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# Understanding and Addressing Medical Misinformation and Disinformation: The Pharmacist's Role

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Given the ease of access to online information, it is common for patients to seek diagnoses, treatments, and medical advice through the internet. This practice is not inherently destructive, as it can help patients be more involved in their healthcare and can promote conversations with healthcare professionals; however, issues arise because mis/disinformation are widespread and can be difficult to distinguish from high-quality information.<sup>1</sup> Quality information may be thought of as that which is endorsed by healthcare professionals and reliable evidence. Current practices in the United States healthcare system revolve around evidence-based medicine, where health recommendations are supported by randomized trials, case studies, meta-analyses, and expert opinions. In contrast to reliable health information, misinformation refers to the presentation of health-related opinions as facts, despite lack of evidence and agreement from the scientific community. It may take the form of misleading hyperbole drawn from emerging research; anecdotal evidence without statistical or empirical significance; and/or false information and conspiracy theories that perpetuate distrust. This includes information that was initially thought to be true but was later corrected or withdrawn.<sup>2</sup> Sometimes, accurate data

## Abstract

Given the ease of access to online information, it is common for patients to seek diagnoses, treatments, and medical advice through the internet. However, this practice may jeopardize the pharmacist-patient relationship due to the rise of the spread of healthcare-related mis- and disinformation. Here, we investigate the propagation of, who is most vulnerable to, and what approaches pharmacists can take to address health-related mis/disinformation.

may be misinterpreted to form a false narrative; for instance, a national analysis of COVID-19 inpatient mortality in 2020 found that there was a mortality rate of 13.2% in hospitalized COVID-19 patients, and that proportion increased to 55.9% for COVID-19 patients who had been put on a ventilator.<sup>3</sup> This statistic could be mistakenly interpreted as ventilators being the cause of increased patient mortality, though the higher mortality rate is actually due to the fact that patients with more severe, life-threatening infections are more likely to require mechanical ventilation. The spreading of misinformation is unintentional, as even the deliverer of the misinformation believes it to be true. In contrast, disinformation is the purposeful spreading of information that is known to be false to support a personal claim and/or deliberately mislead the public.<sup>3</sup>

There are a variety of reasons that people spread unjustified health claims, and they are largely the same reasons that a person might be susceptible to accepting these health claims as truth. Some individuals might have an underlying distrust of the United States healthcare system, due to its history of mistreatment of minority groups; others, which might include celebrities or politicians, might spread unfounded health claims for personal or political gain.<sup>4</sup> The spread of mis/disinformation has been amplified by social media outlets such as YouTube, Twitter, and TikTok, especially following the COVID-19 pandemic that began in March 2020. As public health information and recommendations were politicized and changed frequently, many Americans grew hesitant to trust professional health organizations such as the Centers for Disease Control (CDC)

and the World Health Organization (WHO).<sup>4</sup> Demographic, socio-economic, and psychological vulnerabilities influence how likely an individual is to believe and spread unjustified claims.<sup>5</sup> Therefore, it is important that each strategy for correcting mis/disinformation accounts for the extent and nature of such information rather than blaming an individual who might be vulnerable. Furthermore, healthcare professionals should recognize vulnerabilities among their patients, as well as themselves, and approach conversations with empathy, open-mindedness, and reliable information to facilitate constructive dialogue and a recognition of patient perspectives.

Social media, personal beliefs, and/or propagation of false health information can have a real-world effect on health risks. One survey evaluated the relationship between the amount of COVID-19-related conspiracy theories one believed and one's risk of contracting COVID-19. In this study, Hughes et. al. found a positive correlation between conspiracy theory belief and having lower compliance to pandemic regulations, increasing the risk for contracting COVID-19.<sup>6</sup> Furthermore, people who are susceptible to such conspiracy theories might have a greater need for intervention by healthcare providers and pharmacists. Numerous articles have focused on the identification of misinformation, but there are still gaps in the research about how to most effectively correct health misconceptions. Pharmacists are the most easily accessible healthcare providers and therefore have an opportunity to improve health literacy among the public. Even so, efforts made by public health ambassadors such as pharmacists may be compromised if they lack the techniques and strategies to effectively combat mis/disinformation.<sup>2</sup> Pharmacists and student pharmacists should understand mis/disinformation, as well as be able to address it at individual and systemic levels through dialogue with patients, novel routes of communication, and improved access to reliable information.

