Social Media and Vaccine Hesitancy

Help Us Move the Needle

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KEYWORDS

• Social media • Vaccine hesitancy • Antivaccine movement • Misinformation
• Disinformation • Communication

KEY POINTS

- Although antivaccine sentiment is not new, social media has provided a way for antivaccine activists to organize, grow their numbers, and spread misinformation and disinformation.
- It is not in the financial interest of social media companies to reduce antivaccine misinformation and disinformation on their platforms, so we cannot rely on these companies to eliminate such content.
- Although effective face-to-face communication by pediatric health-care providers is a powerful tool, it is not a scalable solution to address the antivaccine misinformation and disinformation that confront patients and their families on social media.
- It is incumbent on pediatric health-care providers to leverage social media for good and use it to effectively reach patients and their families, who are already on these platforms.

INTRODUCTION

Despite pediatric health-care providers' years of education and training, use of cutting-edge technology, and adoption of ever-improving care algorithms, we are not as impactful as we could be in the promotion and protection and of our patients' health through social media. This marginalization may be due in part to pediatric health-care providers' lack of communication through these platforms, which is where patients and their families increasingly turn for health advice. According to a 2021 survey, more than 75% of adults get some health-related information on social media.[1]

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If the COVID-19 pandemic had a silver lining, it was the real-world demonstration of human vulnerability in the face of a novel, highly infectious virus. The rapid creation of a safe and effective vaccine for this virus should have resulted in a universal celebration of science, public health, and evidence-based medicine. However, despite attempts by the World Health Organization, Centers for Disease Control and Prevention (CDC), and other health agencies to communicate about the vaccines online, these efforts were no match for the coordination and growth of the modern antivaccine movement and their ability to disseminate misinformation and disinformation powered by social media.[2]

As Dr Paul Offit frequently states, "Vaccines are a victim of their own success."[3] Although children in the United States have earned a significant degree of safety from infectious diseases due to robust vaccine research and development, rigorous review and approval, careful guidelines and policies, surveillance and monitoring, as well as successful distribution and vaccination platform,[4] problems with vaccine uptake persist.

Lack of vaccine uptake can be explained by the 5 As: Access, Affordability, Awareness, Acceptance, and Activation.[5] Although Access and Affordability remain a problem, particularly for historically marginalized communities, the last 3 As—Awareness, Acceptance, and Activation—are also key barriers. Billions have been spent globally on vaccine research and development,[6] but substantially less has been invested in better understanding and addressing lack of vaccine acceptance (ie, vaccine hesitancy).[7] This is particularly concerning as we are in a golden age of antivaccine misinformation and disinformation,[1,8] with the rapid spread of this content fueled by social media.[9] Behavior change is hard even when humans know right from wrong[10]; it is exponentially harder when caregivers fear vaccinating their children thanks to a steady stream of exposure to antivaccine content on social media.

It is important to clarify some terms: *antivaccine* refers to people in complete opposition to one or more vaccines; *vaccine-hesitant* refers to a continuum of people skeptical or concerned about vaccines who have good-faith questions. It is understandable that, given the exposure to so much vaccine misinformation and disinformation, many caregivers will have concerns about vaccines.

Antivaccine tactics are sophisticated and nuanced, and social media allows narrow targeting of messages intended to create fear based on an individual's beliefs, values, and situation.[11] A 2020 study that used social network analysis to examine how nearly 100 million people who expressed views about vaccines on Facebook interacted with each other found that those who espouse antivaccine views are well connected to people who express vaccine hesitancy but people who espouse provaccine views are mostly only connected to others who express provaccine views. In other words, people on Facebook who post provaccine content mostly interact with like-minded people, whereas those who post antivaccine content often reach out to those who express hesitancy. They accomplish this, in part, by tailoring their messages to specific audiences with narratives tied to safety, conspiracies, and alternative medicine.[12] This study also found that provaccine narratives, in contrast, are relatively uniform and not well tailored to address different vaccine-related concerns.[12] These findings explain how antivaccine misinformation and disinformation can travel so quickly on social media and exert such a powerful effect on the vaccine hesitant.

