

Science communication: A tool against misinformation

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Abstract

As the world continues to mitigate the effects of the COVID-19 pandemic, it is also facing an overabundance of information. This is referred to as an “infodemic”, which has rendered misinformation indistinguishable from accurate information. Misinformation poses detrimental effects to the public health response against COVID-19. It has perpetrated violence against healthcare workers and vandalism of property. Misinformation has also promoted unsafe regimens including the digestion of bleach as a treatment against SARS-CoV-2. Fortunately, efforts have increased to develop science communication projects that promote accurate information about COVID-19. Projects that have been selected for this commentary include: the Manitoba COVID-19 Report, COVID-Alerts, COVID MythBusters, and several independent initiatives. The Manitoba COVID-19 Report was an initiative organized by staff and students from the Max Rady College of Medicine to provide health professionals with weekly research updates about COVID-19. COVID-Alerts is a graduate student-led science communication project that utilizes Short Message Service and WhatsApp to disseminate information about COVID-19 to populations in Kenya. COVID MythBusters, another graduate student-led project, is an Instagram initiative that provides up-to-date information about COVID-19 to over 500 subscribers. Together, these projects illustrate the accessibility and feasibility of applying science communication as a tool against misinformation.

Keywords: science communication; SARS-CoV-2; COVID-19; misinformation

Conflict of Interest Statement: The authors of this paper are the creators of COVID Alerts, and @Covid_mythbusters. These projects are not-for-profit, and there is no revenue gained from them.

Introduction

The emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent of coronavirus disease 2019 (COVID-19) has had momentous impacts worldwide. As this pandemic continues to claim lives, it is also fueled by the spread of misinformation - also known as an “infodemic”. The World Health Organization (WHO) describes an infodemic as a surplus of information that overwhelms the public by rendering misinformation indistinguishable from accurate information.^{1,2} Health misinformation is defined as a health-related claim that is untrue based on current scientific knowledge. If left unaddressed, health misinformation can undermine the general public’s trust in their healthcare workers and scientists. Unfortunately, health misinformation has been shown to disseminate faster than accurate information.³

At the start of the 2020 pandemic, a systematic analysis revealed that, while 38% of misinformation on social media was completely fabricated, the largest proportion of misinformation (59%) was accurate information manipulated to be misleading.⁴ As a result, re-

searchers are beginning to witness the harmful effects of misinformation on public health. For example, the false notion that alcohol intake can help prevent or treat COVID-19 has so far been linked to more than 800 preventable deaths and 5800 hospital admissions around the world.⁵⁻⁹ Even worse, this misinformation has further transpired into violence against frontline healthcare workers. News stories published throughout 2020 describe healthcare workers being threatened, physically assaulted, spat on, pelted with eggs, stoned, and doused with bleach.¹⁰⁻¹³ One international study even found that high susceptibility to misinformation was linked with increased vaccine hesitancy and decreased compliance to COVID-19 public health measures.¹⁴

Some of the most harmful effects involving misinformation occur when scientific uncertainties are exploited to promote toxic narratives. Since the start of the COVID-19 pandemic, there has been a surge of misinformation related to the origin, transmission, and treatment of SARS-CoV-2. One popular myth suggests that Microsoft founder Bill Gates created the virus to profit from a mandatory vaccine, which would contain digital trackers for mass surveillance.¹⁵⁻¹⁷ There are

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also conspiracy theories that implicate 5G, a new generation of wireless technology for broadband cellular networks, as a transmission agent of SARS-CoV-2.^{18,19} This has resulted in mass vandalism and illegal destruction of over 80 cell phone towers across the UK.^{20–23} Another myth promotes drinking methanol or bleach as a form of self-treatment for COVID-19.²⁴ This misinformation was further propagated by former President Donald Trump at a press briefing on April 23, 2020, when he speculated about the use of disinfectant injections to treat COVID-19.^{25–27} Following that press briefing, the American Association of Poison Control Centers reported a 121% spike in accidental poisonings from disinfectants compared to the same month the previous year.^{28,29} Misinformation has also been shown to be perpetuated by other famous figures: one study found that 20% of the false claims in their sampling were shared by public influencers. However, this 20% ended up accounting for 69% of social media engagement.⁴ While the examples listed here are not comprehensive, they nevertheless illustrate the unpredictable and proliferative nature of misinformation.