## Spreading of Misinformation and Disinformation

### Exploring Dissemination Mechanisms

Before proposing how healthcare professionals such as pharmacists can

combat the mis/disinformation crisis, we must examine how it has become such a large issue, and, more specifically, the methodologies that are used to spread it. The transmission of inaccurate information depends on various factors, including personal belief systems, education background, and previous experiences with the healthcare system.<sup>7</sup> A 2021 study conducted in China with around 22,700 participants further examined these external factors and found positive relationships between the acceptance of misinformation and increased health-related anxiety, predisposed beliefs favoring misinformation, and exposure to the same misinformation. In addition, certain demographic differences, including age, socioeconomic class, and level of education, were negatively associated with misinformed acceptance. For example, people of a lower socioeconomic status showed greater acceptance of misinformation. The United States' population shares similar susceptibility with China, with varying economic classes, education standards, and diverse belief systems. A study was done to investigate how virtual forums utilize other methods of content-phrasing to propagate inaccurate medical information. Examples identified were: 1) misleading content application or creating false context, 2) satire, 3) fabrication of information, 4) impersonation of reputable sources, 5) distorting genuine information, or 6) explicitly deceiving readers through mismatching article titles and content.<sup>4</sup> These methods for distributing disinformation impact patients' ability to make safe, autonomous decisions regarding their health and can make it even more difficult for patients to sift through valid or invalid information online.

The concept of misinformation or disinformation stemming from information initially believed to be true but later corrected is key to understanding another method for perpetuating incorrect medical information: the continued influence effect (CIE). CIE explains how a memory containing inaccurate information continues to have influence over a person's reasoning.<sup>2</sup> This can generally be explained by a person's need for developing their own mental map of events, resulting in an inability to recall information from the correct source; or recalling false information more frequently, and therefore making it more familiar and

believable. Considering the long-term impact CIE has on population reasoning, particularly when making decisions about health, it is important to recognize its significance and consider how each unsubstantiated statement, video, article, or other media can alter patients' perspectives.

Finally, it is important to consider the role of infodemics in the spread of misinformation and discouraging patients from seeking reliable health information. Infodemics are events where "too much information [is published] including false or misleading information in digital and physical environments during a disease outbreak" or health emergency.<sup>8</sup> As seen during the COVID-19 pandemic, updates on disease spread and pathology changed on a nearly daily basis, with publications from a multitude of sources with varying credibility. Being able to distinguish between accurate and false information was difficult, even for very health-literate readers. To further investigate the impacts of infodemics, Nascimento et.al. conducted a systematic review that showed infodemics negatively impacted patients' willingness to follow health recommendations on medical treatments or during public health emergencies, which was amplified by misinformation on media platforms.<sup>9</sup>

### Propagators of Information

Misinformation seems ubiquitous today—so where is it coming from? Many articles investigating this question concluded that social media platforms such as YouTube or TikTok and public discourse from celebrities or political figures were the primary sources of misinformation.<sup>10-13</sup> Research on misinformation has showed social media platforms having a greater role in the spread of misinformation due to its rapid updates and wide availability to various populations. One example of misinformation propagation in social media can be found in a YouTube media frenzy over the self-administration of Fenbendazole and its effects on cancer. Research by Yoon et. al. showed that it wasn't a singular YouTube post that led to the movement in Fenbendazole use, but rather the consistent video uploads by multiple people advocating for its efficacy.<sup>10</sup> Moreover, as the number of social media posts about inaccurate medical knowledge increases, the greater an influence the

falsified information has on patients using these forums. In addition, this study showed how YouTube's video recommendation system was unlikely to connect viewers with accurate medical information if they had already engaged with material promoting self-administration. This was an example of social media platforms' pre-programmed recommendations that can lead users to more content containing health fallacies.

Another example of social media's impact on spreading poor-quality information can be seen in its ability to generate "echo chambers." Echo chambers are illusory spaces where individuals seek information that reinforces their own polarized views.<sup>14</sup> Within these internet environments, there is a strong separation between contradicting medical recommendations, leading patients down a path of affirming what they already believe versus learning new, scientifically sound treatment options.

