COVID-19 | Healthcare Coalition

Health Communication Science:
The Amplification of Health Dis/Mis Information for COVID-19

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Executive Summary

In December 2019, the world was first introduced to the novel coronavirus (COVID-19) as cases began to emerge out of Wuhan, Hubei Province, China. Today COVID-19 is a world-wide pandemic. On the heels of the spread of the virus, disinformation (intentional) and misinformation (unintentional) related to COVID-19 began to also emerge. Experts agree the spread of dis/mis information on social media has been unprecedented (Wang et al., 2019), leading the World Health Organization (WHO) to declaring it an "infodemic." In addition to the threat of the virus itself to the health and well-being of individuals, the barrage of dis/mis information impacts effective care, health behavior, and decision-making. In the case of the current pandemic, can threaten the lives of individuals throughout the world (Ratzan, 2011).

The purpose of this document is to explore health dis/mis information related to COVID-19. Specifically, this document addresses the following questions:

1. What is the potential impact of dis/mis information to the health and well-being of individuals and how does it complicate emergency response to the COVID-19 health threat?

2. What interventions are currently being implemented to address or slow the spread of dis/mis information related to COVID-19?

3. What are the opportunities to help navigate and address health-related dis/mis information?

This paper is organized to orient the reader to the core definitions of related terms and to provide general background and context of COVID-19 dis/mis information. Other sections provide information related to the amplification of dis/mis information and the potential implications. Last, the document looks at potential opportunities for approaching the challenge of COVID-19 dis/mis information.

Definitions

- Disinformation – "Deliberately misleading or biased information; manipulated narrative or facts; propaganda" (Strauss, 2018).

- Misinformation – "False information that is spread, regardless of whether there is intent to mislead" (Strauss, 2018).

- Infodemic – The World Health Organization defines an infodemic as "an overabundance of information — some accurate and some not — that makes it hard for people to find trustworthy sources and reliable guidance when they need it" (WHO, 2020).

Background

In December 2019, numerous cases of pneumonia of an unknown origin were being reported in Wuhan, Hubei Province, China. In the same month, researchers there determined that it was a novel coronavirus, now known as COVID-19 (Taylor, 2020). Coronaviruses are themselves not new and are known for being behind several high-profile illnesses in the 21st century.

By mid-January 2020, cases of COVID-19 reached Japan, South Korea, Thailand – and the United States. The month would close with the number of people infected by the virus in the thousands, and with the WHO declaring a "public health emergency of international concern." Government officials across multiple countries, including Italy, other parts of Europe, Iran and the United States, called for city lockdowns and the closing of borders as the virus continued to spread. By March 11, the WHO would officially declare the coronavirus a pandemic. As of May 5, 2020, 177 countries have reported more than 3.5 million COVID-19 cases and more than 250,000 deaths (Taylor, 2020).

The danger of an infodemic

As the COVID-19 virus propagates, so too has dis/mis information about the disease. It has reached such a volume that the WHO declared an "*infodemic*" in February 2020 (WHO 2020). There are a number of theories about the coronavirus circulating online, ranging from allegations that the illness came from outer space (Funnell 2020), to fake "silver liquid" cures (Haring, 2020) and everything in between.

> "We know that every outbreak will be accompanied by a kind of tsunami of information, but also within this information you always have misinformation, rumors, etc. We know that even in the Middle Ages there was this phenomenon," said Sylvie Briand, director of Infectious Hazards Management at WHO's Health Emergencies Programme and architect of WHO's strategy to counter the infodemic risk, to *The Lancet.* "…What is at stake during an outbreak is making sure people will do the right thing to control the disease or to mitigate its impact. So it is not only information to make sure people are informed; it is also making sure people are informed to act appropriately" (Zarocostas, 2020).

