitter is a valuable asset to their day-to-day operations and communications strategies because of its ability to instantaneously disseminate information to a variety of audiences in a manner that differs greatly from other social networking websites. Yet

Twitter remains a largely untapped resource in the hospital setting despite the opportunities to revolutionize health care and create a competitive advantage for adopters (Burke et al., 2018). Those hospitals that have chosen to utilize Twitter frequently use it as a one-way marketing tool to share organizational news and services, general healthcare news, community events, success stories, and consumer outreach (Gomes & Coustasse, 2015). Both individuals and healthcare institutions are using these platforms increasingly to communicate and share information. Social media facilitates two-way communication and direct engagement with audiences. Two-way communication as a concept can widely be understood as the interaction between organizations, individuals, and groups that affect or influence the organization, with the general goal of getting support from the public so that the organization can achieve its goals (Pertiwi & Purwanti, 2023). In the health education and promotion field, social media has established its effectiveness by providing access to information, delivering health campaigns, and offering social support (Doogan et al., 2020). Many government agencies and public health organizations (e.g., the WHO, the Centers for Disease Control and Prevention [CDC], and other local health departments) have adopted social media to enhance their communication with the public (Doogan et al., 2020). Social media can serve as a useful tool to relay outbreak-related updates and critical information effectively to the public. In this way, healthcare institutions provide health-related information to not only those who are in their geographic area but also those who reside in other cities, regions, or countries and those who may not have time or financial resources to participate in traditional educational and community-based programs (Kostygina et al., 2020).

Existing research suggests that people often turn to social media for information during infectious disease outbreaks, which can influence their decision-making and subsequent

behaviors (Doogan et al., 2020). The WHO calls for more proactive use of social media to disseminate health messages to journalists, physicians, and the general public, mainly to counteract misinformation regarding infectious diseases (Doogan et al., 2020). During situations with a sudden increase in caseload or transmission, a coordinated public health strategy can facilitate communication about risks and appropriate behavioral responses (Aboelmaged, 2018). Creating and implementing a coordinated public health strategy requires effective communication deployed in a rapid manner (Burke et al., 2018). Social media offers a way to provide the public with emergency alerts and real-time updates regarding emergencies (Wang et al., 2021). Effective communication also requires that public health professionals deftly handle the rising problem of health-related misinformation on social media (Aboelmaged, 2018).

Dialogic Communication on Twitter

The advent of social media has opened up even greater possibilities for interpersonal and organizational communication. At the interpersonal level, scholars have examined the role of Twitter as a growing platform for interpersonal research. This provides evidence of a connection between individual users' tweet profiles and community formation.

While *what* to say (i.e. message content) is an important aspect of any communication, a comprehensive analysis of a communication strategy necessitates an examination of *how* a message is communicated (Wu et al., 2023). One salient feature of communication on social media is dialogic communication (Wanga & Yang, 2020). Kent & Taylor (1998) referred to dialogic theory as a dialogic perspective focused on the attitudes toward each other contained in the communication transaction by the participants. With that being said, dialogic communication can be understood as any negotiated exchange of ideas and opinions. Dialogic denotes a communicative give and take which is guided by two principles. The individuals who engage in

dialogue do not necessarily have to agree quite often they disagree. However, what they share is a willingness to try to reach mutually satisfying positions. Creating effective dialogic relationships with the public necessarily requires just that: dialogue. Without a dialogic loop in in the online context of communication, public relations becomes nothing more than a new monologic communication medium, or a new marketing technology. The Web provides public relations practitioners an opportunity to create dynamic and lasting relationships with the public, however, to do so requires that dialogic loops be incorporated into web pages and online communication. Hence, relationships between the public and organizations can be created, adapted, and changed through the medium of online communication. There are multiple resources for constructing visually appealing and economically successful websites. Therefore, it is possible to present a dialogic loop that allows the public to query organizations and, more importantly, it offers organizations the opportunity to respond to questions, concerns, and problems. For dialogic communication to take place in the online context it requires a commitment of resources on the part of website providers. It is also noted that if organizations intend to talk like human beings on social media, they must adopt some dialogic principles. The dialogic theory is a public relations theory that "heralds the participatory nature of the internet's relationship-building potential" (Yue et al., 2021). This theory suggests that long-lasting organization-public relationships are built upon open and honest dialogic communication. Five dialogic principles were proposed based on the dialogic theory, including the usefulness of information, conservation of visitors, generation of return visits, ease of interface, and dialogic loop (Yue et al., 2021). Although these dialogic principles were originally posited for web-based Internet communication, later research has applied them to successfully studying organization-public communication on social media, especially on Twitter because of its unique

dialogic nature (Yue et al., 2021). Likewise, Sundstorm and Leventus (2017) concentrated on nonprofit organization executives and studied their communication with the online public.

Moreover, organizations can use social media to communicate and connect with stakeholders, facilitating the formation of an online community. Organization-audience interaction provides an opportunity to empower stakeholders, helps organizations better understand audiences' needs, and offers useful insights to tailor campaign strategies. Thus, instead of merely one-way information dissemination, organizations are increasingly emphasizing interactions with their audiences. Campaign organizations can interact with target audiences on social media in various manners (Zhou & Pan, 2016). For example, audiences sometimes post questions and use the "@" symbol to seek support from the organization. Responding to such public messages can help to build trusting organization-public relationships.

Additionally, organizations can proactively solicit responses from audiences on social media. Collecting feedback from stakeholders is critical to improving organizations' performance. Kostygina et al. (2020) concluded that organizations should use social media as a "stakeholder-engagement vehicle." On social media, audience engagement can be reflected in audiences' reactions to an organization's online messages. In addition to that, Zheng et al. (2021) conducted a content analysis of COVID-19 information on Twitter and found that tweets mentioning advisories received more shares than those mentioning support and news updates. The authors also noted that through online sharing, important public health actions can be seen by people within and beyond peer networks, thereby assisting in the building of group cohesion to cope with health challenges.

