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COMMENTARY

The pharmacist's active role in combating COVID-19 medication misinformation

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ABSTRACT

Pharmacists listen to and dispel medication misinformation daily. Because of their accessibility, pharmacists have the opportunity during pharmacist-patient interactions to begin a dialogue with their patients and provide critical education to improve patient safety and public health. Current examples of pharmacists intervening with medication misinformation include addressing the antivaccination community, educating on the safety of generic drugs, and using evidence-based medicine for antimicrobial stewardship. However, combating medication misinformation in pharmacy practice with patients takes on many forms and can pose a number of challenges. Most recently during the coronavirus disease 2019 (COVID-19) pandemic, a concurrent infodemic has led to claims of pharmacotherapeutic superiority and efficacy unsubstantiated by scientific evidence. Misinformation and partisan politics have also created a distrust in COVID-19 vaccine development. In addition, rogue Internet pharmacies and companies have marketed new and unverified COVID-19 treatments and tests. Pharmacists must actively combat these instances of medication misinformation and educate their patients on how not to fall victim to convincing marketing and misinformation schemes. Pharmacists can help patients recognize misinformation by vetting sources of information and communicating how negative emotional information circulates. In addition, pharmacists combat misinformation with patients by providing accurate alternative explanations in patient-friendly language. Although it is easier to stay silent and let misinformation circulate, pharmacists must work with their health care team members to actively reject misinformation pertaining to medications, COVID-19 pharmacotherapy and vaccinations, and in any future public health crisis.

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What is an infodemic?

The coronavirus disease 2019 (COVID-19) pandemic has introduced the world to unprecedented challenges, and scientists have sounded the alarm in efforts to prioritize public health. Concurrently, a second and insidious global-scale event has emerged; the 2020 epidemic of misinformation. This infodemic, a term coined by the World Health Organization (WHO), refers to the overabundance of information including

the widespread dissemination of accessible misinformation.¹ Taking advantage of mass uncertainty, anxiety, and political divisiveness, infodemics undermine credible science and erode trust in public health.¹ WHO recently convened numerous experts in policy and science for its first Infodemiology Conference to discuss the global impacts of misinformation during the COVID-19 pandemic.^{1,2} There, it was determined that although infodemics cannot be eliminated, they can be managed.²

In 1918, the influenza pandemic infected nearly 500 million people and killed at least 50 million people.³ This influenza pandemic is often referred to as the Spanish flu, but this misnomer demonstrates the ubiquity of misinformation at that time. Because Spain was a neutral party during World War I, they were free to report influenza cases in their newspapers. Many other countries active in war enforced media blackouts, and little influenza-related information including the extent of the pandemic was reported. Although the origin of the 1918 influenza pandemic is contested, one of the first documented

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Key Points**Background:**

- Pharmacists dispel medication myths in pharmacy practice.
- The concurrent coronavirus disease 2019 (COVID-19) pandemic and infodemic have amplified the availability of medication misinformation.

Findings:

- Pharmacists must take an active role in combating medication misinformation in their roles and as it pertains to COVID-19.
- Actively combating misinformation as a pharmacist is a professional responsibility.
- Pharmacists must work with patients and interdisciplinary colleagues to combat medical and medication misinformation during COVID-19 and in future public health crises.

cases was discovered not in Spain but in a crowded army camp on American soil.³ In addition, the scope and severity of the 1918 influenza pandemic were underplayed in the media and by various governments. A second wave of influenza later that year enhanced by an underinformed and misinformed public meant scores of lives, some possibly preventable, lost.⁴ Although infodemics are not new, when paired with a large-scale public health crisis, dire consequences arise.

Dispelling myths and misinformation in pharmacy practice

Pharmacists listen to and dispel medication misinformation daily. Patients frequently report myths and misinformation about influenza vaccines and dietary supplements to their community pharmacists.^{5,6} Pharmacists during these pharmacist-patient interactions have the opportunity to begin a dialogue with their patients and provide critical education to improve patient safety and public health.