Dis/mis information travels fast online. According to a study authored by researchers at Massachusetts Institute of Technology, false news spreads more quickly on the social media platform Twitter than the truth does (Vosoughi et al., 2018). According to the *Washington Post*, an unpublished U.S. State Department study that looked at social media in other countries identified approximately 2 million tweets circulating various hoaxes and conspiracy theories about the coronavirus as the disease found its way outside of China (Room, 2020).

> "Disinformation that specifically targets your health system or your leaders who are trying to manage an emergency is a way of destroying, undermining, disrupting your health system," Dr. Margaret Bourdeaux, research director for Harvard Belfer Center's Security and Global Health Project, explained to NPR (Gharib, 2020).

The Rise of Dis/mis information for COVID-19

Dis/mis information has always been present; however, social media and smart phones accelerate it on a new scale. Many social media platforms are built on personalized artificial intelligence algorithms that can be influenced by various actors, which can negatively impact the online and news infrastructure, businesses and economies, civil society, and democracy worldwide. This infodemic can be traced in part back to the plethora of information available,

both factual and inaccurate. Despite the unprecedented access to information enjoyed by anyone with an internet connection, people are challenged to discern for themselves which information is accurate and which sources can be trusted. Inaccurate information also includes dis/mis information. COVID-19 disinformation that is currently being amplified by untrusted sources can be categorized into one of the following: (1) race-related/social stigma, (2) conspiracy theories, and (3) cures for the virus. Misinformation regarding the seriousness of the disease, transmission, availability of testing, and a vaccine for the virus has also been amplified, resulting in confusion among the public.

Racial/social stigma

When news of the COVID-19 outbreak was released in December 2019, dis/mis information related to race began to grow resulting in social stigmatization of certain racial groups. Local news stories covered Chinese Americans experiencing racial discrimination with the labeling of COVID-19 as an "Asian disease" or "Chinese coronavirus" (Lee, 2020). With growing concerns of discrimination against people of Chinese descent, United Nations leadership called for an end to these discriminatory actions (UN News, 2020).

In another case, Rep. Bobby Rush (D-Illinois) asked the CEOs of Facebook and Twitter about their efforts to fight race-based dis/mis information on their platforms, citing a tweet that stated, "Blacks are not getting Coronavirus! Coronavirus cannot attack black people because it is a Chinese virus" (Feiner, 2020). This statement communicates a false sense that race is a protective factor and that the virus is associated with a certain race. Similarly, PolitiFact, a fact-checking partner of Facebook, identified an article stating that melanin made people of color immune to the coronavirus as false (Kertscher, 2020). The danger in this type of dis/mis information is that it not only ties COVID-19 to race but creates potential opportunities for social stigma. In order to dispel dis/mis information focusing on race and ethnicity and coronavirus, the CDC has included a key fact in their messaging, saying that "Disease can make anyone sick regardless of their race or ethnicity" (Centers for Disease Control and Prevention, 2019).

Conspiracy theories

During the Zika outbreak, the conspiracy theory that the virus was caused by genetically modified (GM) mosquitoes was amplified through social media. It was propagated despite rationale being presented as to how this could not be true, and data showing that GM mosquitoes actually reduced the spread of the disease (Mitchell, 2019). Many anti-vaccine conspiracy theories have negatively influenced parents' intentions to vaccinate their children against childhood diseases (Jolley & Douglas, 2017).

Fake cures

The internet is filled with unscrupulous people seeking to take advantage of others' fears during the COVID-19 pandemic and offering fake cures. These fake cures range from the relatively benign recommendations such as oregano oil, taking vitamin C and avoiding spicy foods, or eating garlic, to extremely harmful recommendations such as taking a supplement containing the bleaching agent chlorine dioxide, or using cocaine (Shmerling, 2020; Waterfield, 2020). While some recommendations are relatively benign, even they can be problematic if they result in people not following evidence-based recommendations.

Amplifiers of Dis/misinformation

Bots and trolls on social media have been linked to proliferating fake cures about COVID-19 (Capitides, 2020).