It is critical to engage those who are vaccine hesitant with respect, attention, active listening, empathy, and evidence-based answers. Although engaging face-to-face with vaccine-hesitant caregivers is important, it is also essential to engage them virtually. Social media platforms are inexpensive, easy to master, and able to reach tens (or hundreds) of thousands more people daily than can possibly be seen in an office. It is

particularly important for individual practitioners and practices to use these platforms because they can build on the trust they establish in the examination room.

In this article, we will first review the ways in which the antivaccine movement has leveraged social media to expand their considerable influence, as well as why social media companies have failed to reduce antivaccine misinformation and disinformation. We will then review barriers to adoption of social media-based communication by pediatric health-care providers, and close with action-oriented items to increase the adoption of this powerful tool by providers and health systems.

Like a Fish to Water: the Antivaccine Movement Goes Social

Organized efforts to oppose vaccination campaigns have grown simultaneously with vaccinology. Andrew Wakefield is frequently identified for taking the antivaccine movement into prime-time in the late 1990s, using fraudulent research to advance his claims.[13] His more than 15 seconds of fame exposed his fraudulent research and conflicts of interest and ultimately cost him his medical license but not before damaging confidence in the MMR vaccine.[13]

Before social media, antivaccine groups were loosely organized and aligned with both the political right (on concepts of freedom and liberty) and the political left (on concepts of trust and purity). Their resources were limited but they maintained a devoted following, fueled in part by celebrities such as Charlie Sheen and Jenny McCarthy.

Social media changed the game, allowing those across the political aisles to unite, grow their ranks, secure funding, and organize.[14] The antivaccine movement's use of social media since the early 2010s positioned them to deny facts, control trends, and impact caregivers and politicians alike. The COVID-19 pandemic, coupled with the increase of political radicalism on the right (also fueled by social media), created an opportunity for the burgeoning antivaccine movement.[15] During the pandemic, social media promotion of misinformation and disinformation expanded to multiple antiscience stances such as antimask, antishutdown, antimandates, and anticontact tracing, all aligning with and adding fuel to the antivaccine stance. Furthermore, prior research has found that Russian social media trolls (people who post intentionally provocative or offensive messages to get attention or cause trouble) and bots (automated software that help spread particular messages) push antivaccine rhetoric and purposely try to foment distrust in public health agencies in the United States, all while supporting pronationalism efforts.[16]

The antivaccine movement has also mastered the art of highly coordinated attacks on vaccine advocates. In 2017 Kids Plus Pediatrics, an independent practice in Pittsburgh, Pennsylvania, received tens of thousands of antivaccine comments and threats from around the globe on a video promoting the human papillomavirus vaccine.[17] A 2020 event designed to promote vaccination on Twitter—#DoctorsSpeakUp—was overtaken by a coordinated antivaccine presence.[18] An analysis of Twitter messages (ie, tweets) with this hashtag on the day of the event found that almost 80% were antivaccine, with most antivaccine tweets being one of 6 prewritten tweets disseminated by antivaccine activists before the event. The ability of antivaccine activists to coopt this event was due not only to their swift ability to organize but also the relatively small numbers of pediatric health-care providers and other vaccine advocates who use social media to promote vaccination.

Social Media Exploitation of Human Behavior Vulnerabilities

The ability of antivaccine rhetoric to spread on social media is due in large part to social media algorithms exploiting human behavior vulnerabilities to promote the spread

of false information. In the days of television and print media, a single phrase reflected how to get viewers and reader attention: "If it bleeds, it leads!" In the age of social media, that mantra has become: "If it scares, it shares."[2] A 2018 study found that false information diffuses faster than truth on Twitter,[19] and one can imagine a post claiming "vaccines cause cancer" will spread much more quickly on social media than a factual, and thus not sensational, post proclaiming "550 million doses of COVID vaccines have been administered in the U.S. with outstanding safety and effectiveness."

