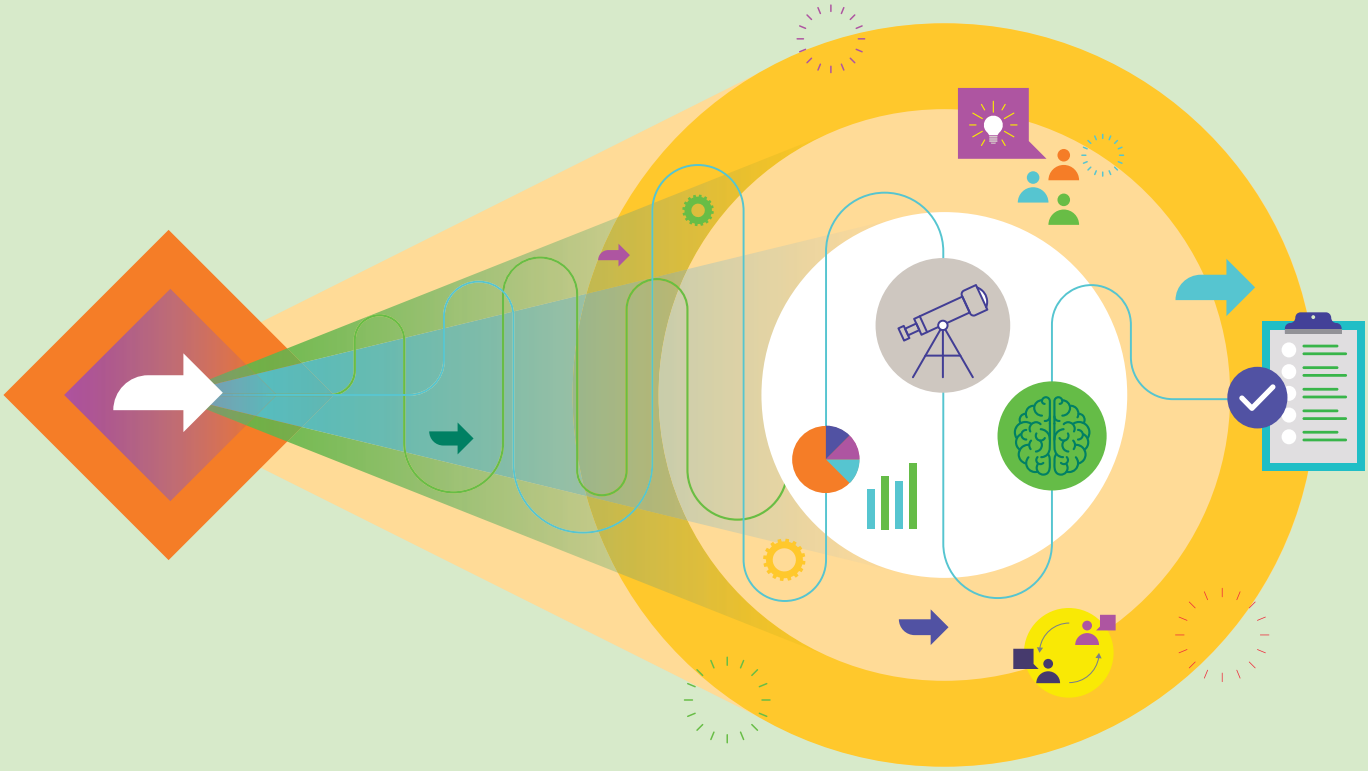
Misinformation in Health Care – The Critical Role of Effective Communication

RESEARCH BRIEF

MAY 2023



Ontario Hospital Association

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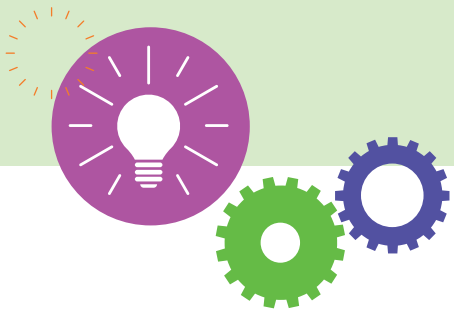


False information can be classified as both misinformation (untruths spread with or without bad intentions) and disinformation (designed with malicious intentions). Mis- and disinformation are particularly harmful to its consumers and society more broadly if the false information relates to human health. As the COVID-19 pandemic has demonstrated, health crises tend to generate an overabundance of information, including the rampant spread of misinformation. This results in a parallel "infodemic" that makes it difficult to protect public health and control the disease. Health misinformation is not easily addressed, but as trusted sources of information, health care workers and hospitals may play a role in facilitating access to accurate, reliable information for the health of their patients and the well-being of society.