Socialbots appear to be accounts by real people but are actually autonomous and have no human involvement (Klepper, 2020). They can spread dis/mis information at a very high rate, sometimes up to hundreds of times per day (Klepper, 2020), and can also spread malicious links and malware (Gorwa & Guilbeault, 2018). Sock puppets are fake accounts that are created to intentionally disseminate disinformation to promote divisiveness and dissent. These accounts are used to attack critics or even to defend their own posts (Klepper, 2020). Sock puppets also frequently engage in deceptive behavior and manipulate discussions (Kumar et al., 2017).

These types of disinformation were used during the vaccine debate to create discord in the U.S. Russian trolls amplified both sides of the vaccine debate, frequently referencing conspiracy theories. These trolls also tied both pro- and anti-vaccine messages to U.S. politics (Broniatowski et al., 2018). Trolls included distinctive arguments not found in regular posts that relate to racial and ethnic divisions as well as socioeconomic tensions (Broniatowski et al., 2018). During the Ebola outbreak in 2014, a high percentage of tweets and retweets amplified dis/mis information regarding cures for the Ebola virus (Oyeyemi et al., 2014). The Nigerian government responded to these false claims with the correct information, and the correction was subsequently amplified on Twitter a few days later.

Combating COVID-19 dis/mis information

Despite the volume of inaccurate messages and issues that exist, a number of interventions have been put into place to address dis/mis information during the COVID-19 pandemic.

Technology companies, social media platforms, and government health agencies are taking action to combat the infodemic. In February 2020, the WHO hosted a meeting with tech companies at Facebook headquarters in Menlo Park, CA, to discuss the steps and actions they could individually and collaboratively take to address the proliferation of dis/misinformation. Among the attendees were representatives from Facebook, Amazon, Google, Twitter, Verizon, Salesforce, Twitter, Dropbox, Twilio, and others (Farr & Rodriguez, 2020). Interventions applied by technology and social media companies both before and after the WHO meeting include:

4. Facebook is removing fake claims and conspiracy theories (Wagner and Savov, 2020).

5. Facebook is providing free ads to the WHO and other organizations to help publicize accurate information on COVID-19 (Reuters, 2020).

6. Google searches for coronavirus triggers and alerts and directs users to mainstream articles with accurate information, as well as to verified health information sites, such as the CDC and WHO (Bergen and De Vynck, 2020).

7. YouTube is removing videos and advertisements with false coronavirus claims and giving free ads to governments and non-governmental organizations (Bergen and De Vynck, 2020).

8. Amazon is removing sellers and products with misleading coronavirus claims (Shanthi, 2020).

9. Multiple platforms are redirecting searches on the virus to credible sources of COVID-19 information (Farr & Rodriguez, 2020).

10. Apple is only allowing coronavirus-related apps that come from recognized medical institutions on its platform (Sonnemaker & Gilbert, 2020).

11. Reddit is asking users to fight dis/mis information and help verified information rise to the top of their feeds (Birnbaum & Mills Rodrigo, 2020).

One of the main interventions deployed during the infodemic is the WHO Information Network for Epidemics, more commonly known as EPI-WIN. Bolstered by the WHO's truth telling strategy, it provides tailored information to different audiences during a public health event (Gharib, 2020). Content on the site ranges from graphics to videos to myth busters, all of which are easily shared on social media. Other interventions applied by government organizations, include:

1. WHO's EPI-WIN team keeps in touch with social media platforms and colleagues in other countries, such as China, who work closely with the foreign social media platforms there. When false information emerges, they collect it and work with the WHO's risk communication colleagues to find evidence-based answers to combat it (Zarocostas, 2020).

2. WHO is organizing conference calls with employers, compiling their questions, having their experts write answers, and providing these frequently asked questions back to the companies to share with their employees (Gharib, 2020).

3. WHO is working to provide information in several different languages (Duffy, 2020).

4. WHO has offered to help technology and social media companies to fact check information rather than having to use third parties (Duffy, 2020).

