

Vaccinatie:

Willingness

Rachael H Dodd 2020

We conducted an online survey of 4362 Australians aged 18 years and older during April 17–21, approximately 4 weeks after lockdown measures had been activated in Australia and at a time when potential deaths and health system capacity were still of great concern. We asked participants about actions or intentions toward the flu vaccine ("I have or I will get the flu vaccine this year") and a potential COVID-19 vaccine ("If a COVID-19 vaccine becomes available, I will get it"). In this sample, 630 (14 · 4%) participants said they would not get the flu vaccine this year, 394 (9 · 0%) were indifferent, and 3338 (76 · 5%) said they have or will get the flu vaccine this year. For a COVID-19 vaccine, 213 (4 · 9%) said they would not get the vaccine, 408 (9 · 4%) were indifferent, and 3741 (85 · 8%) said they would get the vaccine if it became available. Individuals who said they would not get a COVID-19 vaccine were more likely to believe the threat of COVID-19 has been exaggerated (43 · 7% [93/213]) than those who said they would get the vaccine if it became available (11 · 5% [429/3741]) and those who were indifferent (19 · 9% [81/408]). Inadequate health literacy and lower education level were significantly associated with a reluctance to be vaccinated against both influenza and COVID-19.

Rieger 2020

We conduct an online experiment with $N = 303$ subjects (64% female, 79% university students, average age 26 years). The text in the first treatment tried to evoke altruistic motives by explaining that some people cannot get vaccinated or remain vulnerable even after getting vaccinated and that they could get infected or even die. Getting vaccinated would mean reducing the risk of infection of these people. Vaccination is in this case an altruistic act. The other two texts, instead, triggered selfish motivations. In Treatment 2, the focus was on the fact that even younger adults who are not in high-risk groups may die of COVID-19. Thus, a vaccination will also be beneficial for them. Treatment 3 stressed the inconveniences that an infection may cause, even if these are not major inconveniences (having to go to hospital or being sick for a week). While 42.4% of the participants in Treatment 1 expressed an increased willingness to get vaccinated, only 15.4% and 19.0% of the participants did this in Treatment 2 and 3, respectively. The results suggest that triggering altruistic behavior by highlighting the danger for persons who cannot get vaccinated, and thus implying an indirect positive effect of vaccination in protecting these people, is the most promising strategy.

Neumann 2020

We provide some first insights into this willingness to be vaccinated, based on a multi-country European study, in seven European countries ($N = 7.662$). The sample consisted of about 1.000 respondents per country, and an additional 500 from the highly affected region Lombardy. As well as attitudes about vaccination and their willingness to be vaccinated between 2 and 15 April 2020. In total, 73.9% of the 7664 participants from Denmark, France, Germany, Italy, Portugal, the Netherlands, and the UK stated that they would be willing to get vaccinated against COVID-19 if a vaccine would be available. A further 18.9% of respondents stated that they were not sure, and 7.2% stated that they do not want to get vaccinated. As shown in Figs. 1 and 2, the willingness ranged from 62% in France to approx. 80% in Denmark and the UK. The largest proportions of the population opposed to a COVID-19 vaccination were observed in Germany (10%) and France (10%), while France also has the largest group of people who were unsure about getting vaccinated (28%). Looking closer, we found considerable differences in willingness to get vaccinated across genders and age groups. A significantly higher proportion of men were willing to get vaccinated. Especially men aged 55 and above. The same age trend was visible for women with older women being more willing than younger. The uncertainty among women was higher in all age groups and largest for women between the ages of 45 and 54 (26%). One might argue that the group who is currently unsure about getting a vaccine may be the most relevant. These are the people who potentially can be persuaded more easily to get vaccinated to achieve herd immunity. Based on our results, these efforts could best be aimed at persons below the age of 55 and at females in general, where the willingness is lower. We asked respondents who were unsure about being vaccinated about their main reasons (Fig. 4). More than half (55%) said they were concerned about potential side effects of a vaccine, although this concern was more frequent among women

(36%) than men (19%). Around 15% of respondents stated that a vaccine might not be safe, with no notable differences between genders. Our results on acceptability suggest that substantial gains could be made among the sizeable proportion of the population (i.e. 18.9%) that is unsure whether they want to get vaccinated. If this group needs to be convinced to be vaccinated to get to herd immunity, clear communication about safety, and potential side effects of the vaccine is especially important. This could help to stimulate the hesitant part of European citizens to get vaccinated after all.

Sun 2020

This present study examines willingness to participate in a COVID-19 vaccine trial among college students in China. First, this study describes the willingness and perceived concerns for COVID-19 vaccine trial participation. Second, this study explored the influence of demographic, psychosocial, and COVID-19 information sources on willingness to participate in COVID-19 vaccine trials. In this sample of 1,912 Chinese young adults enrolled as college and university students. The majority were female ($n = 1334$; 69.77%). The majority of participants indicated willingness to participate in a COVID-19 vaccine trial (50.31% indicated “maybe willing” and 13.70% noted “absolutely willing”; see Table 2). Among the 10 listed potential concerns for participating in a vaccine trial, prevalent concerns (i.e., top 5) included “Side effects of vaccine” (69.04%), “My family may not want me to take part” (63.02%), “Handicap or death from the vaccine” (58.05%), “Infected by COVID-19 through vaccine” (53.03%), and “Time necessary to be in a medical study” (52.46%).

Less prevalent concerns appeared to be stigma-related, including “Taking part may be seen as having COVID-19” (35.88%) and “Others may refuse contact with me” (36.93%), although the proportions were considerably large (more than one third of the sample).

Participants with higher levels of trust in the public health system and with higher levels of COVID-specific prosocial behaviors were more willing to participate.

Increasing transparency on vaccine research (including potential risks and harms), effective regulation of vaccine production to ensure standards of safety may help.

Thornelou 2020

In this UK-wide cross-sectional survey, we examined willingness to receive a COVID-19 vaccine in the general population and evaluated socio-demographic and clinical factors associated with willingness. We conducted a national cross-sectional online survey of individuals in the UK general population, between April 2020 and June 2020. 2568 deelnemers. The mean age of the sample was 45.3 years old ($SD \pm 16.1$). The majority of the sample were from England (1790; 87.4%), female (1358; 63.2%), from white ethnic backgrounds (1956; 91.0%), educated to degree level or above (1141; 53.0%) and in full or part-time employment (1474; 68.7%).