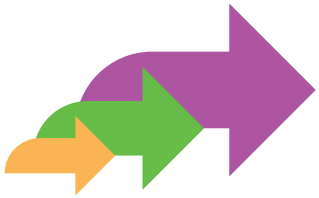
Misinformation, Disinformation and Infodemics

Misinformation is broadly defined as "cases in which people's beliefs about factual matters are not supported by clear evidence and expert opinion."[1] More than just misunderstanding or lack of access to factual information, the belief in and spread of misinformation is driven by cognitive, social, and affective factors. For example, misinformation may be perceived as "novel" or "sensational", garnering more attention and stimulating greater sharing.[2,3] While most misinformation is shared in good faith, **disinformation** is a subset of misinformation that is spread intentionally to mislead, deceive, or confuse an audience.[4,5] Disinformation is more often spread in a political context or used for political gain.[6]

Misinformation is not a new phenomenon, but the internet and social media have enabled its unprecedented spread. Social media platforms appear to act as facilitators of misinformation, often spreading it farther, faster, deeper, and more broadly than true information.[2] As the 17th-century satirist Jonathan Swift aptly noted, "[f]alsehood flies, and truth comes limping after it."[7] Digital misinformation has become so pervasive that it has been likened to a wildfire and was listed as a global threat, even prior to the COVID-19 pandemic, in the World Economic Forum's *2013 Global Risks Report.*[8]

> ***"We're not just fighting an epidemic; we're fighting an infodemic."***[11]
>
> **- Dr. Tedros Adhanom Ghebreyesus Director-General, World Health Organization (WHO)**

The threat of digital information overload is particularly problematic in global health crises. The term "infodemic" was coined during the 2003 SARS outbreak, as it became clear that a concurrent information epidemic made control and containment of the virus more challenging and had needless economic and social consequences.[9] The term **infodemic** has since come to refer to an overabundance of information, both true and false, that makes it difficult to find and discern reliable information.[10] The prevalence of mis- and disinformation surrounding the emergence of the SARS-CoV-2 virus in early 2020 led World Health Organization (WHO) Director-General Dr. Tedros Adhanom Ghebreyesus to declare on February 15, 2020: "We're not just fighting an epidemic; we're fighting an infodemic."[11]



Terms and Concepts

Misinformation

Misinformation is false or inaccurate information disseminated **without** the intention of deceiving the public.[4]

Disinformation

Disinformation is false, inaccurate, or misleading information **deliberately created**, presented and disseminated to deceive the public.[12]

Infodemic

An infodemic is an overabundance of information – good and bad – that makes it difficult for people to make decisions for their health, spreading via digital and physical information systems.[10]

The term is new, but the problem is not – writers have recognized that disease outbreaks spur the spread of incorrect information or misinformation for centuries.[13]

Infodemics are targeted – they exploit the susceptible and people connected to specific networks.[13]

Infodemiology

Information epidemiology, now called *infodemiology*, identifies areas where a knowledge translation gap exists between best evidence and practice. The study of determinants and distribution of health information and misinformation – the sharing of health information on the internet has allowed for this new research discipline and methodology.[14]

What is the Health Impact of Misinformation?

Widespread health misinformation can have potentially devastating consequences. The WHO, the US Surgeon General, and many professional societies, including the American Medical Association, identify misinformation as a significant public health threat and have called for action to combat its spread.[13,15,16] The belief in health misinformation may cause people to engage in risky behaviours (e.g., avoid vaccination, avoid seeking care) or resort to ineffective and potentially harmful medications or remedies (e.g., Ivermectin, drinking bleach). In the case of infectious diseases like SARS-CoV-2, widespread belief in health misinformation can put whole communities at risk from low rates of vaccination or poor adherence to public health measures.

While the COVID-19 pandemic has brought significant attention to the problem, health mis- and disinformation is not a new threat. A decades-long disinformation campaign to conceal the adverse health effects of smoking has led to unnecessary cancer, lung disease, heart attacks, and premature death.[17] Considerable anti-vaccine sentiment was generated when a small study (12 children) published in 1998 in the *Lancet* suggested a causal link between the measles-mumps-rubella (MMR) vaccine and autism. Despite retraction of the article, the lead author being found guilty of ethical, medical and scientific misconduct, and a significant number of large-scale studies discrediting the findings,[18] the false belief that vaccines cause autism has led to a decrease in childhood vaccinations globally and the loss of measles elimination status in multiple countries, including the UK.[4]

Vaccines and tobacco continue to be plagued by misinformation. A recent systematic review found that health misinformation on social media predominately relates to the following domains:[19]

Vaccines

Debates and false narratives about vaccines tend to focus on side effects and risks for specific population groups. For example, the uptake of the human papillomavirus (HPV) vaccine was hampered by controversy in some countries, where parents associated illness or death in their children with the vaccine despite its good safety evidence. According to the WHO and UNICEF, the COVID-19 pandemic has led to further growth in anti-vaccination views and hesitancy, which has contributed to the largest decline in childhood vaccinations in approximately 30 years.[19,20]

Diets and eating disorders

Misinformation about eating disorders is propagated by pro-anorexia websites and social media accounts which encourage disordered eating and share tips and tricks on how to become

and remain anorexic. Promoting misinformation about eating disorders can promote changes in the eating habits of social media users while encouraging unhealthy practices and normalizing eating disorders.[21]

