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# Interventions to increase COVID-19 vaccine uptake: a scoping review (Review)

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[Prototype Review]

# Interventions to increase COVID-19 vaccine uptake: a scoping review

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## ABSTRACT

### Background

Vaccines are effective in preventing severe COVID-19, a disease for which few treatments are available and which can lead to disability or death. Widespread vaccination against COVID-19 may help protect those not yet able to get vaccinated. In addition, new and vaccine-resistant mutations of SARS-CoV-2 may be less likely to develop if the spread of COVID-19 is limited. Different vaccines are now widely available in many settings. However, vaccine hesitancy is a serious threat to the goal of nationwide vaccination in many countries and poses a substantial threat to population health. This scoping review maps interventions aimed at increasing COVID-19 vaccine uptake and decreasing COVID-19 vaccine hesitancy.

### Objectives

To scope the existing research landscape on interventions to enhance the willingness of different populations to be vaccinated against COVID-19, increase COVID-19 vaccine uptake, or decrease COVID-19 vaccine hesitancy, and to map the evidence according to addressed populations and intervention categories.

### Search methods

We searched Cochrane COVID-19 Study Register, Web of Science (Science Citation Index Expanded and Emerging Sources Citation Index), WHO COVID-19 Global literature on coronavirus disease, PsycINFO, and CINAHL to 11 October 2021.

### Selection criteria

We included studies that assess the impact of interventions implemented to enhance the willingness of different populations to be vaccinated against COVID-19, increase vaccine uptake, or decrease COVID-19 vaccine hesitancy. We included randomised controlled trials (RCTs), non-randomised studies of intervention (NRSIs), observational studies and case studies with more than 100 participants. Furthermore, we included systematic reviews and meta-analyses. We did not limit the scope of the review to a specific population or to specific outcomes assessed. We excluded interventions addressing hesitancy towards vaccines for diseases other than COVID-19.

### Data collection and analysis

Data were analysed according to a protocol uploaded to the Open Science Framework. We used an interactive scoping map to visualise the results of our scoping review. We mapped the identified interventions according to pre-specified intervention categories, that were adapted to better fit the evidence. The intervention categories were: communication interventions, policy interventions, educational interventions, incentives (both financial and non-financial), interventions to improve access, and multidimensional interventions. The

study outcomes were also included in the mapping. Furthermore, we mapped the country in which the study was conducted, the addressed population, and whether the design was randomised-controlled or not.

**Main results**

We included 96 studies in the scoping review, 35 of which are ongoing and 61 studies with published results. We did not identify any relevant systematic reviews. For an overview, please see the interactive scoping map (https://tinyurl.com/2p9jmx24).

**Studies with published results**

Of the 61 studies with published results, 46 studies were RCTs and 15 NRSIs. The interventions investigated in the studies were heterogeneous with most studies testing communication strategies to enhance COVID-19 vaccine uptake. Most studies assessed the willingness to get vaccinated as an outcome. The majority of studies were conducted in English-speaking high-income countries. Moreover, most studies investigated digital interventions in an online setting. Populations that were addressed were diverse. For example, studies targeted healthcare workers, ethnic minorities in the USA, students, soldiers, at-risk patients, or the general population.

**Ongoing studies**

Of the 35 ongoing studies, 29 studies are RCTs and six NRSIs. Educational and communication interventions were the most used types of interventions. The majority of ongoing studies plan to assess vaccine uptake as an outcome. Again, the majority of studies are being conducted in English-speaking high-income countries. In contrast to the studies with published results, most ongoing studies will not be conducted online. Addressed populations range from minority populations in the USA to healthcare workers or students. Eleven ongoing studies have estimated completion dates in 2022.

**Authors' conclusions**

We were able to identify and map a variety of heterogeneous interventions for increasing COVID-19 vaccine uptake or decreasing vaccine hesitancy. Our results demonstrate that this is an active field of research with 61 published studies and 35 studies still ongoing. This review gives a comprehensive overview of interventions to increase COVID-19 vaccine uptake and can be the foundation for subsequent systematic reviews on the effectiveness of interventions to increase COVID-19 vaccine uptake.

A research gap was shown for studies conducted in low and middle-income countries and studies investigating policy interventions and improved access, as well as for interventions addressing children and adolescents. As COVID-19 vaccines become more widely available, these populations and interventions should not be neglected in research.

## PLAIN LANGUAGE SUMMARY

### Interventions to increase COVID-19 vaccine uptake

**Background**

Vaccines are effective in preventing death or severe illness from COVID-19, a disease for which few treatments are available. Widespread vaccination against COVID-19 may help protect those not yet able to get vaccinated. However, many people do not want to get vaccinated against COVID-19. This can put them at increased risk of severe disease and death.

**What was our aim?**

We wanted to find out which interventions to increase COVID-19 vaccine uptake have been or are currently evaluated.

**Methods**

We searched medical databases and trial registries until the 11 of October 2021. We included all studies investigating interventions to increase COVID-19 vaccine uptake. We excluded studies looking at other vaccines, for example, measles. We included all forms of studies as long as they had more than 100 participants.

Once we found the studies, we categorised the interventions into the following groups: communication interventions, policy interventions, interventions to improve access, educational interventions, incentives, and multidimensional interventions. We summarised the results in an interactive scoping map. Furthermore, we mapped the study outcomes, the country in which the study was conducted, the study population, and the study design.

**Results**

We included 96 studies in evidence mapping, 35 of which are ongoing and 61 studies with published results. The interventions tested in these studies are very diverse. Many studies used communication strategies to convince people to get vaccinated against COVID-19. Interventions that included information on vaccination or a mixture of different strategies were also often used.

A majority of studies were conducted in English-speaking countries of the global north, for example, the USA. Moreover, most studies investigated digital interventions in an online setting. The populations addressed varied across the studies. For example, studies addressed healthcare workers, ethnic minorities in the USA, students, soldiers, villagers, at-risk patients, or the general population.

For an overview, please see the interactive scoping map (https://tinyurl.com/2p9jmx24).

**Conclusion**

We identified a large number of studies that investigate how COVID-19 vaccine uptake might be increased. However, more studies are needed focusing on lower-middle-income countries and on children. Future research should compare the effectiveness of different interventions to improve COVID-19 vaccine uptake.

## SUMMARY OF FINDINGS

### Summary of findings 1. Summary of findings

| Intervention Group | Intervention | Outcomes | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Vaccine hesitancy | | | Vaccine uptake | Willingness to get vaccinated | | | Agreement with COVID-19 Policies |
| | | Proportion of participants with COVID-19 vaccine hesitancy | Decrease in vaccine hesitancy | Reactance[1] | Number of participants who got vaccinated | Number of participants<br><br>indicating the intention to get vaccinated | Vaccine trust | Further interest in vaccine information | Agreement with COVID-19 vaccine passport |
| **Communication strategies** | Behavioural messaging | | | | NCT04871776; NCT04895683 | | | | |
| | Text messages | | | | NCT04801524 | | | | |
| | Healthcare providers' communication about the COVID-19 vaccine | | | | | NCT04706403 | | | |
| | Framing | | | | | Borah 2021*; Chen 2021*; *Fox 2021*; Galasso 2021*; Gong 2021*; Huang 2021*; Palm 2021*; Strickland 2021* | | | |
| | Information messaging | | | | | Argote 2021*; Bokemper 2021*; OCEAN*; Schwarzinger | | | |

| | | | | |
|---|---|---|---|---|
| | | | | 2021*; Thorpe 2021*; NCT04813770 |
| Framing videos | | | | Yuan 2021* |
| Expert claims | | | | Robertson 2021b* |
| Messaging about benefits | | | | Ashworth 2021 |
| Gain vs. Loss framing | | Reichardt 2021* | Hong 2021* | Peng 2021*; Ye 2021* |
| HCW vaccine ambassadors | | | NCT04981392 | NCT04930965 (LA-CEAL: HALT COVID) |
| Affect messaging | | | | Capasso 2021* |
| Public service messages | | | | Jin 2021* |
| Norm Framing | Ryoo 2021* | | | Sinclair 2021* |
| Framing and source of information | | | | Pink 2021*; Thunström 2021* |
| Risk framing | | | | Sudharsanan 2021* |
| Visual Illustrations with vaccine information | | | | Ugwuoke 2021* |
| Persuasive messages | | | | Kachurka 2021* |
| Personalised communication | | | Stein 2021*; Santos 2021*; NCT04805931 (VEText); NCT04834726; NCT04924803; NCT04939519 (SCALE-UP Utah); ISRCTN15317247; NCT04952376; NCT04963790; | Keppeler 2021* |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | NCT05027464 (CoVAcS) | | | |
| | Conversational agent | | NCT04884750 | | | |
| | Community influencer groups | PACTR202102846261362 | | | | |
| **Policy interventions** | Mandatory vaccine policy | Sprengholz 2021* | | | | |
| **Multidimensional interventions** | High touch multi-pronged behavioural intervention | | NCT04732819 | | | |
| | Text messages for education outreach[2] | | NCT04800965 | | | |
| | Nudging[3] | | NCT04867174 | NCT05037201 | | Sotis 2021* |
| | Culturally sensitive interventions | | Marquez 2021*; NCT04542395; NCT04779138 | | | |
| | Drawing attention to prosocial concerns | | | Jung 2021* | | |
| | Multidimensional information intervention | | | Kerr 2021* | | |
| | Vaccine education promotion management plan | | NCT04761692 | | | |
| | Phone-based intervention for elders[4] | | NCT04870593 | | | |
| | Incentives and nudging | | Campos-Mercade 2021* | | | |
| | Multidimensional community intervention[5] | | | | NCT05022472 (2VIDA!) | |
| | Multifaceted information intervention for HCW[6] | | Takamatsu 2021* | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Incentives and prosocial communication | | | Sprengholz 2021c* | |
| | Multidimensional intervention for HCW[7] | | | Howarth 2021* | |
| | Education about herd immunity OR empathy condition | | | Pfattheicher 2021* | |
| | Reminders and nudging | | Senderey 2021* | | |
| | Incentives and easy access | | | Klüver 2021* | |
| **Educational interventions** | Entertainment-education video | DRKS00023650 | | | |
| | Educational video | | | Witus 2021*; NCT04876885; NCT04960228; NCT04979416 | |
| | Social marketing intervention | | NCT04801030 | | |
| | Counselling | | NCT04604743 | | |
| | Educational webinar | | | Kelkar 2021* | |
| | Chatbot | | | Kobayashi 2021* | |
| | Workshop | | Talmy 2021* | | |
| | Rapid education | | NCT04939506 | | |
| | Cultural-appropriate Education | | NCT04964154 (BRAVE) | | |
| | COVID-19 vaccine information | | | Merkley 2021* | |
| | Individualised information | | | Tran 2021* | |
| **Incentives** | Financial incentives[8] | | | Kreps 2021*; Robertson 2021a*; Ser- | Duch 2021* |

| | |
|---|---|
| | ra-Garcia 2021*; Yu 2021*; Yu 2021b* |
| Lottery | Barber 2021*; Brehm 2021*; Sehgal 2021*; Thirumurthy 2021*; Walkey 2021*; NCT04951310 |

*Studies have published results

[1] Reactance was defined as "how frustrated, annoyed and disturbed participants felt about the vaccination situation" by the study authors (Sprengholz 2021).