In total, 76.9% (1654) were classified as being willing to receive a COVID-19 vaccine. Just over one in five individuals were unwilling or unsure whether they would receive a COVID-19 vaccine if one were to become available (498; 23.1%). Individuals who were older, from white ethnic background, educated to degree level or above and had not had COVID-19 were significantly more likely to be willing to have a COVID-19 vaccine. Willingness did not vary among adults at increased risk of COVID-19 compared with those not at increased risk.

Voetnoot: Individuals from BAME groups were significantly more likely to be unsure about receiving a COVID-19 vaccine (28.8% vs. 13.6%) compared with strongly agreeing or agreeing that they would

be willing to receive a COVID-19 vaccine. There was no significant association between ethnicity and willingness when examining those who were unsure about receiving a COVID-19 vaccine vs. those who disagreed or strongly disagreed that they would be willing to receive a COVID-19 vaccine.

Fu 2020

The objective of the present study is to reveal the acceptance and preference for the 2019 novel coronavirus disease (COVID-19) vaccination in health-care workers (HCWs). We performed an internet-based, region-stratified survey among 352 HCWs and 189 individuals in the general population enrolled on March 17th and 18th 2020 from 26 Chinese provinces. The HCWs developed a more in-depth understanding of SARS-Coronavirus-2 infection and showed a higher tolerance to the future vaccination than the general population. 76.4% of HCWs (vs. 72.5% in the general) showed their willingness to receive vaccination. For all subjects, 80% agreed that it should be free of charge and nearly half could afford a cost of 100-299 RMB (14-42 dollars) for total doses. Three quarters of the HCWs would receive vaccination against COVID-19; however, nearly one fifth needed more information before they could finally make their decisions. Compared to the general population, HCWs showed more tolerance on the adverse effects and the effectiveness of vaccine. HCWs are vital to the public's decisions to receive the vaccination, which can eventually increase vaccine coverage.

Different from HCWs, the general population in the study showed more attention to the COVID-19 vaccine safety. It is natural that the public usually completely or partially refuses the vaccination when an emerging vaccine is in use. Due to a lack of knowledge of vaccine, they have to make trade-offs between the adverse outcomes of vaccination and the disease burden, indicating education should be strengthened at this stage. Social contacts, including the behaviors and attitude of relatives, friends and neighbors, play an importance role in decision for both HCWs and the general population. Uncertainty in the vaccination choice or being socially acceptable may contribute to the cautious or wait-and-see attitude. When vaccine safety or effectiveness is uncertain, external cues such as others' vaccination uptake will greatly help to strength or weaken the vaccination intent.

Lima 2020

Our first research question broadly addressed the overall willingness to accept a vaccine to combat the current pandemic. Participants of this study were marginally predisposed to accept a new vaccine against the novel coronavirus. Figure 2a shows a lower overall willingness to vaccinate children regardless of the respondent's level of concern regarding COVID-19 or their predisposition to seek health care. The participants revealed a lower acceptance of the vaccine for children when compared to their willingness to vaccinate themselves and their elders. The participants, however, indicated no difference in their inclination to get personally vaccinated against COVID-19 and the predisposition to take their elders to get the vaccine. We did not find any differences between willingness of US and UK participants. The participants' level of concern regarding the novel coronavirus is positively correlated with the overall willingness to accept a newly developed COVID-19 vaccine to all recipients. Those more concerned about the disease were more predisposed to get vaccinated in relation to those less concerned about it or in the middle of the road. Moreover, those in the middle of the road were more willing to accept the vaccine than less concerned respondents. Finally, we also analyzed whether there exists any difference in vaccination acceptance depending

on the respondents' previous experiences with vaccines and their contact with COVID-19. The participants who have received all their countries' required vaccines reported a higher acceptance in comparison to those who have only received some ($\Delta=0.196$, $P <.001$) or none of them. Moreover, having an acquaintance or themselves previously infected with COVID-19 also increased willingness to get vaccinated. Lastly, those who were residing in cities where COVID-19 had at least infected one resident also reported lower hesitancy towards the vaccine. Our findings indicate an overall lower willingness to get vaccinated if the vaccine's compound was independently found by an AI rather than solely by human researchers. A more positive framing of the consequences of the COVID-19 vaccine increased overall willingness to get vaccinated in comparison to the control group. Finally, the participants' initial willingness was strongly correlated to how much people modified their inclination to get vaccinated upon an intervention ($F=110.949$, $P <.001$). Participants in the lower tercile of vaccine acceptance reported a higher willingness-change when compared to those in both the center and upper terciles of willingness to get vaccinated against COVID-19. Those who reported an average willingness, were more affected by the stimulus than respondent's in the upper tercile. Therefore, those initially less willing to accept a vaccine are overall more likely to increase their inclination to get vaccinated.

Explicitly introducing the effectiveness of a new vaccine has shown to positively influence willingness to get vaccinated in comparison to only reporting the availability of the vaccine to the population (i.e., the control group in our study). Our results suggest, therefore, that governments might choose to promote vaccination through an advertisement of the efficacy of a coronavirus vaccine once it has been approved. We also examined whether a more negative stance while reporting the outcomes of the vaccine could negatively influence people's willingness to get vaccinated. Our results indicate a marginal positive overall willingness-change in comparison to the control group. We hypothesize that this is caused by the form of how the stimulus was designed. First, the consequences were not extremely serious or harmful; we explicitly addressed the side effects saying that they did not lead to any complications and disappeared after a few hours. Second, we also reported at the end of the articles that this vaccine was the most effective and safest way to combat the pandemic, so our intervention would not promote anti-vaccination feelings. Moreover, the participants assigned to the *human-AI collaboration* scenario reported an even higher positive change in vaccine acceptance in such treatment group. Our results suggest that those who are initially less willing to vaccinate report a greater positive change in their acceptance of the vaccine. Therefore, public promotion campaigns, especially if focused on advertising vaccines' effectiveness against the novel coronavirus, could influence those less willing to get vaccinated, an important step towards stopping the pandemic. Finally, a human-AI collaborative vaccine has shown to be malleable in terms of public willingness. We thus posit that people are open to human-AI collaborations in this field, particularly if such vaccines are proved to be safe (i.e., approved). Alongside our results indicating that participants' initial acceptance of the vaccine did not differ between vaccines solely developed by humans and those collaboratively created, our findings indicate that including AI into the development of vaccines could be extremely beneficial to the process without much public hesitancy or backlash.

