Vaccine hesitancy: Definition, scope and determinants

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Vaccine hesitancy: Definition, scope and determinants

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ABSTRACT

The SAGE Working Group on Vaccine Hesitancy concluded that *vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence.* The Working Group retained the term 'vaccine' rather than 'vaccination' hesitancy, although the latter more correctly implies the broader range of immunization concerns, as vaccine hesitancy is the more commonly used term. While high levels of hesitancy lead to low vaccine demand, low levels of hesitancy do not necessarily mean high vaccine demand. The Vaccine Hesitancy Determinants Matrix displays the factors influencing the behavioral decision to accept, delay or reject some or all vaccines under three categories: contextual, individual and group, and vaccine/vaccination-specific influences.

1. Background

The first tasks of the SAGE Working Group on Vaccine Hesitancy (WG) [1] established in 2012, was to propose a definition of hesitancy and its scope and to develop a model to categorize factors that influence the behavioral decision to accept a vaccine. The WG accomplished these tasks through discussion of the use of the term and similar terms in the scientific literature, review of models of vaccine hesitancy, review of (a) a commissioned systematic review of determinants of vaccine hesitancy [2], (b) field reports and personal observations from the field by different organizations on hesitancy factors, and (c) a commissioned immunization managers' survey of vaccine hesitancy [3], as well as personal observations and experiences of WG members.

2. Terminology

As review of the literature did not reveal an established definition, the WG, in its early meetings, discussed at some length whether 'hesitancy' was the most appropriate word to describe the problem. Concerns were raised that hesitancy has a negative connotation. The most commonly offered alternative in the literature was confidence, a more positive word. While confidence covers a range of issues such as trust in vaccines including concerns about vaccine safety, and trust in health-care workers delivering the vaccine and in those making the decisions to approval of vaccines for a population, confidence is still narrow in scope covering only one category of factors that affect vaccination acceptance decisions (see Matrix Determinants below). Terms such as vaccine acceptance and uptake were also excluded as neither captured the concept breadth i.e. one might accept a vaccine but delay in accepting it i.e. not accepted according to the vaccine schedule. Hence the WG accepted the term hesitancy and then explored potential factors needed in its definition.

During discussions when the WG presented its report to SAGE in October 2014, the concept of vaccine hesitancy versus vaccination hesitancy was also raised. The former implies that the core issue is vaccine related while the latter covers a much wider range of factors such as immunization services, time and place, fear of needles, lack of concern about vaccine preventable diseases, etc. The WG nevertheless chose to adopt the term vaccine hesitancy but defining it in the broader sense (see Definition), noting that SAGE had used it in the terms of reference for the WG, and that this term has become the one more widely accepted in practice.

3. Scope

While acceptance of vaccination is the norm in the majority of populations globally, a smaller number refuse some vaccines but agree to others and some delay vaccination or accept vaccination but are unsure in doing so. Hesitancy is thus set on a continuum between those that accept all vaccines with no doubts, to complete refusal with no doubts, with vaccine hesitant individuals the

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[1] See SAGE Working Group on Vaccine Hesitancy members in Appendix A.

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heterogeneous group between these two extremes (Fig. 1). While recognizing that hesitant individuals encompass a wide range of people who differ from the very small percentage who refuse all vaccinations and have no doubts about doing this [4,5], the WG concluded that defining vaccine hesitancy on the continuum was not sufficient as it neither defined the scope nor implied the range of factors that influence hesitancy.

In further elucidating the scope, the WG emphasized that hesitancy is a behavioral phenomenon which is vaccine and context specific and measured against an expectation of reaching a specific vaccination coverage goal, given the immunization services available. Vaccine hesitancy may be present in situations where vaccination uptake is low because of system failures, e.g. stock-outs, limited availability of vaccination services (time, place, etc.), curtailment of vaccine services in the presence of conflict or natural disaster, but in these situations hesitancy is not the main explanation for the presence of unvaccinated or under-vaccinated members of the population. Assessing whether hesitancy is present in a population and differentiating hesitancy from other reasons why children/adults are unvaccinated or under-vaccinated is essential for the selection of interventions needed to address low vaccine uptake.

