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**Short Report – unpublished manuscript under peer review**

**A vicious circle between lack of confidence in crisis management, vaccine refusal and failure to control the epidemic?**

Judith E. Mueller (1,2), Sandra Chyderiotis (2), Jonathan Sicsic (3), François Langot (4),  
Serge Blondel (3,5)

- 1) EHESP French School of Public Health
- 2) Institut Pasteur
- 3) LIRAES/Université de Paris
- 4) Université du Mans (GAINS-TEPP, IRA) & Institut Universitaire de France & Paris  
School of Economics & Cepremap & IZA
- 5) Université d'Angers (GRANEM-TEPP)

## **Abstract**

While the COVID-19 epidemic enters its second year, confidence in national authorities to manage the health and economic COVID-19 crisis may impact COVID-19 vaccine acceptance. To assess the relation between confidence in national authorities, socio-economic status and vaccine intention, we conducted an online survey among French adults during November 2020. Our results suggest that confidence, educational level and subjective deprivation are independent determinants of vaccine intention and indecision, including among  $\geq 65$ -year-old participants. We suggest that providing all citizens with equal opportunities and incentives for a health-focussed vaccine decision is essential to obtain high and equal vaccine coverage against COVID-19.

## **Introduction**

The rollout of COVID-19 vaccination in France is overshadowed by the poor vaccine coverage achieved during the H1N1-pandemic flu vaccine campaign in 2009, accredited to both unsuccessful organisation and disloyal mediatisation by medical experts [1]. What are the threats for the current campaign? While on one side, the government is accused of tardiness in organising the vaccine campaign, on the other, there is worry about low vaccine acceptance in the population. For example, in December 2020, intention to accept Covid-19 vaccination in the general French population was 40%, compared to 77% and 65% in the UK and Germany [2].

Confidence in vaccine safety is an important component in the vaccine hesitancy concept [3] and in an international comparison in 2016, the percentage of the general population agreeing with the statement “vaccines are safe” was particularly low in France [4]. We hypothesize that confidence in national authorities in a larger perspective may play an additional role, in particular in the context of an epidemic that has been ongoing for almost one year with various public debates about control measures.

## **Methods**

We designed a survey to assess the relation between confidence in national authorities, socio-economic status and vaccine intention. A representative sample of the French population (n=908) completed the anonymous online questionnaire between November 26th and December 1st, at the end of the second lockdown and before first efficacy data from COVID-19 vaccine trials were published. The survey did not require ethical review according to French regulations, as it collected only anonymous information and no medical data. Confidence was assessed by the question: “On a 0-10 scale how much confidence do you have in the authorities to manage the health and economic crisis due to COVID-19?": 32%,

33% and 36%, respectively, had a confidence level 0-3 (low), 4-6 (medium) and 7-10 (high). Socio-economic status was approximated through level of the highest diploma obtained (below, at or above French baccalaureate), subjective deprivation (« Did your household have financial problems during the last 12 months that hindered paying in time the rent, mortgage, consumer credits or every-day bills such as water, gas or electricity?») and theoretical possibility to stay at/work from home (beyond employer's attitude). Intention to accept COVID-19 vaccination was assessed as "Would you accept COVID-19 vaccine if it was recommended to you by your general practitioner?": 47% accepted and 12% did not know. We evaluated determinants of vaccine intention (yes vs. no/do not know) and indecision (do not know vs. no) based on relative risks estimated from modified multivariate Poisson models [Barros]. For this, we included in a full model all variables associated at  $P < 0.2$  and kept them in a parsimonious model only if associated at  $P < 0.05$ .

## Results

COVID-19 vaccine intention strongly increased with confidence in authorities' crisis management across gender and age groups (**Suppl. File**). Even among  $\geq 65$ -year-old persons, acceptance in low-confidence strata (47% and 58%, respectively, among women and men) contrasted with high acceptance in high-confidence strata (68% and 95%, respectively). The determinants of vaccine intention were high confidence (vs. low: relative risk (RR) 2.35, 95%-confidence interval 1.94-2.84), older age (65+yrs vs <45 yrs: RR 1.54, 1.28-1.86), male gender (RR 1.45, 1.28-1.66), higher educational level (higher vs. lower than baccalaureate: RR 1.33, 1.13-1.57), living in a small town (defined as 2,000-20,000 inhabitants vs. rural: RR 0.75, 0.63-0.90), having a close relative in nursing home (RR 1.24, 1.04-1.49) and believing that one has a risk factor for severe COVID-19 (RR 1.24, 1.08-1.41) (**Table 1**). Neither subjective deprivation nor possibility of home office contributed significantly. Specifically

among  $\geq 65$ -year-old individuals, determinants were educational level (higher vs. lower than baccalaureate, RR 1.58, 1.13-2.20), confidence in authorities' crisis management (high vs. low level, RR 1.52, 1.10-2.11) and male gender (RR 1.45, 1.11-1.89). In the full sample, expressing indecision with regard to vaccination vs. refusing was positively associated with medium (RR 2.06, 1.36-3.11) and high confidence (RR 1.80, 1.12-2.87), and negatively with feeling deprived (RR 0.46, 0.21-0.99) (**Table 1**).