Barello 2020

Study, not yet reviewed.

Italian students: Exploring their attitudes towards a future vaccine to prevent COVID-19 and; (2) evaluating the impact of the university curricula (healthcare vs. non-healthcare curricula) on the

intention to vaccinate. 735 students from distinct academic curricula took part in the study. Our sample was not designed to be representative of the Italian university students, but to provide an initial and insightful description of the investigated phenomena. Descriptive analysis on the 735 students that answered to the question on the intention to vaccinate showed that 633 (86.1%) students reported that they would choose to have a vaccination for the COVID-19 coronavirus; on the other side, 102 (13.9%) students reported that they would not or be not sure to vaccine (low intention to vaccinate). This means that in our sample more than one student out of 10 shows low intention to vaccinate (vaccine hesitancy). All the comparison analysis showed that responders who chose not to disclose their intention to vaccinate did not significantly differ from the others on demographic and social characteristics. Furthermore, when running analysis comparing healthcare students versus non-healthcare students we found no significant differences in responses' percentage. we expected that the intention to vaccinate would have been higher in students attending healthcare curricula due to higher literacy on health-related issues. this finding suggests that vaccination attitude is not only influenced by the students' level of health knowledge, but probably by other motivational and psychological factors, including the sense of individual responsibility for population health and the common sense about the value of civic life and social solidarity, as demonstrated by other studies on the COVID-19 pandemic

Blanchard 2020

Preprint

The purpose of the present study was to assess attitudes towards COVID-19 vaccination, and to also examine how the COVID-19 crisis affects support for vaccination in general. The effect of socio-economic characteristics and public health parameters on these attitudes was investigated. Data were drawn from two surveys and a variety of publicly available sources. First, a nationally representative sample of 1,653 UK residents was surveyed in October 2019 (pre-COVID-19) about their vaccination attitudes. The same 1,653 UK residents were contacted again for a second survey in April 2020, at the peak of the COVID-19 pandemic. 1,194 (72%) of the initial participants responded to the second survey. In addition, the April 2020 follow-up survey asked a set of additional questions about the perceived risk of COVID-19 for respondents or their immediate family, attitudes towards COVID-19 vaccination. Dus ze waren al een keer gevraagd over vaccinaties in het algemeen. Nu specifiek COIVD. Is er wat veranderd?

85% of respondents in the nationally representative sample of 1,194 UK residents are either definitely or probably willing to become vaccinated against COVID-19. Only 8% said that they would either probably or definitely not take the vaccine. Next, the responses were analysed according to three groups of vaccination attitudes; the vaccination sceptics, the vaccination hesitants, and the pro-vaccination respondents. Respondents were assigned to one of these three categories based on their answers to a set of 8 questions on vaccines. Attitudes towards vaccination in general correlate with willingness to receive a potential COVID-19 vaccine. In the Pro Vac group, 95% state that they would like to be vaccinated against COVID-19. Even among the most skeptical – who believe that vaccines cause autism and have few demonstrable benefits – 24% would “definitely” like to be vaccinated against COVID-19 and another 31% would probably do so. Only 29% think they would probably or definitely not do so. A similar pattern emerged for the question about making COVID-19 vaccinations mandatory, with 36% of the most skeptical respondents favoring a legal obligation to be vaccinated.

Second, the COVID-19 shock was sufficiently severe to create substantial support

for vaccination across all socio-economic groups in the UK, and even among vaccination sceptics. Having a close family member at risk sharply increased support for vaccination (Figure 2). Even respondents who believed that vaccines can cause autism, have other severe side-effects, generate few benefits, and are mainly prescribed because of financial interests of the pharmaceutical industry, were overwhelmingly willing to become vaccinated against COVID-19 in April 2020 (Figure 1). This implies that vaccine hesitancy is unlikely to impede herd immunity against COVID-19 through vaccination.

It was further examined how ICU availability and perceived individual and family risk affect the willingness to be vaccinated against COVID-19. First, it was found that in areas where the NHS maintained sizeable spare capacity in ICU units, vaccination support was markedly higher. The greater the number of ICU units in an area, the more people indicated that they would be willing to be vaccinated. The effect is independent of pre-existing attitudes towards vaccination – both sceptics and vaccination-supporters show higher rates of support for COVID-19 -vaccination where England's National Health Service had enough free ICU capacities.

Further, survey respondents who thought that COVID-19 posed a clear risk to themselves or family members were much more likely to be willing to be vaccinated.

As individuals were asked the same questions about support for punishing vaccination evaders twice – in October 2019 and April 2020 – it was possible to directly examine this issue. Of the three measures – keeping non-vaccinated children out of school, cutting parents' benefits, and fining the parents if a child is not vaccinated – only one measure (fining) saw a major increase in support during the COVID-19 crisis. No additional support for withholding attendance or cutting benefits was forthcoming in the sample. At the same time, 1 out of 10 respondents who stated that parents who refuse to vaccinate should not be fined changed their mind by April 2020, a mere 7 months later. The rise in support for fines was mainly driven by those with pro-vaccination attitudes – and to a lesser extent, the vaccination hesitants. Respondents with antivaccine beliefs did not change their support for penalties, despite the severity of the COVID-19 crisis and their frequent willingness to become vaccinated against COVID-19.

