Commentary

Increasing acceptance of a vaccination program for coronavirus disease 2019 in France: A challenge for one of the world's most vaccine-hesitant countries

L. Cambon *, M. Schwarzinger, F. Alla

[a] *SSMIP, CHU Bordeaux, Bordeaux, France*
[b] *MeRISP, Centre Inserm U 1219, Bordeaux Population Health, Université de Bordeaux, France*

ABSTRACT

France is one of the most vaccine-hesitant countries in the world, including for coronavirus disease 2019 (COVID-19). After 10 months of restrictive measures and media coverage of the dangers of COVID-19, French attitudes towards a vaccine continue to deteriorate. The communication strategies of the government have not helped; in fact, they have made the situation worse.

Empirical studies on the national strategy for management of the COVID-19 pandemic in France have shed light on the reasons for vaccine hesitancy. These studies have identified four pillars for the vaccination strategy: i) Communication regarding the importance of herd immunity, ii) making healthcare workers the focus of the vaccination campaign, iii) citizen mobilization and guaranteed consultations, and iv) access to free vaccines without delay. This paper discusses the evidence supporting this strategy.

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1. Introduction

At the beginning of the coronavirus disease 2019 (COVID-19) vaccination campaign, there was a general mistrust in COVID-19 vaccines [1], particularly in France [1]; this is in line with the general negative attitude towards vaccines in this country [2]. In fact, the proportion of French adults willing to get vaccinated, was 40% in December 2020 as compared to 53% in November 2020 [3]. This declining and alarming rate should have required a proactive and well-founded prevention policy.

Prevention policies in France are typically based on providing information designed to change behaviours. For example, most of the measures included in the national public health program ("Plan priorité prévention") are related to health education and information of the population [4]. However, the COVID-19 scientific committee [5] appointed by the President to guide public health decisions included nine virus experts (virologists, infectious disease specialists, epidemiologists) as compared to one sociologist and one anthropologist with expertise on health behaviour change at the population level. Accordingly, there was an inherent risk to define COVID-19 vaccination strategies based on the sole inputs from basic sciences and overlook multiple determinants from social sciences.

Vaccination behaviours are complex [6,7] and should be accounted for when formulating vaccination strategies [8]. A key to a successful COVID-19 vaccination campaign lies in identifying and addressing the multiple determinants linked altogether to vaccine hesitancy REF 7. Here, using previous results from published studies, we aimed at drawing key strategies and recommendations to overcome COVID-19 vaccine hesitancy in France. Especially, in order to understand how these determinants interact and which strategies would be most likely associated with higher vaccination uptake, our research team conducted a cross-analysis of i) CoVaPred and CoviPrev studies on COVID-19 vaccine hesitancy in representative samples of the French population [9,10], ii) studies on H1N1pdm09 pandemic influenza vaccine hesitancy in France[11–13]; iii) meta-analyses and systematic reviews of vaccine hesitancy [6,7,14]and iv) behaviour theories used for preventive measures. Based on this cross-analysis, we found four potential key strategies to increase COVID-19 vaccination intentions and discuss how they were used in the COVID-19 vaccination campaign in France.

2. Previous results crossed to draw the different strategies

2.1. Addressing vaccine hesitancy through different studies

The CoVaPred study [9], conducted by our team, highlighted determinants predicting the intention of French people of working age to be vaccinated against COVID-19. The results showed that perceived vaccine efficacy is a major determinant of the acceptance

* Corresponding author at: Linda Cambon, ISPED, 146 Rue Leo Saignat, 33000 Bordeaux, France.
E-mail address: Linda.cambon@u-bordeaux.fr (L. Cambon).

of vaccines, which depends also on the laboratory that manufactures the vaccine, along with the risk of serious side effects and the healthcare workers (HCWs) who perform the vaccinations (where physicians and pharmacists are trusted more than vaccination centers) [9]. Public acceptance of vaccination may only be achieved if the importance of herd immunity is adequately communicated by policymakers (*i.e.* the need for immunity in at least 50% of adults [through vaccination or infection] aged between 18 and 64 years) [9]. Given anti-vaccine attitudes, in the most optimistic scenario overall vaccination intentions were estimated at 61.3% in June 2020, assuming that the vaccine demonstrated 90% efficacy, originated from a European laboratory, had a severe adverse events rate of 1/100,000, and was administered in mass vaccination centers in the explicit context of achieving herd immunity [9]. Overall vaccination intentions were projected to decrease to 44.6% for a vaccine that is 50% effective and has a severe adverse events rate of 1/10,000. This vaccination rate would not be sufficient for herd immunity [9].

