



# Ecological Model of Health Behavior in Reducing Anti-Vaccination Trends

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## Introduction

Vaccines are one of the essential measures of public health practice and preventative medicine to protect the population from diseases and infections. They have contributed to decreasing rates of common childhood diseases and infant and childhood mortality. In some cases, vaccination wiped out diseases that were common in years past, such as smallpox, and have nearly eradicated malaria and polio [1].

Objection to vaccination is not a novel phenomenon. There have been anti-vaccination movements at least since 1796 when Edward Jenner invented the smallpox vaccine – then, most of the claims were “witchcraft/religion” related. However,

## Abstract

**Background:** Anti-Vaccination and vaccine hesitation is not a novel phenomenon, but in the modern and more connected world, the magnitude of the issue is sky-rocketing and presents a clear danger to public health.

**Objectives:** This paper summarizes factors contributing to the phenomenon based on the recent literature review and proposes a possible behavioral intervention framework based on the ecological model of health behavior.

**Method:** Using the Ecological Behavioral model as a framework for formulating possible behavioral interventions based on current trends in anti-vaccination and vaccine hesitation.

**Conclusions:** A review of the current vaccine hesitation phenomenon suggests that the vast majority of the parents with anti-vaccination traits exhibit behavior patterns consistent with the ecological model of health behavior. Structured intervention at all levels may contribute to reducing the phenomenon among hesitating parents and declining in the influence power of anti-vaccination “gurus.”

many experts say that the current phenomenon can be traced to 1982. That year, NBC broadcasted a documentary, “DPT: Vaccine Roulette,” which discussed controversy spreading in the UK: a suspected connection between the vaccine for pertussis and seizures in young children [2]. Despite the strongest objections from medical society, fear started to spread, and this fact leads us to the conclusion that the anti-vaccination movement is first and foremost - breach/lack of trust between medical professionals and the public. The magnitude of the problem caused the WHO to declare vaccine hesitation as one of the global threats to public health and to declare it as a target [3]. To analyze this breach of trust will be necessary to state five



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behavioral patterns that lead to vaccine hesitancy among the parents. Hornsey et al., work, which mapped behavioral reasoning among the parents of 24 nations for refusing to scientifically based vaccinations, found that the phenomenon is global and share common features.

### Conspiracy theories

The most common reason to refuse vaccinations is conspiracy beliefs [2]. Conspiracy theories rooted in lack of trust in governmental bodies and development of paranoid-like beliefs that “government hiding something.” The major problem of such theories in the almost complete inability to refute them by governmental agencies. Furthermore, attempts to respond to such theories, sometimes perceived as additional attempts of “covering the truth,” and the vicious cycle continues. Another, relatively easy targets for conspiracy beliefs are large corporations. Due to the significant influence on the population and appearance of “back-door” cooperation with the government - many conspiracy theories connect corporations, governments, and secret, fraternity-like organizations, e.g., the Freemasonry.

Pharmaceutical corporations are not excluded, and probably the most defamed corporations in conspiracy theories circles. Most “famous” vaccine-related conspiracy theories are probably “MMR-Autism theory,” which claims the causality relationship between MMR vaccinations and later diagnosis of autism [4]. Another “theory” claims that the human immune system does not need vaccines, and “natural immunization” is more effective and safe, and many other theories and claims that parents sometimes quickly adopt and bring them to refrain from the vaccination [5].

### Additional behavioral patterns

Another pattern of anti-vaccination behavior lies in “reactant” and “individualism.” Anti-conformism and willingness to make personal decisions may lead some people into complete refuse to accept anything which they cannot understand or to perceive in their OWN way [2]. This group requires a personal approach and much patience. These people need to be provided with all possible information but also been given time to make their conclusion and decision. Another, relatively small group of vaccination objectors is people with underlying fear from medical procedures, needles, and medicaments. Those cases should be faced with classic psychological management of phobia and can be excluded from this discussion.

### Ecological Model factors and intervention methods

An ecological approach focuses on both population-level and individual-level determinants of health and healthcare-related interventions. In the ecological model context, factors determine health based on several levels of influence: from a public policy level, community, institutional, interpersonal, and intrapersonal factors.

- On the policy level, there is a place to establish a mandatory vaccination routine for education establishments (e.g., school, kindergartens). It may increase the ratio of vaccination just by “forcing” parents with legislation; however, it may increase anti-governmental attitude and deepen conspiracy theories. Thus, policy-based action cannot be a “stand-alone” measure.