Furthermore, Twitter is regarded as an ideal platform to target young audiences. Information about skin cancer can be treated after early detection so the earlier the public can be

aware and participate in skin health prevention activities, the higher the possibility that they can avoid this disease (Jenkins et al., 2020). There are mixed perspectives of how to best use Twitter for health communication. Without continuous interaction with the target audience, it is hard to foster conversations and may hinder public engagement (Jenkins et al., 2020). Organizations also risk losing their audiences (Uysal, 2018). Furthermore, continuous interactions with audiences probably encourage actions on health campaign participation (Watkins, 2017)). Since social media offer a range of communication tools to engage the public, such as Liking, Sharing, and Commenting on Twitter (Jenkins et al., 2020), two-way communication activities involve more engagement and can favor in-depth insights into the public's engagement.

However, this study notes the limitation that it does not offer enough detailed topical focus regarding health information in these tweets. Therefore, we asked the following research question to explore healthcare organizations' utilization of dialogic communication on Twitter.

RQ1: How do U.S. health care organizations utilize dialogic communication on Twitter?

Dissemination of Health Topics

Many existing studies have used the Health Belief Model (HBM) as a theoretical framework to understand individual behavioral change (Sommerfeldt & Yang, 2018).. In addition, the HBM serves as the theoretical framework for conducting a content analysis of Twitter tweets to analyze messaging disseminated by the CDC and the WHO about the Covid-19 pandemic. Developed in the 1970's the Health Belief Model (HBM) was formulated to explain preventive health behavior (Rosenstock, 1974). Health behavior can be determined as any kind of activity performed by a person for the purpose of preventing or detecting the disease in an asymptomatic stage (Rosenstock, 1974). HBM explores the underlying relationship between how preventive health services are used and why they are being used. The premise of the HBM is

that people are more likely to engage in healthy behavior if they hold certain beliefs, such as they are susceptible to a disease condition, or that there are benefits to taking action (Rosenstock, 1974). The constructs include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, perceived self-efficacy, and cues to action. This model serves to add to the growing body of literature addressing communication in the Covid-19 era (Nasir et al., 2020). Given the recent emergence of the pandemic, limited research currently exists to provide any insight into how public health organizations formulate messaging to address a crisis of this magnitude (Pham et al., 2020).

Understanding, predicting, and influencing healthy behaviors among the population are critical issues for healthcare providers (Hall, 2012). Even with cooperation from citizens, a proven evaluation tool must exist to assist policymakers in communicating effectively with the citizens they are endeavoring to influence. The HBM is a psychosocial model that predicts factors affecting individual practices. In the ongoing COVID-19 pandemic, the HBM was adopted to identify factors that change people's attitudes toward public policies (Womg et al., 2020). The HBM is a theoretical framework that is used as a landmark to direct planning for disease prevention and health promotion programs. Its common use is derived from its efficiency in explaining and predicting factors that modify personal changes in health behavior (Gaber & Elsamadicy, 2021). For instance, it focuses on the role of psychological factors (i.e. perceptions) in the severity of and susceptibility to diseases.

Hence, it guides decision-makers about the significance of focusing on these two aspects to shift individual behavior (Gaber & Elsamadicy, 2021). The HBM considers the role of demographic and psychological variables in changing personal perceptions. While demographic variables include factors such as age, gender, and educational background, examples of

psychological variables include personality traits and peer group pressure (Walrave et al., 2021). Thus, it can be deduced that HBM acknowledges various contextual factors (i.e. internal factors related to persons such as their demographic information and psychology).

In the United States, Cleveland Clinic, Mayo Clinic, and Johns Hopkins Hospital are three renowned institutions that have pioneered the use of social media to educate people and raise awareness about health and wellness topics (Alhaimer, 2022). In addition to that, they have also been consistently ranked among the top hospitals in the country in terms of quality of care and their approach to integrating healthcare services with clinical research and education (Mason et al., 2021). Hence, it is crucial to analyze the content of the tweets made by these three institutions and provide content strategy recommendations to not only these institutions but also all of the hospitals and clinics that are active on Twitter (Alhaimer, 2022). Subsequently, prior research has investigated public communications related to health topics on Twitter but very few studies (Nomani et al., 2020) have specifically analyzed the content of the tweets made by hospitals and clinics, particularly in the USA, to identify the health-related topics and educational themes commonly used in their tweets which poses the gap in the literature (Alhaimer, 2022).

A study conducted by Kordzadeh (2021) seeks to understand how popular health topics including diabetes, diet, exercise, obesity, mental health, cancer, and heart and brain issues have been used in the three medical institutions' tweets. These eight topics were selected for this analysis because they are not only among the major health problems (e.g. cancer and diabetes) and preventive measures for diseases (e.g. exercise and diet) in the USA (Kordzadeh, 2021), but also popular, interesting and important to Twitter users. To determine the educational themes of the tweets, this study draws on the health belief model (HBM), which is a widely known health

promotion and disease prevention framework (Kordzadeh, 2021). The HBM posits that one's perceived threats, including beliefs about the severity of, and susceptibility to, a health problem and perceived benefits and barriers to taking preventive or curative action, determine one's likelihood of engaging in health-promoting behaviors (Kordzadeh, 2021). While researchers have investigated the use of social media in healthcare, it remains unclear how exactly renowned hospitals and clinics use Twitter to improve health literacy and promote healthy lifestyles.

RQ2: How do U.S. healthcare organizations communicate health topics on Twitter?

Factors that influence user engagement on Twitter

According to Haroz et al. (2015) the term "engagement" refers to the willingness of users to put up the effort necessary to learn more about the visualization of the content. Likewise, Moere et al. (2012) defined "engagement" as the perceived effectiveness of visualizations or appearances of the content, as indicated by increasing participation/use of visualizations. The irregularity in how scholars defined engagement reflects the various approaches to capturing and quantifying.