The software engineers who program social media algorithms do not work in a vacuum. They are supported by myriad experts in social science, linguistics, risk, and decision-making who understand how to leverage the innate human response to detect and respond to perceived threats.[19] Humans are hard-wired to respond to fear, so seeing a frightening message, video, or post triggers an urge to "like" or "share" content quickly, often before reading the full post and almost always before validating the accuracy of the content.[20] Although it is easy to blame trolls and bots for the problem of the rapid spread of sensational and divisive content, it is far too often "ordinary" users who amplify this propaganda.[20]

The algorithms leverage another innate factor: humans are social creatures. Most people not only seek out connectedness with others but strive to be liked. Research has found that cognitive biases related to social interaction function differently online compared with offline.[21] For example, people may be more attuned to cues indicating in-group versus out-group status online,[22] meaning when people see their social networks sharing misinformation or disinformation, they may be more likely to accept it than if they encountered it offline. Research has also found that when we post/contribute/share content, we are encouraged to repeat this action because we receive our version of a reward—an endorphin spike—in the form of a like, share, and/or follow.[23] In other words, "click-bait" is real, and it works!

These human behavioral vulnerabilities can be manipulated and monetized.[24] To social media platforms, each click equates to money in the form of advertisement revenue and billions of posts, likes, and shares translate to hundreds of billions of dollars of revenue annually.[25] A recent analysis by the Center for Countering Digital Hate estimates that the advertisement revenue connected to antivaccine content alone amounts to more than US$1 billion a year, likely explaining why social media companies continue to turn a blind eye to the harm this content causes.[26] Although they repeatedly make gestures and promises to police themselves, it is simply not in their financial interest to reduce misinformation or disinformation. Furthermore, social media companies are not liable for false information on their platforms due to Section 230 of the Communications Decency Act, which states that no "provider or an interactive computer service shall be treated as the publisher…of any information provided by another."[27] In other words, although the author of a particular social media post can be sued for defamation, the social media platform itself cannot be. Because of extensive lobbying by social media companies, repeal of Section 230 is unlikely.[27]

Barriers to Adoption of Social Media: the Caged Pediatrician

In 2008, only 10% of Americans reported having a social media profile. By 2021, that number increased to 79%.[28] Internet health-related inquiries are common; Google Health Vice President David Feinberg, MD, claims there are more than 1 billion health queries daily.[29] Recognizing the power of social media as a behavior change tool,[30] in 2020 US corporations spent US$40 billion on social media advertisements.[31] Despite this power, pediatric health-care providers have yet to understand, invest in, and use this vast resource for behavior change.[32]

Although systems-level social media (eg, Kaiser Health System) can be created, the innate trust based on authentic personal-professional relationships carries more social media cachet and connectedness. Families want reliable, trusted, expert guidance when making decisions about their children. Health-care professionals are the most trusted profession in the United States, and pediatricians are near the top of the list[33]—likely due to the longitudinal relationships, often decades long, that pediatric providers have with families. This trust is precious and powerful.

In considering why relatively few pediatric health-care providers to date have successfully leveraged this trust with social media-based communication, it should be noted that pediatric providers face barriers related to training, perpetuation of health communication fallacies, lack of system-level support, fear of negative repercussions, and concerns about equity.

Training: Pheochromocytoma Versus Facebook

Health-care professional training programs, including medical schools, frequently highlight their adaptations to our changing world to reflect advances in areas such as epigenetics, technological advances, and the application of big data.[34] However, these newer topics still compete with ageless issues such as: *"A 42 year old male presents with headache, palpitations and diaphoresis… need another hint… headaches…What is the diagnosis?"*

If you have not yet diagnosed pheochromocytoma, take note, as you will likely see this on at least 2 to 3 key examinations you will take for licensure. Although we have nothing against familiarity with neuroendocrine tumors, we are perplexed about why we are continually testing medical professionals on a rare tumor occurring in 2 to 8 per 1,000,000 people, which they will likely never see in practice. Even without specific suspicion for pheochromocytoma, these persistent symptoms would almost certainly result in workup, which would lead to a correct diagnosis. There are much more common medical topics pediatric providers encounter that should receive much more time, for example, sleep, breastfeeding, social determinants of health, and health equity.