4. Vaccine hesitancy versus vaccine demand

The Working Group examined the relationship between vaccine hesitancy and vaccine demand [6]. In the Global Vaccine Action Plan, approved by the World Health Assembly in May 2012, Strategic Objective 2 states that "*individuals and communities understand the value of vaccines and demand immunization as both their right and responsibility*" [p. 38].

As illustrated in Fig. 1, vaccine hesitancy occurs on the continuum between high vaccine demand and complete vaccine refusal, i.e. no demand for available and offered vaccines. However, demand and hesitancy are not completely congruent. An individual or community may fully accept vaccination without hesitancy but may not demand vaccination or a specific vaccine. The following examples illustrate demand aspects that go beyond hesitancy. In Uttar Pradesh, India, the community demanded, through the courts, public access to Japanese encephalitis vaccine to curb annual disease outbreaks associated with high morbidity and mortality among their children [7]. In Calgary, Canada, in-school access to Human Papilloma Virus vaccine was prohibited in Catholic schools in 2008, but citizens' demand successfully overturned this ban in 2013 and supported in-school access to HPV vaccination as had previously been available only in non-Catholic public schools [8].

Because hesitancy undermines demand, to achieve the vaccine demand goal, as defined in the Global Vaccine Action Plan, countries will need to take action to counteract hesitancy. When rates of hesitancy are high, levels of demand are low, but low rates of hesitancy do not necessarily mean that demand will be high. To achieve high individual and community vaccine demand, context, community and vaccine specific strategies beyond those aimed at addressing hesitancy need to be developed.

5. Vaccine hesitancy models

Acceptance of vaccination is an outcome behavior resulting from a complex decision-making process that can be potentially influenced by a wide range of factors. In developing the definition, the WG in 2012 reviewed a number of conceptual models for grouping vaccine hesitancy determinants [2,9–11]. In the review, model complexity, global applicability, breadth of factors considered and potential usefulness in informing the development of vaccine hesitancy indicators and survey questions for use at the global and country levels were all considered. The WG also assessed whether the model could facilitate understanding of the concept of vaccine hesitancy for those unfamiliar with the term.

Review of these models confirmed the complexity of vaccine hesitancy and its determinants. The "3 Cs" model, first proposed to the WHO EURO Vaccine Communications Working Group in 2011 [9], highlights three categories; complacency, convenience and confidence (Fig. 2). As this model was viewed as being the most readily understandable, the concepts were incorporated in the definition.

In the "3 Cs" model, *confidence* is defined as trust in (i) the effectiveness and safety of vaccines; (ii) the system that delivers them, including the reliability and competence of the health services and health professionals and (iii) the motivations of policy-makers who decide on the needed vaccines.

Vaccination *complacency* exists where perceived risks of vaccine-preventable diseases are low and vaccination is not deemed a necessary preventive action. Complacency about a particular vaccine or about vaccination in general is influenced by many factors, including other life/health responsibilities that may

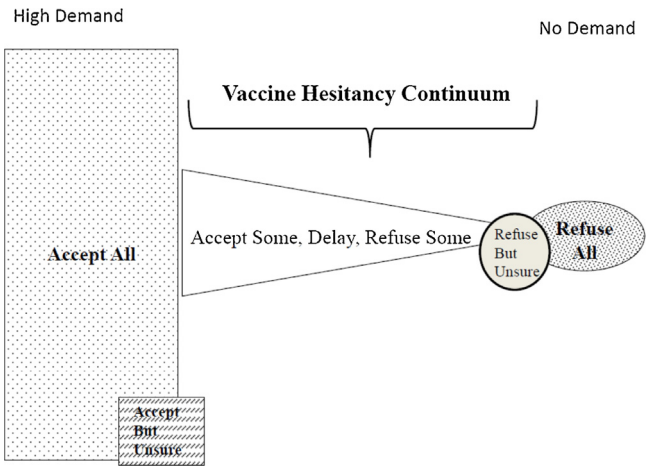

Fig. 1. The continuum of vaccine hesitancy between full acceptance and outright refusal of all vaccines.

