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COMMENTARY

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# Online mis/disinformation and vaccine hesitancy in the era of COVID-19: Why we need an eHealth literacy revolution

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**ABSTRACT**

The quality of online health information is cause for concern in general, and the spread of mis/disinformation on the benefits and risks of vaccines has certainly been fueling vaccine hesitancy. In the wake of the COVID-19 pandemic, we have entered an era of unprecedented "infodemic." There has never been a more urgent time to address the long-standing question of how to overcome the deleterious influence of exposure to online mis/disinformation on vaccine uptake. eHealth literacy, a skill set including media literacy, is key to navigating the web in search for health information and processing the one encountered through social media. Studies assessing the impact of increasing eHealth literacy on behavioral attitudes and health outcomes in the general population are relatively scarce to date. Yet for many reasons, leveraging eHealth literacy skills, and more specifically, media literacy, could be of great value to help mitigate the detrimental effects of erroneous information on vaccination decision-making. In this paper, we make the case that eHealth and media literacies should be viewed as fundamental skills that have the potential to empower citizens to better recognize online mis/disinformation and make informed decisions about vaccination as any other health matters.

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"I hope the government will not force us to get the COVID-19 vaccine," said an anxious young lady whom I met at an outdoor after-work party, just a few weeks before the beginning of the second French lockdown in October 2020. "Don't you know that Bill Gates is planning to use COVID-19 vaccines to implant microchips into our bodies to monitor our movements?", she added. As she looked at my incredulous face, she finally advised: "Do your research, then!". Little did she know that the person she was kindly advising (the lead author of this paper) happened to be a public health physician working at a vaccinology research center – which was actively involved in recruiting study participants for a COVID-19 vaccine trial in France – and a PhD candidate then writing a piece of research on the detrimental effect of the use of the Internet as a source of information on the uptake of the human papillomavirus (HPV) vaccine in the country.[1]

Online false news stories spread more rapidly than true news.[2] Back in 2014, the World Economic Forum had already identified the rapid spread of online misinformation (information that is false but not created with the intention of causing harm[3]) as one of the top ten trends in modern societies.[4] In 2018, growing concern about the impact of online disinformation (information that is false and deliberately created to harm a person, a social group, an organization or a country[3]) prompted the European Commission to issue a series of measures,[5] including an EU-wide code of practice on disinformation.[6] In 2020, the World Health Organization (WHO) has listed the "uncontrolled dissemination of misinformation," including in the field of vaccination, among its urgent health challenges for the next decade.[7]

The quality of online health information is cause for concern in general;[8,9] and the spread of mis/disinformation on the benefits and risks of vaccines has certainly been fueling vaccine hesitancy.[10,11] A content analysis of first-page Google search results suggests that parents concerned about vaccination safety and thus searching for information about vaccination risks would encounter 3.6 times more vaccine myths per website than parents who use neutral terms (i.e., neither related to risks nor benefits), and 4.8 times more myths than parents who search information about vaccine benefits.[12] A Canadian population-based study reported twice higher odds of perceiving vaccines less safe for parents using the Internet to search for vaccination information, compared to parents who did not search the Internet.[13]

In the wake of the COVID-19 pandemic, we have entered an era of unprecedented "infodemic," in which we are just two clicks away from conspiracy theories.[14] The term "infodemic" was coined by the WHO to refer to the "over-abundance of information – some accurate and some not – that occurs during an epidemic."[15] In this context, Rozeenbenk et al. have found that susceptibility to misinformation may make people less likely to report willingness to get vaccinated against COVID-19, and less likely to recommend vaccination to vulnerable people in their social circle.[16] In a world already marked by "circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief," namely the "post-truth" (international word of the year 2016, as declared by Oxford dictionaries[17]), there has never been a more urgent time to address the long-standing question of how to overcome

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the deleterious influence of exposure to online mis/disinformation on vaccine uptake.

