

## What influences vaccine acceptance: A model of determinants of vaccine hesitancy

### ***Definition of vaccine hesitancy***

**Vaccine hesitancy is a behavior, influenced by a number of factors including** issues of **confidence** (do not trust vaccine or provider), **complacency** (do not perceive a need for a vaccine, do not value the vaccine), and **convenience** (access). Vaccine hesitant individuals are a heterogeneous group who hold varying degrees of indecision about specific vaccines or vaccination in general. Vaccine hesitant individuals *may accept* all vaccines *but remain concerned* about vaccines, some may refuse or delay some vaccines, but accept others; some individuals may refuse all vaccines.

### ***Definition of vaccination confidence***

Trust in the effectiveness and safety of vaccines and in the system that delivers them, including the reliability and competence of the health services and health professionals and having trust in the motivations of the policy-makers who decide which vaccines are needed and when they are needed. Vaccination confidence exists on a continuum, ranging from zero-to-100% confidence. Vaccination confidence is only one of a number of factors that affect an individual's decision to accept a vaccine.

### ***Definition of vaccine complacency***

Vaccine complacency exists where perceived risks of vaccine-preventable diseases are low and vaccination is not deemed a necessary preventive action. Besides perceptions of the threat of disease severity and/or transmission, complacency about a particular vaccine or about vaccination in general can be influenced by under-appreciation of the value of vaccine (effectiveness and/or safety profile) or lack of knowledge. Immunization program success may result in complacency and ultimately, hesitancy, as individuals weigh risks of vaccines against risks of diseases that are no longer common as a result of immunization.

### ***Definition of vaccination convenience***

The quality of the service (real and/or perceived) and the degree to which vaccination services are delivered at a time and place and in a way that is considered appealing, affordable, convenient and comfortable, also affects the decision to vaccinate. Vaccination convenience and complacency are also determined by the priority that an individual places on vaccination.

***Vaccine decision making by a caregiver or patient is a complex process with many factors influencing this both directly and indirectly. Some factors may be more important in certain contexts than in others. Experience and circumstances may change the weight of a factor(s) in different settings.***

<u>CONTEXTUAL INFLUENCES</u>	<b>a.Communication and media environment</b>	<b>b. Influential leaders, gatekeepers and anti- or pro-vaccination lobbies</b>	<b>c.Historical influences</b>	<b>d.Religion/culture/gender/socio-economic</b>	<b>e. Politics/policies (Mandates)</b>	<b>f.Geographic barriers</b>	<b>g.Pharmaceutical industry</b>
Influences arising due to historic, socio-cultural, environmental, health system/institutional, economic or political factors	<i>Media and social media can create a negative or positive vaccine sentiment and can provide a platform for lobbies and key opinion leaders to influence others; social media allows users to freely voice opinions and experiences and it can facilitate the organization of social networks for or against vaccines .</i>	<i>Community leaders and influencers, including religious leaders in some settings, celebrities in others, can all have a significant influence on vaccine acceptance or hesitancy.</i>	<i>Historic influences such as the negative experience of the Trovan trial in Nigeria can undermine public trust and influence vaccine acceptance, as it did for polio, especially when combined with pressures of influential leaders and media. A community's experience isn't necessarily limited to vaccination but may affect it.</i>	<p><i>A few examples of the interplay of religious/cultural influences include:</i></p> <p><i>Some religious leaders prohibit vaccines</i></p> <p><i>Some cultures do not want men vaccinating children</i></p> <p><i>Some cultures value boys over girls and fathers don't allow children to be vaccinated),</i></p>	<i>Vaccine mandates can provoke vaccine hesitancy not necessarily because of safety or other concerns, but due to resistance to the notion of forced vaccination</i>	<i>A population can have general confidence in a vaccine and health service, and be motivated to receive a vaccine but hesitate as the health center is too far away or access is difficult.</i>	<i>Industry may be distrusted and influence vaccine hesitancy when perceived as driven only by financial motives and not in public health interest; This can extend to distrust in government when perceived that they are also being pushed by industry and not transparent.</i>