Responding to misinformation is challenging. One effective strategy is to offer accurate information directly to those exposed to misinformation.^{30,31} Social media has been a major instrument in the dissemination and circulation of misinformation.^{32,33} To address this issue, trained health professionals and scientists must take active roles in science communication to combat the spread of misinformation. Given the COVID-19 pandemic, there have been considerable efforts to develop science communication projects that promote accurate information and debunk misinformation. This commentary provides an overview of several science communication projects led by health professionals and scientists to promote accurate information about COVID-19. The objective is to demonstrate the accessibility and feasibility of using science communication as a tool against misinformation.

Manitoba COVID-19 report

The Manitoba COVID-19 Report was an initiative led by staff and students at the Max Rady College of Medicine to address clinically relevant questions about COVID-19.³⁴ Once per week, questions from the medical community were summarized and assigned to one of six research teams based on their area of focus: clinical description and epidemiology, diagnostics and surveillance, therapeutics, infection prevention and control, public health interventions, and pediatrics. These teams composed of librarians, clinicians, fellows, medical students, and graduate students met several times each week to review the latest evidence pertaining to their assigned questions.^{35,36} After extensive peer review, the findings were summarized into newsletters for dissemination. The Manitoba COVID-19 Report published a total of eight reports and saw international impact. Prior to discontinuation, over 9000 health practitioners across Canada, United States, South America,

Caribbean/West Indies, and Europe subscribed to the report with an open rate of 33–47%.³⁴

COVID alerts

COVID-Alerts, founded by the first author (TL), is a science communication project that uses platforms such as Short Message Service and WhatsApp to disseminate weekly texts about COVID-19 to populations in Kenya. These texts include information about the latest news on COVID-19, tips and guidance on protective measures, and describes how inaccurate misinformation is. The project relies on a peer engagement model where select community members from Kenya are designated peer leaders and made responsible to advocate for the needs of their community. This model has been used for over 40 years in Nairobi, Kenya as part of a public health program to promote accurate health information about sexually transmitted infections.³⁷ In addition to peer leaders, COVID-Alerts also relies on the support and collaboration between graduate students, researchers, and local clinicians from the University of Manitoba and University of Nairobi.

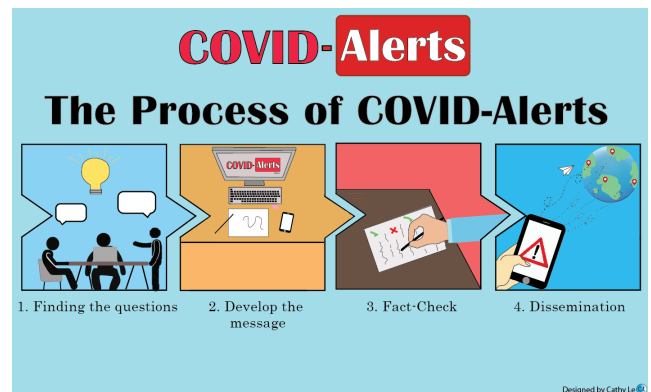


Figure 1. The workflow of 'COVID-Alerts'.

A strength of COVID-Alerts is that it engages all key stakeholders in the process of creating text updates about COVID-19 (Figure 6). The process begins with stakeholders meeting online once per week to discuss community concerns and questions. After a set of key questions are identified, graduate students review and summarize the latest evidence into brief text messages. Visual graphics are also designed to complement these texts for individuals with limited literacy skills. The text messages are then peer-reviewed by all stakeholders and translated into Kiswahili, the national language in Kenya. Finally, the text messages are disseminated through the clinics and peer leaders in Nairobi. As of February 27, 2021, COVID-Alerts has disseminated 5 weekly text messages about COVID-19 to over 15 000 community members in Kenya.

