Should we be Afraid of an Infodemic?

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Abstract

Since the COVID-19 pandemic, webinars, gray literature, and studies on the "infodemic" have proliferated, and it has been stated that the COVID-19 infodemic is as dangerous as the epidemic itself. Excess information and the dissemination of false information have been considered threats after every technological revolution that increased the spread of information. As they have done in past centuries, individuals in the digital age continue to develop adaptive strategies. Social media users exhibit discernment, and the impact of false information on their beliefs is limited. Its impact on behaviors, such as COVID-19 protective measures and vaccination, has not been demonstrated. There is no need for specific efforts to combat the "infodemic." As in the past, combating false information today essentially involves implementing best practices in public health communication.

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Introduction

The word "Infodemic," first appearing in 2003 in the *Washington Post*, has since 2020 enjoyed the rare fortune of becoming popular simultaneously in the media, scientific literature, and the writings and conferences of international organizations. PubMed lists only one article containing "infodemic" or "infodemics" until 2019, 150 in 2020, reaching a peak of 290 in 2022. Google finds over two million pages containing one of these words.

"Infodemic" has been used almost exclusively to designate the circulation of information about COVID-19 and actually refers to two different concepts, which became clear as soon as the WHO brought it into the public arena in February 2020.

On February 2, 2020, the WHO wrote in a Situation Report: "The 2019-nCoV outbreak and response has been accompanied by a massive 'infodemic'—an over-abundance of information—some accurate and some not—that makes it hard for people to find trustworthy sources and reliable guidance when they need it." The concern was the abundance of information, whether accurate or not. However, on February 15, WHO Director-General Dr. Tedros Adhanom Ghebreyesus made a widely quoted declaration: "We're not just fighting an epidemic; we're fighting an infodemic. Fake news spreads faster and more easily than this virus and is just as dangerous" (Munich Security Conference. February 15, 2020). The "infodemic" was reduced to the circulation of false information and considered as dangerous as the COVID-19 epidemic itself. The use of "infodemic" most often refers to this second meaning of the word.

Simon et al. pointed out that journalists and numerous gray literature and academic publications seemed "to treat as a given the existence of an infodemic" (Simon et al. 2023). Its negative impact on COVID-19 prevention and vaccination is also treated as a given, in both senses of the word.

We will analyze these two concepts of "infodemic" and their potential negative impact on health, if any.

The infodemic as excess information

The term "overload of information" is more frequently used than "over-abundance," with a similar meaning. According to Badwen et al., "for almost as long as there has been recorded information, there has been a perception that humanity has been overloaded by it" (Badwen et al., 2020).

Seneca lamented two thousand years ago that "the multitude of books disperses" (Distringit librorum multitudo, letter to Lucilius). Even in the Middle Ages, when books were copied by hand, people complained about "the multitude of books, the shortness of time, and slipperiness of memory," as Vincent de Beauvais wrote in 1255. The technological leap of Johannes Gutenberg's invention of printing in 1450 led to an explosion in the number of books, growing from 30,000 (hand-copied) to 10 million in Europe within fifty years. This abundance of circulating books raised concerns among intellectuals.

In 1545, Swiss naturalist Conrad Gesner complained about the "confusing and harmful abundance of books" (Blair, 2003). French theologian and prolific author Adrien Baillet wrote in 1686, "We have reason to fear that the multitude of books, which grows every day in a prodigious manner, will plunge future centuries into a state as bad as the barbarism that followed the fall of the Roman Empire" (Bailet, 1686). He advocated "the usefulness of censorship," which "benefits the public greatly" by rejecting "indecisive propositions" and delivering it "from the uncertainty of doubts." Dutch humanist Desiderius Erasmus, himself the author of many books, lamented in the 16th century that "stupid, ignorant, raving, irreligious and seditious" texts contaminated the book market (Kojali, 2023). He worried that deliberately corrupt texts would taint the market and feared that works by ancient authors, such as Aristotle and Cicero, would be overshadowed by his contemporaries' publications, all of which he deemed unworthy. German philosopher Leibniz, who was a professional librarian, worried in 1680 about "the horrible quantity of books that continues to grow."

The introduction of steam-powered presses in the mid-19th century increased the speed of book and newspaper printing, generating a modern sense of overload that continued to grow in the following century. During a Royal Society conference on scientific information in 1948, "participants expressed a fear that scientists would be overwhelmed, that they would no longer be able to control the vast amounts of potentially relevant material" (Bawden et al., 2020). Statements like "information has always been a source of power, but it is now increasingly a source of confusion" and references to "a well-defined disease, information overload" became increasingly common at the end of the last century.