Drugs and new tobacco products

There is a high prevalence of misinformation about drugs (e.g., opioids, marijuana) and new tobacco products (i.e., hookah, water pipes, e-cigarettes) that focuses on denying the health damage. For example, e-cigarette manufacturers, retailers, and social media influencers claim that e-cigarettes only contain water vapour, are harmless, and may be an aid to quitting smoking.[22] In the case of e-cigarettes, social media, including fake accounts, appears to be a primary source of this misinformation.[19] The impact of misinformation on e-cigarettes has contributed to the youth vaping epidemic over the last few years.[22]

Communicable and noncommunicable diseases

False and misleading information is a major concern during pandemics and other communicable disease outbreaks such as H1N1, Zika, Ebola and Diphtheria because it can hamper containment efforts, promote unproven or dangerous treatments, and ultimately cause harm. During the Zika outbreak in Brazil, some parts of the country banned the use of an insecticide that controlled mosquito populations after it was misperceived as the cause of microcephaly.[23]

Medical treatments and health interventions

Health misinformation related to treatments and interventions is a growing concern. During the COVID-19 pandemic, several rumours circulated about treatment methods for COVID-19. Poison control centres worldwide began to see increasing numbers of people calling about home remedies to prevent or cure COVID-19.[24]

How does Misinformation Impact Hospitals?

Beyond the adverse effects misinformation has on public health and the subsequent burden on health care capacity, hospitals may be impacted by its spread in other ways. Misinformation can put the safety of health care workers in jeopardy. Anti-vaccine activists and other individuals fueled by misinformation related to the COVID-19 pandemic have harassed and attacked healthcare workers and disrupted hospital care.[25,26]

Health care workers are also not immune to unintentionally or intentionally spreading misinformation.[27] The COVID-19 pandemic has demonstrated that a very small number of health care workers may be a source of misinformation.[28] The intentional spread of harmful misinformation about the COVID-19 vaccines and other public health measures led the College of Nurses of Ontario and the College of Physicians and Surgeons of Ontario to release statements indicating that nurses and physicians involved in spreading misinformation could risk disciplinary action.[27,28]

What Can Hospitals do to Tackle Misinformation?

Hospitals can work to support clinicians, public health, and their communities to take effective and actionable steps against health mis- and disinformation. Effective health communication is critical in addressing misinformation, speeding up the flow of factual information and building trust among people regarding information sources and services.[29] The US Surgeon General recommends specific actions that can be taken by health professionals and health organizations to combat misinformation that is based on effective communication with patients and the community.[16] Broadly, actions include:

- Proactively engaging with patients and the public on health misinformation.
- Sharing accurate health information with the public.
- Partnering with community groups and organizations to prevent and address health misinformation at the local level.

It may also be helpful to treat misinformation, and infodemics, like an infectious disease and address it using epidemiological approaches (see Figure 1) (i.e., real-time surveillance, accurate diagnosis, and rapid response).[13,30] The World Health Organization suggests that a public health research agenda is needed while developing interventions for infodemic management. This includes:

- **Prepare and Monitor** (Stream 1): Measure and monitor the impact of infodemics during health emergencies.
- **Detect** (Stream 2): Detect and understand the spread and impact of infodemics.
- **Intervene** (Stream 3): Respond and deploy interventions that mitigate and protect against the infodemic and its harmful effects.