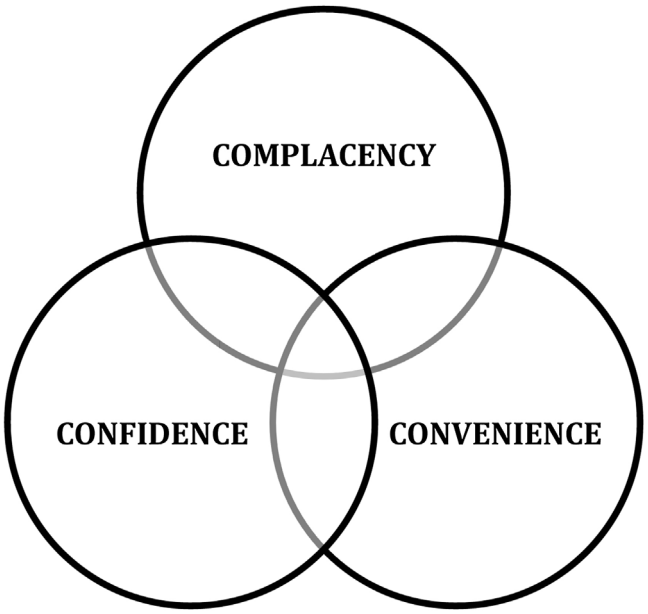

Fig. 2. "Three Cs" model of vaccine hesitancy.

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Table 1
Working Group on Vaccine Hesitancy Determinants Matrix.

Contextual influences Influences arising due to historic, socio-cultural, environmental, health system/institutional, economic or political factors	a. Communication and media environment b. Influential leaders, immunization programme gatekeepers and anti- or pro-vaccination lobbies c. Historical influences d. Religion/culture/gender/socio-economic e. Politics/policies f. Geographic barriers g. Perception of the pharmaceutical industry
Individual and group influences Influences arising from personal perception of the vaccine or influences of the social/peer environment	a. Personal, family and/or community members' experience with vaccination, including pain b. Beliefs, attitudes about health and prevention c. Knowledge/awareness d. Health system and providers – trust and personal experience e. Risk/benefit (perceived, heuristic) f. Immunization as a social norm vs. not needed/harmful
Vaccine/vaccination – specific issues Directly related to vaccine or vaccination	a. Risk/benefit (epidemiological and scientific evidence) b. Introduction of a new vaccine or new formulation or a new recommendation for an existing vaccine c. Mode of administration d. Design of vaccination programme/Mode of delivery (e.g., routine programme or mass vaccination campaign) e. Reliability and/or source of supply of vaccine and/or vaccination equipment f. Vaccination schedule g. Costs h. The strength of the recommendation and/or knowledge base and/or attitude of healthcare professionals

be seen to be more important at that point in time. Immunization programme success may, paradoxically, result in complacency and ultimately, hesitancy, as individuals weigh risks of vaccination with a particular vaccine against risks of the disease the vaccine prevents that disease is no longer common. Self-efficacy (the self-perceived or real ability of an individual to take action to be vaccinated) also influences the degree to which complacency determines hesitancy.

Vaccination *convenience* is a significant factor when physical availability, affordability and willingness-to-pay, geographical accessibility, ability to understand (language and health literacy) and appeal of immunization services affect uptake. 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 cultural context that is convenient and comfortable also affect the decision to be vaccinated and could lead to vaccine hesitancy.

6. Vaccine hesitancy determinants matrix

After review of models and much discussion about factors that can influence hesitancy, the WG developed the Vaccine Hesitancy Determinants Matrix with factors grouped in three categories: *contextual*, *individual and group* and *vaccine/vaccination-specific influences* (Table 1). The Matrix includes determinants identified from research studies, experiences of WG members in the field, and discussions with experts working in the area. Neither the commissioned systematic review of determinants [2], nor the findings from the WG's Immunization Managers Survey on hesitancy [3] uncovered new determinants that had not been included in the Matrix.

Of note, unlike with the social determinants of health, vaccine hesitancy determinants like education and socio-economic status do not influence hesitancy in only one direction. As shown in the commissioned systematic review, higher education may be associated with both lower and higher levels of vaccine acceptance [2]. In contrast, as a social determinant of health, education drives in one direction – more education leads to better health outcomes [12].