Frank en Adim 2020 government paper

Canada → Willingness → role of trust. The degree to which individuals have trust in policy makers and public health authorities has been associated with their willingness to engage in public health measures such as vaccinations (Dubé et al. 2013; Greenberg, Dubé and Driedger 2017). This study examines how crowdsourcing participants' willingness to receive a COVID-19 vaccination when one becomes available differs by their level of trust in other people, government and public health. Results for this study were drawn from Statistics Canada's crowdsourcing data collection series *The Impacts of COVID-19 on Canadians: Trust in Others*. From May 26 and June 8, 2020, over 36,000 participants voluntarily completed this online questionnaire which focused on the level of trust Canadians have in government, in businesses, and in others, and their views regarding the reopening of workplaces and public spaces. Readers should note that crowdsourcing data are not collected under a sample design using probability-based sampling. As a result, the findings cannot be applied to the overall Canadian population.

Over two-thirds of crowdsourcing participants (68.2%) reported that they were very likely to voluntarily get vaccinated (Chart 1). Just over 1 in 10 participants indicated that they were somewhat unlikely (4.1%) or very unlikely (7.9%) to get a COVID-19 vaccine. Trust in others played a role in crowdsourcing participants' willingness to voluntarily get a COVID-19 vaccine (Chart 2). About 7 in 10 participants who indicated that most people can be trusted were very likely to get a COVID-19 vaccine when one becomes available, compared to 6 in 10 participants who indicated that most people cannot be trusted (70.7% and 60.6%, respectively).

Crowdsourcing participants' willingness to get a COVID-19 vaccine differed markedly between participants with high and low levels of trust in government and public health authorities, particularly at the federal level. Over three-quarters of crowdsourcing participants who had a high level of trust in federal government indicated that they were very likely to get a COVID-19 vaccine when one becomes available (77.3%), compared to more than half of participants who had a low level of trust in federal government (53.8%). Similarly, while 76.4% of participants who had a high level of trust in federal public health authorities were very likely to get a COVID-19 vaccine, fewer than half of participants (44.4%) with a low level of trust in federal public health authorities indicated that they were very likely to get vaccinated

Detoc

France → willingness to participate in a trial and to get vaccinated against COVID-19.

We conducted an anonymous online survey (Lime Survey) from the 26th of March to the 12th of March 2020 among adult general population and adult patients. 3,259 participants. Women accounted for 67.4 % of the responders. 24.1% responders reported a chronic medical conditions, 68 (2.1%) diabetes mellitus, (8.0%) history of hypertension, 2.8 a history of cardiac disease, 139 (4.3%) a history of chronic lung disease, and 63 (1.9%) were receiving an immunosuppressive medication.

According to their statements, 2,512 participants (77.6%, 95 % CI 76.2-79.0 %) will certainly or probably be willing to get vaccinated against COVID-19. Among the 1,063 men, 883 (83.1% 95% CI 80.8-85.3%) are COVID-19 vaccine acceptors, 1,629 women among the 2,196 responders (74.2 % 95 % CI 72.3-76.0%) are COVID-19 vaccine acceptors ($p<0.005$). The proportion of vaccine hesitant responders who would probably be willing to get vaccinated against COVID-19 vaccine was 61.9 % (95 % CI 59.1-64.7 %) during the current pandemics. The proportion of healthcare workers willing to get vaccinated was 81.5 %, and this proportion was 73.7 % in non-healthcare workers ($p<0.005$). older age, male gender, fear about COVID-19, be healthcare workers and individual perceived risk remained associated with COVID-19 vaccine acceptance. One thousand and five hundred and fifty two responders (47.6 % 95 % CI 45.9-49.3 %) will certainly or probably be willing to participate in a COVID-19 vaccine clinical trial. Among the 1.063 men, 634 (59.6 % 95 % CI 56.7-62.5 %) will probably accept to participate in a COVID-19 vaccine clinical trial, this proportion is significantly greater than women (41.8 % 95 % CI 39.7-43.9 %, $p<0.005$). The percentage of potential participants in a COVID-19 vaccine clinical trial was 56.8 % (53.4-60.2 %) in the 50-64 years age group, and 58.7 % (95 % CI 52.8-64.6 %) in the 65-80 years age group. Healthcare workers are more prone to participate in a vaccine clinical trial than non-healthcare workers (50.5 % vs 45.4 %, $p<0.005$). Fears about COVID-19 were not associated with willingness to participate in a clinical trial. However, individuals who considered themselves at-risk for COVID-19 infection were more prone to accept to participate in a clinical trial for a vaccine. Furthermore, a great number of healthcare workers (43.6 % of the responders) answered the survey and we observed that healthcare workers were more prone to get vaccinated or to participate in a vaccine clinical trial independently of the perceived risk to get contaminated. However, vaccine hesitancy also affects healthcare workers [15-17]. In our study sample, vaccine hesitancy affects 29.3 % of the healthcare workers and 39.9 % of the non-healthcare workers.

Sherman 2020

UK → preprint. To investigate factors associated with intention to be vaccinated against COVID-19. Online cross-sectional survey of 1,500 UK adults, recruited from an existing online research panel. As intended, participants were broadly representative of the UK population (mean age 46.0 years, SD=15.8, range 18 to 87; 51% female; 85% white ethnicity). Data were collected between 14th and 17th July 2020. 64% of participants reported being likely to be vaccinated against COVID-19; 27% were unsure and 9% reported being unlikely to be vaccinated. Intention to be vaccinated was associated with more positive general

COVID-19 vaccination beliefs and attitudes, weaker beliefs that the vaccination would cause side effects or be unsafe, greater perceived information sufficiency to make an informed decision about COVID-19 vaccination, greater perceived risk of COVID-19 to others but not oneself, older age, and having been vaccinated for influenza last winter (2019/20). Despite uncertainty around the details of a COVID-19 vaccination, most participants reported intending to be vaccinated for COVID-19. Importantly, we found that the factor that explained the greatest proportion of the variance in vaccination intention was COVID-19 vaccination beliefs and attitudes (20%). This factor encompassed items measuring positive influence of recommendations from authorities to be vaccinated, greater perceived social norms about vaccination, greater perceived effectiveness, greater perceived likelihood of catching COVID-19 without a vaccine, greater anticipated regret of not being vaccinated, beliefs that COVID-19 vaccination should be mandatory and greater perceived ease of vaccination. In contrast to previous research,(9) we found no evidence of an association between greater perceived risk of COVID-19 to oneself and vaccination intention. However, greater perceived risk to others was associated with vaccination intention in our study. This suggests that vaccination campaigns and messaging highlighting the need for vaccination for altruistic reasons (i.e. to protect others) might be particularly effective.