The use of social media has become a daily habit for a vast majority of the global population and poses both benefits and risks to the spread of health information. It creates an environment for falsified beliefs to thrive through spreading disinformation and allowing mass publication of misinformation, leading to an accumulation of unfounded sources that are difficult to separate from founded ones.<sup>15</sup> As healthcare professionals, it is important for us to keep in mind the methods used to propagate information and the reasons why mis/disinformation is accepted in order to properly address it.

### **Impact on Pharmacy Practice**

Primary pharmacist responsibilities in any healthcare setting include managing disease states and medication therapy, monitoring outcomes, administering vaccinations, and patient education on all these services. However, the delivery of pharmacist services can be severely impacted by the spread of inaccurate information. Despite pharmacist education on the importance of adherence, patients may not comply with the prescribed regimen due to unfounded fears; may self-medicate; or may seek alternative, harmful, non-evidence-based therapy. Patients may also hinder the monitoring of outcomes by misinterpreting symptoms and side effects, making it more challenging for pharmacists to assess critical factors in medication safety and

efficacy. Furthermore, as the spread of mis/disinformation erodes trust between patients and healthcare professionals, pharmacist-patient relationships may become strained. Public health initiatives such as vaccination campaigns may also face significant resistance.

### **Vulnerable Populations**

Mis/disinformation is inherently compelling, and innate vulnerabilities leave us all at risk of being misled. Misinformation is more than simple ignorance; it is driven by social and psychological factors. Awareness of underlying vulnerabilities can help pharmacists and other healthcare workers recognize their own gaps in understanding, and approach misinformed patients with empathy.

As previously noted, the infodemic phenomenon complicates public reaction in times of emergency, and it increases public anxiety.<sup>8</sup> Anxious patients turn to the internet in search of information to ease their worries, but when confronted with information that intensifies their anxiety—factual or not—they dig even deeper. This experience is called "Cyberchondria."<sup>16</sup> Most people, regardless of their health literacy level, tend to use poor-quality sources and unreliable websites when seeking health information online.<sup>14,17</sup> In fact, people generally engage more with articles of low scientific quality compared to those of higher quality, as the former are often easier to find and access. Thus, reliable articles compete with clickbait designed to prompt engagement and an emotional response from readers.<sup>11</sup>

As people sift through online information, confirmation bias drives them towards information that confirms their prior beliefs and knowledge, and repeated exposure makes that information more salient in the readers' minds. As previously described, increased acceptance of misinformation has been found among those with health-related anxiety, beliefs aligned with misinformation, and repeated exposure to the same misinformation.<sup>7</sup> Nevertheless, people tend to assume that others are more heavily influenced by media and misinformation than they are themselves, a phenomenon known as the "third-person effect."<sup>18</sup> Individuals are likely to underestimate their own level of

misperception and exaggerate the extent to which others are misinformed.

While several psychological phenomena render all people vulnerable to mis/disinformation, certain populations may be more vulnerable for other reasons. Seo et al. identify low-income, African American older adults as a particularly vulnerable group, while Basch et al. suggest that young people may be increasingly susceptible to inaccuracies; however, these groups are sensitive for different underlying reasons.<sup>12,20</sup> On one hand, young people are significantly more reliant on social media for news and health information, making them a target.<sup>15</sup> A 2022 survey conducted by the Pew Research Center found that 50% of adults younger than 30 "have some or a lot of trust in the information they get from social media sites."<sup>21</sup> On the other hand, the intersection of age, racial disparities, and financial hardship contributes to the limited internet access and lower rates of digital literacy among low-income, African American older adults. More generally, Seo et al. note that older age and lower socio-economic status are each associated with lower rates of internet use and access, irrespective of race.<sup>20</sup> With limited access to reliable sources of information and/or fact-checking resources online, low-income adults, particularly older adults, are less equipped to assess information credibility. Additionally, many African Americans, Indigenous communities, and other marginalized groups have experienced abuses and trauma within medical and governmental systems and thus may be less trusting of the medical establishment and government entities as reliable sources of information.<sup>4</sup>

