VIEWPOINT

Communicating About Vaccines in a Fact-Resistant World

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The continued success of vaccines, one of the most effective public health interventions, depends on high rates of acceptance. Vaccine refusal in the United States has increased since the late 1990s.[1] This trend has coincided with an increase in vaccine safety concerns. Such concerns result from easy recall of adverse events, misinformation, and human tendency to poorly judge probabilities. When a significant proportion of the US population is impervious to scientific facts, such as belief in human-induced climate change, it is difficult to communicate vaccine-related information to patients.

Parent-physician communication in such conditions is challenging and, if done improperly, may worsen the problem. Although the evidence base for vaccine-related communications is still emerging, we present developments in social and behavioral communication, behavioral economics, social psychology, and persuasion theory to guide productive vaccine discussions in the clinic.

Availability Heuristic

When faced with immediate decisions, such as vaccination during a routine clinic visit, humans often lack the time or resources to examine all plausible options. Heuristics are mental shortcuts that allow humans to arrive quickly at an answer. For example, after seeing several news reports about violence, someone might judge that violence is much more common than it actually is in one's own neighborhood and may subsequently behave congruently with this judgment. Although helpful, heuristics can result in errors in judgment and decision making. One heuristic particularly relevant to vaccine-related perceptions is the *availability heuristic*, first described by Nobel Laureate Daniel Kahneman and his colleague, Amos Tversky, in their landmark 1974 article.[2] The availability heuristic describes our propensity to estimate the probability of an event based on how easily an instance of that event comes to mind. For example, plane crashes attract substantial public attention and media coverage, although the odds of dying in a plane crash are 862 times lower than the odds of dying in a car crash.[3] Nonetheless, more people are afraid of flying than driving.

After successful introduction of a vaccine for a specific disease, rates of that disease start decreasing. Owing to the increase in the number of vaccine doses delivered, the absolute number of real (and perceived) adverse events after vaccination starts increasing. Successive cohorts of parents primarily hear about these adverse events, and the collective memory of the disease declines. This change in the ease of recalling benefits vs risks can result in a change of one's appreciation of and confidence in vaccines. Empirical evidence supports this phenomenon, not only for parents but also for physicians. For example, physicians who graduated from medical school between 1995 and 2002 had relatively less favorable attitudes regarding vaccines compared with those who graduated between 1954 and 1964.[4]

Countering Misinformation and the Boomerang Effect

The instinctive response to vaccine-related misinformation is to provide correct information. However, this information correction–based approach has limitations and can backfire. For many, processing information on controversial topics occurs in a way that preserves pre-existing beliefs. Individuals who receive messages opposing their pre-existing beliefs may not just resist challenges to their views but support their original opinion even more.[5] Coined the *boomerang effect* by psychologists in the 1950s, several others have explored this concept in various disciplines.[6]

For example, political scientists Nyhan and Reifler[5] had participants read mock news articles about weapons of mass destruction in Iraq that included either a misleading claim from a politician or a misleading claim and a correction. Conservative participants who were presented with a claim and a correction were more likely to agree that Iraq had weapons of mass destruction than those who only received misinformation.[5] This backfire effect was also observed in a trial to evaluate effectiveness of correcting misperceptions regarding the measles, mumps, and rubella vaccine.[7] When presented with information refuting claims of a link between the measles, mumps, and rubella vaccine with autism, parents who distrusted vaccines demonstrated reduced intention to vaccinate their children despite greater knowledge of the lack of association between vaccines and autism.

Focus on the Disease

Given the possibility of backfire, one promising approach is to avoid correcting misperceptions regarding vaccine adverse events and to instead pivot the conversation to the disease itself. The extended parallel processing model is a behavioral framework for situations when an individual perceives a threat of a disease. In such situations, individuals will either address the issue head-on or become cognitively frozen and incapable of action. To effectively stimulate action to address possible disease, an individual must perceive they are at risk for disease (risk perception) and believe there is an effective action (response efficacy) and that they are capable of taking that action (self-efficacy).

Primary literature focused on influencing perceived severity and susceptibility is limited, to our knowl-

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edge. However, there are some promising leads. Sadique et al[8] presented mothers with general information about the risks and severity of a hypothetical disease and of adverse effects from a vaccine. Susceptibility was manipulated by presenting different probabilities of the infection or the adverse event. Severity was influenced by varying the type of symptoms (irritability, fever, and bowel obstruction) and the duration of the symptoms such that the descriptions clearly differed in seriousness. They then asked the mothers to decide whether to vaccinate their child against this hypothetical disease. Mothers with high knowledge of real disease prior to the study were more willing to vaccinate their child compared with those with low knowledge, even with the risk of an adverse event from vaccination.[8] What ultimately predicted the likelihood of vaccinating was not the probability of getting sick or experiencing an adverse event, but the perceived seriousness of the disease or the adverse event.[8] These perceptions of severity were influenced by the researchers by presenting different symptoms associated with the disease or the adverse event. As described previously, the ease of recall of relevant information influences perceptions around susceptibility and severity; therefore, clinicians can use recent news stories of outbreaks to increase disease salience.

Although it is preferable to focus on the disease rather than the vaccine, directly addressing vaccine-related myths relies on 3 principles.[9] First, confrontation of the myth should be focused on key facts, instead of every supportive fact. Too much information may inadvertently reinforce the myth, whereas straightforward facts will decrease misperceptions.[9] Key messages can center around facts such as "no recommended childhood vaccines contain thimerosal" to convey a simple, clear message.[9] Second, before the myth is mentioned, clearly indicate that subsequent information is false to signal the mind to be alert. Third and most importantly, an alternative explanation should be provided. Attempts to correct the myth without filling in mental gaps are likely to be unsuccessful. An explanation about why the myth is wrong and/or why some people promote the myth can be used to fill this gap.

Leverage the Power of Defaults

A binary taxonomy of vaccine acceptors or refusers is somewhat simplistic. Many parents are "fencesitters" and are uncertain about the benefit of vaccination outweighing potential adverse events. For these parents, nudges and interventions that leverage defaults (ie, whatever outcome happens if no action is taken) can be helpful in bridging the intention-to-action gap.

Such interventions may include presumptive communication, which shapes discussion with the presumption that the parent will vaccinate their child. Participatory communication is shaped by asking whether the parent would like their child to be vaccinated (eg, presumptive: "It's time for little Johnny to get vaccinated!" vs participatory: "Should little Johnny get vaccinated at this visit?"). More parents voice resistance to vaccines when a physician uses a participatory approach to vaccinations, while fewer parents will resist when a presumptive approach is used.[10]

Conclusions

The aforementioned list of strategies includes only a few promising evidence-based approaches rather than an exhaustive list of all possible interventions. However, in an environment where fact-based interventions have limitations, there is a need for moving from wisdom-based to evidence-based tailored approaches to increase vaccine acceptance.

ARTICLE INFORMATION

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