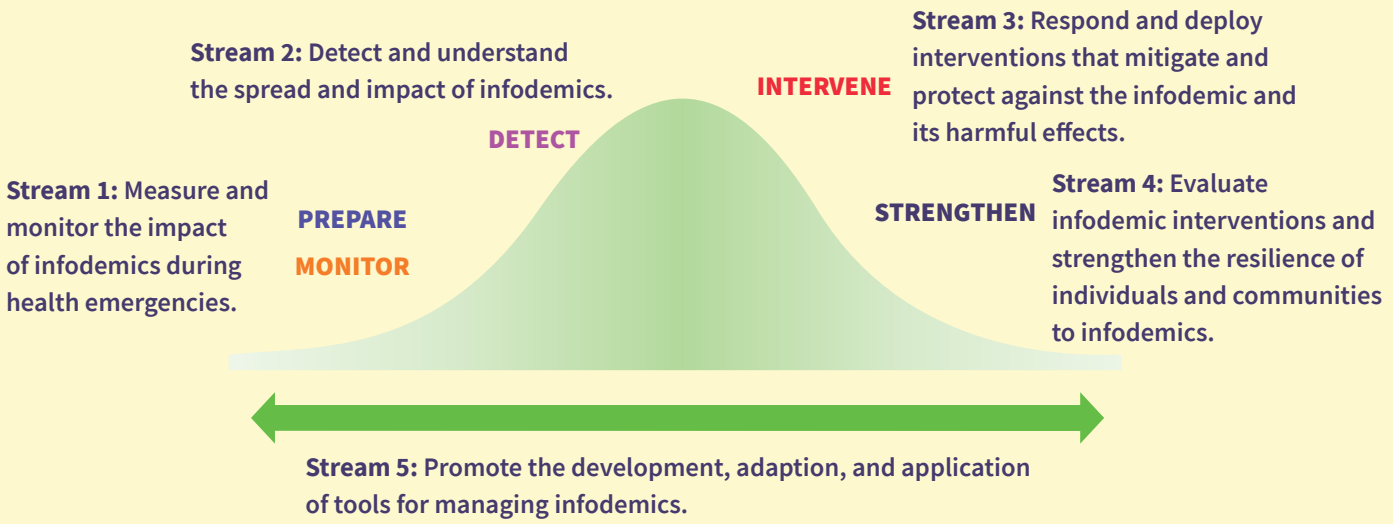


Figure 1: Calleja et al., 2021. Public health research agenda for managing infodemics; Methods and Results of the First WHO Infodemiology Conference.[10]

- **Strengthen** (Stream 4): Evaluate infodemic interventions and strengthen the resilience of individuals and communities to infodemics.
- **Enable** (Stream 5): Promote the development, adaptation, and application of tools for managing infodemics.

Monitoring misinformation can help contain super spreader conspiracies or false claims, allowing for more rapid debunking or fact-checking before the misinformation goes viral.[14,33] Fact-checking can reduce people's beliefs in false information and the deliberate dissemination of disinformation.[31] Debunking false information is needed once people have been exposed to misinformation. A recent study[32] found that delivering debunks further in time from exposure to misinformation can be more effective than immediate feedback, giving readers time to process information. For debunking to be effective, the approach must include detailed refutations.[31] A non-profit organization, Skeptical Science, developed the Debunking Handbook,[31] which suggests to "provide a clear explanation of (1) why it is now clear that the information is false, and (2) what is true instead."

While fact-checking and debunking health misinformation can be effective, it can also be challenging in the case of harmful misinformation.[33,34]

- Independent media and fact-checkers play an essential role in addressing virus-related misinformation.[35,36]
- Providing good content while debunking misinformation is more important than the format.[37]
- Timing of fact checks matter. Debunking misinformation online after someone had been exposed improved the likelihood they could discern the truth as opposed to providing that information during (labeling) or prior to exposure (prebunking).[32]
- There is a need for digital platforms to monitor accounts created with bad intent.[38]

> ***"Infodemic management is the mother of all public health interventions - without it, their effectiveness is threatened."***[39]
>
> **– Dr. Neville Calleja, MD, MSc, PhD**
> **Associate Professor, Public Health**
> **University of Malta**

The following table outlines evidence-based tools and strategies to effectively promote health information and challenge misinformation.

TOOLS/STRATEGIES	ELEMENTS/PRINCIPLES	EXAMPLES AND ADDITIONAL RESOURCES
 **Build Trust and Rapport** *Trust is a key determinant of our knowledge, beliefs, attitudes and ultimately, behaviour.*[40]	• Proactively engage with patients and the public on health misinformation • Relationships must be authentic • Clinicians can take the time to understand each patient's knowledge, beliefs and values • Listen and lead with empathy, and when possible, correct misinformation in personalized ways • Identify trusted journalists/scientific experts/institutions and refer to them for reliable information • Communicate the science, and be mindful of people's past experiences with health care and health authorities • When addressing health concerns, use less technical language that is accessible to all patients • Find opportunities to promote patient health literacy regularly	In 2021 the Office of the U.S. Surgeon General published an advisory for health care professionals and administrators, teachers and librarians, faith leaders, and trusted community members to address misinformation using a whole-of-society approach with a common theme of trust. Canadian Red Cross provided mobile vaccine clinics that successfully delivered thousands of vaccines across Ontario and noted they believe much of their success at the clinics can be owed to one key ingredient. "When people come for a vaccine, they look for trust," explained one of the public health leads. The Black Scientists' Task Force on Vaccine Equity was formed in December 2020 to address Black community concerns and issues related to the COVID-19 pandemic, testing and vaccines. The Task Force achieved concrete outcomes by holding community town halls, where "participants valued the respectful dialogue with scientists that look and talk like them." A participant described the town halls as "culturally and racially safe spaces."
 **Build Community Partnerships** *Partner with community groups and local organizations to build trust and mutual understanding.*[16]	• Work with community members to develop localized public health messages • Engage with faith-based communities to provide information that respects scientific evidence and religious values • Listen and respond to concerns, rumours and myths • Reinforce national public health and social measures • Tailor health, information and digital literacy initiatives[41] • Work with associations and other organizations to offer training for clinicians on how to address misinformation in ways that account for patients' diverse needs, concerns, backgrounds and experiences	Ma Mawi Wi Chi Itata (translated from Ojibway into the phrase, "we all work together to help one another") has worked to support families to better care for children by creating meaningful opportunities for community and family involvement. In 2022, they launched the Protecting Our Future campaign which took a community-driven grassroots approach to address vaccine hesitancy within the urban Indigenous community by providing accessible, culturally relevant, and science-backed information to community in a safe and trusting way. Additionally, Ma Mawi Wi Chi Itata partnered with ScienceUpFirst and local Indigenous Health Professionals to answer questions about COVID-19 and the vaccines.