COVID MythBusters

COVID MythBusters (@COVID_mythbusters) is an Instagram account created by second author (JF) and Davina Dobbins from the University of Arizona.³⁸ The

account provides the public with up-to-date information about SARS-CoV-2 and COVID-19 from peer-reviewed sources and debunks myths surrounding the pandemic. Content is curated in accordance with the common myths listed on the WHO and the Center for Disease Control and Prevention (CDC) websites. Additional information is researched and relayed in an accessible format that is visually appealing to consumers. This is done with the assistance of Hailey Kostusik, a local Winnipeg graphic designer. As the Instagram account gained followers, the use of the “Stories” function of Instagram was used to communicate with fol-

lowers about their concerns and questions. This feedback loop provides the team with several topics to research and post online. For example, a question was posed to the account regarding how COVID-19 would affect new or expecting parents (Figure 7). There was also a strong desire from followers for a summary of COVID-19 vaccines (Figure 8). The “Stories” function also facilitated interactions such as comments, personal messages, “likes”, and re-sharing of the content on followers’ personal Instagram pages. To date, the account has 560 followers on Instagram and 53 posts.

COVID-19 and Babies

New or expecting parent?
This post is for you!

Expecting? Here are some tips!

- Limit interactions with large social circles!
- Keep going to your healthcare appointments.
(If you are uncomfortable going in, call your health care provider, they may offer phone consultations).
- Ask your healthcare provider any questions or concerns you have about COVID-19, delivery etc!

If you are concerned you need immediate medical attention. do not delay because of COVID-19. Make sure the emergency department knows you are pregnant when you go in.

Post-delivery:

- Keep going to those newborn appointments!
- As hard as it may be, limit the number of guests in your house.
- Do NOT put a face shield or a mask on your baby, their sudden movements make this very dangerous.

Breastfeeding FAQ's

Can COVID-19 be passed through breastfeeding?
To date there have not been any documented events of transmission.

If I am COVID-19 positive should I breastfeed?
Yes, if you are able to and want to.
BUT: make sure you wash your hands frequently, wear a medical mask during any contact with the baby, and clean surfaces often! This is a situation where the benefits would out weigh the risks.

New Parents

Make sure you have the support you need! This is a challenging time.
Keep connected to family and friends!
See what supports are offered to new parents in your area!

You've got this!

Covid Mybusters

Sources:

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-breastfeeding>

<https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/pregnancy-breastfeeding.html>

The authors of this post are training in science and research and are here to make knowledge about COVID-19 accessible.

Covid Mythbusters brought together through a SciCommMake competition hosted by SigmaXi and ScienceTalk.

Figure 2. Content from @covid_mythbusters Instagram page, posted December 17th, 2020. Slides provide information surrounding COVID-19 and expecting parents, or new parents.