With respect to that, an extensive amount of research has used specific behavior indicators, such as the number of "likes" to measure Twitter engagement. A "like" is a way for users to indicate their interest in the tweet. By using likes, followers show more attention, and their level of participation increases (Mazid, 2022). Likes is considered as a form of communication that allows social media users to provide feedback to other users with a simple click (Kaur et al., 2019). This quick interaction (i.e., likes) signals the user's agreement with the published content and is perceived as a way of supporting the post (Wohn et al., 2016).

Scholars have argued that "liking" content on social media could be a gateway to public attention (Li et al., 2022). The communicative affordances of social media provide opportunities

that could be leveraged to gain public attention. Twitter liking behavior reflects the affective evaluation of users and reveals the content's possible reach (Wang & Lu, 2022). Analysis of affective engagement can provide insights into the motivations that drive how and why individuals engage with relevant health messages. User behavior in online social networks can be represented by the features extracted from the user's previous activity, i.e., the likes generated on the tweets that the user engaged with in the past. Day et al. (2022) suggested that followers'use of "likes" can indicate a satisfactory level of interaction. However, Day et al. (2022) argued that the impetus to 'like' a tweet is not necessarily based on agreeing with its content—'liking' may be indiscriminate or based on the status of the tweeter—but the amplification of certain messages became part of the online phenomenon itself. Regardless of the triggers for their amplification, Twitter users saw and engaged with the tweets, which could possibly amplify the dissemination of liked messages to followers' feeds.

The notion of "likes" on social media is viewed as a form of social currency, which relates to one's acceptance of the information they are receiving. In relation to engagement, likes can be defined as a person acknowledging that the information is "good", and overall enjoying it (Habibi & Salim, 2021). When an individual "likes" content, they show interest in that information. As the number of likes on a post goes up, the visibility of that post to a broader audience also increases, thus allowing more individuals an opportunity to engage with the information (Zhan et al., 2023).

Retweeting is believed to portray a behavior of giving and receiving attention, whereas liking acts as a bookmark that enables users to keep useful tweets for future reference (Zhang et al., 2022). In addition, retweets indicate that "engaged audiences experience a desire to share the content with others online, offline, or through both methods" (Huang & Yeo, 2018). These

studies have highlighted the differences in users' intentions when retweeting or liking organizations' tweets. Earlier research has suggested that retweeting comparatively has a higher level of engagement than liking and commenting (Saffer et al., 2019). The like button is the quickest and easiest way to show users' agreement and positive feedback toward organizations' social media content; however, it is considered a minimal and symbolic action. Thus, individuals or organizations are more likely to retweet when messages are congruent with their intended audience and with their identity (Chung et al., 2020). On the other hand, the absence of real dialogue only means that engagement is not immediately triggered. This neglects that continuous interaction might lead to online and offline engagement processes in the long term (Okay et al., 2022). Retweet allows a user to repost tweets from another user while acknowledging that user (Saffer et al., 2019). People can also add their thoughts when retweeting others' messages. This will eventually entail two-way communication between the healthcare organization and its public which, in turn, brings more people into the conversation.

In existing altimetric literature, retweeting is the most analyzed user engagement behavior. Priem and Costello (2010) found that retweeting behaviors only made up 19% of a sample of scholarly tweets posted by 28 academic users. However, in more recent research, it was generally reported that retweets accounted for close to or over half of the scholarly tweets of papers, being a key component of the database of studies related to scholarly Twitter metrics. For a sample of 3,200 tweets posted by the 130 Twitter accounts of 25 U.S. health agencies, Bhattacharya et al., (2014) found that about one-third of them had zero retweets while the rest were retweets at least once. As a form of information diffusion in nature, retweets were often analyzed to help capture topics of the public's interest in sharing or to construct Twitter dissemination networks of scientific knowledge across communities.

Studies have shown that retweets are mostly associated with negative content (Hansen et al., 2011).Trying to better understand this sharing behavior, Suh et al., (2010) confirmed that content resources, URLs, and hashtags have a major influence on whether something will be retweeted. Over the years, Twitter has updated its functions, and Soboleva et al., (2017) found that posts that include images also have a positive influence on one's decision to retweet. Retweeting is an important activity on Twitter as it facilitates virality and the dissemination of information in real-time (Soboleva et al., 2017). It involves users' active participation by disseminating the most relevant news by sharing them with their peers. It is easy and quick to perform as it only takes one click for the user to retweet information (Smith et al., 2019; Suh et al., 2010).

Acknowledging that the immediate reaction of stakeholders provides a first indication of how successful the communication attempt was, these metrics additionally analyze the dialogic intention of the companies' tweets (Pilgrim & Bohnet-Joschko, 2022). The dialogic intention, in this sense, describes the willingness of companies to engage in dialogue, which can be characterized by factors such as a call to actions, the fit between company and concern, or the fit between question and response (Niehoff, 2022). The usefulness of health topics has the potential to motivate public engagement. Thus, the following hypothesis and research question is proposed:

H1: The use of dialogic communication is positively associated with user engagement on Twitter.

RQ3: How does communicating health topics influence user engagement on Twitter?

Method

Data Collection

Between October 5, 2022, to November 27, 2022, the data was collected by searching the keywords “Top Hospitals in the U.S.” on Google. An article published by Newsweek was utilized wherein World Best Hospitals in 2022 with a list of more than 100 hospitals was obtained. The top 100 hospitals with their name, the location which presents in which city and states the hospital is based and their score was shortlisted. The data was then transferred to the Excel sheet manually. Later, each hospital’s Twitter handle was searched and the account was determined active based on if the account has posted updates in the last three months. A total of 90 active Twitter accounts were included for analysis (see Appendix A). The data also consisted of the number of followers each hospital has and the number of years the account has been active on Twitter.

