

A Prologue to the Special Issue: Health Misinformation on Social Media

This National Cancer Institute–sponsored special issue of the *AJPH* reflects the growing consensus among national health agencies, public health researchers, and practitioners that online health misinformation, particularly on social media (SM) platforms, presents a critical challenge for public health. The spread of misinformation threatens to erode much of the progress that has been made on many fronts, including vaccination, tobacco use, and control of infectious diseases.

This special issue came about in recognition of several key trends that have emerged over the past decade, including (1) Americans are increasingly getting their news and health information from SM; (2) the public's trust in traditional sources of information (e.g., mass media, government agencies, the medical system) is at historic lows; and (3) the online discourse, from politics to health, has become increasingly divisive and partisan. These factors provide a fertile environment where health misinformation can take root and spread, and the potential real-world consequences are alarming. For example, antivaccine views promoted on SM could lead to avoidance of routine vaccinations and community spread of disease, and videos advertising ineffective or dangerous cancer

treatments could lead patients to forgo recommended therapies.

Reacting to these trends, we began planning this special issue in 2019. However, shortly after the article submission deadline passed, the world experienced the defining health crisis of our generation—the COVID-19 pandemic—and we witnessed in real time how the proliferation of misinformation hindered pandemic response. Rumors, myths, and conspiracy theories regarding the origins of the disease, its severity and prevalence, vaccine development, prevention measures, and unproven treatments spread online at alarming speed.

The consequences of endorsing such misinformation can be disastrous: the belief that the pandemic is overblown can make people less willing to comply with social-distancing measures and mask requirements, mistrust in vaccine experts can impede vaccination programs' ability to achieve sufficient coverage, and the use of unproven treatments can cause serious injury or even death. The onslaught of misinformation about COVID-19 grabbed news headlines and became a key theme in both public and private discourse during the pandemic, engendering a wider recognition of the urgent need to better understand, and more effectively respond to, health misinformation. The contributions

in this special issue are, therefore, especially timely.

Our initial call for proposals attracted more than 140 submissions, demonstrating the field's readiness to tackle the challenge of health misinformation. After two rounds of competitive reviews, we selected the articles for publication based on rigor, public health relevance, and diversity of topics and methods. The issue therefore covers a wide array of health topics, including vaccines (Dunn et al., p. S319; Bonnevie et al., p. S326; Jamison et al., p. S331; Broniatowski et al., p. S312; Guidry et al., p. S305), cancer prevention and treatment (Wilner and Holton, p. S300; Zenone et al., p. S294), and infectious disease outbreaks (hepatitis A in Oren et al., p. S348; Zika in Safarnejad et al., p. S340).

The issue also features research across a diverse set of SM platforms. Although most articles

examined Twitter (Dunn et al.; Bonnevie et al.; Jamison et al.; Oren et al.; Safarnejad et al.) and Facebook (Broniatowski et al.), a few focused on understudied platforms such as Pinterest (Guidry et al.; Wilner and Holton) and GoFundMe (Zenone et al.).

The articles in this issue also showcase a wide range of research methods, including machine learning and natural language processing (Bonnevie et al.; Dunn et al.; Jamison et al.; Broniatowski et al.), content analysis (Guidry et al.; Wilner and Holton; Oren et al.; Zenone et al.), and network analysis (Safarnejad et al.). These contributions provide an informative set of rigorous and replicable approaches to understanding and responding to misinformation.

More important than the diversity of topics and methods are the practical lessons these studies offer the field of public health. Analyses of SM content can yield useful findings, for example, in tackling vaccine misinformation. Dunn et al. show that vaccine misinformation on Twitter is not primarily driven by bot activity—suggesting that focusing on specific communities where vaccine misinformation is circulating

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might be more effective than targeting bot accounts. Bonnevie et al. show that the types of misinformation that vaccine opponents spread are quite limited and that the sources of misinformation are not heterogeneous or distributed; therefore, identifying and countering a small set of arguments and highly influential accounts could be an efficient way to address vaccine misinformation.

The methodology developed by Jamison et al. could be used to help identify prominent themes in SM vaccine discourse and develop counterarguments against misinformation. The longitudinal analysis of antivaccine Facebook pages in Broniatowski et al. points to one such theme: the “freedom of choice” framing of vaccine decisions. The increased focus on civil liberties since 2015 suggests that attempts to counter vaccine misinformation will need to address political arguments, rather than solely providing facts about vaccine safety and efficacy.

Notably, public health practitioners are not the only ones dealing with health misinformation, and the actions of other players, such as SM platforms, need to be studied. Evaluating the impact of Pinterest’s 2019 vaccine content moderation policy, Guidry et al. show that although it successfully reduced human papillomavirus vaccine misinformation in search results, it also reduced the amount of human papillomavirus vaccine-related content overall, potentially creating an information vacuum. As SM sites enact new policies, public health organizations and health care providers should be ready to fill any information gaps resulting from these changes. It is not enough to simply remove misinformation; we must ensure that accurate information is widely accessible on these platforms.