## **Discussion**

Our results suggest that confidence in national authorities to manage the health and economic COVID-19 crisis, educational level and subjective deprivation act as independent determinants of COVID-19 vaccine intention and indecision among French adults, including among those at high risk of severe COVID-19 by their age.

The association of vaccine intention with higher educational levels and the observation that subjectively deprived persons rather said no than expressed indecision support concerns that unequal uptake of COVID-19 vaccination due to vaccine hesitancy could increase the already great inequality of burden of disease between socio-economic groups [5,6].

The strong association of vaccine intention with confidence in authorities' crisis management points to the previously described close interaction between politics and vaccination programmes: Holmberg, Stuart and Blume described how governments historically used vaccination, especially during epidemics, for demonstrating their power to protect and bring together the nation [7]. A French survey during the first COVID-19 epidemic wave in spring 2020 found that participants' willingness to get vaccinated against COVID-19 varied to some extent by their political choices made during the 2017 presidential election, with lower willingness expressed by those in extreme right or left wing votes [8]. In the light of these elements, our data show the risk of a vicious circle between lack of confidence in the crisis

management by national authorities, vaccine refusal and failure or delay to control the epidemic. The ongoing highly mediatised debate about the perceived tardiness of the vaccine rollout in France may push this even further.

Which could be a way forward? Without doubt, granting rapid and uncomplicated access to individuals in the target group with clear COVID-19 vaccine intention is essential and campaigns need to be organised consequently. However, to avoid unequal vaccine uptake determined by health-unrelated factors (such as confidence in authorities, educational level or deprivation), decision-making with health care providers should become central for those hesitating or refusing. This could imply a free and easily accessible vaccine consultation with physicians or other trained health care professionals, including teleconsultations and community-based sessions. Discussions would focus on the individual and collective benefits of vaccination and clear information about to be expected side effects.

Providing all citizens with equal opportunities and incentives for a vaccine decision focussing on health may be a worthwhile investment to obtain high and equal vaccine coverage against COVID-19.

### **Funding and conflict of interest**

We conducted the survey with financial support from the Conseil regional des Pays de la Loire, France (PANORisk project). The authors declare no conflict of interest.

### **Data availability statement**

Data available on request.

### **Key points**

- Intention to accept COVID-19 vaccination among French adults in November 2020 was strongly determined by confidence in authorities to manage the health and economic crisis due to the COVID-19 epidemic
- Socioeconomic status was associated with vaccine intention and indecision via educational level and subjective deprivation.
- To obtain high and equal COVID-19 vaccine coverage, free and easily accessible consultations with health care providers are needed for health-focussed vaccine decision making for hesitating or refusing individuals.



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**Table 1.** Determinants of COVID-19 vaccine intention in a representative sample of the general French adult population (n=908), November 2020.

	Yes vs. no or undecided		Undecided vs. no	
	RR	95%-CI	RR	95%-CI
Gender			-	
female	1			
male	1.45***	[1.28,1.66]		
Age category			-	
<45 years old	1			
45-64 years old	1.36***	[1.17,1.58]		
65+ years old	1.54***	[1.28,1.86]		
Confidence level in crisis management				
low (0-3)	1		1	
medium (4-6)	1.61***	[1.30,1.98]	2.06**	[1.36, 3.11]
high (7-10)	2.35***	[1.94,2.84]	1.80*	[1.12, 2.87]
Subjective deprivation				
no			1	
yes			0.46*	[0.21, 0.99]
Size of municipality of residence			-	
rural area, <2,000 inhabitants	1			
2,000-20,000 inhabitants	0.75**	[0.63,0.90]		
20,000-100,000 inhabitants	0.89	[0.76,1.05]		

≥100,000 inhabitants	0.91	[0.76,1.10]	
Educational level (relative to French <i>baccalaureate</i> )			-
lower	1		
equal	1.11	[0.91,1.36]	
higher	1.33***	[1.13,1.57]	
Close person in nursing home			-
no	1		
yes	1.24**	[1.04,1.49]	
Belief of having a risk factor for severe Covid-19			-
no	1		
yes	1.24**	[1.08,1.41]	

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\* P-value <0.05, \*\* P-value <0.01, \*\*\* P-value <0.001

95%-CI, 95% confidence interval

Relative risks were estimated in multivariate parsimonious Poisson models.

Other variables that were tested in bivariate models were geographic region, having children at charge, possibility of working in home office

**Supplementary File** to Short Report, Judith E. Mueller et al.

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**Figure 1.** Intention to accept Covid-19 vaccination among French adults (N=908) end of November 2020, by age group, gender and level of confidence (low, medium, high) in the authorities to manage the health and economic crisis due to Covid-19.