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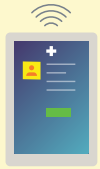 **Ensure Information is Accessible** *Develop high-quality, accessible health information in different digital formats.*[41]	• Ensure health guidance is current to help avoid confusion • Consider types of internet access available to different groups (i.e., people with low-bandwidth connections and with disabilities) • Websites should be adapted to local cultures and translated to reach multilingual audiences • Content should be adapted to mobile devices • Use technology and media platforms to share accurate health information with the public[16]	ScienceUpFirst, co-founded by Dr. Timothy Caufield, is a national initiative that works with a collective of independent scientists, researchers, health care experts and science communicators. They communicate evolving science to the public in a way that is easy to understand and accessible by using infographics and social media. Unambiguous Science provides health data in easy to understand posts. The information shared is evidence-based and delivered in formats that are accessible and available over social media platforms. The Centre for Disease Control and Prevention released a Health Literacy Action Plan in 2022, which aims to share health and safety information that is accurate, accessible, and actionable.
 **Fact-Checking and Verification**[42] *Monitor and verify factual accuracy of information.*	• Assess the source • Go beyond headlines • Identify the author • Check the date • Examine the supporting evidence • Check your biases • Turn to fact-checkers • Act quickly when misinformation is released • Beware of sloppy reporting and misleading data visualizations • Pause before you share	The World Health Organization Misinformation course developed in 2021 highlights the work of the International Fact-Checking Network (IFCN), which empowers fact-checkers through networking, capacity building and collaboration. Ted Rogers School of Management Social Media Lab created a Quick Start Guide for COVID-19 Fact-Checking and developed interactive dashboards to keep track of COVID-19 claims circulating online.

TOOLS/STRATEGIES	ELEMENTS/PRINCIPLES	EXAMPLES AND ADDITIONAL RESOURCES
 **Debunking**[43–48] *Challenge misinformation already spreading in the information ecosystem.*	• Provide the science • Use clear and shareable content • Reference trustworthy and independent sources • If possible, note scientific consensus (and that science evolves) • Be authentic, empathetic and humble • Highlight gaps in logic and rhetorical tricks • Make facts the hook (not the misinformation) – The general public is your target audience, not the vocal vaccine denier – Aim to correct the content AND unmask the techniques that the vocal vaccine denier is using	ScienceUpFirst publishes a running list of Debunking Resources and the latest research on debunking, last updated in 2022. Leading researchers in the field of misinformation developed a handbook for debunking. The Debunking Handbook (2020) summarizes effective practices for debunking and includes predefined steps to debunk misinformation.
 **Prebunking or Inoculation**[47,49,50] *Preempt misunderstandings or misinformation before they become widespread and build resilience against belief in misinformation.*	• Empower the audience by letting them be 'in the know' and on the alert for misinformation and less trustworthy sources of information • Explain tactics and manipulation techniques used to spread misinformation (e.g., fearmongering, cherry-picking data, fake experts) • Expose communicators to elements of misinformation to train them to identify future forms of misinformation **Prebunking Steps:**[51] 1. Identify information gaps, determine which narratives might be exploited, and anticipate upcoming events (e.g., health campaigns) 2. Lead with the facts 3. Include an explicit warning about misinformation or misinformation tactics 4. Present misinformation and provide counterarguments, explaining the tactics in use 5. Repeat the facts	Inoculation Science is a lab based out of the University of Cambridge and the University of Bristol, which brings together research and resources on inoculation theory techniques applied to misinformation. They have developed interactive resources to help individuals identify tactics and techniques used in false claims online. The Vaccine Misinformation Management Field Guide, developed by Unicef, First Draft, Yale Institute for Global Health, and The Public Good Projects, includes guidance on pre-bunking and inoculation.