The CoviPrev study [10], another French study based on repeated cross-sectional surveys conducted by Sante Publique France, assessed the adoption of preventive measures recommended by the public authorities in response to the COVID-19 epidemic during the lockdown in metropolitan France. That study highlighted the influence on preventive measures of gender (i.e men adopted fewer preventive measures than women), socioeconomic status and related literacy (*i.e.* the average number of preventive measures adopted increased with higher socioeconomic status), having a relative with symptoms of COVID-19 (i.e positive influence on the adoption of preventive measures), approval and adherence to the measures by relatives (i.e positive influence), perceived ability to follow the recommended measures (i.e positive influence) and, to a lesser extent, the perceived severity of COVID-19 (i.e positive influence) [10].

Finally, studies on non-compulsory adult vaccination (*i.e.* for seasonal and pandemic influenza) enlight the importance for vaccine acceptance of the following determinants was highlighted: type of HCWs performing the vaccination, perceived benefits and risks of a new vaccine [6,7,11,12,14], norms perceptions – peer influence [6,7,11,12,14] or modelling [6,7,11,12,14], general attitudes and behaviours regarding vaccination [6,7,11–14], confidence in health authorities [7], and perceptions regarding self-efficacy and ease of access to the vaccine [6–8].

2.2. Key determinants for reducing vaccine hesitancy through theoritical models

Multiple determinants are involved in vaccine intentions. Thus, simply informing the public of the need to protect themselves is not sufficient; promoting vaccine confidence and collective responsibility is needed, while also addressing reasons for vaccine hesitancy. This can be achieved by following the principles of behavioural theories, such as: i) the continuum of vaccine hesitancy [8]; ii) the health belief model [15], which incorporates the notions of severity and vulnerability, as well as confidence in preventive measures; iii) a revised model of the theory of planned behaviour pertaining specifically to immunization [7], which weights certain determinants such as perceptions of the usefulness of vaccination, social norms, contextual elements, and personal and health goals; iv) the theory of interpersonal behaviour [16], which can be applied to vaccination in terms of habits and the novelty of the behaviour (*i.e.* vaccination), and also assigns weights to mediators and moderators; v) the theory of self-determination, which highlights the pathway between motivation and intention [17,18]; and vi) the Health Action Process Approach, which describes strategies promoting the implementation of intentions (*i.e.* to be vaccinated) and healthy actions [19]. These models posit that a person is more likely to be vaccinated if his or her intention is strong and persistent, and conditions promoting vaccination are in place.

3. Key strategies for the French vaccination campaign

From these previous results and theoretical models, we defined key potential strategies to increase COVID-19 vaccination intentions in France. They are presented in the Fig. 1 (Fig. 1. Meta-model of routes to overcoming COVID-19 vaccine hesitancy) and the description below.

3.1. Positive communication regarding the objective of herd immunity

The literature highlights the need to strike a balance between the benefits and risks of a vaccine [15]. In the case of COVID-19, perception of the individual risk/benefit ratio is important because i) the rapidity of development of the vaccine did undermine confidence in its safety; ii) the severity of COVID-19 depends on age and comorbidities, therefore the majority of the French adult population (29.7 million) might be concerned about being vaccinated for a disease that poses little danger to them (*vs.* the 23 million who may be at risk, including 13.7 million over the age of 65 years). Some studies have highlighted the importance of emphasizing the seriousness of the disease [20], and the regrets of those who are infected or transmit it to others [21]. But these determinants lose their influence if the person contracts the infection with weak symptoms [11]. The perceived seriousness of the disease may ultimately depend on personal experience or that of a close relative, especially in young and low-risk populations as demonstrated in CoviPrev study [10].