Another limitation of SM companies’ actions is that they tend to be reactive and focus on the particular topics receiving attention at a given moment, rather than tackling misinformation in a holistic manner. Although Pinterest took action to address vaccine misinformation, the study by Wilner and Holton shows that misinformation about breast cancer is also a significant issue on the platform. These authors found that many pins about breast cancer prevention or treatment contain misinformation, including claims about foods that allegedly prevent or treat cancer, references to unsubstantiated cancer risk factors, and statements downplaying the accuracy and safety of mammograms. However, the subtlety of the misinformation identified (e.g., most claims were exaggerated rather than patently false, inaccurate information was often conveyed through images instead of text) highlights why falsehood detection and content moderation efforts can be challenging.

Zenone et al. also confront a complex case of cancer-related misinformation in their examination of the way cannabidiol is portrayed in fundraising campaigns on GoFundMe. Most campaigns were found to misleadingly present cannabidiol as curative or life prolonging, with many relying on anecdotal evidence to support these claims. The hype and misperception surrounding cannabidiol underscores the need to investigate the real-world harms of misinformation, especially when the evidence base on a topic is not well established. Furthermore, the study demonstrates the need to expand research beyond prominent platforms, as misinformation can also proliferate on SM platforms that are not primarily considered information-dissemination channels.

The last research articles offer timely case studies on two previous disease outbreaks, with lessons for the COVID-19 pandemic. Oren et al. demonstrate the feasibility and utility of studying tweets to understand the community response to a hepatitis A outbreak. Key themes identified—including risk perception (e.g., susceptibility to and severity of infection), criticisms of the government’s response, and stigma against the population perceived to be the source of the outbreak—all have echoes in the current discourse on COVID-19. The authors also point to missed opportunities for health organizations to use SM to engage in dialogue with affected communities, rather than using these platforms to simply broadcast information.

Safarnejad et al. analyzed tweets related to the 2015 to 2016 Zika outbreak, finding distinctly different dissemination network structures between misinformation and accurate information. This study highlights the need to go beyond cross-sectional content analysis to track how misinformation spreads. It also points to a central challenge in outbreak communication: the evolving nature of the evidence base makes it difficult to identify and counteract misinformation in real time.

As a complement to the empirical research articles, we also solicited commentaries and editorials focusing on critical gaps and priorities in health misinformation research and practice. To begin, Chou et al. (p. S273) outline five priority areas for future research:

1. enhancing misinformation surveillance,
2. understanding the psychological drivers of misinformation endorsement and sharing,

3. identifying real-world consequences of misinformation,
4. intervening with those who are most vulnerable to misinformation and its consequences, and
5. developing and testing effective responses to misinformation.

Scherer and Pennycook (p. S276), Vraga and Bode (p. S278), and Tan and Bigman (p. S281) further expand on some of these priority areas. Scherer and Pennycook present three theoretical perspectives that may explain what makes certain people more susceptible to misinformation and suggest additional factors (such as trust) to be further explored. Vraga and Bode summarize best practices for “observational correction” online—a potentially effective approach that can be scaled up by engaging the public, experts, and SM platforms. Tan and Bigman explore avenues for misinformation research in the context of tobacco control, highlighting the need to enhance misinformation surveillance of new tobacco products; assess the impact of exposure to online tobacco misinformation, especially among vulnerable populations; and develop interventions for tobacco disparity populations.

The final set of editorials offers concrete recommendations for those on the front lines of public health. Southwell et al. (p. S288) highlight the critical role of health care providers, encouraging them to proactively combat misinformation by monitoring the information environment, listening to patients, and helping patients gain a better understanding of medical evidence. Donovan (p. S286) offers recommendations for public health communicators seeking to provide timely, relevant, and local information on COVID-19 and

other health issues, including monitoring rumors that are gaining traction, building stronger relationships with journalists, and using channels other than SM (e.g., text messaging) to communicate critical health information.

Vanderpool et al. (p. S284) discuss the need to leverage the attention paid to COVID-19 vaccines to tackle vaccine hesitancy more broadly, advocating efforts to enhance vaccine literacy and improve communication efforts by taking into account people's values as well as the cognitive, emotional, sociocultural, and contextual factors associated with vaccine hesitancy. Finally, Susser (p. S290), an ethicist, cautions the field against adopting the tools that have proven effective for spreading misinformation (e.g., micro-targeting) to disseminate evidence-based health information, noting the need to weigh the potential effectiveness of digital influence tools against the risks they raise, such as violations of privacy, disregard for personal autonomy, perpetuation of bias, and lack of transparency and accountability.

In summary, as our knowledge of the (mis)information ecosystem grows, we will need to reexamine traditional health communication theories, standard research designs, and ongoing public health practices. It would be naïve to assume that delivering accurate health information earnestly using existing tools, channels, and guidance will be effective. It is time to boldly explore innovative, adaptive, and alternative approaches to both disseminating evidence-based information and mitigating the impact of misinformation. With COVID-19 continuing to cause global suffering and disruptions, understanding and combatting

health misinformation is one of the most urgent public health priorities of our time. **AJPH**

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to disclose.