Mis/disinformation exploits the inherent psychological vulnerabilities of confirmation bias, the third-person effect, and health anxiety to produce false beliefs about health information. Poor internet literacy may also contribute to individuals' vulnerabilities, given that many people rely on low-quality websites and engage minimally with quality scientific information online. Over-reliance on social media for health and news information can leave young people particularly vulnerable to mis/disinformation on these platforms, but lack of access to the internet among low-income, elderly, and marginalized populations makes it difficult to reach

these groups to address and combat false information. To successfully address mis/disinformation among patients, pharmacists should approach patients with knowledge of the psychological phenomena that make them inherently persuasive as well as an empathetic understanding of the social factors influencing access to and comprehension of reliable scientific information. As a trusted professional, a pharmacist is uniquely situated to work with patients to come to an accurate understanding of their health literacy

## Pharmacist Relevance in Addressing Misinformation and Disinformation

According to the American Society of Health-System Pharmacists, pharmacists have an obligation to “participate in global, national, state, regional, and institutional efforts to promote public health.”<sup>22</sup> Pharmacies have already begun efforts to improve public health in various ways, including tobacco cessation programs, appropriate opioid use counseling, and administering vaccinations. These services can be highlighted or adjusted based on the needs of the community; for example, as the use of e-cigarettes grows among adolescents, pharmacies can begin tailoring tobacco cessation programs towards overall nicotine cessation. Because the spread of mis/disinformation grows on the internet, it is only natural that pharmacists begin addressing this problem to promote public health.

Given the factors that can make an individual vulnerable to believing mis/disinformation, pharmacists might ask how to best intervene and correct false conceptions. A study conducted by McGinnes and Ward found that trustworthiness of a source trumped the expertise of the source in the ability to persuade in an argument.<sup>23</sup> This means that even though a professional might be an expert on a topic, an element of trust is crucial for changing someone's mind. In general, the public trusts healthcare providers more than non-medical scientists to provide accurate health information, with pharmacists being among the top three most trusted healthcare professionals.<sup>11</sup> Coupled with their abundance and accessibility, pharmacists are in a unique

position to intervene in the spread of mis/disinformation.

While pharmacists are equipped with clinical knowledge, patient counseling skills, accessibility, and public trust to combat misinformation, there are still barriers to be considered. Hermansyah et. al. asked 41 pharmacists about health misinformation and identified four factors that influence the willingness of a pharmacist to correct misinformation. The factors were: pharmacist motivation, patient-pharmacist relationship, opportunities to respond, and ability to respond.<sup>13</sup> Pharmacist motivation refers to why the pharmacist chooses to correct some pieces of misinformation but not others, which can become a barrier when discussing sensitive topics that may give rise to conflict. The patient-pharmacist relationship is a crucial factor because, as mentioned, trustworthiness is often more important than expertise in individuals' minds. The opportunity and ability to respond to mis/disinformation are additional obstacles, with time being the largest barrier.

## Systemic Solutions

Some evidence indicates that interventions from official governmental bodies, such as the CDC, are effective in correcting health misconceptions. This aligns with real-world examples in other countries such as Japan, where one tweet from Tokyo City Hall significantly reduced the rumor that there would be chemical rain after an earthquake.<sup>14</sup> When presented with clear, evidence-based corrections, patients can reduce their belief in misinformation.<sup>24</sup> Given how powerful the effects of an organizational effort can be, healthcare institutions have a responsibility to disseminate precise and trustworthy health information via transparent communication networks. Additionally, they should train healthcare professionals to leverage resources for bolstering public trust.

Some of the barriers to communicating health information are a lack of communication training and a lack of standardization of health literacy among healthcare staff. Currently, there is a fraught relationship between health experts and the media, with many health experts believing the media reports inaccurate information and many in the media believing health experts lack communication skills.<sup>14</sup> One

solution is to have health professionals build a positive relationship with media outlets, and having journalists help train healthcare workers in making their message more palatable to a wider audience, while health professionals help journalists with discerning accurate sources of information. In addition, a good relationship between the media and health experts creates a situation where the public's attention is called toward a public health crisis. An example of this is the 1980s AIDS crisis where, with the help of the media, accurate information about the source and transmission of AIDS was disseminated nationwide and allowed for a dramatic decrease in the spread of HIV. By the end of the 1980s, nearly all adults were aware of precautionary steps to avoid infection.<sup>25</sup> Not only did this collaboration result in millions of lives saved at the time, but it also continues to help keep people safe to this day.