To compile public tweets from US-based healthcare organizations, I utilized Twlets, a free scraping tool, to download the tweets from the official Twitter accounts of the hospitals. Twlets is a web-based software where at once 2,500 tweets and associated engagement metrics can be downloaded. Tweets from the active accounts of the hospitals were downloaded using Twlets and were compiled in the Excel sheet. A total of 2,700 tweets were downloaded (30 recent tweets per account as of November 2022) and organized into an excel spreadsheet for content analysis. All tweets were in English and originated in the United States. After removing unavailable tweets, the final sample size was 2,691.

Measurements of Manual Content Analysis

Independent Variables

The presence of five-message level factors measured in dichotomous scales (0=not present, 1=present) using dialogic communication was recorded (Yue et al., 2023). Conservation of visitors refers to posts containing hyperlinks to the organization's official websites. The tweets containing URL links for the external news coverage mentioning the employees or the healthcare organization were coded as generation of return visits.

The use of dialogic loop was identified when tweets provided linguistic cues to call for actions or embedded interactive polls/surveys for feedback (Liu et al., 2020; Ju et al., 2021). In order to gauge two-way communication between Twitter users and the hospital organization, taggings was used (Lovejoy et al., 2012). Hence, mentions of user accounts whose affiliations are outside the hospitals by making use of the sign @ were analyzed. Information of interest to stakeholders included promotional messages displaying organizations or employers' achievements, educational programs, being a part of community events/sports events, fun traditional/festive activities, and appreciation of health care workers.

I annotated each tweet into one of nine mutually exclusive categories to investigate the prevalence of primary topics. When there were multiple topics, I determined the main focus of the messages and the frequency of topic-specific keywords. Understanding the organizational messages that would most likely contribute to people's health beliefs is beneficial for individuals' motivation to take preventive behaviors (Kordzadeh, 2022; Tang et al., 2023; Tsai et al., 2023). Accordingly, I adapted a theory approach towards analyzing topics comparable to concepts suggested in the HBM: (1) general health advice, (2) general health information, (3) cure and coping strategy, (4) diagnosis, (5) causes, (6) patient story, (7) prevention, and (8) consequences. In order to fulfill the need for information about the organizational operations , hospitals would mention non-health topics such as responding to patient complaints/inquiries,

celebrating Veterans day, and featuring doctors visiting foreign countries. Table 1 summarizes detailed operationalizations of respective topics.

To establish intercoder reliability, two independent coders randomly analyzed 10% of selected tweets from the sample size of 2,671 tweets. Out of 2,671 tweets, 270 tweets were randomly selected and manual content analysis was performed. The researcher then compared the results of the independent coders to evaluate the reliability of the initial codebook to interpret and assign meaning to the language. Continuing with transferability, the researcher used intercoder reliability to ensure that the coding of the data was consistent. Measuring this consistency helped in balance of the subjectivity of the coding process itself.

Dependent Variables:

Referring to prior research (Ju et al., 2021; Park et al., 2016; Zhang et al., 2022), the total number of likes was used to measure user engagement (M=21.44, SD=198.56) and retweets (M=4.65, SD=44.88) were regarded with each set of a unique tweet that was posted.

Controls

The number of followers (M=70,090.3, Min=973, Max=2,000,000) (see Table 2) and years since the accounts were first created (M=12.31, SD=2.11) might influence the reach of the message and the levels of user engagement. The word count in the tweets (M=31.97, SD=10.62) was included as a control variable. Previous studies have displayed a significant relationship between interactive features used in tweets and user engagement along with mixed findings. The evaluation was conducted on interactive features by adding up the presence of 6 distinct characteristics, including emojis, photos/memes/infographics, GIFs, hyperlinks, hashtags, and videos (M=1.83. SD=0.88). The retweeted posts from other accounts (21.5%) were entered as controls.

Results

RQ1 investigated if the tweets posted by US hospitals utilized dialogic communication. Table 1 presents the data that posts containing links for conservation of visitors 49%, whereas sharing information of interest to stakeholders is 43%. However, tagging accounts were found to be independent in hospitals 23% that appeared to be frequent. Contrastingly, the use of a dialogic loop was found to be only 15% and the generation of return visits was only 12%.

RQ2 explored the information of topics allocated by the hospital organizations in the form of health promotion and education. The healthcare organizations catered to non-health-related topic reporting (30%). General health advice and general health information accounted for 9% and 25% respectively. On the other hand, cure and coping strategy, diagnosis and cause displayed a significant number of 11%, 6%, and 4%. Patient story (7%) and prevention (9%) had a small presence in the tweet. inconsequential results portrayed. Lastly, the information containing possible consequences of diseases was almost non-existing (0.5%).

H1 investigated the relationship between dialogic communication and user engagement with Twitter posts. In Table 2, the results demonstrate the audience's liking behavior. If we look at the IRR column in Table 2 we can see the association for each predictor variable with the dependent 'liking' count, as indicated by the incidence rate ratio (IRR). In negative binomial regression models, IRR reports the strength of associations between predicting factors and count outcome variables, enabling researchers to identify which factors are statistically more important than others. IRR > 1 indicates that the specific predictor is associated with a positive increase in the dependent variable (e.g., favorite and retweet count). When an IRR is below 1, there is a

negative effect. For example, the IRR of dialogic loop in predicting the number of likes is 0.35. It suggests that including dialogic loop in a tweet reduces the chances of receiving likes by 65%. Therefore, Generation of return visits (IRR=0.47, 95% CI=0.38-0.59, $p < .001$) and dialogic loop (IRR=0.35, 95% CI=0.29-0.43, $p < .001$) displayed a negative relationship with liking. In contrast, information of interest to stakeholders had a positive relationship with liking (IRR=1.46, 95% CI=1.21-1.76, $p < .001$).

Table 3 presents the retweeting behavior with hospitals' content. The results show that that generation of return visits (IRR=0.73, 95% CI=0.56-0.95, $p < .05$), dialogic loop (IRR=0.47, 95% CI=0.38-0.59, $p < .001$), and tagging (IRR=0.79, 95% CI=0.65-0.96, $p < .05$) were reported to have a significant negative influence on retweetability. Comparatively, the conservation of visitors was positively associated with retweeting (IRR=1.25, 95% CI=1.03-1.51, $p < .05$). Hence, H1 was partially supported.