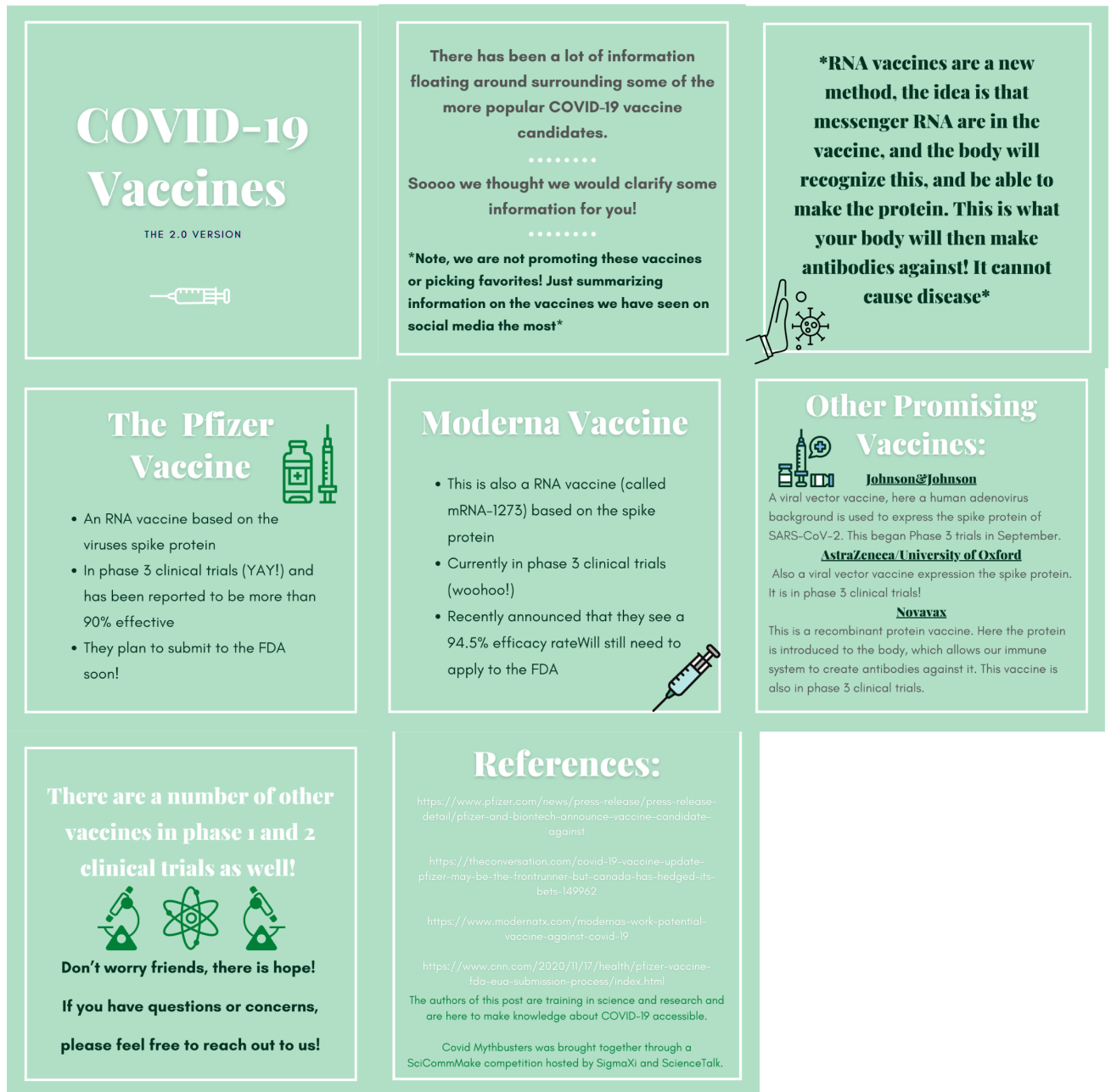


Figure 3. Content from @covid_mythbusters Instagram page, posted November 25th, 2020. Slides describe a summary of COVID-19 vaccine candidates that were being focused on by the media.

An advantage of Instagram is that it enables users to target content at specific demographics and promote content for a low daily fee. This is helpful to target accurate information at communities that are most affected by the pandemic or those who face a spread of misinformation. The COVID-19 MythBusters organizers selected a target age range of 25–45 years old to be the primary audience. The assumption was that these targeted users could help circulate content to a larger secondary audience consisting of both younger (i.e. their children) and older (i.e. their parents, grandparents) populations. This age group was also identified by public health officials in the United States as having the most COVID-19 cases.³⁹ In order to refine

the target geographical locations, the team surveyed where COVID-19 outbreaks in Canada and the United States occurred prior to promotions. The first promotion, Mask Myths, ran for five days with a fee of \$20 CAD per day. This was the initiative’s largest promotion and resulted in the highest number of impressions (the number of times a promotion appears on an individual’s screen) as well as the highest number of promotional clicks (Table 8). Future promotions were set for five days each with a fee of \$10 CAD per day to allow for a greater variety of content to be promoted with the remaining funds. From the 53 posts as of submission, COVID-19 MythBusters has reached approximately 45 000 accounts through Instagram.

Table 1. Demographics of Instagram posts by @covid_mythbusters.