One recent and important example is that of the anti-vaccination and vaccine-hesitant communities. As discussions around vaccination and autism are reamplified, pharmacists have the opportunity to reeducate their patients and debunk incorrect scientific conclusions.⁷ Pharmacists must connect patients with reliable sources of information and make professional recommendations to ensure the patient's health is prioritized.⁷

Pharmacists also hold a responsibility in educating patients about the safety of generic drugs within the U.S. drug supply chain and notifying patients of any related medication recalls or concerns.⁸ Current events of nitrosamine-related impurities in several legend and over-the-counter medications have brought questions about the safety of specific generic medications. Pharmacists are at the front line to respond to medication recalls and address those patient concerns.⁹ Despite Internet misinformation about generic drug safety and constant news coverage around medication recalls, pharmacists

are still the best sources for medication safety-related information, and their expertise can ensure patients receive safe, effective, and affordable medications.

Pharmacists also discuss evidence-based medicine with prescribers. Working together, pharmacists and prescribers can practice antimicrobial stewardship in the inpatient and outpatient settings. Because the use of antibiotics is often requested by patients and proper testing to rule out bacterial infections in cases that are likely viral are not done, inappropriate outpatient antibiotic prescribing and use continues.¹⁰ Pharmacists play a role in managing inappropriate antibiotic use through antimicrobial stewardship programs, conversing with prescribers and patients, dispelling preconceived notions about the harmlessness of unnecessary antibiotics, and offering additional point-of-care testing to promote appropriate medication use.¹¹⁻¹³

A more challenging misinformation education space for pharmacists occurs when patients inquire about treatments that lack sufficient data to make an informed recommendation. The field of dietary supplements, herbals, and vitamins, for example, is fraught with challenging discussions around natural health remedies and safety of these unregulated products. Oftentimes, pharmacists make judgment calls and use the limited available evidence to determine how the use of specific remedies will affect the health of their patients.^{6,14}

This is all to say that misinformation education in pharmacy practice with patients takes on many forms and can pose a number of challenges. Newly emerging or understudied medical literature can be conflicting and scarce. Often, pharmacists are tasked with decision making from what little information is available. However, pharmacists have the knowledge and the expertise to identify those literature gaps and explain the nuanced science to their patients. Pharmacists are expertly trained in patient counseling in which they distill complex information into understandable messages for patients to optimize their medication regimens. Pharmacists leverage tools of medical and scientific communication to convey uncertainty and address patient questions and concerns. This specific step is vital as conducting misinformation education includes scientific communication tailored to a nonscientific audience to combat misinformation spread actively.¹⁵

Pharmacists and the 2020 COVID-19 infodemic

As COVID-19 was a novel disease emerging in late 2019, limited therapeutic options were immediately available. According to the U.S. Food and Drug Administration (FDA), as of September 30, 2020, more than 350 therapeutic options were being studied for the treatment of COVID-19 and several more in various combinations.¹⁶ Five therapeutic options have been granted an emergency use authorization by FDA.¹⁶ Some of these proposed therapies are novel agents, and others are medications commonly used for other, non-COVID-19–related purposes. Using the hierarchy of evidence, scientists are determining the ever-changing landscape of contending and ineffective COVID-19 therapies.

There is an infodemic pertaining to COVID-19 pharmacotherapy in addition to the reputable studies being conducted. This infodemic is taking 2 forms: exaggerated therapeutic superiority claims and unsubstantiated therapeutic efficacy

claims. Although examples of these claims do not bear repeating, it is important to recognize that pharmacists in the inpatient and outpatient settings play a role to ensure the appropriate and evolving use of medications for COVID-19 and the availability of medications studied for COVID-19 that treat other conditions.¹⁷

There are also several vaccine candidates for COVID-19 in phase 3 clinical trials. As of October 2020, none are licensed and approved by FDA.¹⁸ However, survey data show increasing public skepticism toward a future COVID-19 vaccine with questions centralizing around safety and political influence.^{19,20} A recent FDA Advisory Committee on October 22, 2020 along with remarks from FDA officials have sought to instill public confidence in COVID-19 vaccine development and quell misinformation and hesitancy.^{19,21} Still, a substantial marketing campaign to garner support for a future COVID-19 vaccine is needed.²⁰ As licensed pharmacists, student pharmacists, and pharmacy technicians are already authorized to administer an FDA-licensed COVID-19 vaccine once available, pharmacy personnel will likely play a role in addressing vaccine misinformation and managing vaccination hesitancy.^{22,23}