Now imagine the potential for better care if health-care professionals received more training on communication, for example, how to be a better communicator; where to communicate: in person and online; what to do when faced with hesitancy or distrust; and sources of communication that most influences patients and families. Communication expertise is a critical resource that must become a part of all health-care fields. Communication training should start in health-care professional schools, be expanded upon in advanced training or residency, and practiced, supported, and updated throughout health-care careers.

The Two Health-Care Communication Fallacies

Pediatric providers have been traditionally been trained to believe 2 health-care communication fallacies: (1) you can only give advice to patients inside the 4 walls of an examination room and (2) you will be believed (**Fig. 1**).

Unfortunately, the US health-care system pressures providers to minimize good communication in service to charting rapidly and generating more RVUs.[35] Providers are already overwhelmed having to see 20 or more patients per day, and in each annual visit there are far too many important topics to cover everything your families want and need to know.[36] As of June 2022, only about 30% of 5 to 11-year olds have completed their primary series of safe and effective COVID-19 vaccinations.[37] If a pediatric provider wants to be effective in reaching and influencing families at a population-based level in 2022 and beyond, then that provider must be where caregivers live and learn every day—on social media.

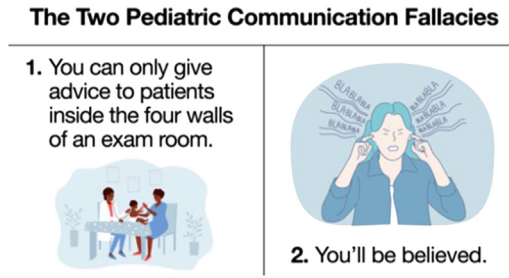

Fig. 1. The 2 health-care communication fallacies.

Lack of Support

In addition to the health-care communication fallacies (see Fig. 1), several institutional barriers inhibit pediatric providers' ability to use social media. The first relates to concerns about how social media pushes information to users. Pulling information, as its name suggests, involves using online resources to "pull" the information you desire, such as using a search engine to look up a movie review, restaurant rating, or weather forecast. In contrast, a "push" occurs when social media applications deliver information to you, in a timeline or newsfeed, based on your history, your likes, and your preferences on the platform. When you "pull" information, you get what you want to see. When social media apps "push" information, you get what they want you to see. This feature of social media contributes to providers being unsure about its use for professional communication.

Our experience suggests the primary reason health-care providers were slow to adapt to, and still often avoid using, social media professionally is because of a lack of financial compensation and professional recognition. There is currently a generational disconnect: decision-making authority (ie, senior physicians or administrators) are typically Generation X (born 1965–1980) or older, and less familiar and/or comfortable with the use of social media.[38] In contrast, Generation Y and Z providers grew up immersed in technology and find using social media second nature but many of them are not empowered to make business decisions about its use in daily practice.

Thus, despite the ability of social media to reach and impact thousands of patients and families each week, very few providers are incentivized or encouraged to post on social media.[39] As a result, the time that providers spend engaging on social media is often at the expense of other activities such as time with loved ones.[39]

Regarding professional recognition, social media engagement is rarely valued by tenure or promotion committees for those in academic spaces.[39] Furthermore, practitioners with authority tend to be highly risk-adverse, and so overinflate or misinterpret liability and communication risks (such as HIPAA violations) commonly associated with social media use. It is not uncommon for health-care organizations to have strict regulations around employee use of social media in a professional capacity, or to have privacy controls or content blockers on work devices that prevent providers from accessing social media sites.[39]