RQ3 aimed to understand the role of topics in influencing user engagement levels. The general health advice is a reference category posted in the multivariate regression models. Causes of diseases (IRR=2.22, 95% CI=1.56-3.16, $p < .001$), non-health related information (IRR=1.48, 95% CI=1.11-1.97, $p < .05$) and prevention (IRR=1.38, 95% CI=1.04-1.84, $p < .05$) gained an eminent number of likes compared to information about health advice. Moreover, there were only four topics that appeared to be significant positive predictors on Twitter related to the retweeting behavior: causes (IRR=2.40, 95% CI=1.61-3.58, $p < .001$), diagnosis (IRR=1.87, 95% CI=1.30-2.71, $p < .01$), prevention (IRR=1.78, 95% CI=1.27-2.46, $p < .01$), and non-health messages (IRR=1.66, 95% CI=1.20-2.32, $p < .01$).

Discussion

It is noted that US hospitals increasingly utilized dialogic communication to engage stakeholders and showed an intention to embrace two-way communication. Regarding the dissemination of health, 30 percent of Twitter posts were non-health topics, expressing healthcare organizations' particular interest in being a part of the community. General health information and cure strategy were frequently posted; other topics appeared infrequent. Therefore, there is improvement needed in terms of topic variety to engage and enhance literacy related to health and more towards preventive behavior. The results indicate that although multiple healthcare organizations are using Twitter, there is a great deal of difference between engaging in dialogue with the stakeholders, as measured by favorites and retweets. For healthcare organizations, a tiny minority of tweets got over 100 retweets; a two-thirds majority of tweets received an average of 4-7 retweets. A Twitter handle's information of interest to stakeholders had a positive relationship with liking behavior. In contrast, the conservation of visitors, wherein hyperlinks were provided to direct stakeholders to the healthcare organizations' official website page, positively predicted retweets but did not influence liking. While communication professionals who manage healthcare organizations' social media pages may monitor the user engagement metrics regularly, the study provides additional insights into why and how dialogic communication principles and health topics influence audiences' reactions to organizational messages.

Surprisingly, organizational tweets related to establishing two-way communication with the audiences or tagging people outside the hospital organization do not necessarily lead to retweets. In fact, I found that generation of return visits, dialogic loop, and tagging are negatively associated with retweets. This suggests that healthcare organizations might want to consider

posting tweets that provide more information of interest to the stakeholders. However, this observation must be balanced against the fact that communication strategies may be driven by promoting healthcare organizations' images rather than optimizing public engagement on Twitter. Additionally, I found the role of topics in motivating user engagement levels. Cause of diseases, prevention, and non-health related information are positively associated with user engagement of likes and retweets. Healthcare organizations should consider what health topics might serve the public's need for information and trigger user engagement.

Limitations and future research

The thesis research has some limitations. First, for an exploratory scope of this research purposes, only 30 tweets per healthcare organization were analyzed. Future research can use the verified codebook in this study to analyze more data from top-ranked organizations and provide a comprehensive overview. Secondly, the presenting information does not identify the quality of health information conveyed in Twitter. Research can be further expanded to what extent health information is simplified for the general audience and where culturally sensitive messages(e.g., presenting Hispanic translations and using diverse representations of human images) are considered by the healthcare organizations when providing health education and promotion online . Lastly, the current study did not include analysis on images and videos that sometimes appear in tweets. In the future, researchers can investigate and analyze the content information in the tweets containing images and videos.

Conclusion

Grounded in two prominent theories in communication research, this study fills an important knowledge gap through understanding how U.S. hospital organizations communicate

with various stakeholders on Twitter. A systematic content analysis of 2691 tweets examine the use of dialogic communication principles and the prevalence of health topics that may entourage preventive behavior. Findings reveal the prevalence of conserving visitors and information of interest to stakeholders. Non-health related topics, general health information, and cure strategy are common. While most dialogic communication strategies are negatively associated with user engagement, information appealing to stakeholders' interests, in general, has more liking and conservation of visitors has more retweeting. Topics of non-health, causes of disease, and prevention positively influence liking and retweeting. Together, this research provides a rigorous framework of understanding healthcare organizations' communication strategies and shed light on how communication strategies are associated with user engagement on Twitter.

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Appendices

Table 1.

Operationalization of variables, intercoder reliability, and descriptive statistics

Variables	Definition	Krippendorff's Alpha	Percentage
Dialogic Communication			
Conservation of visitors	Contain links to the hospital's official website or other social network sites.	0.94	49.1
Generation of return visits	Contain links to news coverage/opinion pieces related to the organization.	0.88	12.3
Dialogic loop	Phrases provide cues to action (e.g., check out the information, include a survey or a poll for the audience to express opinions, please contact us)	0.79	15.3
Tagging	Contain tagging of user accounts whose affiliations are outside the hospital.	0.83	23.3
Information of interest to stakeholders	Information about promoting the organization, appreciation of healthcare workers in the organization, community events, donation events, and featuring employees.	0.92	42.7
Topics		0.75	
Non-health related	No health topics are mentioned.		30.3

General health advice	Tips and advice help people have a healthier body, mind, and lifestyle (not tied to a specific medical condition). Advice needs to improve people's health status.	8.7
General health information	Information raises health literacy about general health topics.	24.5
Cure and coping strategy	Information about medications, surgical operations, procedures, activities or any other salutations to treat or cope with a medical condition.	10.9
Diagnosis	Information about diagnosis, symptoms, condition detection, prediction and or risk assessment of a disease.	5.7
Causes	Information about reasons behind a disease or the factors that may contribute to a medical condition.	4.1
Patient story	Stories focus on individuals rather than a group of people.	6.7
Prevention	Information about medications, supplements, diets, physical activities, annual screening, and any other measures that reduce the risk of disease.	8.8
Consequences	Information about the effects of disease and resulting situations.	0.5

Table 2.