Another solution is to improve the health literacy of pharmacy staff, as literacy can vary across organizations and jobs. The issue of uniformity can be addressed by having continuing education seminars for staff that address questions about medications and conditions observed in the patient population in a more patient-friendly manner. This could also be integrated into existing staff training. This will help pharmacists, pharmacy technicians, and student pharmacists translate medical jargon into patient-friendly terms to help compensate for patients' varying degrees of health literacy. In doing so, these professionals will not only increase quality of care by helping their patients achieve knowledge required for autonomous decisions, but also protect them from mis/disinformation. Additionally, educating patients makes it easier for them to distinguish between reliable and unreliable information on their own.

To better communicate information, part of the challenge is to know the information inside and out. A team of researchers in Germany proposed a general framework for how to design and implement a training program for institutions.<sup>26</sup> These training programs will serve to improve and standardize the health literacy among staff in an institution. This framework can be modified depending on the needs of each health system. These programs are divided into three phases:



development, implementation, and evaluation. In the development phase, leadership should gather 6 to 8 people from each department to represent their group and interview these representatives with a focus on barriers or facilitators of health literacy. Collaboration with these departments to develop participatory workshops to increase health literacy will provide workers with the opportunity to practice such skills and retain them. In the implementation phase, trainers should slowly integrate these workshops and adjust them based on feedback.<sup>26</sup> The pace needed for this may vary among organizations. For the evaluation phase, longitudinal surveys for patients and staff should be used to evaluate the effectiveness of these workshops. Using this data, efforts can be made to improve workshops in future applications.

Another issue in communicating health information to the public is the waning trust between healthcare organizations and patients. While trust in organizations is steadily decreasing, trust in healthcare workers remains strong due to more personal individual interactions.<sup>14</sup> Many videos and posts about health on social media are personal, anecdotal stories or questionably sourced think pieces. An increase in evidence-based online content by health experts would be beneficial for the public.<sup>27</sup> Organizations can give these professionals a platform, such as YouTube or a blog, to share their expertise. An organization could provide a platform for pharmacists to answer patient questions or create educational videos on medications, which can reach a wider audience. In addition to communication training, additional social media training could be given. This could include standardized guidelines on content and how to peer-review information. Similar to the framework for training, these guidelines will depend on the values of the organization. By giving these professionals a platform, they will be able to educate more patients and protect them from the consequences of mis/disinformation.

With the collective efforts of an organization, it will be easier to combat the spread of mis/disinformation on a larger scale due to their access to resources and available workforce. A staff of healthcare workers trained in translating health

topics for mass consumption will not only help improve health outcomes to allow patients to make informed decisions but also increase organizational trust by demonstrating organization-wide competence. Furthermore, making patients more receptive to correction and giving healthcare workers a platform to reach more people could help minimize the effects of mis/disinformation.

## Individual Solutions

Addressing health mis/disinformation will require the coordinated efforts of health organizations, media organizations, technology platforms, and educators. However, there is an urgent need for the efforts and expertise of individual healthcare professionals to address the issue through their day-to-day interactions with patients. Pharmacists have a unique position to proactively engage with patients and influence their exposure to and acceptance of evidence-based medical information. Guidance provided by the U.S. Surgeon General's advisory on building a health information environment advises that clinicians begin by taking the time to learn the patient's knowledge and values with empathy and understanding, then "correct their misinformation in personalized ways."<sup>28</sup> The following are some helpful recommendations for pharmacists to assist in addressing mis/disinformation in practice, via online platforms, and through engagement with other healthcare professionals.

### *Understanding why misinformation and disinformation are appealing and using that lens to guide motivational interviewing with patients.*

An important element of the appeal of mis/disinformation is that it often originates from truth that is distorted to fill a complicated information gap. Therefore, the motivational interviewing style of communication should guide patients in critically analyzing medical information presented to them while honoring their autonomy. Motivational interviewing is a communication method that emphasizes empathy and collaboration between the healthcare professional and patient. It focuses on analyzing components of the patient's perspective and tailoring the response to the patient's specific needs in