[2] Providing information as well as convincing people to get vaccinated via video, text messages and providing a link to schedule an appointment.

[3] Nudges are behavioural interventions that influence people's choices from the perspective of policy-makers or society, without restricting freedom of choice and changing the incentive system.

[4] Calling elders to inform them of the vaccine and encouraging them to create buddy systems and gossip about the vaccine.

[5]Education and promotion (COVID-19 awareness, education, health promotion), outreach and easy access (linkage to medical and supportive services, pop-up vaccination sites)

[6]Education and information (lectures, educational sessions about the vaccine, informational leaflets), encouragement and risk reduction (vaccination-encouraging announcements, allergy testing at risk of allergic reactions to the vaccine)

[7]Vaccine information (e.g. posters targeting vaccine misinformation, vaccine information packs) and vaccine role models (“Vaccine champions”, posters showing already vaccinated staff members

[8]Hypothetical financial fee or out-of-pocket cost for getting vaccinated

For an interactive version of this map, please see https://egmopenaccess.3ieimpact.org/evidence-maps/interventions-increase-covid-19-vaccine-uptake?

# BACKGROUND

## Introduction

In March 2020, the World Health Organization (WHO) declared the current COVID-19 outbreak a pandemic. The approval of the first COVID-19 vaccine in December 2020 has been long-awaited to help mitigate the effects of the COVID-19 pandemic. Currently, 10 vaccines are recommended by the WHO (WHO 2021a), and many more are in development (WHO 2021b). Countries with limited vaccine access might not be in the position to create and implement vaccine campaigns raising awareness and willingness to be vaccinated.

Widespread COVID-19 vaccination is crucial to protecting population health - vaccination has been shown to be highly effective in preventing severe COVID-19 illness and death from the disease (Public Health Ontario 2021). In nursing homes and hospitals, in particular, vaccines are supposed to protect high-risk populations from severe illness, including healthcare workers. Furthermore, high vaccine uptake may indirectly protect people with a weak response to the vaccine, such as the elderly or immunosuppressed patients, from severe COVID-19 disease. High levels of vaccination against COVID-19 ought also to help ensure the smooth operation of health systems, as unvaccinated people are hospitalised for COVID-19 more often than vaccinated people (Lopez 2021). In addition, new and vaccine-resistant mutations of SARS-CoV-2 are more likely to develop if the spread of COVID-19 is not limited. However, vaccine hesitancy is a serious threat to the goal of nationwide vaccination (Thunstrom 2020).

## Vaccine hesitancy: reasons and prevalence

A recent systematic review of global COVID-19 vaccine acceptance rates shows that populations widely differ in their acceptance of the COVID-19 vaccines (Sallam 2021). For example, nearly the whole population of Ecuador, Malaysia and Indonesia are willing to get vaccinated against COVID-19, while the projected acceptance rate among the French population was only 58.9%. In the USA, where COVID-19 vaccines are widely available for the adult population, about 30% of the population remain unvaccinated (KFF 2022). Likewise, in countries where the vaccine is not yet widely available, a low willingness to be vaccinated against COVID-19 is predicted by experts (Afolabi 2021).

In addition to a broad distrust in and doubts about vaccines in general, there seem to be specific reasons for hesitancy towards COVID-19 vaccines. Studies show that people distrust the COVID-19 vaccines as they believe the vaccines were manufactured too quickly (Nguyen 2021), or are sceptical of the new mRNA (messenger ribonucleic acid) technology used in some vaccines (Dror 2021). A number of conspiracy theories have been spread about the COVID-19 vaccine that are likely influencing vaccination uptake (Romer 2020; Ullah 2021). For example, the mistaken belief that COVID-19 is either a non-existent or a harmless disease makes people unwilling to get vaccinated (Troiano 2021). Furthermore, people also express the fear of adverse vaccine reactions and long-term harms of the COVID-19 vaccine as a reason not to get vaccinated (Abu 2021).

Next to individual beliefs about COVID-19, other characteristics are also associated with vaccine hesitancy. A survey conducted in the UK shows that factors such as negative experiences with the healthcare system and a general distrust of authorities are associated with COVID-19 vaccine hesitancy (Freeman 2020). For example, people voting for anti-establishment parties in Austria are also more likely to be vaccine-hesitant (Schernhammer 2021). Likewise, political partisanship is predictive for COVID-19 vaccine uptake in the USA (Hamel 2021), where Democrats are more likely to get vaccinated than Republicans. Distrust in authorities is also high among marginalised populations that have been affected disproportionally by the pandemic (Jaiswal 2020). Additionally, as reported by several studies, being female is linked with a higher hesitancy towards COVID-19 vaccination (Bono 2021; Edwards 2020). Other demographic variables, such as age, education and ethnicity have also been linked to vaccine hesitancy (Nguyen 2021a; Reno 2021).

## Why it is important to do this review

While attitudes towards the COVID-19 vaccine have been thoroughly researched (Ahmed 2021; Akarsu 2021; Al-Jayyousi 2021), it is still unclear whether there are effective interventions available to increase COVID-19 vaccine uptake. The WHO identifies five factors that are central to the willingness to get vaccinated (Brewer 2017): social processes and people's emotions and thoughts impact their motivation to get vaccinated. Practical issues, such as costs and access, then influence if someone will get vaccinated or not. Each factor can be an important starting point for an intervention to increase vaccine uptake. A plethora of interventions have been proposed to increase the willingness to get vaccinated or to decrease vaccine hesitancy for other diseases. For example, financial incentives have been shown to increase vaccine uptake for human papillomavirus (HPV) vaccinations (Mantzari 2015), role models can increase vaccine uptake for hepatitis B (Vet 2010), and patient outreach has been utilised to increase pneumococcal vaccination (Winston 2007) and immunisation rates overall (Jacoboson Vann 2018). Moreover, Cochrane Reviews have demonstrated the effectiveness of different interventions, such as face-to-face communication, incentives or mandatory vaccinations to increase vaccine uptake for diverse populations (Abdullahi 2020; Jacoboson Vann 2018; Kaufman 2018; Oyo-Ita 2016). Interventions can be categorised as communication-based interventions, motivational interventions, or as structural interventions based on health policies and increased accessibility (Dubé 2015; Jarrett 2015; Odone 2015; Wigham 2014).

## Rationale for conducting a scoping review

Research into measures to address COVID-19 vaccine hesitancy is emerging rapidly. The methodology of scoping reviews can be used to identify and map available evidence (Anderson 2008; Munn 2018). Hence, a scoping review will allow us to obtain a rapid, comprehensive overview of possible interventions and populations targeted.

No systematic or scoping review has yet systematically identified and analysed these interventions in the context of COVID-19. COVID-19 vaccine hesitancy poses a substantial threat to population health and therefore, the evidence for interventions aimed at increasing COVID-19 vaccine uptake needs to be investigated. This scoping review will help to define the scope of a subsequent systematic review.

## OBJECTIVES

To scope the existing research landscape on interventions to enhance the willingness of different populations to be vaccinated against COVID-19, increase COVID-19 vaccine uptake, or decrease COVID-19 vaccine hesitancy, and to map the evidence according to addressed populations and intervention categories.

## METHODS

### Scoping review methodology

We followed the interim guidance on scoping reviews by Cochrane and the guidance of the Joanna Briggs Institute for conducting this review (Peters 2020). Furthermore, we consulted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist (Tricco 2018) for the reporting of the results. Please see Appendix 1 for the completed checklist for this scoping review. The methods for this scoping review were published beforehand (Andreas 2021).

### Inclusion criteria

#### Study design

We included studies that assess the impact of interventions implemented to enhance the willingness of different populations to be vaccinated against COVID-19. As we wanted to get a broad overview of interventions being investigated and as no past reviews exist on this topic, we decided to include studies with the following designs: randomised controlled trials (RCTs), non-randomised trials, observational studies (controlled pre-post studies, interrupted time-series studies, case-control, cohort, and cross-sectional studies), and single-arm studies (uncontrolled pre-post studies) with more than 100 participants. Furthermore, we included systematic reviews. For psychological experiments with hypothetical scenarios being tested, we decided to only include those studies that investigate scenarios that can be manipulated in a real-world setting, so the findings can be translated into interventions. For example communication about vaccines can be manipulated, but vaccine efficacy cannot be manipulated.

#### Addressed population

In order to get a broad overview of all interventions and addressed populations, we did not limit the scope of our review by focusing on specific population groups. We also included studies testing interventions directed at healthcare providers, community leaders, or other role models to help these groups to increase COVID-19 vaccine uptake more widely.

#### Interventions

We only included studies on interventions specifically addressing willingness to get vaccinated against COVID-19, or intended to increase COVID-19 vaccine uptake, or decrease COVID-19 vaccine hesitancy. We excluded interventions addressing hesitancy towards vaccines for diseases other than COVID-19.

#### Outcomes

We did not limit the scope of our review by focusing on specific outcomes in order to get a broad overview of the outcome measures assessed in studies.

An overview of inclusion and exclusion criteria is provided in Table 1 and Table 2, respectively.

#### *Identification of relevant studies*

For the identification of evidence syntheses and completed and ongoing studies systematic searches were performed by our Information Specialist (IM). They were peer-reviewed by a second Information Specialist as part of the editorial process for this manuscript.

We searched the following electronic databases for primary studies from 1 January 2020 to 11 October 2021:

- Cochrane COVID-19 Study Register (CCSR) (www.covid-19.cochrane.org)
  - Cochrane Central Register of Controlled Trials (CENTRAL);
  - PubMed;
  - Embase.com;
  - ClinicalTrials.gov (www.clinicaltrials.gov);
  - World Health Organization International Clinical Trials Registry Platform (WHO ICTRP) (www.who.int/trialsearch);
  - medRxiv (www.medrxiv.org).
- Web of Science Core Collection
  - Science Citation Index Expanded (1945 to present);
  - Emerging Sources Citation Index (2015 to present).
- WHO COVID-19 Global literature on coronavirus disease (search.bvsalud.org/global-literature-on-novel-coronavirus-2019-ncov/)
- PsycINFO (Ovid 1806 to present);
- CINAHL (EBSCO 1982 to present).