Pharmacists may be asked about unregulated over-the-counter drugs, supplements, vaccines, and testing kits for COVID-19 by patients and providers.^{24,25} Many of these products seek to deceive consumers and may even be marketed by rogue Internet pharmacies.^{24,25} Past examples of vitamin C and zinc, marketed for common cold symptoms, make extensive claims about treating and curing common colds, but the data do not fully support safety and efficacy of these agents.²⁶⁻²⁸ Ironically, these agents are being promoted as unsubstantiated treatments or preventives for COVID-19 today.²⁶ Pharmacists can help patients avoid falling victim to these marketing ploys and online misinformation schemes by ensuring that unapproved testing devices are not sold within licensed pharmacies or promoted by licensed pharmacists. Pharmacists might also include signs and educational information for over-the-counter options, inappropriately promoted for COVID-19 but used for other purposes. If patients come looking for these items, pharmacists can share the latest known information and remind patients to stay alert for “too good to be true” claims. Pharmacists can also report suspicious and potentially unlawful websites making fraudulent COVID-19 or other therapeutic claims to FDA.²⁵

Identifying and correcting misinformation

Identifying misinformation and distinguishing between verified and unverified claims can be time-consuming and challenging. However, pharmacists have a professional responsibility to take the time in vetting therapeutic claims particularly during an infodemic by preventing misinformation proactively and correcting misinformation reactively.

Proactively preventing the spread of misinformation

Negative emotional arguments stick

Information that best circulates during and because of an infodemic often plays into the negative emotions of the population.²⁹ When individuals are fearful, frustrated, or hurt, common emotions during COVID-19, the information that claims to address these concerns rise in prominence. People

want to be heard and want their feelings and emotions validated. Pharmacists can recognize these emotions when speaking with patients, particularly when patients bring up sources of misinformation.

Misinformation is political. Accurate information is public health

A decrease in scientific trust has increasingly less to do with communication problems and more to do with mechanisms, platforms, and processes available to spread misinformation.⁶ Partisanship and animosity globally for any party or candidate drives how scientific information is communicated, misconstrued, and spread.¹⁵ Pharmacists, similar to other health professionals, have a responsibility to combat misinformation actively through clear and repetitive communication and active denouncement of misinformation. It is easier to stay quiet on misinformation, but for the sake of public health, providers and clinicians must speak up.

Reacting to shared misinformation

Check the source

The most obvious of these roles for pharmacists involves evaluating the source of the information from which questions and data originate. Pharmacists should examine the currency, relevance, authority, accuracy, and purpose (CRAAP) of a source, also known as the CRAAP test. This test can help ensure that the data pharmacists are evaluating and patients are reviewing are reputable.³⁰ Crosschecking this information with additional journal articles, news outlets, websites, and abstracts can ensure that the information being shared is not unnecessarily slanted or politically motivated.

Provide the alternative explanation

During a time of extensive uncertainty, providing an alternative explanation is a simple and effective way to combat misinformation.³¹ Most people are looking to understand and explain the pandemic's resulting chaos, and replacing a misunderstood belief with an accurate explanation can fix the patient's knowledge gap.³¹ Psychology research supports that people favor simple explanations over complex ones, therefore, the way the alternative explanation is communicated matters.³¹ Aim to combat misinformation by providing patient-friendly, scientifically backed explanations and using the teach-back method to assess understanding.