Negative binomial regression model predicting number of favorites (N=2691)

Variables	b	Exp (B)	95% Confidence Interval
Number of Followers (log)	0.67***	1.95	1.70-2.24
Active years	0.01	1.01	0.98-1.05
Tweet length	0.01	1.01	0.99-1.01
Retweeted post	2.53***	12.54	10.59-14.85
Interactive features	-0.24***	0.79	0.73-0.85
Dialogic Communication			
Conservation of visitors	0.02	1.02	0.86-1.20
Generation of return visits	-0.75***	0.47	0.38-0.59
Dialogic loop	-1.04***	0.35	0.29-0.43
Tagging	-0.04	0.96	0.81-1.13
Information of interest to stakeholders	0.38***	1.46	1.21-1.76
Topics			
Non-health related	0.39**	1.48	1.11-1.97
General health information	0.04	1.04	0.80-1.35
Cure and coping strategy	0.20	1.22	0.92-1.62
Diagnosis	0.30	1.34	0.97-1.86
Cause	0.80***	2.22	1.56-3.16
Patient story	0.21	1.23	0.90-1.68
Prevention	0.32*	1.38	1.04-1.84
Consequence	-0.53	0.59	0.23-1.51
χ^2	1660.41		
AIC	16302.52		
BIC	16426.37		

Retweeted post: 0=No; 1=Yes
Number of followers of each Twitter account used log transformation.
The reference category for topics is general health advice.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Table 3.

Negative binomial regression model predicting number of retweets (N=2691)

Variables	b	Exp (B)	95% Confidence Interval
Number of Followers (log)	0.75***	2.11	1.80-2.47
Active years	-0.01	0.99	0.95-1.03
Tweet length	0.00	1.00	0.99-1.01
Retweeted post	2.51***	12.32	10.23-14.84
Interactive features	-0.25***	0.78	0.71-0.85
Dialogic Communication			
Conservation of visitors	0.22*	1.25	1.03-1.51
Generation of return visits	-0.32*	0.73	0.56-0.95
Dialogic loop	-0.76***	0.47	0.38-0.59
Tagging	-0.24*	0.79	0.65-0.96
Information of interest to stakeholders	0.12	1.13	0.91-1.39
Topics			
Non-health related	0.51**	1.66	1.20-2.32
General health information	0.12	1.12	0.83-1.52
Cure and coping strategy	0.30	1.35	0.98-1.86
Diagnosis	0.63**	1.87	1.30-2.71
Cause	0.88***	2.40	1.61-3.58
Patient story	0.17	1.18	0.82-1.71
Prevention	0.57**	1.78	1.27-2.46
Consequence	-0.46	0.63	0.21-1.90
χ^2	1149.88		
AIC	10139.86		
BIC	10263.71		

Appendix A. List of active Twitter accounts included in the analysis

Name of the Hospital	Score	City	State	Active	Twitter Handle	No. of Followers	Years of being active
Mayo Clinic-Rochester	97.96%	Rochester	MN	1	Mayo Clinic	2 M	14
Cleveland Clinic	94.39%	Cleveland	OH	1	Cleveland Clinic	1.9 M	13
Massachusetts General Hospital	92.80%	Boston	MA	1	MassGen News	57.9 K	12
The John Hopkins Hospital	86.55%	Baltimore	MD	1	The John Hopkins Hospital	633.4 K	13
UCLA Health- Ronald Reagan Medical Center	81.71%	Los Angeles	CA	1	UCLA Health	45.2 K	13
Brigham and Women's Hospital	81.48%	Boston	MA	1	Brigham and Women's Hospital	56.9 K	15
Stanford Health Care- Stanford Hospital	80.86%	Stanford	CA	1	Stanford Health	38.3 K	13

Presbyterian Hospital- Columbia and Cornell	79.81%	New York	NY	1	Presbyterian Hospital	54.5 K	11
Northwestern Memorial Hospital	79.49%	Chicago	IL	1	Northwestern Memorial Hospital	25.1K	13
The Mount Sinai Hospital	79.43%	New York	NY	1	Mount Sinai	89.5K	13
University of Michigan Hospitals- Michigan Medicine	79.25%	Ann Arber	MI	1	University of Michigan Hospitals- Michigan Medicine	42.1 K	14
Cedars- Sinai Medical Center	79.02%	Los Angeles	CA	1	Cedars- Sinai	3,288	2
Duke University Hospital	78.76%	Durham	NC	1	Duke Hospital	1,655	3
UCSF Medical Center	78.75%	San Francisco	CA	1	UCSF Hospital	77.6 K	12
Hospital of the University of Pennsylvania- Penn Presbyterian	78.11%	Philadelphia	PA	1	Penn Medicine	29.2 K	13
Rush University Medical Center	77.70%	Chicago	IL	1	Rush University	3,349	8

NYU Langone Hospitals	77.13%	New York	NY	1	NYU Langone Hospital	34.8K	13
Mayo Clinic-Jacksonville	76.95%	Jacksonville	FL	1	Mayo Clinic	2 M	14
UCLA Health- Santa Monica Medical Center	76.71%	Santa Monica	CA	1	UCLA Health	45.1 K	13
Mayo Clinic- Phoenix	74.77%	Phoenix	AZ	1	Mayo Clinic	2 M	14
Houston Methodist Hospital	74.47%	Houston	TX	1	Houston Methodist Hospital	23.6 K	13
University of Wisconsin Hospitals	74.35%	Madison	WI	1	University of Wisconsin Hospital	21.4 K	14
University of Washington Medical Center	73.72%	Seattle	WA	1	University of Washington Medical Center	25.8 K	13
Vanderbilt University Medical Center	73.72%	Nashville	TN	1	Vanderbilt University Medical Center	13K	3
Beth Israel Deaconess Medical Center	73.71%	Boston	MA	1	BIDC Medical Center	19.8 K	13