We also found that concerns about adverse effects and vaccine novelty were associated with vaccination intention. However, vaccination intention was lower in those who thought that only those who are at risk of serious illness need to be vaccinated. This may be because most of the sample did not think that they were at increased clinical risk of COVID-19. Our findings that thinking that one has had COVID-19 was not associated with vaccination intention is reassuring.

Williams 2020

Preprint, UK. Data collection took place for ten days from 1st April 2020, spanning the second and third weeks of lockdown in the UK. At that time, the COVID-19 vaccination was in early development, with the first human trial of the vaccine commencing on 23rd April 2020 in the UK. The sample for the present study had previously been recruited for two ongoing projects examining vaccination behaviour more broadly. The present sample comprised 527 participants (57% female) with a mean age of 59.5 years old.

The sample is well balanced in terms of gender profile (56.7% female) and deprivation category. We found that 58% of the sample (n=307) would definitely want to receive a vaccine for COVID-19 once it becomes available, and 27% (n=143) probably would want to receive it (see Table 1). However, 7% were unsure (n=38), 2% (n=9) would probably not want to receive it, and 6% (n=29) would definitely not COVID-19 vaccination uptake 11 want to receive it. willingness to receive a COVID-19 vaccination

was positively associated with the belief that the COVID-19 outbreak is going to continue for a long time, and negatively associated with the belief that the media has over-exaggerated the risks of catching COVID-19. There were no significant correlations between intention to vaccinate and the other questions tapping perceptions of COVID-19, or with age. Higher levels of worry about COVID-19 were positively associated with perceived likelihood of infection, severity, and timeline, and negatively associated with media over-exaggeration and age. 'Personal health' (n=176 responses), 'severity of COVID-19 disease' (n=85), and 'health consequences to others' (n=36), and were viewed as factors which facilitated vaccination, while 'concerns about vaccine safety' (n=158) was considered a barrier to vaccine uptake.

Personal health (facilitator): Participants primarily described feeling particularly susceptible to contracting the virus. Risk factors included older age ("age and underlying medical condition makes me vulnerable" [female, aged 70]), having a chronic lung condition or other co-morbidities ("I have asthma so any chest infections put me at risk" [female, aged 57]), and working in a high-risk profession. Feeling vulnerable due to these risk factors, participants emphasised that vaccination against COVID-19 would provide a sense of COVID-19 vaccination uptake 13 protection ("I have a number of co-morbidities so feel it is important to take the protection which is offered" [female, aged 68]), and could help maintain their long-term health by gaining antibodies and immunity to the disease.

Severity of COVID-19 disease (facilitator): Concerns of contracting COVID-19 disease and the highly contagious nature of the virus were highlighted by respondents as factors to vaccinate. The severity of contracting COVID-19, and the fear of possibly dying from the disease, were motivators for participants to vaccinate. **Health consequences to others (facilitator)** Achieving herd immunity and protecting the health of others were considered benefits to vaccinating by participants. **Concerns of vaccine safety (barrier)** As the COVID-19 vaccination is still under development at the time of this study, barriers to vaccine uptake from participants primarily centred on the newness of the vaccine and its safety and effectiveness ("a bit sceptical as it would be a new vaccine" [female, aged 41]). Participants felt that

the development of COVID-19 vaccines may be rushed, and that vaccination safety measures could

be overlooked in the development process. Promisingly, our data also suggest that COVID-19 may have a substantial and positive impact on vaccination behaviour in general, with 38% saying it will make them more likely to get the annual flu vaccination, and 51% saying they will now be more likely to receive the one-off pneumococcal vaccination.

Advies: Using the BCW (Michie et al., 2014), we identified several intervention functions. In the current context, the functions of education and persuasion are likely to be the most useful. Education can

improve knowledge of susceptibility and severity of COVID-19 and the effectiveness of vaccination, while persuasion can be used to change beliefs and encourage action towards vaccination. In terms of content of these mass media interventions, we identified a number of potential BCTs that reflected the beliefs about consequences domain of the TDF (see Table 3 for detail). As the vaccination is likely to be needed at a population-level, the mode of delivery for an intervention could be a combination of mass media (e.g. TV and radio, print media), the social media, and working closely with broadcasters and journalists to manage consistent messaging and challenge misinformation (Davis et al., 2020). A coherent media presence would enable the communication of strong descriptive and injunctive social norms concerning COVID-19 vaccination.

Hesitancy:

Vaccine hesitancy has been defined by the WHO Strategic Advisory Group of Experts (SAGE) on vaccine hesitancy as the "delay in acceptance or refusal of vaccination despite the availability of vaccination services" (MacDonald & SAGE, 2015, p.4161). Thus, vaccine hesitancy is not confined only to those who outright reject vaccines, but those who believe that they are unsafe and therefore delay scheduled immunization programmes or those who accept some vaccinations but not others (Yaqub, Castle-Clarke, Sevdalis & Chataway, 2014). (In Butter 2020)

Thunstroem 2020

We design a survey experiment in which a nationally representative sample of 3,133 adults in the U.S. state their intentions to vaccinate themselves and their children for COVID-19.

Participants in our survey experiment were assembled by the survey company Qualtrics, who was instructed to recruit a sample of 3,000 survey respondents who are representative of the U.S. general population in gender, age, income, education, race, and residential region.

In a survey experiment ($N=3,133$) that accounts for uncertainty in probabilities of infection and conditional mortality rates, we find that around 20% of Americans would decline a COVID-19 vaccine for themselves and for their children when having children.

Our exploration of the determinants of vaccine avoidance suggests that the probability of infection matters—the higher the probability of the average American to catch the virus, the more likely people are to choose to vaccinate. The share of people who vaccinate is 69% if the probability of catching COVID-19 is communicated as high and 81% if the probability is communicated as low.

shows that women are 6% less likely to vaccinate than men, and low-income earners are close to 4% less likely to vaccinate than medium income earners. We find that people who are taking more of preventive measures are more likely to vaccinate for COVID-19. We find that trust in government agencies matters to the decision to vaccinate for COVID-19.

people who are confident that vaccines in general are safe are 17% more likely to take the COVID-19 vaccine.