None of the pessimistic, even apocalyptic predictions from previous centuries came true. Users, who were then readers of newspapers and books, adapted. Lessons from the past do not automatically apply to the current situation, marked by significantly greater information generation and circulation since the advent of the Internet and smartphones. However, history encourages caution in making judgments and avoiding unverified assumptions about the negative effects of information abundance that have proven unfounded in the past.

Is the overload of information an issue?

Over the past 30 years, the notion of information overload has been contested by various authors, who have described it as a "myth of modern culture" or "painfully familiar and trite-by-overuse," among other critiques. The terms "overload of information" and "over-abundance of information" do not objectively describe the

abundance of information itself but rather how individuals receive it. The prefix "over" implies that the information is excessive. "Overload" and "over-abundance" assume that people are incapable of managing the volume of information, a claim that must be supported by evidence.

In reality, people have consistently adapted to the increasing quantity of information across eras. During the manuscript age, they developed silent reading, punctuation, and the codex format. After the invention of printing, they created indexes, reference books, bibliographies, note-taking, critiques, and reviews. Similarly, people have developed coping strategies for managing the abundance of information in the age of the Internet and of social media. They avoid certain sources of information, filter the information they receive, leave some information unprocessed, and make satisfactory decisions when it is not feasible to fully evaluate all options.

A study concluded that health information similarity and overload could trigger fatigue, leading to information avoidance (Shong et al., 2024). Savolainen observed that "information overload does not seem to exist for many people since they tend to ignore what they do not need or that which is seen as irrelevant. Thus, people may cope with information overload by simply avoiding or ignoring the excessive supply of information" (Savolainen, 2007). Shirky argued that we've had an abundance of information since the advent of the printing press and the problem for lost productivity is not information abundance, but the failure to filter information as it is either published or consumed (Davis, 2011).

The health impact of information overload—or more precisely, the lack of adequate filtering mechanisms—has been studied in relation to mental health, often in professional contexts. It can cause "information anxiety" or "information fatigue

syndrome" and reduce well-being (Bawden, 2020). However, there is no demonstrated impact of excess information or information avoidance strategies on health behaviors. While information avoidance is well-documented, there is no reason to believe it significantly influences health behaviors.

The infodemic as the spread of false information

The etymology of "infodemic," a contraction of "information" and "epidemic," suggests a negative connotation, similar to an epidemic. Even though it is officially defined as "an overabundance of information, some accurate and some not," the metaphor overshadows this definition (Briand et al., 2021). For most users of the term, it aligns with the WHO Director-General's assertion that it is "just as dangerous as a virus."

However, the metaphor of an infodemic is misleading. According to Simon and Camargo, it presupposes "a susceptible public getting 'infected' with information, turning into (unknowing) hosts who not only succumb to it but also unwittingly carry it across to others. (…) Such epidemiological models (…) often posit passive audiences becoming 'infected with information' against their will, thus not only ignoring cognitive mechanisms of information uptake and sharing which counter such claims, but a large body of research that demonstrates audience's active decision-making in what to consume, what to believe and whom to share it with" (Simon et al., 2023).

Not everything is new under the sun

The spread of false information is not new to the COVID-19 pandemic. Just as the sense of information excess is as old as the earliest books, false information has existed for a long time (Freiling et al., 2023). Even before vaccination, the French philosopher Voltaire lamented in 1733 the spread of

misinformation about variation (Voltaire, 1986).

Online "fake news" did not emerge with the COVID-19 pandemic and was proportionally more prevalent during other epidemics and concerning other health issues. A study of tweets and Facebook pages on a variety of health topics, including influenza, cancer, obesity, and allergies in 2019, compared with those about COVID-19 in 2020, showed that the latter contained a higher proportion of links to reliable sites and a lower proportion of links to unreliable sites. For example, links to unreliable sites appeared in 4% of tweets, 1.7% of Facebook pages, and 4.3% of Facebook groups about COVID-19, compared to 9.2%, 4%, and 11.3%, respectively, for other health topics (Broniatowsky et al., 2022). Thus, not only did the circulation of false health information on social media not originate with COVID-19, but it was also proportionally higher before the pandemic.

The Internet mostly contains accurate Information on health

Positive or accurate information constitutes the vast majority of health-related content on social media. For example, a study conducted on tweets mentioning vaccination in 2012 showed that 33% were positive, 54% neutral, and 13% negative. 14% contained medical information, over two-thirds of which were the results of medical research.