- On the community level, we find not only a “classic” community but also the internet medium. Current research in

anti-vaccination incidence finds many similarities between developed countries with advanced internet access [2]. Open and unmediated access to medical information online has dramatically changed the dynamics of the healthcare industry and patient-physician interactions in recent years. Medical knowledge that was previously bound solely to textbooks and journals, and held primarily by medical professionals, is now accessible to anyone. However, an average online user may not be able to distinguish between reliable and bogus sources; thus, the Internet became a vital tool in the hands of anti-vaccination “gurus” [4]. Online anti-vaccination publishers use various tactics to promote their ideas. They include but are not limited to, pseudo-science, using medicine-like terminology, aggressive censorship of any opposition, attacking critics, claiming to be “pro-safe healthcare,” and not “anti-vaccine,” claiming that vaccines are toxic or unnatural. Most of the online activity brings us back to conspiracy theories, and due to the nature of the internet medium, it is very hard to deploy effective behavioral intervention. The positive online campaign to promote vaccination and show transparency regarding the mechanism of research and vaccine development may have desirable effects; however, it should include the option of “two-way” communication via the Internet to answer questions and to address issues in “real-time”. An additional factor that should receive attention on the community level is the increased incidence of “anti-vaccination related” diseases and conditions (e.g., autism). Increased number of cases of the specific, “conspiracy related” diseases in a relatively small geographic area may lead to a more rapid expansion of anti-vaccination theories and to undermine any attempt to correct the situation [6].

- On an institutional level, a positive behavioral intervention can be done by promoting vaccination among employees based on the personal example of influential persons, e.g., institutional management and celebrities, to assist people to assume behavior based on Social Cognitive Theory.

- Interpersonal and Intrapersonal factors are crucial for effective behavioral intervention, and leading roles in these interventions lay on the medical professional community. Several conversation strategies are recommended for use when interacting with vaccine-hesitant parents. These include managing honest and respectful dialogue, refraining from paternalism, which has been suspected as a contributing factor for malicious provider-patient relationships [4]. Acknowledging the risks of a vaccine is also essential, but balancing them against the risk of disease is the right way to present them. No less crucial is referring parents to reputable sources about vaccination and maintaining ongoing conversations with vaccine-hesitant families. Additional aspects of intervention on an interpersonal level lay with community-level interaction. Several studies showed that information disseminated by peer parents usually better assumed and accepted than information from “official” and medical sources [7]. Thus, it might be useful to interact with other families within the community to provide them with relevant information and to let them interact with anti-vaccination families. An additional crucial contributing factor to anti-vaccination trends comes from religion: Hinduism, Ultra-Orthodox Judaism, Jehovah’s Witnesses, and several more [4]. Healthcare providers from the same religion can do the most successful intervention in these cases, and all possible religions and confession are represented in the modern healthcare system and must be utilized to address specific issues of these populations.

## Conclusion

Vaccine hesitancy and vaccine refusal are incredibly complex social issues that require interventions at the individual, provider, healthcare system, and national levels. The rise of anti-vaccination movements in different parts of the world poses an immediate danger to public health and especially in the context of immune-suppressed patients [5] also, people of all ages affected by recent outbreaks of measles, one of the most notable “eliminated” diseases that made a comeback as a direct consequence of not reaching the immunization threshold due to anti-vaccination trends [8]. From public health point of view, the phenomenon may impact beyond to just specific disease incidence but extend across the life course of a vaccinated person, prevent outcomes on the broader community, reduce healthcare spending and hospitalization ratio, stabilize health systems, promote health equity, and benefit local and national economies [1]. The degree to which vaccinations provide broad public health benefits is more substantial than for other preventive and curative interventions; thus, the intervention to correct anti-vaccination behavior should be located on the list of national priorities of all countries. A review of current research regarding vaccine hesitation suggests that the vast majority of the vaccine hesitation exhibits behavior patterns consistent with the ecological model of health behavior. Structured intervention at all levels may contribute to reducing the phenomenon among hesitating parents and declining in the influence power of “anti-vaccination gurus.” Important to combine any legislation action with a comprehensive behavioral approach on the healthcare provider level to diminish conspiracy beliefs, which appear to be the most significant factor in bringing parents to endanger their children based on pseudo-scientific information from doubtful sources.

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