We searched the following electronic databases and websites for evidence syntheses from 1 January 2020 to 10 June 2021:

- Evidence Aid Coronavirus (Covid-19) (evidenceaid.org/evidence/coronavirus-covid-19/);
- Usher Network for COVID-19 Evidence Reviews (www.ed.ac.uk/usher/uncover/register-of-reviews);
- Epistemonikos COVID-19 L*OVE Platform (app.iloveevidence.com/loves);
- MEDLINE (Ovid, 1 January 2020 to 10 June 2021) with a filter for systematic reviews (Wong 2006).

We searched for primary studies on 10 June 2021 and updated the search on 11 October 2021. We did not update the search for evidence syntheses, because we did not identify any relevant hits in the search of June. We began the search in January 2020 as this was when COVID-19 was declared a Public Health Emergency of International Concern by the WHO.

Please see Appendix 2 for the search strategies for evidence syntheses and Appendix 3 for the search strategies for primary literature. The search was conducted in English, however, we did not exclude studies if they had not been published in English.

#### *Study selection*

Two review authors (MA, EB) independently screened titles and abstracts of identified records. We used the web-based application Rayyan (https://rayyan.qcri.org/welcome) for title and abstract screening. Discrepancies between authors were discussed and in

case the conflict persisted a third review author (CI) resolved conflicts. To ensure that all review authors screen consistently, we developed a guidance document to standardise the screening process. We then retrieved full-text articles of all potentially included studies and assessed the eligibility of the remaining records against our pre-defined eligibility criteria. This was also done independently and in duplicate. We documented reasons for the exclusion of full texts.

#### *Extraction and presentation of data*

Two authors (MA, EB) independently extracted the following information into a piloted data extraction sheet. Disagreements were resolved by discussion.

### Study characteristics

- Study design
  - Country of origin (where the study was conducted)
  - Characteristics of the population addressed by the intervention (age; gender; ethnicity)
  - Intervention details (timeframe; intervention category; intervention method)
  - Comparison details (if applicable)
  - Time of follow-up (if applicable)
  - Outcomes (outcome measures; time points of outcome assessment)
- Financial support and sponsoring
- Disclosure of conflicts of interest (COIs)

If any of the above data were not available, we contacted the study authors for further information.

### Summary and reporting of results

We presented the results in a tabular form using software by 3ie EGM (https://egmopenaccess.3ieimpact.org/evidence-maps/interventions-increase-covid-19-vaccine-uptake?) to create the evidence map. We mapped data according to the categories of interventions identified and the outcomes assessed. The classification of interventions was first based on a review by the SAGE working group for vaccine hesitancy (Larson 2014), and other systematic reviews addressing vaccine uptake (Dubé 2015; Jarrett 2015; Odone 2015; Wigham 2014; Winston 2007). We have added policy interventions (e.g. mandatory vaccine uptake) as we think these are especially relevant in the context of nationwide COVID-19 vaccine rollouts. We adapted the categories originally published in our protocol to better fit the evidence we found. Thus, the final intervention categories were: education, policy interventions, communication interventions, incentives, interventions to improve access, and multidimensional interventions. Please see Table 3 for an overview and description of each category. Please see the Differences between protocol and review section for a justification of the changes made. Additionally, we mapped the region and country in which studies were conducted, the addressed population, as well as the study design.

## RESULTS

### Results of the search

We identified 11,608 potentially relevant references. After the removal of duplicates (208), we screened 11,400 references based on their titles and abstracts, excluding 11,269 references because they did not meet the prespecified inclusion criteria. We screened the full texts of the remaining 131 references, or, if these were not available, abstract publications or trial registry entries. We excluded 30 studies after the full-text screening. We identified 101 eligible studies, five of which were assessed as awaiting classification as it was unclear from trial registries if they really are intervention studies. In the end, we included 96 studies in the interactive scoping map, 61 studies with published results, and 35 of which are ongoing. The process and results of study selection are documented in the PRISMA flow diagram (Figure 1).

**Figure 1.**

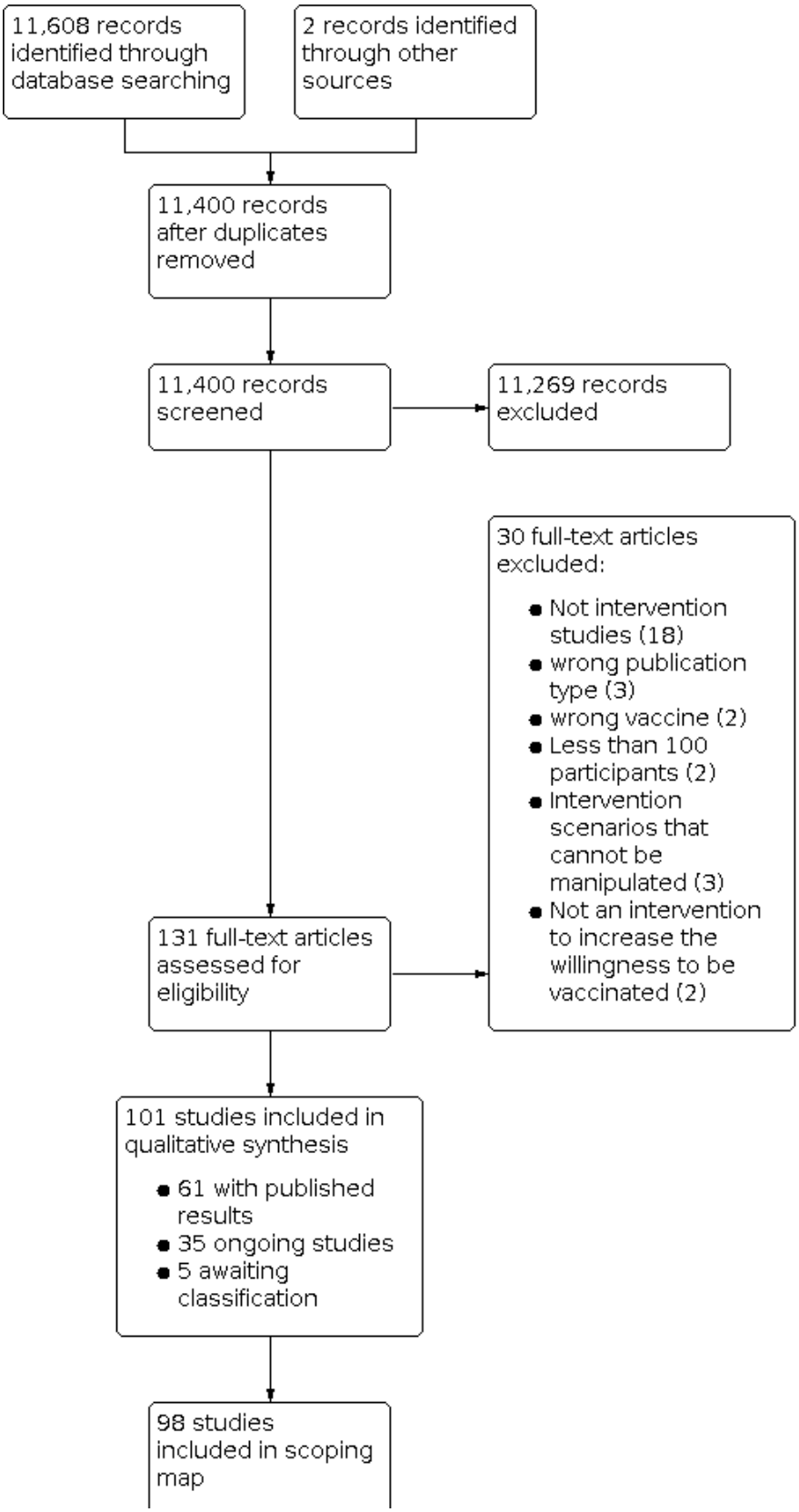
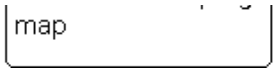


**Figure 1. (Continued)**




For an overview of all studies please see the Summary of findings 1 and the interactive scoping map.

### Studies with published results

We included 61 studies with published results in the interactive scoping map. Of the studies with published results, 46 studies were randomised controlled trials (RCTs) (Argote 2021; Ashworth 2021; Bokemper 2021; Borah 2021; Campos-Mercade 2021; Capasso 2021; Chen 2021; Duch 2021; Fox 2021; Galasso 2021; Gong 2021; Hong 2021; Huang 2021; OCEAN; Jin 2021; Jung 2021; Kachurka 2021; Kerr 2021; Keppeler 2021; Klüver 2021; Kreps 2021; Merkley 2021; Palm 2021; Peng 2021; Pfattheicher 2021; Pink 2021; Reichardt 2021; Robertson 2021a; Robertson 2021b; Santos 2021; Schwarzinger 2021; Sinclair 2021; Strickland 2021; Senderey 2021; Serra-Garcia 2021; Sotis 2021; Sprengholz 2021; Sprengholz 2021c; Sudharsanan 2021; Thorpe 2021; Thunström 2021; Ye 2021; Yu 2021; Yu 2021b; Yuan 2021; Witus 2021). Fifteen studies were non-randomised intervention studies. Of these, two studies were uncontrolled post-intervention studies (Kobayashi 2021; Ryoo 2021), and nine were uncontrolled retrospective cohort studies (Barber 2021; Brehm 2021; Kelkar 2021; Marquez 2021; Sehgal 2021; Stein 2021; Talmy 2021; Thirumurthy 2021; Walkey 2021). One study was a controlled cohort study (Ugwuoke 2021). Three studies had a pre-post interventional design (Howarth 2021; Takamatsu 2021; Tran 2021).

A majority (29 of 61) of studies were conducted in the USA. One study was conducted in the USA and Germany, and one in the USA and UK. Six studies were conducted in China. Six studies were conducted in the UK, two in France, two in Japan, one in Sweden, one in Poland, one in Italy, one in Canada, four in Germany, and two in Israel. Furthermore, one study was conducted in Pakistan and one in Nigeria. One multinational study was carried out in Australia, France, Germany, Italy, New Zealand, Poland, Sweden, the UK, and the USA. One study was carried out in Argentina, Brazil, Chile, Colombia, Mexico, and Peru. In summary, the majority of studies were conducted in high-income countries. For an overview, please see our interactive scoping map, in which you can select regions and countries.