5. WHO joined the TikTok social media platform to provide accurate information to that social media platform (Papadopoulos, 2020).

6. The CDC has COVID-19 social media content suitable for sharing, including videos and graphics (CDC, 2020).

7. The CDC is targeting dis/mis information on platforms such as Facebook, Twitter, Tencent, and TikTok. (Papadopoulos, 2020).

Implications

Finding the right solution to respond to dis/mis information is one of the greatest challenges in health communication, particularly during a global disease outbreak or pandemic. Health dis/mis information during times of crisis can negatively influence health choices such as the decision to not vaccinate a child (Greenberg et al., 2017), health policy and interventions as shown in the Ebola outbreak (Mitchell, 2019), and the negative repercussions on personal health as evidenced in the ingestion of harmful products that are touted as a cure of COVID-19, for example (Waterfield, 2020).

The good news for authoritative health agencies such as the CDC and WHO is that the public trusts them and the information they provide (Roberts et al., 2017). In a study on digital health communication during the Ebola epidemic, CDC.gov and WHO.int were ranked the top two media sources by respondents; the top three media stories were from the CDC and WHO (Roberts et al., 2017). During the anti-vaccine debate, a survey asking parents who their trusted sources for health information were showed that parents selected their physician, public health officials, and academics as their top three choices (Greenberg et al., 2017). Given that the CDC and WHO are preferred resources for health information, particularly during a health crisis, how do we combat dis/mis information during these periods when the population is most vulnerable and fearful?

One of the recommendations is for government agencies to respond with the correct information (Oyeyemi et al., 2014). Crook et al. (2014) recommend that government agencies prepare educational messages and communication materials to manage dis/mis information about the disease. For example, they can provide information on the themes found in their research on Ebola that included combating the disease, as well as understanding the disease, how it is spread, and from where it originated. Lessons learned from the 2002-2003 Severe Acute Respiratory Syndrome (SARS) epidemic highlighted the need for government agencies to communicate factual and honest information rapidly to the public to prevent the spread of the disease and, ultimately, the loss of life (Bowen et al., 2005). Narratives communicated to the public conflicted with each other and resulted in dis/mis information and confusion. By 2004, when another SARS outbreak occurred in China, officials contacted the WHO, which allowed the appropriate measure to be implemented, preventing another epidemic (Bowen et al., 2005).

However, sharing such information by government or other reliable sources may not be effective in countering conspiracy beliefs because these beliefs do not necessarily stem from a lack of information (Mitchell, 2019). Furthermore, once a population accepts information, even dis/misinformation, it becomes difficult to persuade them otherwise (Southwell & Thorson, 2015).

Roberts et al. (2017) recommend including social health communication strategies such as social diffusion approaches that include influencers within online social networks. They also recommend that global health agencies consider modeling their content on "successful debunking stories." Understanding what makes content go viral should also be considered when developing messaging. Content that evokes low-arousal or deactivating emotions such as sadness tends to be less viral whereas content that evokes high-arousal positive or negative emotions like anger or anxiety has more virality (Berger & Milkman, 2012).

Another recommended method of combating health dis/mis information is based on the inoculation theory. Inoculation persuasion techniques may be a preventative approach to dis/misinformation. Inoculation is a process of presenting anti-conspiracy messages prior to the conspiracy message in an attempt to reduce the negative effect of the conspiracy theories (Jolley & Douglas, 2017). However, once the conspiracy theories are amplified, they may be difficult to correct. Inoculation persuasion techniques have also been shown to reduce the perceived reliability and persuasiveness of fake news in a study of high school students who wrote fake news articles using the tactics of fake news producers (Roozenbeek & van der Linden, 2019). This requires health communication scientists to understand the persuasion models used by these fake news producers in developing dis/mis information messaging.