Fear of Negative Repercussions

Senior physicians or administrators may also fear online criticism. However, this fear is misplaced, as such criticism can occur whether one has a social media profile or not. In fact, a social media profile allows providers to better see and respond to what is being said about them and provides an avenue for online support from the families in their

practice. Additionally, many pediatric health-care providers fear being on the receiving end of an online attack if they post provaccine content.[22] Although it is true that the antivaccine movement uses tactics of social media harassment to scare trusted and knowledgeable social media vaccine advocates,[40] it should be noted that there are an increasing number of resources available to help. One such resource, the nonprofit group Shots Heard Round the World, was formed in the aftermath of the 2017 antivaccine attack on Kids Plus Pediatrics.[41] This organization provides resources to help vaccine advocates to prevent, defend against, and recover from coordinated online antivaccine attacks, and has effectively come to the aid of pediatricians attacked on social media for advocating vaccines—most famously in the case of Dr Nicole Baldwin.[42] Shots Heard Round the World also provides a support network to vaccine advocates leveraging social media to promote vaccination.[41]

EQUITY CONCERNS

A final concern related to professional social media use is equity. Because social media use requires WiFi or hard-wired connectivity, there are justifiable concerns that it does not reach all people well. This concern has been documented in both rural and underserved urban areas. As a result, lower socioeconomic-status communities struggle with access to this virtual information exchange.[43] Additionally, older, lower technology and cheaper devices and phone carrier plans can also exacerbate inequities regarding access and end-user experience. As a result, it is essential that social media outreach not replace in-person communication but rather be used as a tool to enhance existing on-the-ground outreach.

Social Pediatrics: Trust and Evidence-Based Recommendations via Social Media

Given these barriers, it is understandable that even pediatric health-care providers who understand the value of using social media to reach their families may struggle to adopt this powerful tool. In this section, we review action-oriented items to help providers become ADEPT at using social media (**Table 1**). First, with so many social media platforms out there, providers may wonder which platform to start using. We recommend starting with a single platform, and having that platform be the one with the greatest participation by caregivers of children of the practice. It may be helpful to conduct a brief survey of caregivers or informally assess this during clinic visits. Related to this, remember that the primary audience for your posts is families of the practice. They trust you and can help amplify your message.

When it comes to creating or posting content, keep it interesting and keep the primary audience in mind. It may be helpful to remember frequently asked questions in the examination room and then create or share content to address these topics. The content should be regularly posted and engaging but does not need to be original. Rather, providers can quickly *amplify* trusted voices such as the American Academy of Pediatrics (AAP), AAP's HealthyChildren.org, and the CDC. Sharing content from these sources on a provider or practice-level account serves as a trusted endorsement of this content and the institutions that provide it (see **Table 1**). This can be done in conjunction with *directing* patients and families to resources, either from your practice or these trusted voices (see **Table 1**). If providers find they have time to *post* new content, this can be a great opportunity to *tag* colleagues, thereby easily sharing the content created with other providers and practices. Finally, when engaging with caregivers and/or patients who ask questions or comment on posts, make sure to *engage* with empathy (see **Table 1**).

Table 1
How pediatricians can become adept at using social media to promote vaccination

Tasks	Description	Examples
*A*mplify trusted voices	Repost (eg, share, retweet) content from trusted health sources such as the CDC, AAP, or local health department	• Share a post by the CDC about influenza vaccines for children • Share a post by the AAP addressing misinformation about COVID-19 vaccines for children
*D*irect patients to resources	Post information about local vaccine clinics or clinic-related events	• Share a post from the health department about a COVID-19 vaccine clinic • Post a copy of an infographic you have hanging in your waiting room about an influenza vaccine clinic
*E*ngage with empathy	When patients and caregivers ask good-faith questions about vaccines, respond with empathy and compassion	• Respond to a caregiver expressing confusion about Moderna vs Pfizer COVID-19 vaccines for young children by acknowledging that it can be difficult to wade through all of the information online
*P*ost new content	Be creative! Post engaging content that addresses issues you think is most pertinent to your patients and caregivers	• Create a TikTok video to a catchy song informing adolescents about the HPV vaccine • Create an Instagram post addressing FAQs about COVID-19 boosters for children
*T*ag colleagues	Use each platform's tagging features to easily share the content you create with other pediatric health-care providers	• Tag the HPV Roundtable in a picture you post as part of a tweet encouraging HPV vaccines for boys and girls • Tag individual providers in your practice in a clinic Instagram post about COVID-19 vaccine availability