Post Promotions	Location of Targeted Audience	Number of Impressions ^A	Number of Promotional Clicks ^B	Age (Years) Demographics	Sex Demographics
Mask Myths: Promoting how masks can stop the spread of the virus	Ontario, Quebec, Georgia, Arizona	17 210	278	18–24yrs: 56% 25–34yrs: 35% 35–44yrs: 9%	Female: 74% Male: 26%
Transmission Myths: Debunking popular myths surrounding the spread of SARS-CoV-2	Arizona, South Dakota, North Dakota	5 591	21	18–24yrs: 41% 25–34yrs: 43% 35–44yrs: 15%	Female: 67% Male: 33%
Treatment Myths: Debunking dangerous myths surrounding how to treat COVID-19	Arizona, South Dakota, North Dakota	4 061	49	18–24yrs: 41% 25–34yrs: 48% 35–44yrs: 11%	Female: 52% Male: 48%
Halloween Safety: Promoting safe practices for those celebrating Halloween	Ontario, Manitoba, Arizona, Montana, South Dakota	4 165	85	18–24yrs: 33% 25–34yrs: 52% 35–44yrs: 16%	Female: 82% Male: 18%

^A Impressions: The number of times the promotion appeared on an individual screen.

^B Promotional clicks: The number of times an individual clicked on our promotion.

COVID-19 MythBusters required baseline funding and a substantial time commitment from the developers. The use of a graphic designer was critical to create an aesthetically appealing page that conveyed information without being overwhelming to viewers. The ability to promote posts also allowed the number of people it could reach to increase substantially. While resources were required for this initiative, it also allowed for important information to reach a wide range of people quickly. This could be a beneficial method to use in future public health endeavors when combating misinformation.

Independent initiatives

Scientists and healthcare workers have also started using their personal social media platforms to provide accurate information regarding the SARS-CoV-2 pandemic. Using platforms such as Facebook, Instagram, TikTok and YouTube, these individuals can address questions from their followers. For example, Dr. Samantha Yammine (@science.sam) is a neuroscientist who uses Instagram with the objective of making science accessible to the public.⁴⁰ Dr. Yammine keeps her followers up-to-date with research on COVID-19 and answers questions posed by her followers. Another example is Dr. John Campbell, a retired nurse from England who uses YouTube as his science communication platform. In weekly videos, Dr. Campbell critiques new data and explains findings in simple terms that are accessible to the public. His videos incorporate easy-to-follow linear reasoning and require minimal editing.⁴¹ Overall, as social media grows in popularity it has become a tool for public health education. It allows for

those working in the public health field to target large populations quickly with few resources required. When used correctly, it results in the accurate and efficient transmission of health information.⁴²

Independent initiatives can also leverage existing resources from international organizations to promote accurate information on their social media platforms. The WHO has an audio and video series called “Science in 5” where experts explain scientific concepts in five minutes or less.⁴³ Both the WHO and CDC have also redesigned their websites to include resources that aim to clarify common misconceptions and knowledge gaps surrounding the pandemic.^{44,45} Despite the many available resources, independent initiatives are crucial intermediaries for reaching target and remote audiences that would otherwise not see the information. This further emphasizes the accessibility and feasibility of social media as a tool for independent initiatives to address misinformation.

Conclusion

Misinformation is a contagious and ubiquitous threat that damages public health efforts to combat COVID-19. Preventing and addressing misinformation can help encourage the public to adopt and adhere to safety measures more effectively. The science communication projects described in this commentary illustrate different methods to address misinformation that require varying commitment of time and resources. Some projects may require substantial commitments if they recruit teams of people and/or large investments of time and funding. Other projects may require smaller commitments if they can be accomplished independently

or with limited resources. Ultimately, there are many accessible and feasible methods to address misinformation. This commentary is a call to action for researchers and healthcare professionals to seek opportunities within their reach to educate their peers about misinformation. As misinformation continues to spread and contribute to increasing morbidity and mortality around the world, it is important that researchers and health professionals explore creative ways to counter this infodemic.

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