Forty-one studies were conducted in an online setting, while 20 studies were conducted in person. Of the latter, one study was conducted in a university, five studies in a hospital setting, one study with a healthcare provider, and one study in a health system. Furthermore, one study was set in a military unit, one in Sweden, and one study in a Latinx community. Four studies were conducted in Ohio, USA and one study in 24 US states. One study was conducted via telephone in Germany, and one study via letters in a German municipality. One study was conducted in a camp for internally displaced persons. One study did not report a specific setting. In summary, a majority of published studies were conducted in an online setting, mostly testing hypothetical scenarios. We define online settings as interventions solely conducted online, for example, webinars or online surveys. For more detailed information, please see the Characteristics of included studies table.

Of the included studies, 11 were published on preprint servers (Argote 2021; Barber 2021; Duch 2021; Keppeler 2021; Kobayashi 2021; Marquez 2021; Senderey 2021; Serra-Garcia 2021; Strickland 2021; Thirumurthy 2021; Witus 2021).

### Ongoing studies

We identified 35 ongoing studies. Of the ongoing studies, 29 studies are RCTs (DRKS00023650; ISRCTN15317247; NCT04604743; NCT04706403; NCT04732819; NCT04761692; NCT04800965; NCT04801524; NCT04805931 (VEText); NCT04813770; NCT04834726; NCT04867174; NCT04870593; NCT04871776; NCT04884750; NCT04895683; NCT04924803; NCT04930965 (LA-CEAL: HALT COVID); NCT04939519 (SCALE-UP Utah); NCT04951310; NCT04952376; NCT04960228; NCT04963790; NCT04964154 (BRAVE); NCT04979416; NCT04981392; NCT05022472 (2VIDA!); NCT05027464 (CoVAcS); NCT05037201). Six studies have a non-randomised intervention designs. Of those, one study will investigate the intervention in a prospective, two-arm observational study (PACTR202102846261362). Three studies will utilise a non-randomised trial design (NCT04876885; NCT04801030; NCT04939506). Two studies will use a pretest-posttest design without a control group (NCT04542395; NCT04779138).

A majority (26 of 35) of ongoing studies are planned in the USA. One study will be conducted in the USA and China. Three studies will be conducted in the UK, three in Canada, one in Uganda, and one in India. In summary, a majority of ongoing studies are planned to be conducted in English-speaking, high-income countries.

Five of the ongoing studies will be conducted in an online setting, one study will be conducted via text messages and three via phone calls, while 11 studies are planned in person. Of the latter, two studies will be conducted in a hospital setting, two studies in a health centre, two studies within a healthcare provider, one in a primary care practice, one study in a skilled nursing facility, two in veteran health care, and one study in a rural clinic. Furthermore, two studies will be set in a church setting, one study in London, one in villages in Uganda, two in a university, one in a managed care setting, and two in public housing. One study will be conducted in southern California, one study will be conducted in Philadelphia, and one study will address vulnerable communities in Louisiana. Four studies did not report a specific setting. In summary, a majority of ongoing studies will address populations in person, most of them in a healthcare setting.

Eleven ongoing studies have estimated completion dates in 2022 (NCT04542395; NCT04964154 (BRAVE); NCT04800965; NCT04801524; NCT04867174; NCT04871776; NCT04895683; NCT04930965 (LA-CEAL: HALT COVID); NCT04939519 (SCALE-UP Utah); NCT04952376; NCT04963790). For the estimated completion dates of all ongoing studies, please see the characteristics of included studies table for each study.

### Excluded studies

We excluded 30 studies for the following reasons.

Three studies were excluded because they were an ineligible publication type; one was an opinion piece (Hofer 2021), one was a letter to the editor (Sprengholz 2021b), and the other one was a correction (Loomba 2021). Furthermore, one study was excluded because it investigated interventions for influenza vaccine uptake (Yousuf 2021), and one because it investigated measles, mumps and rubella uptake (Kirkpatrick 2021). We excluded two uncontrolled studies with less than 100 participants (Ali 2021; Gakuba 2021). Batteux 2021, Davis 2021 and Wagner 2021 were excluded as the studies investigate scenarios that cannot be manipulated. Loomba 2021a and Thaker 2021 measure the effect of misinformation on vaccine intent and thus are not relevant to the research objective. The other 18 studies were excluded because they did not investigate interventions (American Society of Safety Professionals 2021; Bell 2021; ChiCTR2100043018; Community Practitioner 2021; Crawshaw 2021; Crawshaw 2021b; Gehrau 2021; Guelmami 2021; Kaplan 2021; Knight 2021; Kumar 2021; Lim 2020; NCT04694651; Rahmandad 2021; Salali 2021; Shmueli 2021; Vasquez 2021; Yuen 2021).

### Studies awaiting assessment

We classified five studies as awaiting assessment because from the trial registrations and publications of these studies it is not clear whether these studies will test interventions to enhance COVID-19 vaccine uptake (INFORMED; NCT04460703; NCT04731870; Larson 2020; Supraneni 2021).

## Studies included in the scoping map

Please see our interactive scoping map (https://egmopenaccess.3ieimpact.org/evidence-maps/interventions-increase-covid-19-vaccine-uptake?) and the Summary of findings 1 for an overview of the interventions and outcomes used in studies as well as study location, population, and design. Please note that studies with published results as well as ongoing studies were included in the scoping map.

### Studies with published results

#### *Participants*

The interventions investigated in the studies addressed a wide variety of different participants. Howarth 2021, Santos 2021, Takamatsu 2021, and Yu 2021b addressed healthcare workers. Kelkar 2021 and Stein 2021 included cancer patients. Patients in France were addressed in Tran 2021. Marquez 2021 included Latinx community members in San Francisco. Israeli soldiers participated in Talmy 2021, and American veterans and the general population in Thorpe 2021. Adult US citizens participated in Ashworth 2021, Barber 2021, Bokemper 2021, Borah 2021, Brehm 2021, Duch 2021, Fox 2021, Huang 2021, Jung 2021, Kreps 2021, Palm 2021, Pink 2021, Robertson 2021a, Robertson 2021b, Ryoo 2021, Sehgal 2021, Serra-Garcia 2021, Sotis 2021, Strickland 2021, Thirumurthy 2021, Thunström 2021, Witus 2021, Walkey 2021, and Yuan 2021. Adult US and UK citizens participated in Sudharsanan 2021. Merkley 2021 included Canadian residents. Chen 2021, Gong 2021, and Peng 2021 included Chinese citizens and Yu 2021 Hong Kong citizens. Kerr 2021, Sinclair 2021, Pfattheicher 2021, and OCEAN included UK citizens. US citizens and German citizens participated in Sprengholz 2021 and German adults only in Keppeler 2021, Klüver 2021, Reichardt 2021, and Sprengholz 2021c. Japanese residents participated in Kobayashi 2021, Pakistani residents in Jin 2021, Polish residents in Kachurka 2021 and Swedish residents in Campos-Mercade 2021. Israeli citizens were addressed by Senderey 2021. Internally displaced persons in Nigeria were addressed by Ugwuoke 2021. Argote 2021 included adults in Argentina, Brazil, Chile, Colombia, Mexico, and Peru and Galasso 2021 included adults in Australia, France, Germany, Italy, New Zealand, Poland, Sweden, the UK, and the USA. French citizens participated in Schwarzinger 2021 and Italian citizens in Capasso 2021. Young adults participated in Hong 2021 and Ye 2021.

All studies report a sample size of more than 100 participants. In summary, a majority of interventions were targeted towards US adults. For more detailed information on sample size, please see the characteristics of included studies tables. Population groups can also be selected in the interactive evidence map.

#### *Interventions*

Interventions were grouped as educational interventions, incentives, policies, communication strategies, increased access and multidimensional interventions. In summary, a majority of published studies tested communication strategies to increase COVID-19 vaccine uptake. For more detailed information on the interventions, please see the evidence map as well as the characteristics of included studies table and Summary of findings 1.

##### Communication interventions

Thirty-four studies tested communication strategies to increase the willingness to vaccinate against COVID-19 (Argote 2021; Ashworth 2021; Bokemper 2021; Borah 2021; Capasso 2021; Chen 2021; Fox 2021; Galasso 2021; Gong 2021; Hong 2021; Huang 2021; Jin 2021; Kachurka 2021; Keppeler 2021; Merkley 2021; OCEAN; Palm 2021; Peng 2021; Pink 2021; Reichardt 2021; Robertson 2021b; Ryoo 2021; Santos 2021; Stein 2021; Sudharsanan 2021; Schwarzinger 2021; Strickland 2021; Sinclair 2021; Sotis 2021; Thunström 2021; Ugwuoke 2021; Witus 2021; Ye 2021; Yuan 2021), with most studies using framing as a method. Framing is the selection or highlighting of certain aspects of an issue to bring these to the forefront in communication and encourage particular interpretations (Entman 1993). For example, some studies compared gain and loss frames (Hong 2021; Peng 2021; Reichardt 2021; Ye 2021). Text messages, E-mails, letters, webpages, posters, and face-to-face communication were used as media to transport messages about COVID-19.

##### Incentives

Eleven studies investigated financial incentives to enhance COVID-19 vaccine uptake (Barber 2021; Brehm 2021; Duch 2021; Kreps 2021; Robertson 2021a; Sehgal 2021; Serra-Garcia 2021; Thirumurthy 2021; Walkey 2021; Yu 2021; Yu 2021b). Specifically, a majority of studies investigated vaccine lotteries, where it is possible to win a cash price for getting vaccinated. Other studies researched the effectiveness of financial incentives to motivate people to get vaccinated.

##### Multidimensional interventions

Ten studies investigated multidimensional interventions, that evaluated a mix of educational, communicational, and policy interventions as well as improved access (Howarth 2021; Jung

2021; Kerr 2021; Klüver 2021; Marquez 2021; Pfattheicher 2021; Senderey 2021; Serra-Garcia 2021; Sprengholz 2021c; Takamatsu 2021). For example, one study combined incentives with easy access to vaccines (Klüver 2021).

#### Educational interventions

Five studies investigated educational interventions such as workshops or information texts. Specifically, Kelkar 2021 conducted a webinar, Talmy 2021 investigated the use of workshops to educate soldiers about COVID-19 vaccines, Thorpe 2021 used online fact boxes to educate veterans, Kobayashi 2021 investigated a chatbot answering questions about COVID-19 and vaccines, and Tran 2021 utilised an interactive web tool to offer individualised information for users.

#### Policy interventions

One study investigated a policy intervention (Sprengholz 2021), specifically the effects of a mandatory vaccine policy.

#### Interventions to improve access

We did not identify any studies with published results that investigate the effects of improved access.