In the absence of a trusted pediatric provider on social media, caregivers or patients may turn to nonreputable sources offering advice, which could be unintentional misinformation or purposeful disinformation. Thus, whether creating new content or sharing content from reputable sources, a primary goal should be providing evidence-based information before people are exposed to misinformation or disinformation. Research has shown that when people receive factual information before hearing misinformation or disinformation—also known as "prebunking"—it acts as a kind of inoculation, making them less susceptible to the misinformation or disinformation.[44] Social media can also be used as a "fact-check," to address concerns generated by previous exposure to vaccine misinformation or disinformation. As with in-person communication, social media messages must express empathy without reinforcing the disinformation. Similar to the Announce, Inquire, Mirror, Secure method for in-office vaccine conversations,[45] social media posts should first state the facts about the recommended vaccination, next dispel the misinformation or disinformation, and finally conclude with further information or support for the evidence-based vaccine recommendation.[2]

A Call to Action

It is incumbent on medical schools, pediatric training programs, other health training programs, professional medical organizations, and health systems to adapt to the realities of social media. Although face-to-face opportunities are powerful, they are not a scalable solution to the dilemma facing pediatric providers and practices. The multiple competing priorities facing providers makes reaching families on social media with factual pediatric health-care recommendations imperative. Social media provides a significant source of information—and misinformation and disinformation—for families and caregivers. Not maintaining a pediatric provider (or at least practice-level) presence on at least one key social media platform opens the door for parents and caregivers to consume advice from a range of questionable and even nefarious sources. Social media can be used for good but doing so requires a commitment on the part of both providers and health-care systems. With effective use of social media, the precious and trusted longitudinal relationships pediatric providers create with families in the examination room can be both enhanced and fortified; educational content will be welcomed by the many families who enjoy trusted longitudinal relationships with the practice providers. The barrier to entry is low, and social media is an inexpensive, efficient, effective tool to engage, educate, and affect health change at a population level. Social media use offers pediatric providers and practices the ability to reach and affect thousands of patients and families each week, with desired and needed pediatric health-care recommendations. In 2022 and beyond, it is paramount that a pediatric provider (or at least at the practice-level) has a social media presence on at least one social media platform to help effectively counter the contagion of online misinformation and disinformation. We invite you to review the following resources, and then join us in harnessing social media for good.

Resources

CDC Social Media Tools, CDC Social Media Tools: https://www.cdc.gov/socialmedia/tools/index.html.

Shots Heard Round the World: https://shotsheard.org/

Social Media for Doctors, Social Media for Doctors: Taking Professional and Patient Engagement to the Next Level:https://www.aafp.org/pubs/fpm/issues/2020/0100/p19.html.

Social Media –, Social Media – How to harness its power and avoid its traps:https://www.contemporarypediatrics.com/view/social-media-how-to-harness-its-power-and-avoid-its-traps.

CLINICS CARE POINTS

Pitfalls

- Clinical office visits are increasingly packed with multiple competing priorities, making addressing vaccine hesitancy in the office extremely challenging.
- Social media is being used by antivaccine advocates to spread misinformation and disinformation.

Pearls

- Social media is inexpensive to learn and use, relatively easy to master, and its impact can be significantly scaled in a relatively short timeframe to create significant change.
- Health-care leaders/decision-makers must educate themselves so that they might harness this powerful communication and behavior-change tool.
- Health-care social media must become normalized and be incorporated in training so that pediatric health-care providers can use it to positively influence patients and families.

- Most younger providers are intimately familiar with the use of social media. Health-care systems and practices should support and nurture these users and leverage their experience and knowledge professionally.

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