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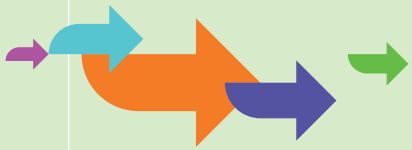
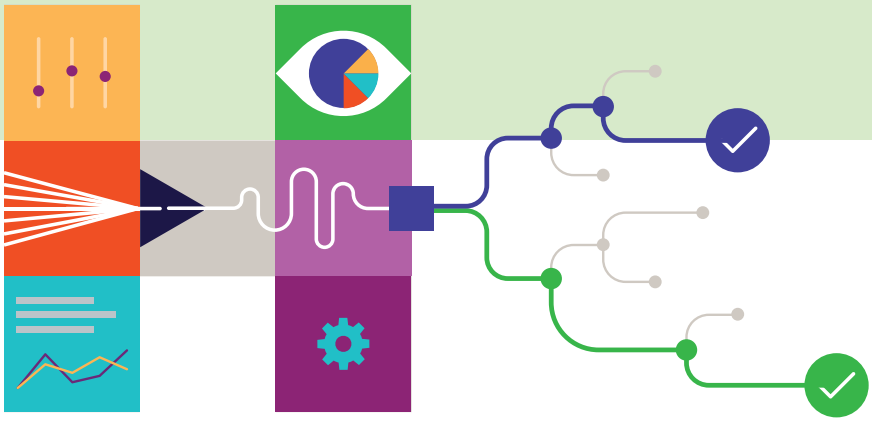
 **Storytelling or Narratives**[52] *Use a form of communication that uses stories to make information more interesting, understandable, believable, and persuasive.*	**Recommendations:**[53] • Rely both on personal and cultural experiences • Tailor to the target's audience • Affirm the audience's worldview • Research the existing conspiracy theories • Mind the "whom" – identify those who would benefit most from a narrative intervention • Combine facts and narratives • Don't go to extremes in emotion	The World Health Organization partnered with Story Collider in 2022 to present a learning opportunity on effective storytelling to communicate about infodemics, their impact and how to contribute to infodemic management practice. The video recording noted above highlights the impacts of storytelling skills on effective communication.
 **Infodemic Training**[40] *Understanding and identifying key mechanisms and actors in an infodemic. Infodemics cannot be suppressed, they need to be managed. WHO has put forward a competency framework and several training sessions for infodemic managers.*	Health care communicators and professionals can consider the following courses and training available on infodemic management: • WHO Infodemic Management 101 (2021) • European Centre for Disease Prevention and Control Course for Online Vaccination Misinformation (2022)	The Office of the US Surgeon General (2021) provides a health misinformation checklist for each member of society to confront health misinformation. 

Infodemics cannot be suppressed, they need to be managed.

Summary

The COVID-19 pandemic and previous epidemics have illustrated the consequences of mis- and dis-information. Many people who were exposed to misinformation were subjected to false claims that had the potential to impact their health. Scientists, health care providers, health care institutions and governments have the difficult challenge of ensuring that reputable and validated information is disseminated to the public without being compromised by false claims or conspiracy theories.

As a trusted source for health care advice, hospitals and health care providers can play an important role in addressing health misinformation. Beyond promoting timely, accurate, and accessible information, countering misinformation requires understanding the nature and scope of circulating falsehoods to address them effectively. Engaging communities and continuing to build trust is also fundamental to every approach. Together, these actions can reduce the spread and weaken the footing of misinformation and ultimately protect the health of our communities.



References

1. Pan W, Liu D, Fang J. An Examination of Factors Contributing to the Acceptance of Online Health Misinformation. *Front Psychol*. 2021;12:630268. doi:10.3389/fpsyg.2021.630268

2. Vosoughi S, Roy D, Aral S. The spread of true and false news online. *Science*. 2018;359(6380):1146-1151. doi:10.1126/science.aap9559

3. Kumari R, Ashok N, Ghosal T, Ekbal A. What the fake? Probing misinformation detection standing on the shoulder of novelty and emotion. *Inf Process Manag*. 2022;59(1):102740. doi:10.1016/J.IPM.2021.102740

4. Swire-Thompson B, Lazer D. Public health and online misinformation: Challenges and recommendations. *Annu Rev Public Health*. 2019;41:433-451. doi:10.1146/annurev-publhealth-040119-094127

5. Stahl BC. On the difference or equality of information, misinformation, and disinformation: A critical research perspective. *Inf Sci*. 2006;9:83-96. doi:10.28945/473

6. Freelon D, Wells C. Disinformation as Political Communication. *Polit Commun*. 2020;37(2):145-156. doi:10.1080/10584609.2020.1723755

7. Swift J. Political Lying. Vol. III. Seventeenth Century. Henry Craik, ed. 1916. English Prose. Accessed September 5, 2022. https://www.bartleby.com/209/633.html

8. World Economic Forum, Marsh & McLennan Companies, National University of Singapore, et al. *Global Risks 2013: Eighth Edition*; 2013. Accessed June 26, 2022. https://reports.weforum.org/global-risks-2013/risk-case-1/digital-wildfires-in-a-hyperconnected-world/

9. Rothkopf D. When the Buzz Bites Back. *The Washington Post*. https://www.washingtonpost.com/archive/opinions/2003/05/11/when-the-buzz-bites-back/bc8cd84f-cab6-4648-bf58-0277261af6cd/. Published 2003. Accessed June 26, 2022.

10. Calleja N, AbdAllah A, Abad N, et al. A Public Health Research Agenda for Managing Infodemics: Methods and Results of the First WHO Infodemiology Conference. *JMIR Infodemiology*. 2021;1(1):e30979. doi:10.2196/30979

11. World Health Organization. *WHO Public Health Research Agenda for Managing Infodemics*; 2021. Accessed November 3, 2022. https://www.who.int/publications/i/item/9789240019508

12. Charquero-Ballester M, Walter JG, Nissen IA, Bechmann A. Different types of COVID-19 misinformation have different emotional valence on Twitter. *Big Data Soc*. 2021;8(2). doi:10.1177/20539517211041279

13. World Health Organization. *WHO Third Global Infodemic Management Conference: Whole-of-Society Challenges and Solutions to Respond to Infodemics*; 2021.