However, the way in which the various COVID-19 vaccines have been presented to the public by the French government may have emphasized the risk of serious side effects at the expense of the individual benefits in low-risk populations. Three examples could illustrate the blur about the individual risk–benefit ratio of vaccination in the low-risk populations: i) in January 2021, one member of the Immunization Advisory Committee [22]argued for the prioritization of the elderly on the grounds that the risk of adverse effects of new mRNA vaccines is acceptable in light of expected individual benefits (emphasizing that this technological innovation may be associated with an unacceptable risk of serious side effects in low-risk populations); ii) at the same time, health professionals were not prioritized for COVID-19 vaccination (emphasizing that individual benefits of vaccination do not outweigh the risks in low-risk populations), although they became subjected to mandatory vaccination in July 2020; iii) in March 2021, the AstraZeneca vaccine that uses chimpanzee adenovirus vaccine vector was suspended for safety reasons over 3 days and then reintroduced in the mass vaccination campaign. It is likely that all these elements contributed to the general confusion about the safety of COVID-19 vaccines in the low-risk and, to a lower extent, high-risk populations.

By contrast, if the French government's stated goal was to vaccinate the entire population over time in order to achieve a herd immunity, a simple altruistic strategy, *i.e.* emphasizing the importance of herd immunity or the protection of the most vulnerable populations, could have been a more judicious approach to reduce vaccine hesitancy [23]. As prioritization of the most vulnerable populations was unavoidable due to the timing and limited supply of vaccines, the actual reason for this prioritization should have been made explicit. In this regard, the CoVaPred study [9] emphasized the importance of protecting one's relatives and establishing herd immunity in COVID-19 vaccination intentions. According to this study, an explicit goal of herd immunity may be associated
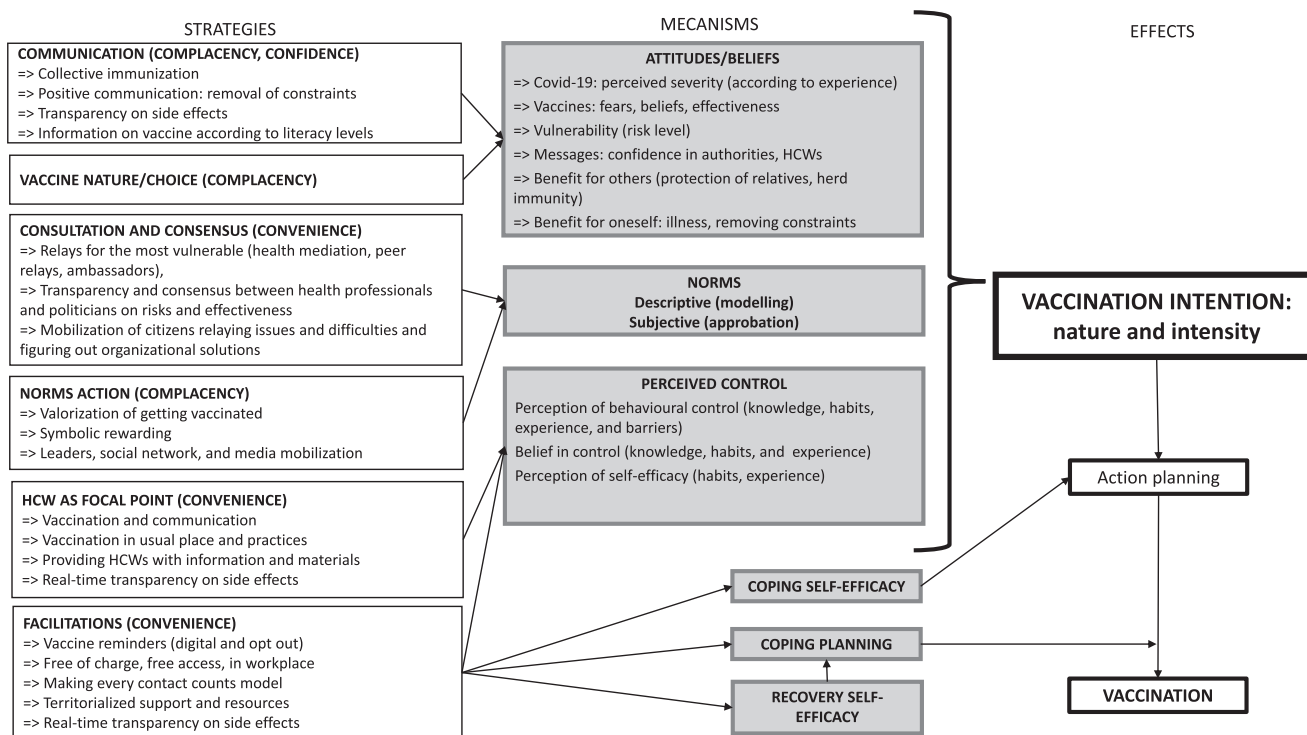
Fig. 1. Meta-model of routes to overcoming COVID-19 vaccine hesitancy.