7. Vaccine hesitancy and communication

The Working Group discussed whether poor communication was a determinant of vaccine hesitancy. The Working Group concluded that communication was a tool not a determinant. While communication is not a specific factor, like confidence, complacency and convenience, when it is poor or inadequate it can negatively influence vaccination uptake and contribute to vaccine hesitancy. Poor quality services of any type, including poor communication, can undermine acceptance. This can be a problem in any setting. In high income countries with well-resourced vaccination programs, inadequate or poor immunization program communications can increase vaccine hesitancy and outright refusal. For example, in 1999, the reason underlying the decision to minimize thimerosal as a preservative in some vaccines in the USA was poorly communicated. As a consequence, this undermined public confidence in vaccination, leading to vaccine hesitancy and refusal [13]. In low and middle income countries, scarce communication resources limit the capacity to counter negative information about vaccines and achieve community support for vaccination programs. For instance, the Independent Monitoring Board on Polio Eradication noted deep concern about "*the Global Programme's weak grip on the communications and social mobilization that could not just neutralize communities' negativity, but generate more genuine demand. Within the Programme, communications is the poor cousin of vaccine delivery, undeservedly receiving far less focus. Communications expertise is sparse throughout and needs to be strengthened*" [14]. The WHO African Task Force on Immunization is collaborating with UNICEF on the development of a tool to improve vaccination programme communications in the region because these deficiencies, especially during crises, may result in significant vaccine hesitancy.

Thus, regardless of the setting and causes of vaccine hesitancy, poor communication needs to be addressed generally, in addition to developing targeted communication to address hesitancy issues and improve vaccination uptake. In this supplement Goldstein et al. [15] provide a brief introduction to health communication in the context of vaccine hesitancy.

8. Definition of vaccine hesitancy

Following its deliberations, the WG decided upon the following definition:

Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence.

9. Conclusions

The Working Group concluded that this practical definition of vaccine hesitancy was needed in order to ensure that Immunization Programme Managers, policy makers, clinicians and researchers

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would consistently use a standard term to cover the broad range of factors causing low vaccination uptake while excluding those not related to personal/community behavior choices. That low vaccine uptake may not be due to hesitancy must be born in mind when selecting interventions to improve uptake. The Vaccination Determinants Matrix, while not primarily intended as a practical tool, may be helpful for researchers, survey question developers and those developing interventions to address hesitancy to approach the problem more broadly than as simply an issue of confidence.

Conflict of interest statement

The LSHTM research group "Project to monitor public confidence in Immunization Programs" has received research funding from Novartis as well as funding from GSK to host a meeting on vaccine confidence. Heidi Larson has done consulting on vaccine confidence with GSK.

None of the other authors had any potential conflict of interest.

Some of the authors are World Health Organization staff members. The opinions expressed in this article are those of the authors and do not necessarily represent the decisions, official policy or opinions of the World Health Organization.

Appendix. SAGE Working Group on Vaccine Hesitancy

Juhani Eskola, National Institute for Health and Welfare, Finland (Chair of Working Group since April 2014); Xiaofeng Liang, Chinese Center for Disease Control, China (Member of SAGE until 2014, Chair of Working Group from March 2012 to April 2014); Mohuya Chaudhuri, Independent Journalist and Documentary Filmmaker, India; Eve Dubé, Institut National de Santé Publique du Québec, Canada; Bruce Gellin, Department of Health and Human Services, U.S.A.; Susan Goldstein, Soul City: Institute for Health and Development Communication, South Africa; Heidi Larson, London School of Hygiene and Tropical Medicine, U.K.; Noni MacDonald, Dalhousie University, Canada; Mahamane Laouali Manzo, Ministry of Health, Niger; Arthur Reingold, University of California at Berkeley, U.S.A.; Kinzang Tshering, Jigme Dorji Wangchuck National Referral Hospital, Bhutan; Yuqing Zhou, Chinese Center for Disease Control, China with the WHO/UNICEF Secretariat: Robb Butler, World Health Organization, Denmark; Philippe Duclos, World Health Organization, Switzerland; Sherine Guirguis, UNICEF, U.S.A.; Ben Hickler, UNICEF, U.S.A.; Melanie Schuster, World Health Organization, Switzerland.

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