14. Eysenbach G. Infodemiology: the epidemiology of (mis)information. *Am J Med*. 2002;113(9):763-765. doi:10.1016/S0002-9343(02)01473-0

15. American Medical Association. *Addressing Public Health Disinformation Disseminated by Health Professionals D-440.914*. American Medical Association; 2022. Accessed July 11, 2022. https://policysearch.ama-assn.org/policyfinder/detail/Addressing%20Public%20Health%20Disinformation%20Disseminated%20by%20Health%20Professionals%20D-440.914?uri=%2FAMADoc%2Fdirectives.xml-D-440.914.xml

16. Office of the Surgeon General (OSG). *Confronting Health Misinformation: The U.S. Surgeon General's Advisory on Building a Healthy Information Environment*; 2021.

17. Cappella JN, Maloney E, Ophir Y, Brennan E. Interventions to Correct Misinformation About Tobacco Products. *Tob Regul Sci*. 2015;1(2):186. doi:10.18001/TRS.1.2.8

18. di Pietrantonj C, Rivetti A, Marchione P, Debalini MG, Demicheli V. Vaccines for measles, mumps, rubella, and varicella in children. *Cochrane Database Syst Rev*. 2020;4(4):CD004407. doi:10.1002/14651858.CD004407.PUB4

19. Suarez-Lledo V, Alvarez-Galvez J. Prevalence of health misinformation on social media: Systematic review. *J Med Internet Res*. 2021;23(1):e17187. doi:10.2196/17187

20. COVID-19 pandemic fuels largest continued backslide in vaccinations in three decades. Accessed July 19, 2022. https://www.unicef.org/press-releases/WUENIC2022release

21. Harris JK, Duncan A, Men V, Shevick N, Krauss MJ, Patricia ACR. Messengers and Messages for Tweets That Used #thinspo and #fitspo Hashtags in 2016. *Prev Chronic Dis*. 2018;15(1). doi:10.5888/pcd15.170309

22. Tan ASL, Bigman CA. Misinformation About Commercial Tobacco Products on Social Media—Implications and Research Opportunities for Reducing Tobacco-Related Health Disparities. *Am J Public Health*. 2020;110(S3):S281-S283. doi:10.2105/AJPH.2020.305910

23. Carey JM, Chi V, Flynn DJ, Nyhan B, Zeitzoff T. The effects of corrective information about disease epidemics and outbreaks: Evidence from Zika and yellow fever in Brazil. *Sci Adv*. 2020;6(5):eaaw7449. doi:10.1126/sciadv.aaw7449

24. Roberts D, Wright N. People want to use bleach and antiseptic for COVID and are calling us for advice. *The Conversation*. https://theconversation.com/people-want-to-use-bleach-and-antiseptic-for-covid-and-are-calling-us-for-advice-168660. Published 2021. Accessed July 5, 2022.

25. Cukier A, Vogel L. Escalating violence against health workers prompts calls for action – CMAJ News. *CMAJ News*. https://cmajnews.com/2021/11/26/covid-violence-1095980/. Published 2021. Accessed July 6, 2022.

26. Preston E. Health care workers say they're facing verbal and physical abuse amid spread of COVID misinformation - CBS News. *CBS News*. https://www.cbsnews.com/news/covid-misinformation-healthcare-workers-harassment/. Published 2022. Accessed July 6, 2022.

27. Nurses supporting public health measures. College of Nurses of Ontario. Published 2021. Accessed July 6, 2022. https://www.cno.org/en/news/2020/december-2020/nurses-supporting-public-health-measures/

28. Statement on Public Health Misinformation. College of Physicians and Surgeons of Ontario. Published 2021. Accessed July 6, 2022. http://www.cpso.on.ca/News/News-Articles/COVID-misinformation

29. Bin Naeem S, Kamel Boulos MN. COVID-19 Misinformation Online and Health Literacy: A Brief Overview. *Int J Environ Res Public Health*. 2021;18(15):8091. doi:10.3390/ijerph18158091

30. Scales D, Gorman J, Jamieson KH. The Covid-19 Infodemic — Applying the Epidemiologic Model to Counter Misinformation. *N Engl J Med*. 2021;385(8):678-681. doi:10.1056/NEJMp2103798

31. Lewandowsky S, Cook J, Ecker UKH, et al. *The Debunking Handbook 2020*.2020. doi:10.17910/b7.1182

32. Brashier NM, Pennycook G, Berinsky AJ, Rand DG. Timing matters when correcting fake news. *Proc Natl Acad Sci USA*. 2021;118(5):e2020043118. doi:10.1073/pnas.2020043118