This is also true for COVID-19. Most of the information about the disease that is circulating on social media is accurate. A study conducted in early 2020 found that the proportion of posts containing false information about COVID-19 ranged from 0.2% to 14.2% (28.8% on Twitter when including inappropriate humor) (Love et al., 2013). Another study during the same period of peak COVID-19 anxiety revealed that when tweets included links to websites, those sites were ten times more likely to belong to health institutions or media outlets than to individuals spreading false information (Singh et al., 2020). Researchers who analyzed 300 million English-language tweets about COVID-19 concluded that these tweets contained "a relatively low prevalence of low-credibility information compared to the entirety of mainstream news." Similarly, an analysis of posts about COVID-19 across five social media platforms estimated that "the number of posts produced by questionable sources represents a small fraction of posts produced by reliable ones" on Facebook, Twitter, and Reddit (Cinelli et al., 2020).

An analysis of 38 million articles published online by traditional English-language media worldwide about COVID-19 showed that 2.9% of them disseminated, amplified, or merely mentioned false information (Evanega et al., 2020).

In addition to the fact that false information is significantly less prevalent than accurate information, social media algorithms create echo chambers. Enthusiasts of false information are more likely to see additional false content, reinforcing their opinions, than individuals accustomed to seeking accurate information.

Belief in false information

The real concern in terms of public health is not the circulation of false information but rather the public's potential belief in this false information and, more importantly, its possible impact on health behaviors.

A study published in 2019 on public opinions about fake news across all domains, including politics, concluded that "perhaps surprisingly, we find that laypeople—on average—are quite good at distinguishing between lower- and higher-quality sources" (Pennycook et al., 2019). This finding holds true in the health domain as well.

Table 1. Proportion that think each false coronavirus vaccine claim is true (Nielsen et al., 2021).								
Coronavirus vaccines…	UK	Spain	Brazil	Argentina	South Korea	Japan	Germany	US
…can alter your DNA	5%	9%	10%	12%	10%	11%	16%	17%
…cause infertility	3%	4%	4%	6%	5%	8%	9%	12%
…contain pork	2%	4%	3%	3%	7%	5%	3%	9%
…cause cancer	2%	3%	3%	2%	5%	4%	8%	10%
…contain aluminium	3%	4%	4%	5%	6%	5%	9%	11%

In the context of the interest generated by the "infodemic," many studies claim that false information impacts people's intention to get vaccinated against COVID-19. Some of these studies recruited volunteers through advertisements on social media, who then filled out online forms. This recruitment method is biased, as anti-vaccination activists often display militant behavior, making them more likely than other Internet users to express their opinions by completing such questionnaires. Other studies exposed equivalent panels to either accurate information (control group) or false information (treatment group) and then assessed their intention to get vaccinated, which was consistently lower in the treatment group (Loomba et al., 2021). However, as we have seen, individuals in real life are exposed to far more accurate than false information.

A 2021 study conducted in eight countries by the University of Oxford and Reuters with representative population panels showed that belief in major false claims about COVID-19 vaccination is low or extremely low (Table 1) (Nielsen et al., 2021).

What is the impact of false information on behaviors?

It is well known that knowledge and intentions alone do not predict health behaviors. So what is the current understanding of the impact of false information on these behaviors?

As Freiling et al. wrote, "are there reliable bodies of evidence that demonstrate that misinformation among public audiences is (a) more widespread now than it has been in the past and (b) causally rather than correlationally linked to behavioral choices or attitudes that might be harmful to societal or individual well-being? The answer to both questions is 'no'" (Freiling et al., 2023).

Studies proving the causality of exposure to false information on behaviors would require comparing a population exposed to false information with one that is not, under identical social circumstances —a virtually impossible setup. However, disproving the hypothesis that false information significantly impacts behaviors is simpler, as it suffices to demonstrate a lack of correlation.

De Saint Laurent et al., who studied the impact of false information on the intention to get vaccinated, concluded that "exposure to false information about the vaccines had little effect on participants' intentions to get vaccinated, even when multiple exposures led them to believe the headlines to be more accurate" (de Saint Laurent et al., 2022). Similarly, Albarracin et al. noted that "even

these dramatic beliefs [conspiracy theories] exert negligible effects on behavior" (Albarracin et al., 2024).

Some studies have shown a positive correlation between social media use and vaccination. In the United States, where adult flu vaccination coverage is 41%, Twitter and Facebook users are more likely to be vaccinated than non-users (Ahmed et al., 2018). In Pakistan, social media use is associated with a 61% increase in the likelihood of getting vaccinated against COVID-19 (Ali Khan et al., 2023).