with a 25% reduction in vaccine hesitancy, all other things being equal. This is coherent with the principle of intrinsic motivation described in the theory of self-determination [17,18]. According to this theory, strategies based on freedom of choice and understanding of the issues (*e.g.* being vaccinated to protect others) is a determinant of intrinsic motivation, which is the more predictable type of motivation to change behaviour. Individuals can be classified as follows: i) those who will not be vaccinated irrespective of the situation ("anti-vaxxers"), ii) those who will be vaccinated when it is demanded by an external agency (perception of having no choice) or to obtain a reward (*e.g.* a return to "normal" life with a health pass), iii) those who will be vaccinated to avoid feelings of guilt or anxiety associated with being responsible for infecting others, iv) those who will be vaccinated to fulfil an important personal goal (*e.g.* to protect their beloved ones), and v) those who are convinced of the merits of vaccination, including the most vulnerable. The most effective communication style regarding the merits of vaccination may differ among these profiles: for ii) and iv), the benefits of the removal of constraints should be emphasized, while for iii) the approval of peers should be highlighted and for iv) a collective enthusiasm should be created. Accordingly, the full range of motivations must be considered to achieve a large vaccination coverage of the population. By contrast, all forms of stigmatization and coercion should be avoided to prevent further entrenchment of coping [24] and reactance [25] strategies. Indeed, these strategies were observed in the French population and illustrated by the fact that the various constraints (confinement, traffic rules, etc.) put in place in everyday life did not succeed in curbing vaccine hesitancy to the point that the French government decided to introduce the health pass in July 2021, *i.e.*, a disguised vaccine obligation. It should be noted, however, that there is still controversy about the ability of vaccines to provide herd immunity beyond a given threshold of vaccination coverage in the population [26]. Early results from the mass vaccination campaign in Israel suggest that COVID-19 vaccines not only decrease the seriousness of COVID-19 [27] but also the spread of SARS-CoV-2 [26], although

the emergence of viral variants-of-concern with vaccine resistance or higher transmissibility may hamper any herd immunity objective [28].

3.2. HCWs as the focus of the vaccination campaign

Vaccination is a basic component of health care delivery. HCWs must be the focal point of vaccination campaigns; their opinions are powerful predictors of vaccine acceptance [11,29–31]. For instance, the fact that vaccinations were carried out in mass vaccination centers rather than by local HCWs, was largely responsible for the failure of the French vaccination campaign against A/H1N1pdm09 pandemic influenza: the vaccination coverage was less than 10% of the population [13]. Moreover, public confidence in vaccination may have been damaged by successive organizational failures and scandals in France [32]. Accordingly, the administration of vaccines by local HCWs seems always preferable in France.