People who agree that they do not need to get vaccinated if everyone else is vaccinated are 8% less likely to get a COVID-19 vaccine. Table 2 shows that participants who believe their risk of infection is lower than that of the average American are 6% less likely to get vaccinated

the most important reason to decline the COVID-19 vaccine is its novelty and worry about negative side-effects (80%). Of those declining the vaccine, 72% state that general avoidance of vaccines is an important reason for also avoiding the COVID-19. Other important reasons for declining the vaccine are doubts that the vaccine will in fact provide protection from catching the virus and the belief that COVID-19 is not severe enough to warrant vaccination.

Trogen 2020

Opinion

Already before coronavirus disease 2019 (COVID-19), vaccine hesitancy and refusal were increasing. In 2019, The World Health Organization even listed vaccine refusal as one of the top 10 global health threats. COVID-19 has created intense concern and uncertainty in the US and throughout the world. There are immense public and political pressures to develop a new vaccine, a process that typically takes years, not months. But as history warns, these pressures must not supplant rigorous scientific practice. Proceeding stepwise through the phases of clinical trials is the ethical standard for investigations involving human research participants. Adherence to the scientific method is the only way to safeguard against a SARS-CoV-2 vaccine that is ineffective, or worse, carries unacceptable adverse effects. In dat geval zal de mistrust t.o.v. vaccines alleen maar groter worden met als gevolg nog meer verpreiding vanvirussen die door vaccinaties gemakkelijk te stoppen zou zijn. To proactively address safety concerns, het van belang de veiligheid en zorgvuldige stappen these and other safeguards should be clearly communicated to the public during the vaccine development process.

McAteer

Pediatric → in deze hoedanigheid veel te maken met ouders/families die tegen vaccineren zijn. Common drivers for vaccine hesitancy die hij tegenkomt in zijn praktijk zijn: Hesitant families frequently express concern about vaccine safety, but even this issue has multiple layers, including fears regarding potential links to autism (now thoroughly refuted), learning difficulties, and chronic illnesses, as well as a perceived lack of safety testing prior to approval for use. Ook hier wordt gesuggereerd dat communicatie belangrijk is. develop the most effective and efficient communication strategies. Maar daarvoor moet eerst een duidelijk beeld geschept worden waarom mensen hesitant zijn.

Dror 2020

To evaluate the current vaccination compliance rate among the Israeli populations, we distributed a multicenter anonymous questionnaire to medical staff and civilians across the country, asking if they would agree to receive a SARS-CoV-2 vaccine once available. March 2020 We analyzed the 1941 responses based on occupation, exposure to either suspected or confirmed SARS-CoV-2 patients, and history of vaccinations

to influenza strains prior to the COVID-19 epidemic. The responses of the 829 healthcare staff were compared with 1112 responders of the general population. All questionnaires were filled out during the mandatory quarantine period in Israel.

Surprisingly, we witnessed a high rate of vaccine skepticism among medical staff who normally advocate for community vaccination. Moreover, most of the

responders who are noncompliant with recommended vaccinations expressed concerns regarding the safety of a rapidly-developed vaccine. Our data also show that individuals who consider themselves to be at a higher risk of the disease have a higher compliance to vaccination.

Surprisingly, our findings suggest that employment within the healthcare sector does not significantly influence the respondents' acceptance or rejection of a potential COVID-19 vaccine.

the rate of acceptance for a COVID-19 vaccine among physicians and nurses overall is lower compared to their acceptance rates of seasonal influenza vaccination.

Further analysis of the subdivisions with healthcare workers (Fig 2) reveals that vaccine acceptance among doctors (78%) is significantly higher than nurses (61%; $p<0.01$), but is indiscriminate to the rate observed by the entire population (75%).

According to our survey, the most significant positive predictor for people to accept a potential COVID-19 vaccine is their current influenza vaccination status. People willing to receive influenza vaccinations in ordinary years have a strong tendency to accept a future COVID-19 vaccine. Another positive predicting factor to accept the future vaccine is the self-perception of individuals who categorize themselves under high-risk for severe COVID19 infection. Interestingly, the prominent trend amongst respondents with children shows that having a child is a negative predictor for accepting future vaccination.

Ward 2020

In this paper, we present the results of four online surveys conducted in April 2020 in representative samples of the French population 18 years of age and over (N=5,018). We found that if a vaccine against the new coronavirus became available, almost a quarter of respondents would not use it. We also found that attitudes to this vaccine were correlated significantly with political partisanship and engagement with the political system. Among the 5,018 individuals surveyed, almost a quarter declared that they would refuse "certainly" (7.9%) or "probably" (16.1%) the coronavirus vaccine if it were available. No difference was found according to gender, age, and COVID-19-related worry. However, other differences were observed as people with an educational level under the High School degree, those with a low or intermediate level of household income per consumption unit (HICU), and those feeling close to a Far-Right party, were more numerous to be certain they would refuse the vaccine. Three main, but not exclusive reasons, were given to refuse the coronavirus vaccine: being against vaccination in general (reason chosen by 27.6% of refusers), thinking that a vaccine produced in a rush is too dangerous (64.4%), and finally considering the vaccine useless because of the harmless nature of COVID-19 (9.6%). around eight percent of refusers declared another reason to reject this vaccine. We showed that almost a quarter of French adults would not get vaccinated against COVID-19 and that the main reason for this reticence was the idea that this vaccine would not be safe. This result is coherent with previous studies showing that, in France, reticence towards vaccines tends to be vaccine-specific rather than targeted at vaccination in general (Ward et al., 2019).

Padhi 2020

Survey in Saoudi Arabia, 992 participants. Average age, majority female (65.8%). Of the 992 respondents, 642 (64.7%) intended to uptake the hypothetical vaccine, only 70 (7%) reported hesitancy towards the COVID-19 vaccine, and 280 (28.2%) were reported "not sure" about their intention. Further, being aged (45 years and above) (aOR: 2.15; 95% CI: 1.08-3.21), and being married (aOR:

1.79; 95% CI: 1.28-2.50) are likely to accept the COVID-19 vaccine than their counterparts.