Combating health dis/mis information during a health crisis will require a multi-pronged approach and must apply the lessons learned not only from the COVID-19 pandemic but also from outbreaks and pandemics of the past. The solution will need to include health, social, environmental, and cultural considerations when working with different populations across the world. It will also need to include various persuasion theories as part of a framework that maintains a focus on prevention, but that can also mitigate dis/mis information once it has been released.

Designing a Best Practices framework

The literature and news sources cited in this document refer to our current period of social media dis/mis information amplification as unprecedented (Wang et al., 2019). Health-related dis/mis information impacts effective care, health behavior, and decision-making, and, in the case of the current pandemic, can threaten the lives of individuals throughout the world (Ratzan, 2011). The approach to COVID-19 dis/mis information illustrates opportunities to view

successful practices and develop a framework that provides recommendations for addressing communication strategies and approaches going forward. Whether the approach is a "better" communication campaign, individual policing of incorrect information, or warning symbols attached to known abusers, the approach needs to address all incidents strategically in a way that reflects best practices. Within a data-driven, strategic approach to better understand and address the spread of dis/misinformation, each incident must be looked at systematically to understand both the nature and driver of the "attack." Additionally, an interdisciplinary view is warranted to expand the traditional communication science lens and draw upon behavioral decision-making and belief system paradigms as well as other best practices to develop a coordinated response and counter communication strategies and tactics.

References

[1]   BBC News. (2020, March 8). Coronavirus: The fake health advice you should ignore. https://www.bbc.com/news/world-51735367

[2]   Bergen, M. & De Vynck, G. (2020, March 10). Google scrubs coronavirus misinformation searches. *YouTube*. Bloomberg. https://www.bloomberg.com/news/articles/2020-03-10/dr-google-scrubs-coronavirus-misinformation-on-search-youtube.

[3]   Berger, J. & Milkman, K. (2012). What makes online content viral? *Journal of Marketing Research*, (XLIX), 192-205.

[4]   Birnbaum, E. & Mills Rodrigo, C. (2020, February 7). Reddit enlists users to combat coronavirus misinformation. *The Hill*. https://thehill.com/policy/technology/481956-reddit-enlists-users-to-combat-coronavirus-misinformation.

[5]   Bowen, S., Heath, R., Lee, J., & Feng Li, K. (2005). Narratives of the SARS Epidemic and Ethical Implications for Public Health Crises. Conference Papers – *International Communication Association*, 1-28.

[6]   Broniatowski, D., Jamison, A., Qi, S., AlKulaib, L., Chen, T., Benton, A., & Quinn, S. (2018). Weaponized health communication: Twitter bots and Russian trolls amplify the vaccine debate. *American Journal of Public Health*, (108)10, 1378-1384.

[7]   Capitides, C. (2020, March 9). Coronavirus cannot be cured by drinking bleach or snorting cocaine, despite social media rumors. *CBS News*. https://www.cbsnews.com/news/coronavirus-drinking-bleach-cocaine-false-rumors-social-media/

[8]   Centers for Disease Control and Prevention. (2019). Coronavirus disease 2019 – Key facts. https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/share-facts.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fabout%2Fshare-facts.html

[9]   Cook, J., Lewandowsky, S., & Ecker, U.K.H. (2017). Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence. *PLoS One*, 12(5), eo175799.

[10] Crook, B., Glowacki, E., Suran, M., Harris, J., & Bernhardt, J. (2014). Content analysis of a live CDC Twitter chat during the 2014 Ebola outbreak. *Communication Research Reports*, (33)4, 349-355

[11] Duffy, Clare. (2020, March 1). How health officials and social media are teaming up to fight the coronavirus "infodemic." CNN Business. https://www.cnn.com/2020/03/01/tech/coronavirus-social-media-reliable-sources/index.html.