However, the French government rushed to set up mass vaccination centers and did not consider the valuable role of HCWs to promote COVID-19 vaccination. In addition, mass vaccination centers could only be accessed via digital planning platforms, with inherent risks of digital divide. Local HCWs were only involved at a late stage of the mass vaccination campaign (May 2021). Thus, the government restricted access to vaccination without really giving any explanation, delayed putting in place the access measures that are nevertheless advocated in all the models relating to the vaccination hesitancy [6,8], and finally forced the population to get vaccinated in an emergency on the grounds of herd immunity (enforcement of the health pass in July 2021). Again, if the government's stated goal was to vaccinate the entire population over time, HCWs should have been given priority to be vaccinated (at least for their prescribing role) and to vaccinate their patients with all the data, information, and materials necessary to reassure and properly manage their patients.

3.3. Citizen, medias, opinion leaders mobilization

The behaviour of, and approval from, relatives and peers exert a powerful influence on behaviour, including that pertaining to vaccination. Observing positive behaviour in others [33,34], valuing group membership, personal choice [35], and rewards for certain behaviours [36] are effective strategies.

Community leaders and the media have a role to play in promoting the positive aspects of vaccination [36], which should be emphasized over stigmatizing communications [37]. The more consensus there is between HCWs and policy-makers on the risks and benefits, the more citizens and media are mobilized in a participatory manner to find solutions to vaccine hesitancy, the more effective the message of the benefits of vaccination can be successfully delivered. Indeed, everyone is a behavioural influencer. Mobilization around immunization is therefore a collective issue that should be mobilize everyone in their zone of influence. Thus, social influencers, local elected officials should be mobilized for such a cause i) to remove uncertainties, ii) to provide valid information, and iii) to adapt the organization of the vaccination campaign to local constraints and contexts, whether in terms of medical demography, culture, access to information, etc.

3.4. Importance of free and rapid access to vaccines

The effectiveness of any vaccination campaign depends as much on messaging that builds public confidence as it does on practical arrangements facilitating vaccine access. This should include limiting delays to vaccination, implementing a system that does not require a prescription or appointment, and reducing travel requirements (*e.g.* by offering vaccinations in the workplace or pharmacy) [38,39].

Thus the health authorities should have favoured individualized communications, automated vaccination appointments (and reminders therefor) for the entire population, exploitation of powerful digital communication platforms [40], rapid and free access to vaccines (including in the workplace), a good health system access via the implementation of the "Making Every Contact Count" model [41,42] and the mobilization of local resources in areas served by fewer HCWs..

4. Conclusion

Unprecedented resources have been deployed to develop and market safe and effective COVID-19 vaccines. Despite high excess mortality rates and among the most severe restrictions in 2020 in France [43], intention to get vaccinated against COVID-19 were initially low and barely increased during the mass vaccination campaign, to the point where the French government decided in July 2021 to introduce a health pass, a disguised vaccination obligation. Policy based on knowledge of the processes that lead a population to comply to a preventive measure should be favored over coercion. Katherine O'Brien, head of the Immunization Division of the World Health Organization, used an analogy whereby the development of COVID-19 vaccines represented merely the establishment of a "base camp" at the foot of Mount Everest (Interview done to Agence France Presse (AFP) by Katherine O'Brien November the 14th, 2020), while vaccinating populations is analogous to scaling the mountain.

When the French vaccination campaign began, we suggested a meta-model (Fig. 1) to climb the mountain, with the ambition to draw the most potential effective and adapted strategies to guide the French vaccination campaign (communicated in different columns). Unfortunately, it turns out that few of these principles were followed as illustrated by previous examples. Eventually, the French government decided to make vaccination somewhat compulsory by enforcing the health pass for all individuals aged 12 years and older in July 2021. However, the inability to reassure the population about the risk of serious side effects through an effective health mediation policy is illustrated by the fact that, although France now sparkles among the highest vaccination coverage rates worldwide [44], 10% of 6.4 million French people aged 75 years or more remain unvaccinated [45].

The authors hypothesize that the strategies proposed in this meta-model (Fig. 1) would have made it possible to implement the mass vaccination campaign more serenely, to avoid the health pass, particularly of teenagers, and to reinforce the confidence of French people in their health authorities.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

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