### *Control conditions*

Most studies used control arms in which other intervention strategies were tested or in which the intervention was slightly altered (Argote 2021; Ashworth 2021; Bokemper 2021; Borah 2021; Duch 2021; Campos-Mercade 2021; Capasso 2021; Chen 2021; Fox 2021; Galasso 2021; Gong 2021; Hong 2021; Howarth 2021; Huang 2021; Jin 2021; Jung 2021; Kachurka 2021; Kelkar 2021; Keppeler 2021; Klüver 2021; Kreps 2021; Merkley 2021; OCEAN; Palm 2021; Peng 2021; Pfattheicher 2021; Pink 2021; Reichardt 2021; Robertson 2021a; Robertson 2021b; Ryoo 2021; Senderey 2021; Serra-Garcia 2021; Sinclair 2021; Sotis 2021; Sprengholz 2021; Sprengholz 2021c; Strickland 2021; Sudharsanan 2021; Takamatsu 2021; Thorpe 2021; Thunström 2021; Tran 2021; Ye 2021; Yu 2021; Yu 2021b; Yuan 2021). Most studies had more than one control condition. Nine studies had control conditions with no intervention (Barber 2021; Brehm 2021; Kerr 2021; Schwarzinger 2021; Sehgal 2021; Thirumurthy 2021; Ugwuoke 2021; Walkey 2021; Witus 2021). One study had a delayed control condition (Santos 2021). Four studies were uncontrolled (Kobayashi 2021; Marquez 2021; Talmy 2021; Stein 2021).

### *Outcome measures*

The willingness to get vaccinated for COVID-19 was assessed as an outcome in 43 studies (Ashworth 2021; Argote 2021; Bokemper 2021; Borah 2021; Capasso 2021, Chen 2021; Fox 2021; Galasso 2021; Gong 2021; Howarth 2021; Huang 2021; Jin 2021; Jung 2021; Kachurka 2021; Klüver 2021; Kelkar 2021; Kerr 2021; Kobayashi 2021; Keppeler 2021; Kreps 2021; Merkley 2021; OCEAN; Palm 2021; Robertson 2021a; Robertson 2021b; Schwarzinger 2021; Serra-Garcia 2021; Sudharsanan 2021; Sinclair 2021; Sprengholz 2021c; Strickland 2021; Tran 2021; Peng 2021; Pfattheicher 2021; Pink 2021; Thorpe 2021; Thunström 2021; Ugwuoke 2021; Witus 2021; Ye 2021; Yu 2021; Yu 2021b; Yuan 2021). Usually, this outcome was assessed with survey questions on the intention to get vaccinated.

A majority of studies (48 of 61) used an unvalidated questionnaire (e.g., “If there is a COVID-19 vaccine available, are you willing to be vaccinated?” Gong 2021) to measure the willingness to get vaccinated or did not give any information on the source or their questionnaire. Some studies used only one question to measure the willingness to get vaccinated, while others used scales with more than one question. Validated questionnaires or questionnaires adapted from other studies were used in Borah 2021, Capasso 2021, Jin 2021, Kelkar 2021, Kerr 2021, OCEAN, Sinclair 2021, Peng 2021, Pfattheicher 2021, Sudharsanan 2021, Witus 2021, and Ye 2021. One study used the clicks on pages to register for a vaccine appointment as a proxy for the willingness to get vaccinated (Keppeler 2021).

Thirteen studies assessed vaccine uptake as an outcome (Barber 2021; Brehm 2021; Campos-Mercade 2021; Hong 2021; Marquez 2021; Santos 2021; Sehgal 2021; Senderey 2021; Stein 2021; Takamatsu 2021; Talmy 2021; Thirumurthy 2021; Walkey 2021). This outcome was usually assessed using real-world data on vaccination rates in the studied population. Reactance was measured in two studies (Reichardt 2021; Sprengholz 2021). Duch 2021 investigated further interest in vaccine information as an outcome. Vaccine hesitancy was measured in Ryoo 2021. Agreement with COVID-19 passports was assessed in Sotis 2021.

Some studies also reported secondary outcomes. These were not mapped in the interactive scoping map and are further described in the Characteristics of included studies table.

## Ongoing Studies

Please note that ongoing studies were also included in the mapping of the results.

### *Participants*

Participant characteristics also differ between ongoing studies. African American and Latinx communities are addressed in four ongoing studies (NCT04761692; NCT04542395; NCT04779138; NCT05022472 (2VIDA!)). Furthermore, NCT04801030 plans to include African American adults and NCT04884750 churchgoers in Black churches in the USA. Ethnically diverse minority populations are being recruited in NCT04867174. Native American residents are recruited in NCT04964154 (BRAVE). NCT04871776 aims to address hospital patients, and NCT04834726 at-risk patients. Nursing home residents and staff are participating in NCT04732819. NCT04876885 includes Ontario residents and healthcare professionals, and NCT05037201 employees in a US healthcare service. Patients are recruited in NCT04939519 (SCALE-UP Utah), NCT04930965 (LA-CEAL: HALT COVID), NCT04952376, NCT04963790, and NCT04981392. NCT04800965 and NCT04801524 aim to include university students. US veterans are participating in NCT04805931 (VEText). Adult US citizens participate in NCT04706403, NCT04951310, and NCT04979416, US and Chinese residents in DRKS00023650. ISRCTN15317247 includes UK citizens, NCT04895683 includes London citizens and NCT04813770 Scottish residents. US veterans are recruited in NCT05027464 (CoVAcS). Ugandan villagers participate in PACTR202102846261362. NCT04870593 aims to address elderly Indian residents. NCT04939506 addresses vaccine-hesitant US adults. NCT04924803 aims to recruit drug users. All studies, except for NCT04604743 and NCT04960228 plan to include adults aged 18 years or older.

All ongoing studies report a sample size of more than 100 participants. Larger studies plan to recruit more than 20,000 participants (for example, DRKS00023650). For more detailed information on sample size, please see the Characteristics of ongoing studies tables.

#### *Interventions*

Interventions were grouped as educational interventions, incentives, policies, communication strategies, increased access and multidimensional interventions.

##### Communication interventions

Sixteen ongoing studies plan to test communication strategies to increase the willingness to vaccinate against COVID-19. Nine of these studies plan the use of personalised communication strategies (ISRCTN15317247; NCT04939519 (SCALE-UP Utah); NCT04924803; NCT04805931 (VEText); NCT04834726; NCT04895683; NCT04952376; NCT04963790; NCT05027464 (CoVAcS); ) such as personalised text messages as reminders. The other studies use different strategies to persuade people to get vaccinated (NCT04706403; NCT04801524; NCT04871776; NCT04981392; NCT04930965 (LA-CEAL: HALT COVID); PACTR202102846261362; NCT04884750).

##### Educational interventions

Twelve ongoing studies aim to investigate educational interventions such as workshops or information texts (DRKS00023650; NCT04604743; NCT04779138; NCT04801030; NCT04813770; NCT04876885; NCT04939506; NCT04960228; NCT04979416; NCT04964154 (BRAVE); PACTR202102846261362; NCT04542395).

##### Multidimensional interventions

Six ongoing studies plan to investigate multidimensional interventions that mix different intervention categories (NCT04732819; NCT04867174; NCT04761692; NCT04800965; NCT04870593; NCT05022472 (2VIDA!)).

##### Incentives

One ongoing study plans to investigate a lottery as an incentive to get vaccinated (NCT04951310).

##### Interventions to improve access

We did not identify any ongoing studies that investigate the effects of improved access.

##### Control conditions

To control intervention effects, a majority (18 of 35) of ongoing studies plan to use an active control (DRKS00023650; ISRCTN15317247; NCT04939519 (SCALE-UP Utah); NCT04981392; NCT04964154 (BRAVE); NCT04924803; NCT05022472 (2VIDA!); NCT04952376; NCT04963790; NCT05037201; NCT04761692; NCT04801524, NCT04813770; NCT04834726; NCT04867174; NCT04870593; NCT04884750; NCT04960228). Eleven studies compare the intervention to current practices (NCT04800965; NCT04801030; NCT04876885; NCT04732819; NCT04805931 (VEText); NCT04871776; NCT04895683; NCT04979416; NCT04951310; NCT05027464 (CoVAcS); NCT04930965 (LA-CEAL: HALT COVID)). Three studies do not further specify the control condition (NCT04706403; PACTR202102846261362; NCT04604743) and three are uncontrolled (NCT04542395; NCT04779138; NCT04939506).

In summary, educational and multidimensional interventions are the most used types of interventions in ongoing studies. For a more detailed description of interventions, please see the Characteristics of ongoing studies table and the Summary of findings 1.

#### *Outcome measures*

Twenty-four ongoing studies plan to assess vaccine uptake as an outcome (ISRCTN15317247; NCT04604743; NCT04779138; NCT04800965; NCT04801030; NCT04801524; NCT04805931 (VEText); NCT04834726; NCT04867174; NCT04884750; NCT04895683; NCT04870593; NCT04732819; NCT04761692; NCT04542395; NCT04939506; NCT04939519 (SCALE-UP Utah); NCT04981392; NCT04964154 (BRAVE); NCT04924803; NCT04951310; NCT05027464 (CoVAcS); NCT04952376; NCT04963790). Usually, the studies plan to assess this outcome using real-world data on vaccination rates in the studied population. Furthermore, the willingness to get vaccinated for COVID-19 is assessed as an outcome in seven studies (NCT04706403; NCT04813770; NCT04876885; NCT05037201; NCT04960228; NCT04979416; NCT04930965 (LA-CEAL: HALT COVID)). Usually, this outcome is assessed with survey questions on the intention to get vaccinated. One study aims to assess the decrease of vaccine hesitancy (DRKS00023650), and two studies the proportion of vaccine hesitancy among participants (NCT04801524; PACTR202102846261362). One study assesses vaccine confidence or trust (NCT05022472 (2VIDA!)). Some studies also reported secondary outcomes. These were not mapped in the interactive scoping mapand are further described in the Characteristics of ongoing studies table.

## DISCUSSION

### Summary of main results

We identified 101 eligible studies and classified five studies of these as awaiting classification since it was unclear from trial registries if they really are intervention studies. Of the 96 included studies, 61 studies have published results and 35 are ongoing. Interventions to increase COVID-19 vaccine uptake were very heterogeneous and included communication interventions (50), educational interventions (17), multidimensional interventions (16), and incentives (12), as well as policy interventions (1). The mapping of the results shows that interventions are mostly assessed with regard to their potential to increase the willingness to get vaccinated or COVID-19 vaccine uptake. A smaller proportion of studies looked at interventions to decrease vaccine hesitancy. Only one study assessed the agreement with COVID-19 policies as an outcome. A majority of studies was conducted in English-speaking high-income countries. Populations that were addressed were diverse with studies addressing healthcare workers, ethnic minorities in the US, students, soldiers, villagers, at-risk patients, or the general population. A majority of the studies addressed adult participants. Most studies investigated the interventions in a randomised-controlled setting.