eHealth literacy is key to navigating the web in search for health information and processing the one encountered through social media. Norman and Skinner, who first introduced this term in 2006, define it as "the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to preventing, addressing or solving a health problem."[18] By definition, eHealth literacy is a metaliteracy comprising six key competencies: (1) *Traditional literacy and numeracy*, the ability to understand text and numbers; (2) *Health literacy*, the ability to process and understand health information; (3) *Computer literacy*, the ability to use computer hardware and software; (4) *Science literacy*, the ability to understand scientific texts, facts, and correlations; (5) *Media literacy*, the ability to process media content and assess its quality; and (6) *Information literacy*, the ability to process information, to know how knowledge is organized, and to know how to use the gained information.[19]

Studies assessing the impact of increasing eHealth literacy on behavioral attitudes and health outcomes in the general population are relatively scarce to date.[19] Yet for many reasons, leveraging eHealth literacy skills, and more specifically, media literacy, could be of great value to help mitigate the detrimental effects of erroneous information on vaccination decision-making.

Firstly, when it comes to vaccine hesitancy, the problem is not so much the deficit of accurate information. Interventions aiming at advocating vaccination by actively providing factual information may backfire,[20] as found in a randomized controlled trial of an intervention refuting claims of the link between the measles, mumps and rubella (MMR) vaccine and autism.[21] This might be linked with the "boomerang-effect" described in the theory of psychological reactance on why people resist persuasion.[22]

Secondly, apart from the topic of vaccination, the web ecosystem is not short of false claims when it comes to treating diseases, from chronic conditions (e.g., drinking celery juice to cure autoimmune diseases[23]), to infectious diseases (e.g., drinking bleach to self-treat for COVID-19[24]), to cancers (e.g., taking vitamins to cure cancer without the use of standard cancer treatments[25]). Adopting a mindset of critical thinking toward any health-related claims found online should be valued and encouraged in general, with no need to draw explicit attention to the topic of vaccination. This holistic approach would be less likely to trigger reactions of resistance among vaccine-hesitant individuals. This is important as the issue of vaccination has become a highly polarized debate.[26,27]

Thirdly, initiatives of banning anti-vaccine posts might be difficult to implement across all media platforms. Even labeling and/or certificating all the websites which provide reliable information from trustworthy sources (e.g., HON certification, see www.hon.ch) may be unrealistic, considering their ever-increasing number. Neither can deter "alternative" websites priding themselves in the freedom of speech to flourish, further polarizing, and even politicizing the debate.[28] For example, attitudes to COVID-19 vaccines in France were found to be significantly correlated with political partisanship and engagement with the political system.[29] Empowering individuals to filter accurate facts in a huge sea of information and come autonomously to their own conclusions – unless they actively seek advice from their health-care providers, which is preferable – may prove more beneficial.

Fourthly, the promotion of eHealth literacy skills could be cultivated across the lifespan. The adult general population could benefit from public health campaigns,[25] while children and adolescents could learn this skill set as part of their educational curriculum.[30] The effects of teaching these skills to the next generation may be seen over a longer period but is probably also the most efficient for two reasons: (1) programs would target young people who are unlikely to have been exposed to inaccurate information, and (2) they would include the entire population of school-aged children, whatever their social background. Older adults can also been taught these competencies, as evidenced by published literature.[31] Furthermore, through social networks and interactions between individuals from different intergenerational groups (e.g., a young adult helping a grandparent to gather information on influenza vaccine; a mother and her adolescent daughter discussing HPV vaccination), applying eHealth literacy skills has the potential to become a common and shared practice, which could reach the most in need.

In the highly digitalized world we live in, eHealth and media literacies should be viewed as fundamental skills, just as writing and reading. They should be promoted as lifelong key competencies, that once acquired, could be applied in any health-related topic. Only then will citizens be truly empowered to better recognize online mis/disinformation and make informed decisions about vaccination as any other health matters.

## Disclosure of potential conflicts of interest

FD declares that MSD vaccines have covered registration fees, transport and accommodation costs for attendance to a conference in 2018 and received a research grant. PM was an investigator on projects that received funding from GSK and MSD for the evaluation of HPV vaccines in Africa. OL declares punctual interventions and support during conferences with Pfizer, MSD, Sanofi Pasteur, Janssen and GSK. PC declares no conflict of interest.

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