Study

participant's trust in the health system (aOR: 3.05; 95% CI: 1.13-4.92) and perceived risk of acquiring

infection (aOR: 2.13; 95% CI: 1.35-3.85) were found to be significant predictors in explaining acceptancy of the COVID-19 vaccine.

Malik 2020

Using an online platform, we surveyed the U.S. adult population in May 2020 to understand risk perceptions about the COVID-19 pandemic, acceptance of a COVID-19 vaccine, and trust in sources of information. Of the 672 participants surveyed, 450 (67%) said they would accept a COVID-19 vaccine if it is recommended for them. The vaccine acceptance differed by demographic characteristics with males (72%), older people (55 years and above: 78%), Asian (81%), and college or graduate degree holders (75%) more likely to accept the vaccine if it would be recommended for them. Our study shows that COVID-19 vaccine acceptance can be predicted with relatively high accuracy by readily available demographic characteristics. Since the beginning of the COVID-19 pandemic in the United States, it has been clear that low-income and communities of color are at higher risk for infection and death from COVID-19. Historical oppression and current disparities in care are linked to a mistrust of the healthcare system among some Black Americans and may result in these differences in health outcomes. Related to this, our study found that as years of education increases, so does reported acceptance of the COVID-19 vaccine. Additionally, unemployed participants reported a lower acceptance rate of a COVID-19 vaccine. These findings demonstrate that low income communities, which are disproportionately impacted by COVID-19,¹³ may be more susceptible to continued outbreaks, even if a vaccine is available.

Butter 2020

With vaccine acceptance largely determining the success of a prospective COVID-19 vaccine, this study aims to investigate the anticipated uptake of a COVID-19 vaccine, should it become available in the future, among key workers and non-key workers in the UK. This research will begin to examine the relative influence of relevant psychological (perceived risk and severity), social, (media exposure), and situational (demographic and medical) factors on intent to engage with a hypothetical COVID-19 vaccine.

The current study is based on a sample of UK adults who took part in the 1-month follow-up survey of the COVID19 Psychological Wellbeing Study. The COVID19 Psychological Wellbeing Study is an ongoing longitudinal online survey of the adult (18+) general population of the UK. Participants completed an online baseline survey between 23rd March and 24th April 2020. All respondents were prompted to complete a 1-month follow-up survey 30 days after completing their baseline survey, which included information on vaccines and risk perceptions. All 1-month follow-ups were completed between 22nd April and 18th May 2020. Only individuals who reported not having been previously diagnosed with COVID-19 were included in the study, resulting in a sample of 1605 participants. Of these, 36.4% worked in key worker roles and 63.6% were not key workers.

The key worker sample was made up of those working in health and social care (26.9%), education and childcare (24.3%), transport (3.4%), key public services (7.7%), local or national government (9.6%), food and other necessity goods (12.2%), public safety (3.4%) and utilities, communication and financial services (12.3%).

Overall, approximately three-quarters (74.2%) of the sample reported that they would accept a vaccine, while 17.7% were uncertain and 8.1% reported that they would refuse it. Fewer key workers indicated that they would reject a vaccine (5.9% vs. 9.3% of non-key workers).

Predictors of vaccine hesitancy (i.e. refusal or uncertainty), compared to acceptance, were examined separately in both groups. In the key worker sample, only two characteristics were

associated with vaccine hesitancy: being female (compared to male; $OR = 1.96$) and perceiving oneself as having a relatively low risk (0-25%) of being infected with COVID-19 in the next 6 months (compared to very high perceived risk: 75-100%; $OR = 2.44$). In the non-key worker sample, several factors were associated with vaccine hesitancy: being aged 25-34 ($OR = 2.41$), 35-44 ($OR = 1.96$) and 45-54 ($OR = 2.91$) compared to 18-24 year olds, having an average ($OR = 2.37$) or below average income ($OR = 2.58$) compared to an above average income. Additionally, knowing someone who is diagnosed with COVID-19 was associated with reduced risk of vaccine hesitancy ($OR = 0.61$).

Anti Vaccination movement

Megget 2020

Opinion: A study of 1000 people in New York over 24-26 April found. "Only 59% of respondents said they would get a vaccine and only 53% would give it to their children. Since the project began in March, Ratzen's group has asked the question three times, and each time the proportion is low. "It's concerning. I would have thought numbers would go up. I didn't expect to see it so negative." In their first poll on 27-29 March, 62% said they would have a coronavirus vaccine, with 19% saying they would decline it and 19% unsure. The latest poll, conducted at the start of May, found that 31% would have a vaccine immediately with 48% saying they would if their doctor recommended it; 12% would reject a vaccine outright. Ratzen also asked if they would volunteer for a coronavirus vaccine clinical trial. Just 31% expressed an interest. He attributes much of the negativity in his surveys around a coronavirus vaccine to a small but incredibly vocal movement. "The anti-vaccination movement is going to make covid-19 more difficult to get under control," he told *The BMJ*. A study of more than 500 Facebook ads between December 2018 and February 2019 found that 145 featured anti-vaccination sentiment, reaching audiences of between 5000 and 50 000 people. Researchers found that 54% of anti-vaccination ads came from just two organisations: the World Mercury Project and Stop Mandatory Vaccinations. The WHO has also "seen anti-covid-19 vaccine sentiment in social media," says Katherine O'Brien, director of the department of immunization, vaccines, and biologicals at WHO.

Willingness to pay

Garcia

For this, it is important to understand the factors or variables that affect consumer demand and the decision to pay for a vaccine. This is addressed in this article through the estimation of a probabilistic model of the willingness to pay (WTP) for the vaccine. Therefore, the objective of this research is to estimate an individual's WTP for a COVID-19 vaccine and, at the same time, find the main factors that affect this valuation.