### Overall completeness and applicability of evidence

The evidence summarised here demonstrates a wide range of interventions addressing specific populations in English-speaking

high-income countries. However, we could only identify a small number of studies set in low and middle-income countries.

Moreover, we only identified four studies that focused specifically on young people. Since some vaccines against COVID-19 are now also approved for young adults and children, it is of utmost importance to investigate interventions addressing COVID-19 vaccine uptake in younger populations.

Until more evidence is available on the effects of interventions focused on increasing COVID-19 vaccine uptake for lower-middle-income countries and younger populations, decision-makers may want to draw on the findings of systematic reviews of related interventions to inform their decision-making. For example, several Cochrane Systematic Reviews have investigated strategies to enhance vaccine uptake for other vaccines (Abdullahi 2020; Jacoboson Vann 2018; Kaufman 2018; Oyo-Ita 2016; Thomas 2018).

None of the studies that we identified assessed the efficacy of policy interventions that have been implemented in 'real-world' or practice settings. We only identified one study of policy interventions, and this investigated the effects of a hypothetical mandatory vaccine policy in a laboratory setting (Sprengholz 2021). With strategies such as mandatory vaccination or travel restrictions for unvaccinated people being discussed or implemented, studies to evaluate the impact of such strategies are becoming increasingly important. Moreover, we only identified one multidimensional study that investigated the effects of improved access (Klüver 2021) and no study only investigating improved access. Since interventions based on increased access to vaccines are effective in other contexts (Dubé 2015), this research gap should be addressed in future studies. Overall, the description of interventions was very heterogeneous and differed in detail. Especially for ongoing studies, interventions often were not well-described and thus our categorization of them is preliminary.

Finally, while validated questionnaires to measure the willingness to get vaccinated or vaccine hesitancy are available, the majority of the included studies did not use these. Future studies should employ validated instruments to measure COVID-19 vaccine hesitancy and willingness.

### Potential biases in the review process

While we published a protocol for this review beforehand (Andreas 2021), it was not peer-reviewed by external experts. Furthermore, although we registered the protocol in advance, the studies that we identified made a change to the intervention categorisation necessary. We adapted the intervention categories to better fit the evidence. Specifically, we added the category “multidimensional interventions” as many studies used a mixture of intervention categories. Additionally, instead of summarising education interventions under communication strategies, it became a separate category. We also added "interventions to improve access" as a separate category. These changes enabled us to more accurately map our findings.

We identified no other potential sources of bias in our review process.

## AUTHORS' CONCLUSIONS

### Implications for research and practice

We were able to identify and map a number of heterogeneous interventions for increasing COVID-19 vaccine uptake or decreasing vaccine hesitancy. Our results demonstrate that this is an active field of research with 61 published studies and 35 studies still ongoing. The contexts and populations in which the interventions were tested were diverse and thus enable policymakers to identify evidence for specific populations.

While we could identify a heterogenous evidence base for interventions to increase COVID-19 vaccine uptake in this scoping review, future research should address the following research gaps:

- Developing and evaluating intervention strategies in low and middle-income countries in order to inform health policies in these contexts
- The majority of studies were conducted in experimental settings only. Studies are also needed on the effectiveness of interventions already in use in routine practice
- Developing and evaluating interventions that address adolescents or children
- Developing and evaluating interventions to improve access to vaccination
- Developing and evaluating policy interventions
- Few studies use validated questionnaires to measure outcomes such as the willingness to vaccinate. Future research should therefore develop and use validated instruments for these outcomes

### Implications for a subsequent effectiveness review

This scoping review cannot answer the question of which interventions are most effective to increase COVID-19 vaccine willingness. However, it provides a systematic overview of interventions, study design, populations, and settings of studies researching interventions to increase COVID-19 vaccine uptake and willingness to vaccinate. We identified 61 published studies and an additional 35 ongoing studies, many of which are RCTs. Furthermore, many ongoing studies have estimated completion dates in 2022. Thus, a systematic review comparing the effectiveness of the various interventions to increase COVID-19 vaccine uptake seems both feasible and warranted.

Nevertheless, this scoping review has also highlighted some challenges of conducting a subsequent systematic review. Firstly, the COVID-19 pandemic is rapidly evolving, both within and between countries, making it hard to compare studies conducted in different contexts. Criteria such as the timing of the intervention should therefore be considered as subgroup analyses in a meta-analysis. Secondly, this scoping review has demonstrated that a range of different measures to increase vaccine uptake exist. It follows that the comparison of different interventions in a systematic review with meta-analysis might be difficult, especially regarding study heterogeneity. Thus, comparing effectiveness within an intervention category might be most appropriate for a subsequent systematic review. Furthermore, in the process of writing this review, we have adapted the categorisation system for interventions to better differentiate between the numerous intervention types we identified. The updated system can be used

for a subsequent systematic review or similar scoping reviews; however, whether further adjustments will be required, remains to be seen.

Finally, the dynamic nature of the COVID-19 pandemic highlights the importance of providing up-to-date evidence to inform policy decisions. New variants and new vaccines have emerged while we worked on this scoping review, that have likely impacted the ability of vaccines to block transmission and may have influenced willingness to get vaccinated. To best reflect the fast-paced COVID-19 pandemic, a living systematic review might be most appropriate.

In conclusion, as COVID-19 vaccine hesitancy remains an urgent topic in most countries, a future systematic review can help to inform evidence-based strategies to address the willingness to vaccinate against COVID-19.

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Editorial and peer-reviewer contributions:

The following people conducted the editorial process for this article.

Sign-off Editor (final editorial decision): Simon Lewin; Joint Co-ordinating Editor of Cochrane Effective Practice and Organisation of Care (EPOC), Norweigan Institute for Public Health
Managing Editor (selected peer reviewers, collated peer-reviewer comments, provided editorial guidance to authors, edited the article): Helen Wakeford, Central Editorial Service, Cochrane
Editorial Assistant (conducted editorial policy checks and supported editorial team): Leticia Rodrigues, Central Editorial Service, Cochrane
Copy Editor (copy editing and production): Heather Maxwell, Cochrane
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**NCT04761692** *{published data only}*

Increasing COVID-19, influenza, and pneumonia vaccine uptake. Clinicaltrials.gov 2021. [NCT: 04761692]

**NCT04779138** *{published data only}*

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**NCT04800965** *{published data only}*

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**NCT04801524** *{published data only}*

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**NCT04805931 (VEText)** *{published data only}*

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**NCT04867174** *{published data only}*

COVID-19 vaccination take-up. Clinicaltrials.gov 2021. [NCT: 04867174]

**NCT04870593** *{published data only}*

What works to get the elderly vaccinated against COVID-19? Experimental evidence from India. Clinicaltrials.gov 2021. [NCT: 04870593]

**NCT04871776** *{published data only}*

Use of construal level theory to inform messaging to increase vaccination against COVID-19. Clinicaltrials.gov 2021. [NCT: 04871776]

**NCT04876885** *{published data only}*

The future of viral communications: video-based health promotion strategies for COVID-19 vaccinations. Clinicaltrials.gov 2021. [NCT: 04876885]

**NCT04884750** *{published data only}*

Conversational agent vaccine promotion RCT. Clinicaltrials.gov 2021. [NCT: 04884750]

**NCT04895683** *{published data only}*

Using text messages to improve COVID-19 vaccination uptake. Clinicaltrials.gov 2021. [NCT: 04895683]

**NCT04924803** *{published data only}*

Community developed technology-based messaging to increase COVID-19 vaccine uptake among people who inject drugs. Clinicaltrials.gov . [NCT: NCT04924803]

**NCT04930965 (LA-CEAL: HALT COVID)** *{published data only}*

Impact of LA-CEAL HALT COVID-19 Ambassador Program on likelihood to vaccinate. Clinicaltrials.gov . [NCT: NCT04930965]

**NCT04939506** *{published data only}*

COVID-19 vaccine education at the point of testing to increase vaccine uptake in vulnerable communities in SE Louisiana. Clinicaltrials.gov . [NCT: NCT04939506]

**NCT04939519 (SCALE-UP Utah)** *{published data only}*

SCALE-UP Utah: community-academic partnership to address COVID-19 vaccination rates among Utah Community Health Centers. Clinicaltrials.gov . [NCT: NCT04939519]

**NCT04951310** *{published data only}*

COVID-19 vaccinations with a sweepstakes. Clinicaltrials.gov . [NCT: NCT04951310]

**NCT04952376** *{published data only}*

Equitable access to COVID-19 vaccines. Clinicaltrials.gov. [NCT: NCT04952376]

**NCT04960228** *{published data only}*

Exploring changes in COVID-19 vaccination intentions by prompting altruistic motives using a video intervention. Clinicaltrials.gov. [NCT: NCT04960228]

**NCT04963790** *{published data only}*

Enabling family physicians to reduce vaccine hesitancy and increase Covid-19 vaccine uptake. Clinicaltrials.gov. [NCT: NCT04963790]

**NCT04964154 (BRAVE)** *{published data only}*

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**NCT04979416** *{published data only}*

Video Messages and Vaccination Intention. Clinicaltrials.gov. [NCT: NCT04979416]

**NCT04981392** *{published data only}*

Intervention to promote COVID-19 vaccination. Clinicaltrials.gov. [NCT: NCT04981392]

**NCT05022472 (2VIDA!)** *{published data only}*

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**NCT05027464 (CoVAcS)** *{published data only}*

Developing and testing a COVID-19 Vaccination Acceptance intervention (CoVAcS). Clinicaltrials.gov. [NCT: NCT05027464]

**NCT05037201** *{published data only}*

Text message nudges for COVID-19 vaccination. Clinicaltrials.gov. [NCT: NCT05037201]

**PACTR202102846261362** *{published data only}*

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* Indicates the major publication for the study

## CHARACTERISTICS OF STUDIES

### Characteristics of included studies *[ordered by study ID]*

#### Argote 2021

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled experiments<br>• Type of publication: preprint<br>• Setting and dates: 0nline survey, between January 11 and January 29, 2021<br>• Countries: Argentina, Brazil, Chile, Colombia, Mexico, and Peru<br>• Language: English |
| Interventions | Different information about COVID-19 vaccine:<br>• Control condition: basic text<br>• Vaccine condition: information about vaccine safety<br>• Biden condition: "President Biden safely received a vaccine against COVID-19"<br>• Herd condition: "Experts say at least 60/70/80% of people need to be vaccinated to prevent the spread of COVID-19"<br>• Current condition: "Recent data indicates that X% of people in [COUNTRY] say they would get vaccinated against COVID-19"<br>• Vaccine + Biden condition<br>• Vaccine + herd condition<br>• Vaccine + herd (60/70/80%) + current condition<br>Motivation treatment:<br>• Control condition: no motivational treatment<br>• Altruism: You will help keep others in your community healthy<br>• Economic recovery: You will help the economy recover<br>• Social approval: You will be respected by the people in your community |
| Population | • Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 13.189/7172/7080<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Comprehension tests<br>• Vaccine willingness<br>• Encourage others to vaccinate<br>• Posterior beliefs about herd immunity and municipal uptake |
| Notes | COI: NR<br>Funding: NR |