We compared the intention to get vaccinated against COVID-19 in 2020 with the actual vaccination rates across 46 countries (Seytre, 2025). Then, we investigated a potential association between the transition from intention to vaccination and exposure to false information. The intention-vaccination evolution showed no correlation with exposure to false information: vaccination rates were much higher than intentions in some of the most exposed countries, while vaccination was lower than intentions in countries with minimal exposure. Moreover, vaccination rates within each country were not correlated with exposure to false information; they were high in highly exposed countries and low in minimally exposed ones.

Could we really manage the infodemic?

It is impossible to do anything against infodemic with the original and less common meaning of an abundance of information. The amount of information will likely continue to increase as it has since the invention of writing. Its effects can be commented on, but its growth cannot be stopped.

Should and can the infodemic, commonly understood as the spread of false information, be effectively combated?

"Debunking" is often cited as a strategy, but no examples of its application at the population level—beyond interpersonal discussions between health agents and individuals or local communities—have been documented. Reiterating a rumor in an attempt to refute it may strengthen the rumor through what is called the illusory truth effect and may backfire, although the backfire effect of debunking is questioned by some authors (Begg et al., 1992; Lewandowsky et al., 2012; Swire-Thompson et al., 2020). Basic caution advises against this practice.

Recommendations to combat the infodemic often fall into two categories.

Social media are urged to remove accounts that spread harmful false health information and adjust their algorithms. Research from the Reuters Institute and Oxford University showed that in early 2020, social media platforms removed a majority of posts containing false information about COVID-19 or flagged them with warnings (Brennen et al., 2020). For example, posts by the former Brazilian President Jair Bolsonaro were deleted. However, some misleading posts remained online without warnings—59% on Twitter, 27% on YouTube, and 24% on Facebook. Five years later, after the takeover of Twitter by Elon Musk and recent moves by other social media owners, it appears increasingly unrealistic to expect meaningful self-regulation from social media networks. In addition to ideological motivations, algorithms are key drivers of user retention and advertising revenue, making it highly unlikely that platforms will voluntarily modify them.

Another challenge in limiting the spread of false information is the nature of some of its promoters. The study of over 38 million pieces of content published by traditional English-language media worldwide between January 1 and May 26, 2020, revealed that 2.9% of the COVID-19 conversation disseminated, amplified, or reported on misinformation (Evanega et al., 2020).**Error!**

Bookmark not defined. Media mentions of President Trump accounted for 37% of the overall "misinformation conversation." Other presidents, health ministers, and political leaders across continents have also propagated false and harmful public health ideas. In 2025, the U.S. Health and Human Services Secretary Robert F. Kennedy promotes disinformation on vaccines. Preventing such figures from speaking out is unfeasible.

Thus, the ability to prevent the spread of false information is very limited.

A second category of recommendations to fight misinformation are aimed at people in charge of communication in governments and international organizations such as the WHO or UNICEF. We can summarize them as: identify circulating falsehoods and assess their impact on the population; disseminate clear, scientifically grounded, and community-appropriate messages; collaborate with media outlets and other partners; enhance public science and health literacy; build trust with communities; raise preventive public awareness about unreliable sources and false information (commonly called "inoculation" or "pre-bunking"); and continue researching the impact and management of false information (Tangcharoensathien et al., 2020; Briand et al., 2021). These recommendations essentially align with best practices in public health communication that have been applied —or should have been applied— since the concept of public health emerged. That is to say, there appears to be no apparent need for any specific program regarding the infodemic.

Conclusion

The metaphor of "infodemic" gives rise to two interpretations.

In its original sense, an infodemic represents an overabundance of information that individuals supposedly cannot manage. This sense of excess has been raised following every technological revolution in reproduction methods, from the first books onward, usually by intellectuals claiming that people's analytical capabilities were overwhelmed. The reality of an overabundance with negative effects has never been demonstrated. In every era, humanity has developed strategies to manage the new quantity of information, continuing to do so since the advent of the Internet.

In its more common sense, an infodemic describes the spread of false information online and on social media, resembling an epidemic and, for some, equally dangerous. Health-related rumors and false information did not originate in the digital age. The Internet facilitates their spread but cannot be blamed for their creation. The health information found online and shared on social media is overwhelmingly accurate, and Internet users are far more exposed to correct information than to falsehoods.

Studies on the impact of false health information, particularly regarding COVID-19, show that its influence on beliefs is limited and that there is no correlation between exposure to false information and behaviors such as COVID-19 vaccination.

Specific efforts to combat the "infodemic" may prove ineffective and represent a misallocation of resources and energy. The only effective approach to combating false information is to apply best practices in public health communication: developing public health communication strategies based on population knowledge and perceptions, enhancing public understanding, and

fostering trust through honest communication. There is nothing new under the sun.

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