The survey was answered by 566 individuals between April 18 and May 5, 2020. Of the total of participants, 62.8% had medium-high income. most of them would be willing to pay for a vaccine (90.6%), they believed that they will get sick (92.4%), and only 4.6% have or have had COVID-19. Of the sample, 53 individuals (9.4%) indicated that they were not willing to pay for a COVID-19 vaccine (Table A3). The self declared reasons why they would not pay are presented in Fig. 1. This shows that the main reasons for not paying are because they believe that the government should finance the cost of the vaccine (38.8%) or they do not have the resources available to do so (25.0%). The latter are individuals who may have a positive evaluation of the vaccine, but their budget constraint does not allow them to pay for it. Of the sample, 55% individuals answered that they would pay the initial

value and that they would also pay a second value, higher than the first; whereas 12% answered "yes" to the first value, but "no" to the second higher value. The results showed an average WTP per individual of US\$184.72. Thus, both the high approval rate for the vaccine (90.1%) and the belief that one will eventually get sick (99.1%) demonstrate a positive intention of individuals towards it, even without knowing the details of its real effects on health. Additionally, we found that perception of government performance in managing the pandemic also influences the WTP. The variables that positively impacted the WTP were the pre-existence of chronic diseases, knowledge of COVID-19, being sick with COVID-19, perception of government performance, employment status, and income. The variables that negatively affected the WTP were belonging to a private health system, non-adaptation to working from home with children (due to quarantine) and having recovered from COVID-19.

Harrisson 2020

As a historian of public health and an infectious disease epidemiologist. But will re-experiencing the force of an epidemic alone be sufficient to solve the problem of vaccine hesitancy? Challenges range from misinformation promulgated on social media, to vaccine refusal among well-educated communities, to lack of trust of public health agencies. Such persistent challenges suggest to us that the current modes of thinking about the problem still fall within too narrow and too clinically-oriented of an idea about health, disease, and how complex the human responses to them truly are. Will COVID-19 fix the problem of vaccine hesitancy? It may fix the problem with respect to a COVID-19 specific vaccination. But a failed vaccine—one in which major post-licensure toxicities occur—might also lead to public backlash with devastating consequences for routine childhood vaccination. And however quickly the public rushes for a vaccine in this particular outbreak, and however successful this one-off vaccine may be, a broader confidence in vaccines after the charted epidemic passes will likely depend on widespread public trust.

Faasse 2020

The current study examined these factors in 2,174 Australian residents. An online survey was completed between 2-9 March 2020, at an early stage of the COVID-19 outbreak in Australia. Results revealed that two thirds of respondents were at least moderately worried about a widespread COVID-19 outbreak in Australia (which subsequently occurred). Worry about the outbreak and closely following media coverage were consistent predictors of health-protective behaviours as well as vaccination intentions.

Finally, respondents were asked how likely they were to get vaccinated against COVID-19 if a safe and effective vaccine was developed. There were no demographic differences in vaccine intentions by gender, ethnicity or level of education. Respondents did differ in their vaccine intentions by age group. Compared to those in the 60 plus age group, being in the 30-49 or 50-59 age group was associated with a lower likelihood of intending to get a vaccination if one becomes available. Having received a seasonal flu vaccine in the past year predicted increased intentions to get a COVID-19 vaccine if it becomes available. With regard to psychological predictors and in line with previous results, both increased exposure to media coverage and heightened worry or concern about the outbreak predicted increased vaccination intentions. In contrast to results relating to health protective behaviours, perceptions of greater scientific and medical understanding of the virus, confidence in government information, and higher knowledge scores, predicted greater vaccination intentions.

Berghea 2020

Preliminary report

This study aims to investigate willingness to pay for a potential vaccine against COVID-19 among adult persons in Romania. Small scale study, 203 respondents. A WTP questionnaire was developed based on the standardized van Westendorp PSM questions; in addition, the questionnaire included consumer demographics characteristics (age, sex, education, residence, number of family members and a composite index of income and purchasing behavior). As presented in Table 2 the acceptable price range of the entire group was around 20–200 EURO. Our data suggest an unexpected modest level of WTP for a 100% effective and 100% safe anti COVID-19 vaccine. Compared to the actual price of vaccination in high risk infectious areas (travel vaccination), comparable values were found: 20–200 EUR accepted for "out of the pocket" costs of a COVID-19 vaccine versus an average of 43.2 (sd:32.1) EUR in travel vaccinations schemes already offered by major networks of health services providers. As expected, the highest income group participants have a more expensive approach (WTP 50–400 vs 20–200 in general population). However the numbers are lower than their correspondent in cancer research – a disease acknowledged with a clear fatal course (WTP around 9000 EUR for a return in precancer health state (16) or about 2500 EUR per year for a cancer treatment (17)). Although not so strikingly different, the numbers are still lower compared to the ones in WTP studies focused on vaccination in HIV infection (220–820 EUR) (18).

Vaccines and health literacy

Start with info on health literacy

Biasio 2020

Pre-print, not peer reviewed.

Health literacy is van groot belang voor het begrijpen van de preventie en het verloop van besmettelijke ziekten. Dit geldt ook voor het COVID-19 en vaccinaties. The objective of this study was to evaluate the feasibility of assessing the levels of health literacy skills about vaccination in the Italian adult general population,

Daarnaast zijn ook perceptions of the interviewees about mogelijke Covid-19 vaccines, their and their beliefs about vaccination in het algemeen onderzocht. Eight-hundred eighty five (885) answers were collected during a full two weeks, starting June 6th 2020, mainly through the web link.

Ongeveer de helft van de participanten was man en 98% had Italiaans als moedertaal. Regarding their age, 23% were in the 18-30, 37% in the 31-50 and 31% in the 51-65 years age group, while only 9% were over 65. No significant correlation was observed between functional VL score and positive perceptions about future Covid-19 vaccines, while the association was highly significant between all questions and the interactive-critical score. Relevant was the high percentage (>90%) of subjects intending to be vaccinated against Covid-19. Functional health literacy → Basic health literacy skills that are sufficient for individuals to obtain relevant health information and apply that knowledge to a limited range of prescribed activities. Interactive and critical health literacy → More advanced literacy skills that enable individuals to extract information and derive meaning from different forms of communication; to apply new information to changing circumstances; and to interact with greater confidence with information providers such as health care professionals. together with social skills, interactive and critical health literacy can be applied to critically analyse information, and to use this information to exert greater control over life events and situations. (Nutbeam)

The study showed a strong correlation between positive opinions about vaccination in general, the educational degree and the VL levels of respondents. This confirms the importance of improving the VL skills (for example through targeted interventions)