33. van Huijstee D, Vermeulen I, Kerkhof P, Droog E. Continued influence of misinformation in times of COVID-19. *Int J Psychol*. 2022;57(1):136-145. doi:10.1002/ijop.12805

34. Roozenbeek J, van der Linden S, Goldberg B, Rathje S, Lewandowsky S. Psychological inoculation improves resilience against misinformation on social media. *Sci Adv*. 2022;8(34):6254. doi:10.1126/sciadv.abo6254

35. Ecker UKH, O'Reilly Z, Reid JS, Chang EP. The effectiveness of short-format refutational fact-checks. *Br J Psychol*. 2020;111(1):36-54. doi:10.1111/bjop.12383

36. Brennen JS, Simon FM, Howard PN, Nielsen RK. Types, sources, and claims of COVID-19 misinformation. *Reuters Institute for the Study of Journalism*. Published online 2020. Accessed March 20, 2022. https://reutersinstitute.politics.ox.ac.uk/types-sources-and-claims-covid-19-misinformation

37. Swire-Thompson B, Cook J, Butler LH, Sanderson JA, Lewandowsky S, Ecker UKH. Correction format has a limited role when debunking misinformation. *Cogn Res Princ Implic*. 2021;6(1):83. doi:10.1186/s41235-021-00346-6

38. Bak-Coleman JB, Kennedy I, Wack M, et al. Combining interventions to reduce the spread of viral misinformation. *Nat Hum Behav*. 2022;6(10):1372-1380. doi:10.1038/s41562-022-01388-6

39. Calleja N. Comprehensive training for promotion of vaccine demand. In: *Bringing It All Together: Health Systems Strengthening*. World Health Organization; 2022. Accessed November 10, 2022. https://www.who.int/news-room/articles-detail/call-for-applicants-for-comprehensive-training-for-promotion-of-vaccine-demand-to-maintain-and-restore-routine-immunization-and-promote-COVID-19-vaccination

40. World Health Organization. *WHO Competency Framework: Building a Response Workforce to Manage Infodemics*; 2021. Accessed November 3, 2022. https://www.who.int/publications/i/item/9789240035287

41. World Health Organization. *WHO Policy Brief: COVID-19 Infodemic Management*; 2022. Accessed September 27, 2022. https://www.who.int/publications/i/item/WHO-2019-nCoV-Policy_Brief-Infodemic-2022.1

42. World Health Organization. Let's flatten the infodemic curve. Accessed March 21, 2022. https://www.who.int/news-room/spotlight/let-s-flatten-the-infodemic-curve

43. van der Linden SL, Clarke CE, Maibach EW. Highlighting consensus among medical scientists increases public support for vaccines: Evidence from a randomized experiment [published correction appears in BMC Public Health. 2017 Mar 29;17 (1):284]. *BMC Public Health*. 2015;15:1207. doi:doi.org/10.1186/s12889-015-2541-4

44. König L, Jucks R. Hot topics in science communication: Aggressive language decreases trustworthiness and credibility in scientific debates. *Public Underst Sci*. 2019;28(4):401-416. doi:10.1177/0963662519833903

45. Caulfield T, Marcon AR, Murdoch B, et al. Health Misinformation and the Power of Narrative Messaging in the Public Sphere. *Canadian Journal of Bioethics*. 2019;2(2). doi:10.7202/1060911ar

46. Yeo SK, McKasy M. Emotion and humor as misinformation antidotes. *Proc Natl Acad Sci U S A*. 2021;118(15):e2002484118. doi:10.1073/PNAS.2002484118

47. Infodemic management 101 | OpenWHO. Accessed March 17, 2022. https://openwho.org/courses/infodemic-management-101

48. World Health Organization Regional Office for Europe. *Best Practice Guidance: How to Respond to Vocal Vaccine Deniers in Public*; 2017. Accessed February 28, 2022. https://apps.who.int/iris/handle/10665/343301

49. Vraga EK, Bode L. Addressing COVID-19 Misinformation on Social Media Preemptively and Responsively. *Emerg Infect Dis*. 2021;27(2):396-403. doi:10.3201/eid2702.203139

50. Roozenbeek J, Linden S van der, Nygren T. Prebunking interventions based on "inoculation" theory can reduce susceptibility to misinformation across cultures. *Harvard Kennedy School Misinformation Review*. 2020;1(2). doi:10.37016/MR-2020-008

51. United Nations Children's Fund. *Vaccine Misinformation Management Field Guide*; 2020. Accessed November 10, 2022. https://vaccinemisinformation.guide/

52. Dahlstrom MF, Ho SS. Ethical Considerations of Using Narrative to Communicate Science. *Sci Commun*. 2012;34(5):592-617. doi:10.1177/1075547012454597

53. Lazić A, Žeželj I. A systematic review of narrative interventions: Lessons for countering anti-vaccination conspiracy theories and misinformation. *Public Underst Sci*. 2021;30(6):644-670. doi:10.1177/09636625211011881

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