navigating medical information. This tool is powerful in addressing mis/disinformation as it fosters a supportive environment that rebuilds the diminishing trust created by propagators of such information.<sup>29</sup> To effectively establish rapport with patients, pharmacists should not dismiss inaccuracies as a whole, but break down the presented claim and extract the correct idea from which it originated. This will guide patients in understanding the flawed reasoning that leads to mis/disinformation and appeals to patients' health-related anxiety and pre-existing beliefs through negative emotional argument.<sup>30,1</sup> Patients are likely to accept this incorrect information as true to alleviate their worries and feel a greater sense of autonomy surrounding their health. It is a pharmacist's professional responsibility to use this understanding to reassure patients and provide advice that accounts for patients' concerns, lived experiences, and diverse needs. Finally, patients tend to adopt mis/disinformation that promises a rapid cure or warns of immense health dangers because such promises are portrayed as imminent, while the effects of complying with evidence-based medicine appear insufficient and irrelevant in comparison. It is important to highlight to patients the difference between nuanced yet credible information based on scientific consensus, and bold statements designed with clever marketing by non-credible sources.

### *Providing a framework for patients to recognize misinformation and disinformation to improve health literacy.<sup>30</sup>*

In addition to addressing mis/disinformation during consultations with patients, pharmacists can provide them with guidance for evaluating the accuracy of health information. Patients should be advised to begin by critically considering the source. They should evaluate whether the creator or author has expertise in the topic through their education, work experience, or credentials and if they provide scientific sources to support their claims. Furthermore, patients should be warned against substituting information provided by "expert patients" for professional advice, as it often presents personal, negative perceptions that induce mistrust in healthcare institutions.<sup>1</sup>

After a source is examined, patients

should be advised to consider whether the medical information is relying on scientific data from a single research article or analyzing a comprehensive body of evidence. Patients should be alerted to the use of one medical journal article in online content as evidence since there is a hierarchy to the quality of research articles and scientific consensus is based on a compilation of peer-reviewed work, not just one. Additionally, they should consider how corrections in science are made based on emerging evidence with statistical significance and incorporated into medical protocols to improve the quality of care provided to patients.

Finally, the content of health information can be evaluated by considering whether it is contradictory to what is advised by scientific experts and medical organizations. Patients should be informed to avoid online content that promotes a medical treatment, diet, or cure that is presented as a simple solution to a complex health problem. Accurate medical information does not contain “miracle solutions” or “alarmist” language; rather, it informs of both the benefits and potential risks of the proposed treatment.<sup>31</sup> They should also critically question information that relies on evoking emotional responses, understanding that it is likely fear-based marketing. Lastly, if flaws are found pertaining to the source of information, evidence, or logic, patients should seek alternative verification to the presented information. In summary, pharmacists can advise patients to evaluate the following elements to determine information’s credibility: source, author credentials, whether it stands alone or with scientific consensus, and whether it is consistent with current expert advice.

After utilizing the aforementioned strategies, if patients express distrust of scientific experts and medical organizations, pharmacists should still encourage critical thinking and source evaluation, understanding that trust is built over time.

### **Providing patients with medically accurate alternative online sources and using social media platforms.**

Many individuals use low-quality websites for health information regardless of their health literacy.<sup>1</sup> Pharmacists can reduce patients’ exposure to online mis-

disinformation by providing patients with links to approved online alternatives. Alternative sources should contain terminology that is friendly for a fifth grade reading level, which is the average Medicare patient reading level;<sup>32</sup> utilize engaging materials; and be easy to share with members of their community. Another method to reduce patients’ need for online medical advice is to become a reference through online social media networks. Misdisinformation is more prevalent on social media than accurate information, with narratives that focus on fear and mistrust in academic and medical institutions in regards to topics such as vaccines, alternative treatments, and medication safety.<sup>15</sup> Pharmacists can dismantle inappropriate health news and disseminate accurate information on social media to promote health literacy and combat the infodemic.<sup>33</sup> The internet can also be used as a collaborative tool with other healthcare professionals to create reliable content for patients.

## **Conclusion**

The unprecedented spread of misdisinformation has been impacting the health of individuals and communities, sowing distrust in healthcare institutions and professionals, and hindering public health efforts. It is critical for pharmacists to be ready to engage in systemic and individual solutions to assist patients in navigating this environment. Pharmacists hold a unique position as accessible healthcare professionals to address misdisinformation with patients with methods that account for their diverse concerns and experiences.<sup>34</sup> This grassroots approach, combined with involvement in organizational efforts, can be a powerful force in curbing misdisinformation and promoting patient resilience against it.

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