UC San Diego Health- Jacobs Medical Center	73.63%	San Diego	CA	1	UC San Diego Health	21.5 K	12
University of Chicago Medical Center	73.52%	Chicago	IL	1	University of Chicago Medical Center	26.2 K	11
University of Colorado Hospital	73.05%	Aurora	CO	1	University of Colorado Hospital	7,586	11
Emory University Hospital	72.84%	Atlanta	GA	1	Emory Hospital	28. 2 K	14
University Hospitals Cleveland Medical Center	72.44%	Cleveland	OH	1	Cleveland Hospital	28.2 K	13
University of Utah Hospitals	72.13%	Salt Lake City	UT	1	Utah Hospitals	19.5K	13
University of Kansas Hospitals	72.02%	Kansas City	KS	1	Kansas Hospitals	8,663	12
University of California- Davis Medical Center	71.51%	Sacramento	CA	1	Davis Medical Center	5,093	8
Scripps Memorial Hospital La Jolla	71.30%	La Jolla	CA	1	Scripps Memorial	28.1 K	14
Yale New Haven Hospital	71.26%	New Haven	CT	1	Yale New Haven Hospital	24.6 K	14

Barnes- Jewish Hospital	70.75%	Saint Louis	MO	1	Barnes- Jewish Hospital	10.8 K	13
Keck Hospital of USC	70.72%	Los Angeles	CA	1	Keck Hospital	196.9 K	13
Cleveland Clinic Fairview Hospital	70.45%	Cleveland	OH	1	Cleveland Clinic	15.3 K	5
Torrance Memorial Medical Center	70.18%	Torrance	CA	1	Torrance Memorial Medical Center	1,529	13
Virginia Mason Francisan Health-Virginia Mason Medical Center	70.14%	Seattle	WA	1	VMF Health	10.6 K	13
OHSU Hospital	70.00%	Portland	OR	1	OHSU Hospital	18.4 K	13
University of Virginia Medical Center	69.99%	Charlottesville	VA	1	UVA Health	12.2 K	13
Tufts Medical Center	69.72%	Boston	MA	1	Tuffts Medical Center	23.1 K	12
Brigham and Women's Faulkner Hospital	69.71%	Boston	MA	1	Faulkner Hospital	1,724	12
Cleveland Clinic-Florida	69.63%	Weston	FL	1	Cleveland Clinic	8,440	8
Morristown Medical Center	69.56%	Morristown	NJ	1	Morristown Medical Center	4,583	7

Baylor University Medical Center	69.51%	Dallas	TX	1	Baylor University Medical Center	8,087	7
UT Southwestern Medical Center	69.46%	Dallas	TX	1	UT Southwestern Medical Center	18 K	13
UAB Hospital	69.38%	Birmingham	AL	1	UAB Hospital	14.5 K	13
Mercy Hospital- St. Louis	69.38%	St. Louis	MO	1	Mercy Hospital	5,224	14
Baylor St. Luke's Medical Center	69.37%	Houston	TX	1	St. Luke's Medical Center	7,668	14
Sanford USD Medical Center	69.30%	Sioux Falls	SD	1	Sanford Hospital	19 K	14
UPMC Presbyterian & Medical Center	69.28%	Pittsburgh	PA	1	UPMC	22.9 K	7
CentraCare- St. Cloud Hospital	69.25%	Saint Cloud	MN	1	CentraCare	1,480	12
Providence St. Vincent Medical Center	69.18%	Portland	OR	1	St. Vincent Medical Center	6,885	12
St. Luke's Hospital of Kansas City	69.16%	Kansas City	MO	1	ST. Luke's Hospital	4,298	12
Hackensack University Medical Center	69.09%	Hackensack	NJ	1	Hackensack Medical Center	5,380	6

Jefferson Health-Thomas Jefferson University Hospitals	68.98%	Philadelphia	PA	1	Jefferson Health	17.7 K	13
St. Luke's Regional Medical Center	68.67%	Boise	ID	1	St. Luke's Regional Medical Center	6,665	13
Memorial Hermann-Texas Medical Center	68.59%	Houston	TX	1	Memorial Hermann Medical Center	38.4 K	14
Northwestern Medicine Central DuPage Hospital	68.28%	Winfield	IL	1	https://twitter.com/AAMC_surgery	25.1 K	13
University of Minnesota Medical Center	68.26%	Minneapolis	MN	1	University of Minnesota Medical Center	8,909	10
Nebraska Medicine-Nebraska Medical Center	68.20%	Omaha	NE	1	UNMC	23.4 K	14
Mayo Clinic- Health System In Eau Claire	68.05%	Eau Claire	WI	1	Mayo Clinic	20.2 K	13
Loyola University Medical University	67.97%	Maywood	IL	1	Loyola Health	5,982	12
Christ Hospital	67.96%	Cincinnati	OH	1	Christ Hospital	8,352	13
Medical City Dallas Hospital	67.93%	Dallas	TX	1	Medical City	973	6

Penn State Health-Milton S. Hershey Medical Center	67.79%	Hershey	PA	1	Hershey Medical Center	10.9 K	12
Indiana University Health West Hospital	67.57%	Avon	IN	1	IU Health	28.9 K	13
Ohio State University- Wexner Medical Center	67.53%	Columbus	OH	1	Wexner Medical Center	34.1 K	14
VCU Medical Center	67.44%	Richmond	VA	1	VCU Medical Center	71.1 K	12
UnityPoint Health-Meriter	67.41%	Madison	WI	1	Unity Point Health	2,543	12
Penn Medicine Chester County Hospital	67.35%	West Chester	PA	1	Chester County Hospital	2,756	14
University of Maryland Medical Center	67.32%	Baltimore	MD	1	UMMC	18.5 K	14
Inova Fairfax Hospital	67.16%	Falls Church	VA	1	Inova Hospital	11.8 K	13
Froedtert Hospital and the Medical Center of Wisconsin	67.06%	Milwaukee	WI	1	Froedtert	5,524	15
ChristianaCare	67.05%	Newark	DE	1	Christiana Care	7,054	13