The pharmacist's active and interdisciplinary role in combating misinformation

If the role of the pharmacist is to be the medication expert, pharmacists must correct misleading and incorrect medication information and identify when needed information is unknown. When medication misinformation arises, the pharmacist should be looked to as the expert. However, pharmacists are not expected to be content experts on all things public health, health care, and medicine. Pharmacists should work together with interdisciplinary colleagues to educate mutual patients, one another, and the general public by sharing evidence-based medicine and identifying areas of uncertainty. This can be challenging in practice as pharmacists and prescribers often lack access to mutual patients' electronic

health records and may not be privy to the patient education provided by other health care team members.^{32,33} However, strengthening relationships between pharmacists and other health care providers and positioning pharmacists and other providers to speak out against medication misinformation can support accurate, evidence-based information that is accessible to the public.

Conclusion

Pharmacists must actively combat and correct medication misinformation. Actively combating misinformation is a professional responsibility and public health goal especially during a concurrent pandemic and infodemic. Although it is easier to stay silent, pharmacists must work with their health care team members to actively reject misinformation pertaining to medications and vaccinations, COVID-19 pharmacotherapy, and in any future public health crisis.

References

1. The Lancet Infectious Diseases. The COVID-19 infodemic. *Lancet Infect Dis*. 2020;20(8):875.
2. World Health Organization. 1st WHO infodemiology conference. Available at: <https://www.who.int/teams/risk-communication/infodemic-management/1st-who-infodemiology-conference>. Accessed September 7, 2020.
3. Centers for Disease Control and Prevention. 1918 pandemic (H1N1 virus). <https://www.cdc.gov/flu/pandemic-resources/1918-pandemic-h1n1.html>. Accessed September 2, 2020.
4. Martini M, Gazzaniga V, Bragazzi NL, Barberis I. The Spanish influenza pandemic: a lesson from history 100 years after 1918. *J Prev Med Hyg*. 2019;60(1):E64–E67.
5. Pullagura GR, Violette R, Houle SK, Waite NM. Shades of gray in vaccination decisions – understanding community pharmacists' perspectives of, and experiences with, influenza vaccine hesitancy in Ontario, Canada. *Vaccine*. 2020;38(11):2551–2558.
6. Ung COL, Harnett JE, Hu H, Desselle SP. Barriers to pharmacists adopting professional responsibilities that support the appropriate and safe use of dietary supplements in the United States: perspectives of key stakeholders. *Am J Health Syst Pharm*. 2019;76(13):980–990.
7. Mormann M, Gilbertson C, Milavetz G, Vos S. Dispelling vaccine myths: MMR and considerations for practicing pharmacists. *J Am Pharm Assoc* (2003). 2012;52(6):E282–E286.
8. Dunne SS, Dunne CP. What do people really think of generic medicines? A systematic review and critical appraisal of literature on stakeholder perceptions of generic drugs. *BMC Med*. 2015;13:173.
9. U.S. Food and Drug Administration. Information about nitrosamine impurities in medications. Available at: <https://www.fda.gov/drugs/drug-safety-and-availability/information-about-nitrosamine-impurities-medications>. Accessed September 6, 2020.
10. Havers FP, Hicks LA, Chung JR, et al. Outpatient antibiotic prescribing for acute respiratory infections during influenza seasons. *JAMA Netw Open*. 2018;1(2), e180243.
11. Klepser ME, Adams AJ, Klepser DG. Antimicrobial stewardship in outpatient settings: leveraging innovative physician-pharmacist collaborations to reduce antibiotic resistance. *Health Secur*. 2015;13(3):166–173.
12. Greene JB, Dolder C, Wallis ML. The NC Tars Project: students leading the way to educate patients about proper use of antibiotics. *J Am Pharm Assoc* (2003). 2011;51(4):539–543.
13. Blanchette L, Gauthier T, Heil E, et al. The essential role of pharmacists in antibiotic stewardship in outpatient care: an official position statement of the Society of Infectious Diseases Pharmacists. *J Am Pharm Assoc* (2003). 2018;58(5):481–484.