#### Ashworth 2021

| ***Study characteristics*** |
|---|

**Ashworth 2021** *(Continued)*

| | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: report<br>• Setting: general population<br>• Country: USA<br>• Language: English |
| Interventions | Different messaging about benefits of the COVID-19 vaccine:<br>• Benefits from vaccination to personal health:<br>  ○ benefits to the health of family<br>  ○ benefits to the health of community members<br>  ○ benefits to local and national economies<br>• Fourth message: emphasises the rigor and safety protocols of the vaccine development process |
| Population | • Population: General population<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (assessed): 3,048<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Vaccine intention |
| Notes | • COI: NR<br>• Funding: Wyoming Health and Bioscience Innovation Hub COVID Grant-1044 |

**Barber 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: cohort<br>• Type of publication: preprint<br>• Setting: general population, announced May 12, 2021, for 5 weeks<br>• Country: USA<br>• Language: English |
| Interventions | Lottery |
| Population | • Population: Ohio state residents<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (assessed): NR<br>• Inclusion criteria: Ohio state residency |
| Outcomes | Vaccine uptake |
| Notes | • COI: NR<br>• Funding: NR |

### Bokemper 2021

| *Study characteristics* | |
|---|---|
| Methods | • Study design: randomised controlled experiments<br>• Type of publication: journal publication<br>• Setting and dates: YouGov Survey, between September 9 and September 22, 2020<br>• Country: USA<br>• Language: English |
| Interventions | Experiment 1:<br>• Vignette A; Vaccine gets approved by FDA 1 week before election; DATE was randomly assigned to be "October 27, 1 week before the election."<br>• Vignette B: "Vaccine gets approved by FDA November 10, 1 week after the election."<br>• Vignette C: "Vaccine gets approved by FDA December 15."<br>Experiment 2:<br>The statement was randomly assigned to one of six values, (1) a positive or (2) negative statement by Dr. Anthony Fauci, (3) a positive or (4) negative statement by President Trump, (5) a joint positive statement by Trump and Speaker of the House Nancy Pelosi, or (6) a positive Trump statement and a negative Pelosi statement |
| Population | • Age: 18 and older<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 5014<br>• Inclusion/exclusion criteria: NR |
| Outcomes | Primary outcome:<br>• Likeliness of getting vaccinated within the first 3 months of the vaccine becoming available measured on a 5-point Likert scale<br>Secondary outcome:<br>• Confidence in vaccine safety and efficacy measured on a 4-point Likert scale |
| Notes | Sponsor/ funding: NR<br>COI: 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. |

### Borah 2021

| *Study characteristics* | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: online survey platform (Qualtrics), July 2020<br>• Country: USA<br>• Language: English |
| Interventions | Framing<br>• Gain vs. loss |

**Borah 2021** *(Continued)*

| | |
|---|---|
| | • Individual vs. collective |
| Population | • Population: general population<br>• Age; M (SD); range: 18 and older; 37.1 (10.99); 21-73<br>• Gender: 42.9% Female, 57.1% Male<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 387 assessed<br>• Inclusion/exclusion criteria: US residency |
| Outcomes | • COVID-19 vaccine intention measured on a 7-point Likert scale<br>• Attitude towards COVID-19<br>• Perceived personal benefits |
| Notes | • COI: NR<br>• Funding: NR |

**Brehm 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: cohort study<br>• Type of publication: journal publication<br>• Setting and dates: Ohio State, announced on May 12, 2021, for 5 weeks<br>• Country: US<br>• Language: English |
| Interventions | "Vax-a-Million" Lottery |
| Population | • Population: general population<br>• Age: 12 and older<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): NR<br>• Inclusion/exclusion criteria: Ohio State residency |
| Outcomes | Vaccine uptake |
| Notes | • COI: NR<br>• Funding: NR |

**Campos-Mercade 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled experiment<br>• Type of publication: journal publication (online)<br>• Setting and dates: Sweden, May to July 2021<br>• Countries: Sweden<br>• Language: English |

**Campos-Mercade 2021** *(Continued)*

| | |
|---|---|
| Interventions | • Monetary incentive: SEK 200 (about $24) conditional for becoming vaccinated<br>• Nudging:<br>  ○ Social impact condition: list four people who would benefit from the participant vaccinating<br>  ○ Arguments condition: to write down arguments that could best convince another person to vaccinate (arguments condition)<br>  ○ Information condition: participate in a quiz with information on the safety and effectiveness of COVID-19 vaccines<br>  ○ No reminder condition: No nudge or reminder |
| Population | • Age: 18-49<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 8286<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Participants' self-reported intention to get a first dose of a COVID-19 vaccine within 30 days after vaccines become available to them<br>• Whether participants vaccinated within 30 days according to the administrative records. |
| Notes | Funding: Danish National Research Foundation grant DNRF134 (PC), Swiss National Science Foundation Grant PZ00P1_201956(ANM), Swiss National Science Foundation grant 100018_185176 (FHS), Chazen Institute for Global Business at Columbia Business School (SM), Columbia Business School (SM), The Booth School of Business, University of Chicago(DP), and Riksbankens Jubileumsfond (EW)<br><br>COI: none declared |

**Capasso 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: Online, November and December 2020<br>• Country: Italian<br>• Language: Italian |
| Interventions | Persuasive messages focused on cognitive attitude plus anticipated affective reactions:<br><br>• Control (no message)<br>• Cognitive attitude<br>• Cognitive attitude + positive affect message<br>• Cognitive attitude + negative affect message |
| Population | • Population: Italian adults<br>• Age; range: 18-75<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 600 recruited, 484 assessed<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Intention to get vaccinated against COVID-19 (3 items, 5-point scale)<br>• Cognitive attitude towards vaccination against COVID-19<br>• Anticipated positive affective reactions |

**Capasso 2021** *(Continued)*

| | |
|---|---|
| | • Anticipated negative affective reactions |
| Notes | • COI: NR<br>• Funding: NR |

**Chen 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled experiment<br>• Type of publication: journal publication<br>• Setting and dates: online experiment, May 28 and June 24 in 2020<br>• Country: China<br>• Language: English |
| Interventions | News article about the development of the COVID-19 vaccine with the following variables manipulated:<br>• Message frames: gain vs. loss<br>• Outcome uncertainty: certain vs. uncertain<br>• Number format: frequency vs. percentage |
| Population | • Population: Chinese adults<br>• Age; mean (SD): 24.70 (9.55)<br>• Gender: 55.2% Male, 44.1% Female<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 413<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Attitudes towards getting vaccinated<br>• Intention to get vaccinated against COVID-19<br>• Numeracy skills |
| Notes | Funding: NR<br>COI: none declared |

**Duch 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: preprint<br>• Setting and dates: Online platforms (Facebook, Cloud Research Platform, Lucid Fulcrum Exchange), June 28 and July 11 in 2021<br>• Country: USA<br>• Language: English |
| Interventions | Financial Incentives: Informational videos promoting vaccination with messages about:<br>• Health benefits (control)<br>• Being entered into lotteries |

**Duch 2021** *(Continued)*

| | |
|---|---|
| | • Receiving cash equivalent vouchers |
| Population | • Population: US residents<br>• Age; range: ≥18 (29-46)<br>• Gender: Female, Male, other<br>• Ethnicity: Black White, Other<br>• Number of participants (recruited/allocated/evaluated): 1500 planned, 1609 assessed<br>• Inclusion/exclusion criteria: residency in the USA |
| Outcomes | Digital expression of further interest in vaccination information: choice between obtaining further information on being vaccinated in their state vs. ending the survey |
| Notes | • COI: NR<br>• Funding: Nuffield College |

**Fox 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: Online platform (Qualtrics), November 23, 2020, December 8, 2020<br>• Country: USA<br>• Language: English |
| Interventions | Framing<br>• Newspaper prime: recommending minority prioritisation for vaccination acknowledging historical racism<br>• Control: article without a minority prioritisation focus |
| Population | • Population: New York State residents<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: Black and Hispanic respondents were oversampled<br>• Number of participants (recruited/allocated/evaluated): 1353 recruited<br>• Inclusion/exclusion criteria: New York State residency |
| Outcomes | • Intention to get vaccinated against COVID-19<br>• Interaction with race-ethnicity |
| Notes | • COI: NR<br>• Funding: State of New York |

**Galasso 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: preprint<br>• Setting and dates: online, December 2, 2020 - December 10, 2020 |

**Galasso 2021** *(Continued)*

| | |
|---|---|
| | • Country: Australia, France, Germany, Italy, New Zealand, Poland, Sweden, UK, USA<br>• Language: NR |
| Interventions | Framing/Information provision<br>• Group 1: vaccine reduces infection<br>• Group 2: vaccine reduces contagion<br>• Group 3: vaccine helps your country<br>• Group 4: vaccine helps the economy<br>• Group 5: no additional vaccine information |
| Population | • Population: adults in the participating countries<br>• Age; range: 18- 60+<br>• Gender: Male, Female<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 13,326 assessed<br>• Inclusion/exclusion criteria: aged 18 years or above |
| Outcomes | • Belief that the vaccine represents a permanent solution to the pandemic<br>• Agreement to be vaccinated<br>• Agreement to compulsory vaccination |
| Notes | • COI: NR<br>• Funding: ANR (French Agency for Research) |

**Gong 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled experiment<br>• Type of publication: journal article<br>• Setting and dates: online Credema platform, November/December 2020<br>• Country: China<br>• Language: NR |
| Interventions | • Control group (non-framed)<br>• Experimental group: gain-framed<br>• Experimental group: loss-framed<br>• Experimental group: altruism |
| Population | • Population: Chinese residents<br>• Age; range: 18 - >50<br>• Gender: Male (48.86%), Female (51.14%)<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 1,404 recruited, 1,316 evaluated<br>• Inclusion/exclusion criteria: aged 18 years or above and no history of receiving a COVID-19 vaccine |
| Outcomes | • Willingness to get vaccinated (Scale from 1 to 5)<br>• Several variables that could influence vaccination willingness (perceived likelihood of getting COVID-19, perceived severity of COVID-19, perceived vaccine effectiveness) |
| Notes | Funding: none |