Umass memorial Medical Center	67.01%	Worcester	MA	1	Umass Memorial Medical Center	8,139	13
UNC REX Hospital	66.95%	Raleigh	NC	1	UNC Health REX	6,661	13
Sharp Memorial Hospital	66.90%	San Diego	CA	1	Sharp Health Care	13.3K	13
Newton- Wellesley Hospital	66.61%	Newton	MA	1	Newton Hospital	4,584	13
Advocate Good Samaritan Hospital	66.46%	Downers Grove	IL	1	Advocate Health	27.3 K	13
Atrium Health Carolinas Medical Center	66.38%	Charlotte	NC	1	Atrium Health	20.4 K	12
Cleveland Clinic Akron General	66.36%	Akron	OH	1	Akron General Hospital	2,308	9
Henry Ford Hospital	66.36%	Detroit	MI	1	Henry Ford Hospital	17.6 K	15
Maine Medical Center	66.34%	Portland	ME	1	Maine Medical Center	6,119	13
Indiana University Health- North Hospital	66.31%	Carmel	IN	1	Indiana University Health-North Hospital	1,810	13

Anne Arundel Medical Center	66.30%	Annapolis	MD	1	Anne Arundel Medical Center	5,730	13
Intermountain Medical Center	66.29%	Murray	UT	1	Intermountain Medical Center	15.4K	12
Tampa General Hospital	66.28%	Tampa	FL	1	Tampa General Hospital	21.7K	10
University of North Carolina Hospitals	66.26%	Chapel Hill	NC	1	UNC Health Care	33.8K	14
MemorialCare Long Beach Medical Center	66.25%	Long Beach	CA	1	MemorialCare Long Beach Medical Center	1,612	12
Aurora St. Luke's Medical Center	66.24%	Milwaukee	WI	1	Aurora Health Care	24.7 K	14
El Camino Hospital	66.24%	Mountain View	CA	1	El Camino Hospital	3,127	12
University of Iowa Hospitals and Clinics	66.24%	Iowa City	IA	1	UIHealthcare	14.1 K	13
Emory Saint Joseph's Hospital	66.22%	Atlanta	GA	1	Emory Healthcare	28.1 K	14
Miami Valley Hospital	66.22%	Dayton	OH	1	Miami Valley Hospital	4,468	13
Mission Hospital	66.19%	Mission Viejo	CA	1	Mission Hospital	8,337	13

Appendix B. Sample tweets of each variable

Variable	Sample Tweets
Conservation of visitors	@MayoCancerCare radiation oncologist Dr. Carlos Vargas discusses #ProstateCancer screening and treatment. https://t.co/5rebrn6GBy
Generation of returned visits	In 2019 @AlisterFMartin, MD, MPP, Emergency Medical Specialist, launched Vot-ER at Mass General. The @BostonGlobe shares how this initiative has helped thousands of patients register and leave our hospitals ready to vote. https://t.co/k2ZDA2sV6u
Dialogic loop	UCLA Health is among the most comprehensive and advanced health care systems in the world. Our physicians are world leaders in the diagnosis and treatment of complex illnesses. Select a health plan that includes UCLA Health. Learn more: https://t.co/JCuTUIa7az https://t.co/LqG8hIivxL
Tagging	Surprising my Captain @kaj33 last night at @UCLAHealth charity event @Lakers @howiemandel @JuddApatow #lakers #showtime https://t.co/dHg846qoei
Information to stakeholders	The newest member of the #ChaseChildLife staff at @uclamch has been a big hit with patients & staff alike. Meet Isha, the pediatric facility dog! Thanks to @teammates4kids & other donors who generously provided funding for Isha. Read more:
Non-health related	UCLA Homeless Healthcare Collaborative takes to the streets to deliver care to people experiencing homelessness throughout Greater Los Angeles. Read more about this program in “House Calls Without Walls”, and article by Jocelyn Apodaca Schlossberg.
General health information	Do you crave junk food? Humans are hardwired to seek fat, carbohydrates and salt. These nutrients help keep our bodies and minds healthy. Fast foods are often packed with unnatural levels of these nutrients, hijacking the reward centers of our brains.
Cure and coping strategy	"While caring for a 4-year-old diagnosed w/lymphoma, I learned that acknowledging and validating pt & family fears strengthens relationships."-Dr. Joanne Shay @HopkinsMedicine @GoldFdtn @ScottVernaglia @DrJRubenstein @SapnaKmd @LifeandPICU #MedTwitter https://t.co/ilP2abBTGq
Diagnosis	Collaboration was key for @cappelliMD in her research. She found patients with autoimmune rheumatic diseases & lung cancer were diagnosed earlier & had better survival outcomes. She’ll present her work at #ACR22 @jhrheumatology https://t.co/s7RX15o0wi

Cause	Researchers from @UCLASemel create molecular map showing molecules made by glioma blood vessels that allow the tumors to grow and spread into the surrounding brain, providing a new direction to identify therapeutic targets. https://t.co/6ME51N2Nie
Patient Story	Ruben Salazar came down with a severe case of #COVID19 in June of 2020. The experience left him with #PTSD and #LongCOVID symptoms. To help deal with the trauma that can result from hospitalization in the ICU, Salazar has been attending a UCLA post-ICU support group. Read:
Prevention	What if a menstrual pad could detect infections or even cancer, making screenings like pap smears a thing of the past? #WomensHealth #HPV https://t.co/ZT1IO3Hnlk
Consequence	Diving deeper into the connection (or lack thereof) between high blood pressure and feelings of fatigue with our preventive cardiologist. https://t.co/y6EuRQntAq