[12] Fake news. It's complicated. (2017, May 15). *First Draft News*. Retrieved April 1, 2020, from https://firstdraftnews.org/latest/fake-news-complicated/

[13] Farr, C. & Rodriguez, S. (2020, February 14). Facebook, Amazon, Google, and more met with WHO to figure out how to stop coronavirus misinformation. *CNBC*.

https://www.cnbc.com/2020/02/14/facebook-google-amazon-met-with-who-to-talk-coronavirus-misinformation.html

[14] Feiner, L. (2020, March 13). Facebook and Twitter slammed by congressman for allowing spread of "racist themes and language" about coronavirus. *CNBC*. https://www.cnbc.com/2020/03/13/bobby-rush-asks-facebook-twitter-about-racist-covid-19-misinformation.html

[15] Funnell, R. (2020, February 19). No, coronavirus didn't come from space. *IFLScience!* https://www.iflscience.com/health-and-medicine/no-coronavirus-didnt-come-from-space/

[16] Gharib, M. (2020, February 21). Fake facts are flying about coronavirus. Now there's a plan to debunk them. *NPR*. https://www.npr.org/sections/goatsandsoda/2020/02/21/805287609/theres-a-flood-of-fake-news-about-coronavirus-and-a-plan-to-stop-it

[17] Gorwa, R. & Guilbeault, D. (2018). Unpacking the social media bot: A typology to guide research and policy. https://arxiv.org/pdf/1801.06863.pdf

[18] Greenberg, J., Dubé, E., & Driedger, M. (2017, March 3). Vaccine hesitancy: In search of the risk communication comfort zone. *PLoS Currents*. DOI: 10.1371/currents.outbreaks.0561a011117a1d1f9596e8690b

[19] Haring, B. (2020, March 6). Televangelist Jim Bakker ordered by Attorney General to stop selling fake cure for coronavirus. *Deadline*. https://deadline.com/2020/03/televangelist-jim-bakker-ordered-by-attorney-general-to-stop-selling-fake-cure-for-coronavirus-1202876625/

[20] Jolley, D. & Douglas, K.M. (2017). Prevention is better than cure: Addressing anti-vaccine conspiracy theories. *Journal of Applied Social Psychology*, (47)8, 459-469.

[21] Kertscher, T. (2020, March 10). Melanin doesn't protect against coronavirus. *PolitiFact*. https://www.politifact.com/factchecks/2020/mar/10/facebook-posts/melanin-doesnt-protect-against-coronavirus/

[22] Klepper, D. (2020, Feb 7). Cyborg, trolls and bots: A guide to online misinformation. *AP News*. https://apnews.com/4086949d878336f8ea6daa4dee725d94

[23] Kumar, S., Cheng, J., Leskovec, J., & Subrahmanian, V. (2017). An Army of me: Sockpuppets in online discussion communities. International World Wide Web Conference Committee. https://cs.stanford.edu/~srijan/pubs/sockpuppets-www2017.pdf

[24] Lee, F. (2020, March 13). COVID-19 is bringing out dep-rooted racism in the Bay Area. *The Bold Italic*. https://thebolditalic.com/covid-19-is-bringing-out-deep-rooted-racism-in-the-bay-area-6829dce987f8

[25] Mitchell, S. (2019). Population control, deadly vaccines, and mutant mosquitoes: The construction and circulation of zika virus conspiracy theories online. *Canadian Journal of Communication*, 33, 211-237.

[26] Oyeyemi, S., Gabarron, E., & Wynn, R. (2014). Ebola, Twitter, and misinformation: A dangerous combination? *BMJ* 2014;349: g6178 doi: https://doi.org/10.1136/bmj.g6178

[27] Papadopoulos, L. (2020, March 1). WHO creates TikTok account to fight spread of coronavirus misinformation. *Interesting Engineering*. https://interestingengineering.com/who-creates-tiktok-account-to-fight-spread-of-coronavirus-misinformation

[28] Ratzan, S. C. (2011). Our new social communication age in health. *Journal of Health Communication*, (16), 803-804.

