The golden age of anti-vaccine conspiracies

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Editor

To the dismay, disbelief, and amusement of many, a few months back, in a widely shared social media post, a person planning to travel with their toddler mentioned having heard that certain airline companies vaccinate people through the air conditioning system. The person was reaching out to seek additional information on which airlines were doing this.

Leaving aside the fact that no airborne human vaccines – which would make life so much easier for children and vaccination programs alike – are currently available, this reminded me, yet again, that conspiracy theories on social media are alive and thriving, rejoicing their *golden age*.

One of the most successful interventions in the history of medicine, vaccination led to the global eradication of smallpox, the nearly global eradication of polio, and the drastic decrease in the morbidity and mortality associated with other infectious diseases. As a result of this success, many parents are unaware of the threats and burden that infectious diseases posed for previous generations.[1-3] To a great extent, this explains that vaccines have become *victims of their own success*.[2]

Conspiratorial beliefs have become *endemic* among anti-vaccination groups.[4] Opposition to vaccination is not new – it dates back to the Victorian age and since the 18th century, fear and controversy accompanied the introduction of every new vaccine.[5,6] This has been compounded, in recent years, by a decreased trust in the institutions that manufacture or distribute vaccines.[2] In the United States, about 1-3% of the children have vaccination exemptions, and this can reach 20% in some communities.[7] An increase in vaccine refusals over time, and the geographic clustering of under-vaccinated or non-vaccinated individuals and communities, were linked to outbreaks of vaccine-preventable infectious diseases in the United States and internationally.[2,8-10]

The impact of vaccination refusal on public health assumes particularly challenging dimensions when misinformation and disinformation are disseminated through the social media.[11] As recently pointed out, a relatively limited number of several categories of "thought influencers" in the anti-vaccine movement, including doctors (many of whom had their theories or articles discredited or retracted), certain celebrities, community organizers, "mommy bloggers", and a few opportunists, collectively attract >7 million Facebook followers, albeit some overlap may exist among these categories.[12] Annually between half and 80% of the people search for health-related information online, their number is increasing, and relatively few of them share their findings with healthcare professionals.[12-16] In addition, web sites that allow interactions among users are also becoming increasingly popular.[16] Thus, the potential for disseminating harmful health-related information through social media seems to be at an all-time high. A study conducted in Italy found an inverse correlation between MMR vaccine coverage and internet search activity, Facebook posts, and tweets.[17] The analysis of HPV vaccine-related information from 258,418 tweets sent over two years revealed that the negative representation of vaccines affected their acceptance and coverage.[18] In a study of 153 YouTube videos about immunization, negative videos were more likely to receive a rating, have higher mean star ratings, and have more views.[19] The most commonly

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discussed vaccine in this study was the HPV vaccine, which is particularly underutilized and represents an important target for interventions.[11,19] These findings are reflected by other studies, which revealed that YouTube videos disapproving of immunization were more viewed, liked, or shared.[20,21]

In a study conducted in the UK, parents who believed in anti-vaccine conspiracy theories were less likely to vaccinate a fictitious child, suggesting that initiatives to increase vaccine uptake should also address the impact of conspiracy theories.[22] Understanding the origin of conspiracy theories and developing initiatives to limit the dissemination of harmful health-related information is much more complex and multi-layered than it may appear. The analysis of a completely fictitious 12-item conspiracy ideation about Red Bull revealed that the strongest predictor of belief was the belief in other conspiracy theories.[23] While not very surprising, contradictory and mutually incompatible conspiracy theories regarding the same events may sometimes be positively associated, indicating that conspiracism may be driven not so much by the adherence to any particular conspiracy theory, but by beliefs that support the general idea of a conspiracy.[24] Conspiracy theories also have more general social consequences, such as a reduced willingness to engage in politics and to reduce the carbon footprint.[25]

An online survey of US parents found that 28% ever refused and an additional 8% delayed getting the HPV vaccine for their child.[26] The two groups had distinct beliefs with respect to vaccination behaviors and communication preferences. Vaccination refusal was associated with lower overall confidence in adolescent vaccination, lower perceived vaccine effectiveness, and higher perceived harms. On the other hand, delaying vaccination was mostly associated with the need for more information, indicating that the communication strategies targeting the two groups need to be different.[26]

Vaccine hesitancy and vaccine refusal are extremely complex social issues that require interventions at the individual, provider, health care system, and national levels.[2] Social media, while referred to as a *hotbed* of activity for anti-vaccine activists, also emerges as a platform instrumental towards forging better opportunities to explore vaccine hesitancy and refusal.[27-32] Human and financial resources devoted to ensure the availability of experts and health officials on social media are critical elements of these initiatives.[15] While today's anti-vaccination movement shares certain similarities with the one in the 19th century, the two are also distinct in a number of ways.[33,34] One of these distinctions is that social networks, in addition to powerfully shaping the doctor-patient interaction, have profoundly changed the way in which information is disseminated.[35] These similarities and differences, collectively, provide critical learning points, and incorporating them into communication strategies to overcome challenges and build opportunities represents one of the acute needs in public health.

Conflicts of interest: None to declare.

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