14. Marupuru S, Axon DR, Slack MK. How do pharmacists use and recommend vitamins, minerals, herbals and other dietary supplements? *BMC Complement Altern Med*. 2019;19(1):229.
15. Iyengar S, Massey DS. Scientific communication in a post-truth society. *Proc Natl Acad Sci USA*. 2019;116(16):7656–7661.
16. U.S. Food and Drug Administration. Coronavirus treatment acceleration program (CTAP). Available at: <https://www.fda.gov/drugs/coronavirus-covid-19-drugs/coronavirus-treatment-acceleration-program-ctap>. Accessed September 6, 2020.
17. American Medical Association. Joint statement on ordering, prescribing or dispensing COVID-19 medications. Available at: <https://www.ama-assn.org/delivering-care/public-health/joint-statement-ordering-prescribing-or-dispensing-covid-19>. Accessed April 9, 2020.
18. Centers for Disease Control and Prevention. Frequently asked questions about COVID-19 vaccination. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html>. Accessed October 27, 2020.
19. U.S. Food and Drug Administration. COVID-19 vaccines. Available at: <https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines#news>. Accessed October 27, 2020.
20. Zizzo J. The missing link in the Covid-19 vaccine race [e-pub ahead of print]. *Hum Vaccin Immunother*. <https://doi.org/10.1080/21645515.2020.1831859>. Accessed October 26, 2020.
21. Food and Drug Administration. Vaccines and related biological products advisory committee; notice of meeting. Federal Register. Available at: <https://www.federalregister.gov/documents/2020/08/28/2020-18985/vaccines-and-related-biological-products-advisory-committee-notice-of-meeting>. Accessed October 26, 2020.
22. U.S. Department of Health & Human Services. Guidance for PREP Act coverage for qualified pharmacy technicians and state-authorized pharmacy interns for childhood vaccines, COVID-19 vaccines, and COVID-19 testing. Available at: <https://www.hhs.gov/sites/default/files/prep-act-guidance.pdf>. Accessed October 26, 2020.
23. U.S. Department of Health & Human Services. Guidance for licensed pharmacists and pharmacy interns regarding COVID-19 vaccines and immunity under the PREP Act. Available at: <https://www.phe.gov/Preparedness/legal/prepact/Documents/pharmacist-guidance-COVID19-vaccines-immunity.pdf>. Accessed October 26, 2020.
24. U.S. Food and Drug Administration. Beware of fraudulent coronavirus tests, vaccines and treatments. Available at: <https://www.fda.gov/consumers/consumer-updates/beware-fraudulent-coronavirus-tests-vaccines-and-treatments>. Accessed September 6, 2020.
25. U.S. Food and Drug Administration. Fraudulent coronavirus disease 2019 (COVID-19) products. Available at: <https://www.fda.gov/consumers/health-fraud-scams/fraudulent-coronavirus-disease-2019-covid-19-products>. Accessed September 6, 2020.
26. Adams KK, Baker WL, Sobieraj DM. Myth busters: dietary supplements and COVID-19. *Ann Pharmacother*. 2020;54(8):820–826.
27. Science M, Johnstone J, Roth DE, Guyatt G, Loeb M. Zinc for the treatment of the common cold: a systematic review and meta-analysis of randomized controlled trials. *CMAJ*. 2012;184(10):E551–E561.
28. Hemilä H, Chalker E. Vitamin C for preventing and treating the common cold. *Cochrane Database Syst Rev*. 2013;1(1):CD000980.
29. Zollo F, Novak PK, Del Vicario MD, et al. Emotional dynamics in the age of misinformation. *PLoS One*. 2015;10(9), e0138740.
30. Blakeslee S. The CRAAP test. *LOEX Q*. 2004;31(3). Article 4.
31. Lewandowsky S, Ecker UK, Seifert CM, Schwarz N, Cook J. Misinformation and its correction: continued influence and successful debiasing. *Psychol Sci Public Interest*. 2012;13(3):106–131.
32. Fuji KT, Gait KA, Siracuse MV, Christoffersen JS. Electronic health record adoption and use by Nebraska pharmacists. *Perspect Health Inf Manag*. 2011;8(Summer):1d.
33. Roberts MF, Reeves K, Divine H. Community pharmacists' lack of access to health records and its impact on targeted MTM interventions. *J Am Pharm Assoc* (2003). 2019;59(4S):S81–S84.

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