<p><b>INDIVIDUAL and GROUP INFLUENCES</b> Influences arising from personal perception of the vaccine or influences of the social/peer environment</p>	<p><b>a. Experience with past vaccination</b></p> <p><i>Past negative or positive experience with a particular vaccination can influence hesitancy or willingness to vaccinate. Knowledge of someone who suffered from a VPD due to non-vaccination may enhance vaccine acceptance. Personal experience or knowledge of someone who experienced an AEFI can also influence hesitancy.</i></p>	<p><b>b. Beliefs, attitudes about health and prevention</b></p> <p><i>Vaccine hesitancy can result from 1) beliefs that vaccine preventable diseases (VPD) are needed to build immunity (and that vaccines destroy important natural immunity) or 2) beliefs that other behaviors (breastfeeding, traditional/alternative medicine or naturopathy) are as or more important than vaccination to maintain health and prevent VPDs.</i></p>	<p><b>c. Knowledge/awareness</b></p> <p><i>Decisions to vaccinate or not are influenced by a number of the factors addressed here, including level of knowledge and awareness. Vaccine acceptance or hesitancy can be affected by whether an individual or group has accurate knowledge, a lack of awareness due to no information, or misperceptions due to misinformation. Accurate knowledge alone is not enough to ensure vaccine acceptance, and misperceptions may cause hesitancy, but still result in vaccine acceptance.</i></p>	<p><b>d. Health system and providers-trust and personal experience.</b></p> <p><i>Trust or distrust in government or authorities in general, can affect trust in vaccines and vaccination programmes delivered or mandated by the government. Past experiences that influence hesitancy can include system procedures that were too long or complex, or personal interactions were difficult.</i></p>	<p><b>e. Risk/benefit (perceived, heuristic)</b></p> <p><i>Perceptions of risk as well as perceptions of lack of risk can affect vaccine acceptance. Complacency sets in when the perception of disease risk is low and little felt need for vaccination. E.g. Patient's or caregiver's perceptions of their own or their children's risk of the natural disease or caregivers' perceptions of how serious or life threatening the VPD is.</i></p>	<p><b>f. Immunisation as a social norm vs. not needed/harmful</b></p> <p><i>Vaccine acceptance or hesitancy is influenced by peer group and social norms</i></p>
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<u>VACCINE/ VACCINATION</u> <u>-specific</u> <u>issues</u>	<b>a. Risk/ Benefit (scientific evidence)</b>	<b>b. Introduction of a new vaccine or new formulation</b>	<b>c. Mode of administration</b>	<b>d. Design of vaccination program/Mode of delivery</b>	<b>e. Reliability and/or source of vaccine supply</b>	<b>f. Vaccination schedule</b>	<b>g. Costs</b>	<b>h. Role of healthcare professionals</b>
Directly related to vaccine or vaccination	<i>Scientific evidence of risk/benefit and history of safety issues can prompt individuals to hesitate, even when safety issues have been clarified and/or addressed e.g. suspension of rotavirus vaccine due to intussusception; Guillain-Barre syndrome following swine flu vaccine (1976) or narcolepsy (2011) following (A)H1N1 vaccination; milder, local adverse events can also provoke hesitancy.</i>	<i>Individuals may hesitate to accept a new vaccine when they feel it has not been used/tested for long enough or feel that the new vaccine is not needed, or do not see the direct impact of the vaccine (e.g. HPV vaccine preventing cervical cancer). Individuals may be more willing (i.e. not complacent) to accept a new vaccine if perception of the VPD risk is high.</i>	<i>Mode of administration can influence vaccine hesitancy for different reasons. E.g. oral or nasal administrations are more convenient and may be accepted by those who find injections fearful or they do not have confidence in the health workers skills or devices used.</i>	<i>Delivery mode can affect vaccine hesitancy in multiple ways. Some parents may not have confidence in a vaccinator coming house-to-house; or a campaign approach driven by the government. Alternatively if a health centre is too far or the hours are inconvenient</i>	<i>Individuals may hesitate if they do not have confidence in the system's ability to provide vaccine(s) or might not have confidence in the source of the supply (e.g. if produced in a country/culture the individual is suspicious of); health workers may also be hesitant to administer a vaccine (especially a new one) if they do not have confidence that the supply will continue as it affects their clients trust in them. Caregivers may not have confidence that a needed vaccine and or health staff will be at the health facility if they go there.</i>	<i>Although there may be an appreciation for the importance of preventing individual vaccine preventable diseases, there may be reluctance to comply with the recommended schedule (e.g. multiple vaccines or age of vaccination).  Vaccination schedules have some flexibility that may allow for slight adjustment to meet individual needs and preferences. While this may alleviate hesitancy issues, accommodating individual demands are not feasible at a population level.</i>	<i>An individual may have confidence in a vaccine's safety and the system that delivers it, be motivated to vaccinate, but not be able to afford the vaccine or the costs associated with getting themselves and their child(ren) to the immunization point. Alternatively, the value of the vaccine might be diminished if provided for free.</i>	<i>Health care professionals (HCP) are important role models for their patients; if HCPs hesitate for any reason (e.g. due to lack of confidence in a vaccine's safety or need) it can influence their clients' willingness to vaccinate</i>

While some of the factors presented in this matrix could easily be understood as mostly convenience issues (e.g. costs, geographic distance to vaccination clinic), to some extent all of these factors can affect confidence (e.g. if I have to pay for the vaccine it can make me hesitate to accept it, because “if it was really important, it would be included in the publicly funded program”). Some factors could also be included in the three Cs, depending on the context. For instance, “vaccination schedule” could be understood as a confidence issue (e.g. if parents lack confidence in it – “too many vaccines, too early”), as a convenience issue (e.g. if parents have transport problems to come for all visits needed to fully immunize their child) or as complacency issue (e.g. if parents don’t think that it is important for their child to receive booster doses). Indeed, confidence, complacency and convenience issues can all result in vaccine hesitancy.

Understanding how barriers to vaccine uptake belong to one or many of the Cs is important in the design of activities and strategies that could have a positive impact on vaccine hesitancy. The varied drivers of hesitancy require different type of interventions (convenience issues call for activities and strategies such as reducing costs or enhancing geographic access to vaccination services, etc. whereas issues around low confidence may require trust building strategies such as improved dialogue).