[29] Reuters. (2020, March 4). Facebook gives WHO free ads in battle with coronavirus misinformation. https://www.reuters.com/article/us-health-coronavirus-facebook/facebook-gives-who-free-ads-in-battle-with-coronavirus-misinformation-idUSKBN20R14A

[30] Roberts, H., Seymour, B., Fish, S., Robinson, E., & Zuckerman, E. (2017). Digital health communication and global public influence: A study of the Ebola epidemic. *Journal of Health Communication*, (22), 51-58.

[31] Room, T. (2020, February 9). Millions of tweets peddled conspiracy theories about coronavirus in other countries unpublished US report says. *Washington Post*. https://www.washingtonpost.com/technology/2020/02/29/twitter-coronavirus-misinformation-state-department/

[32] Roozenbeek, J. & van der Linden, S. (2019) The fake news game: actively inoculating against the risk of misinformation. *Journal of Risk Research*, (22)5, 570-580. DOI: 10.1080/13669877.2018.1443491

[33] Shanthi, S. (2020, February 24). Amazon to remove products that claim to cure or kill coronavirus. *Inc42*. https://inc42.com/buzz/amazon-to-delist-products-that-claim-to-kill-coronavirus/

[34] Shmerling, R. (2020, February 1). Be careful where you get your news about coronavirus. *Harvard Health Publishing*. https://www.health.harvard.edu/blog/be-careful-where-you-get-your-news-about-coronavirus-2020020118801

[35] Sonnemaker, T. & Gilbert, B. (2020, March 6). Apple is reportedly rejecting all coronavirus-related apps unless they come from health organizations in an attempt to prevent the spread of misinformation. *Business Insider*. https://www.businessinsider.com/coronavirus-apple-coronavirus-apps-health-organizations-who-cdc-misinformation-2020-3

[36] Southwell, B. & Thorson, E. (2015). The prevalence, consequence, and remedy of misinformation in mass media systems. *Journal of Communication*, 65, 589-595.

[37] Strauss, V. (2018, December 10). Word of the year: misinformation. Here's why. *Washington Post*. https://www.washingtonpost.com/education/2018/12/10/word-year-misinformation-heres-why/

[38] Taylor, D. B. (2020, March 19). A Timeline of the Coronavirus Pandemic *New York Times*. https://www.nytimes.com/article/coronavirus-timeline.html.

[39] UN News. (2020, February 4). Coronavirus: UN health agency moves fast to tackle "infodemic"; Guterres warns against stigmatization. https://news.un.org/en/story/2020/02/1056672

[40] Vosoughi, S., Roy, D., & Sinan, A. (2018, March 9). The spread of true and false news online. *Science*, (359)6380, 1146-1151. DOI: 10.1126/science.aap9559

[41] Wagner, K. & Savov, V. (2020, January 30). Facebook sets out coronavirus misinformation battle plan. *Bloomberg Law*. https://news.bloomberglaw.com/tech-and-telecom-law/facebook-sets-out-coronavirus-misinformation-battle-plan

[42] Wang, Y., Mckee, M., Torbica, A., & Stuckler, D. (2019). Systematic literature review on the spread of health-related misinformation on social media. *Social Science & Medicine*, 240, 112552. doi: 10.1016/j.socscimed.2019.112552

[43] Wardle, C. (2017, February 16). Fake news. It's complicated. *First Draft News*. https://firstdraftnews.org:443/fake-news-complicated

[44] Waterfield, S. (2020). Coronavirus fake news: Fact checking COVID-19 pandemic hoaxes and misinformation online. *Newsweek*. https://www.newsweek.com/coronavirus-fake-news-fact-checking-covid-19-pandemic-hoaxes-misinformation-1491906

[45] World Health Organization. (2020). *Novel Coronaviruse (2019-nCoV) Situation Report-13*. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200202-sitrep-13-ncov-v3.pdf

[46] Zarocostas, J. (2020). How to fight an infodemic. *The Lancet*, 395(10225), 676. doi: 10.1016/s0140-6736(20)30461-x