Preparing health professionals to respond to misinformation: an inoculation theory approach

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Abstract

Health professionals are increasingly expected to address misinformation after patients encounter it, but health professions education should also prepare them to anticipate misleading claims and influence strategies before those claims shape patients' beliefs and decisions. Inoculation theory, a communication model, offers a useful framework for such preparation. Modeled after biological inoculation, the theory explains how preexposure to weakened persuasive challenges, or misleading techniques, can build resistance to later influence. Although inoculation has a long history in health communication, it has received far less attention as curricular content in health professions education. This commentary argues that future health professionals should learn inoculation theory as part of their communication training. It outlines a basic curricular primer centered on threat and preexposure, introduces technique-based and issue-based approaches, and offers sample messages instructors could use to teach each. It also considers more applied activities, including analysis of existing inoculation games, message design, role-playing, and hypothetical cases. Teaching inoculation theory could help future practitioners recognize likely influence challenges and construct preemptive responses for use in professional practice.

Keywords: inoculation theory, health professions education, misinformation, health communication, preemptive communication

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Health professionals are increasingly expected to address issues of misinformation after patients encounter it, and emerging curricula prepare students for these conversations.[1,2] Health professions education should also provide a framework for anticipating predictable misleading claims and influence strategies, and responding to them before they shape patients' beliefs and decisions. Inoculation theory, a longstanding theory of resistance to influence, modeled after biological inoculation,[3,4] offers one such framework. The theory has been studied and applied for more than 60 years across issues and contexts,[5] including a particularly strong record in health communication.[6] Yet it has received far less attention as curricular content in health professions education. The premise of this commentary is simple: future health professionals should learn inoculation theory itself as part of their communication training, including how to recognize likely influence challenges and construct preemptive responses for use in professional practice.

Inoculation theory is a well-established, widely used framework for building resistance to influence. Its modern formulation emerged from social psychological research in the early 1960s,[4] although its preemptive logic stretches back centuries to Aristotle and others who advocated anticipating and answering an opponent's arguments before they were made.[7] The theory is built on a simple analogy: just as vaccination prepares the body to resist a later biological threat, influence inoculation prepares people to resist future persuasive challenges. It does so through preexposure to weakened forms of those challenges, or to the strategies used to make them persuasive.[3,4] Inoculation commonly begins with a forewarning that an influence challenge is coming, followed by an opportunity to recognize, understand, or respond to that challenge in advance. In traditional inoculation messages, this often takes the form of refutational preemption, in which one or more likely challenges are raised and addressed.[3] Other approaches may prompt recipients to generate their own responses; still others explain the techniques used to mislead them. Conventional

reactive strategies, such as post-exposure fact-checks and corrections, respond after a claim has been encountered: "You were told this, but actually, it is this." Inoculation prepares people beforehand: "You may be told this, but here is how to recognize and resist it."

Meta-analytic evidence indicates that inoculation messages strengthen resistance to subsequent persuasive challenges.[8] Inoculation puts the familiar adage "prevention is the best medicine" into practice. Even so, it has received little attention as a curricular topic in health professions education. A search of the *Education for Health* archives, for example, yielded no articles mentioning inoculation theory.

Health communication has long been a prominent context for inoculation research. Recent reviews highlight the theory's applicability across health issues,[6] including helping adolescents resist pressure to smoke cigarettes,[9] discouraging texting while driving,[10] and addressing vaccine attitudes and misinformation.[11,12] That extensive history has not carried into health professions education, where future health professionals are rarely taught the theory as a framework they can use in their own practice.

Concerns about misinformation are already evident in health professions education scholarship, including in the pages of *Education for Health*. Utomo and Yan,[13] for example, identify misinformation as one of several challenges surrounding the use of generative artificial intelligence (GenAI) in medical education. Traylor and Anderson[14] warn that extreme heat can amplify misinformation about lactation, including persistent advice to supplement exclusively breastfed infants with water. Future health professionals need a framework to anticipate such claims and respond before they shape practice or patient decisions. Inoculation theory offers that framework.

Medical educators could teach inoculation theory itself, preparing students to apply it in professional practice. Instruction could range from a brief introduction to the theory's core concepts to more detailed work on designing and evaluating inoculation-based messages.[15] Even a basic introduction could complement existing communication curricula, including the Attitude, Ethics and Communication module developed by the Medical Council of India.[16]

A curricular primer could introduce health professions students to the basic tenets of inoculation theory. Because those tenets are organized around the medical analogy of inoculation, the framework may be especially intuitive for these students.

A basic primer might focus on threat and preexposure. In inoculation theory, threat is the awareness of one's vulnerability to future influence. Educators could demonstrate how a forewarning elicits that awareness by alerting people that persuasive challenges are coming and that they may not be fully prepared. The primer could then introduce several ways to build resistance in advance: raising and answering weakened versions of likely challenges, prompting recipients to generate their own responses, or explaining the techniques used to make misleading claims persuasive. Instructors could use sample messages to introduce students to two common approaches: technique-based inoculation, which builds resistance to misleading strategies across topics; and issue-based inoculation, which anticipates claims about a particular health issue.

A technique-based example might begin with a general forewarning: "Misinformation can be difficult to recognize, even when we know it is common. Some misleading messages are designed to look credible or provoke a quick emotional reaction, increasing the chance that they will shape our beliefs and decisions." Students could then examine a common misinformation technique, such as the use of emotionally provocative language:[17] "Misinformation often uses fear, anger, or outrage to push people toward a conclusion before they pause to evaluate the evidence. Strong emotion does not necessarily make a claim false, but it can make a misleading claim feel more convincing."

An issue-based example could focus on a specific health claim, such as the advice to give water to exclusively breastfed infants during periods of extreme heat.[14] An instructor could reuse the general

forewarning from the technique-based example, then follow it with a weakened version of the claim and a response: "During very hot weather, you may hear that an exclusively breastfed infant needs extra water to prevent dehydration. That advice may sound sensible, but the World Health Organization advises that infants under six months should not be given water, even on hot days, because breast milk provides the water they need. If an infant seems thirsty, an additional breastfeed can be offered."[18] Students could then identify the forewarning and the preemptive response before constructing an issue-based inoculation message of their own.

A brief introduction could stop there. More applied instruction could ask students to examine existing inoculation games, such as *Bad News,*[19] *Harmony Square,*[20] *Bad Vaxx,*[21] and *Cranky Uncle,*[22] identifying how each one warns of an influence challenge and prepares players to recognize or resist it. The games could also provide models for students designing their own preemptive messages. Additional activities could include role-playing difficult conversations, working through hypothetical cases, or considering the question: What misleading health claims or influence strategies are patients likely to encounter, and how could health professionals prepare patients in advance?

Inoculation theory cannot address every problem posed by misinformation or other harmful influences, but its long record as a preemptive messaging strategy makes it a promising addition to health professions education.[5,8] Because source credibility can strengthen inoculation effects,[23] health professionals may be especially well positioned to use it when patients view them as trusted sources. Decades of research show that inoculation theory can guide the development of effective health messages. Health professions education should also prepare future practitioners to understand, design, and use those messages themselves.

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