**Gong 2021** *(Continued)*

| | |
|---|---|
| | COI: none |

**Hong 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: andomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: young adults in the USA, November 19, 2020 to November 26, 2020.<br>• Country: USA<br>• Language: English |
| Interventions | Framing<br>• Message frame: gain vs. loss<br>• Point of reference: self vs. other<br>• Perceived risk: low vs. high |
| Population | • Population: young adults at universities<br>• Age: *M* = 21.3 years old, *SD* = 3.83<br>• Gender: 64.3% identified as women, 31.9% identified as men<br>• Ethnicity: 33.3% White, 32.4% Hispanic White, 6.1% Hispanic/Latin, 9.4% Asian American or Pacific Islander, 5.2% Black or African American, 1.9% Native American, 9.4% multi-race, 2.4% others<br>• Number of participants (recruited): 213 |
| Outcomes | • Perceived risk<br>• Attitude towards COVID-19 vaccine<br>• Message elaboration<br>• Behavioral intention |
| Notes | • COI: NR<br>• Funding: NR |

**Howarth 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: pre-post survey study<br>• Type of publication: journal publication<br>• Setting and dates: North London Forensic Service, NR<br>• Country: UK<br>• Language: English |
| Interventions | • Mythbusters posters<br>• Posters of staff members who had already taken their vaccine<br>• Vaccine champions to aid engagement in conversation about the vaccine<br>• Vaccine information packs being distributed to all wards<br>• Opportunity for staff to "drop in" to clinics for information about the vaccine |
| Population | • Population: willing staff members across 6 forensic inpatient wards within the North London Forensic Service |

**Howarth 2021** *(Continued)*

| | |
|---|---|
| | • Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited): NR |
| Outcomes | • Vaccine intention<br>• Perceived safety of the vaccine<br>• Perceived amount of information about the vaccine<br>• Reduction of misinformation<br>• View on the vaccine |
| Notes | • COI: NR<br>• Funding: NR |

**Huang 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled experiment<br>• Type of publication: journal article<br>• Setting and dates: online platform (Qualtrics), mid-December 2020<br>• Country: USA<br>• Language: English |
| Interventions | Framing<br>• Gain vs. loss<br>• High vs. low uncertainty<br>• National vs. local agency |
| Population | • Population: general population, residents of the greater Houston Area<br>• Age; range: 18-81<br>• Gender: both<br>• Ethnicity: 52,4% Caucasians, 20, 2% Hispanics/Latinos, 19, 4% African American, 6,5% Asians & Pacific Islanders, 1,6% Multiracials or others<br>• Number of participants (recruited/allocated/evaluated): 408 recruited, 382 assessed<br>• Inclusion/exclusion criteria: residency of the greater Houston Area since March 2020 |
| Outcomes | • Vaccine intention<br>• Vaccine beliefs<br>• Perceived threat to freedom<br>• Psychological reactance<br>• Perceived message relevance |
| Notes | • COI: NR<br>• Funding: University of Houston |

**Jin 2021**

| ***Study characteristics*** |
|---|

**Jin 2021** *(Continued)*

| | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal article<br>• Setting and dates: online platform, NR<br>• Country: USA<br>• Language: NR |
| Interventions | Public service messages<br>• Traditional media public service message (safety benefits of COVID-19 vaccine)<br>• Digital media public service message (safety benefits of COVID-19 vaccine)<br>• Traditional public service message (fear appraisals - no vaccination)<br>• Digital media public service message (fear appraisals - no vaccination) |
| Population | • Population: adult Pakistani nationals<br>• Age; range: 18 and older; 18-60+<br>• Gender: 55.9% Female, 54.1% Male<br>• Ethnicity: Pakistani<br>• Number of participants (recruited/allocated/evaluated): 320 assessed<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Perceived threat of COVID-19<br>• Self-Efficacy towards COVID-19 Vaccine Immunisation<br>• Perceived Benefits of COVID-19 Vaccine<br>• Scepticism towards COVID-19 Vaccines (Barriers)<br>• Willingness to Take COVID-19 Vaccine |
| Notes | • COI: NR<br>• Funding: NR |

**Jung 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled experiment<br>• Type of publication: journal article<br>• Setting and dates: online consumer health platform, NR<br>• Country: USA<br>• Language: English |
| Interventions | Two scenarios:<br>• Social density: low vs. high<br>• Prosocial concern: prosocial vs. individual |
| Population | • Population: US residents<br>• Age; mean (SD): NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 560<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Vaccination intention measured on a 7-point Likert scale |

**Jung 2021** *(Continued)*

| | |
|---|---|
| | • Perceived impact; the extent to which participants perceived their decision to vaccinate to impact others using two items |
| Notes | Funding: National Institutes of Drug Abuse and the NIH<br><br>COI: none declared |

**Kachurka 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled experiment<br>• Type of publication: journal article<br>• Setting and dates: online survey platform (Ariadna), February/March 2021<br>• Country: Poland<br>• Language: Polish |
| Interventions | Persuasive messages:<br><br>• Producer reputation<br>• Efficiency<br>• Safety<br>• Others want it<br>• Scientific authority<br>• Scarcity<br>• Thoroughly tested<br><br>Price information:<br><br>• Pay 0 (free)<br>• Get 70PLN<br>• Pay 10PLN<br>• Pay 70PLN |
| Population | • Population: adult Polish internet users<br>• Age; mean: 43.7 in wave 1, 45.8 in wave 2<br>• Gender: both<br>• Ethnicity: Polish<br>• Number of participants (recruited/allocated/evaluated): 3,117 in wave 1 and 2,814 in wave 2<br>• Inclusion/exclusion criteria: NR |
| Outcomes | Willingness to get vaccinated |
| Notes | • COI: NR<br>• Funding: National Science Centre, Poland |

**Kelkar 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: cohort study<br>• Type of publication: journal publication |

**Kelkar 2021** *(Continued)*

| | |
|---|---|
| | • Setting and dates: webinar, January 2021<br>• Country: USA<br>• Language: English |
| Interventions | • Educational webinar "Cancer in the Time of Coronavirus: COVID-19 Vaccine."<br>• Framing of survey questions: positive framing (90% effective rate), negative framing (10% failure rate), frequency (preventing 9 out of 10 people being infected) |
| Population | • Population: cancer patients and caregivers<br>• Age; mean (SD): NR<br>• Gender: 20% Male, 79% Female, 0.5% Non-binary, 2 % prefer not to answer<br>• Ethnicity: 1% American Indian, 5% Asian, 6% Black, 0.5% Hawaiian, 82% White, Other 3%, prefer not to answer 3%<br>• Number of participants (recruited/allocated/evaluated): 364 participated in webinar, 105 people completed both surveys<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Intention change to receive a COVID-19 vaccine after the webinar measured on a survey<br>• Changes in beliefs and perceptions on the COVID-19 vaccine<br>• Willingness to receive a vaccine with a 90% or 10% effectiveness or protecting 9 out of 10 people |
| Notes | Funding: no external funding reported<br>COI: none declared |

**Keppeler 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: May 21 to May 23, 2021<br>• Country: Germany<br>• Language: German |
| Interventions | • Control letters (outlines the personal benefits of getting vaccinated against SARS-CoV-2)<br>• Personalised letters (contains a psychological ownership manipulation, all necessary information about the vaccine, the need to reach herd immunity, and how to schedule vaccination appointments, formatted and typeset by the municipal administration to align with the municipal corporate design, signed by the municipality's Mayor and two public health officials) |
| Population | • Population: general population<br>• Age: 18 and older<br>• Gender: Male, Female<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 27,306<br>• Inclusion/exclusion criteria: vaccine-eligible residents of the municipality |
| Outcomes | "Unique clicks," indicating the number of individuals who performed at least one click on each link (personalised link and corresponding QR code to the municipality's information website, links to the digital scheduling software for vaccination appointments) |
| Notes | • COI: NR |

**Keppeler 2021** *(Continued)*

- Funding: NR

**Kerr 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled experiment<br>• Type of publication: journal publication<br>• Setting and dates: online survey, 13–17 January 2021<br>• Country: UK<br>• Language: English |
| Interventions | Study 1:<br>• Control condition: no information<br>• 4 different Information conditions:<br>  ○ Factbox (Tables detailing incidence of COVID-19 and side effects in the vaccine and placebo arms of a large clinical trial)<br>  ○ Q&A (Q&A format outlining the results of a clinical trial)<br>  ○ Approval message (overview of the standard and expedited COVID-19 vaccine review processes, highlighting assessment of data undertaken during research/development process)<br>  ○ Mechanism (description of how vaccines induce immunity and in particular the mechanism by which mRNA vaccines produce antigens, noting the benefits of using mRNA)<br>Study 2:<br>• Control condition: no information<br>• Information condition:<br>  ○ Long (what might be found on a web page) or short (2–3 sentence version formatted in the style of a social media post) message with information on COVID-19<br>  ○ With no/medium/high caution |
| Population | • Age: 18 and older<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 5014<br>• Exclusion criteria: failing an instructional attention check, reporting having already received a COVID-19 vaccine, providing an age under 18 or higher than 100 |
| Outcomes | Study 1:<br>Primary outcomes:<br>• Seven item Oxford COVID-19 Vaccine Hesitancy Scale<br>• Adapted version of the Oxford COVID-19 Vaccine Beliefs Scale<br>Secondary outcomes:<br>• Binary measure of vaccination intention<br>• Decisional Conflict concerning COVID-19 vaccination<br>• Estimated frequency of side effects of the COVID-19 vaccine, estimated efficacy of different COVID-19 vaccines<br>• Perceptions of the information<br>Study 2: |

**Kerr 2021** *(Continued)*

| | |
|---|---|
| | Primary outcome:<br>• Intentions to engage in protective behaviour following vaccination were measured with two items<br>Secondary outcomes:<br>• Binary measure of vaccination intention<br>• Decisional Conflict concerning COVID-19 vaccination<br>• Perceived efficacy and public importance of COVID-19 vaccine<br>• Perceptions of the information |
| Notes | Funding: Winton Centre for Risk and Evidence Communication<br>COI: none declared |

**Klüver 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: online survey, 5-25 March 2021<br>• Country: UK<br>• Language: German |
| Interventions | 1. Freedoms<br>– Control (0): there are no special regulations for vaccinated people even when the Corona incidence is high. For example, they cannot travel again, visit cinemas, restaurants or concerts and are still subject to contact restrictions.<br>– Treatment (1): special regulations apply to vaccinated people. For example, even when the Corona incidence is high, they can travel again, visit cinemas, restaurants or concerts and are not subject to any contact restrictions.<br>2. Local Doctors<br>– Control (0): eligible citizens can get vaccinated against Corona at the nearest vaccination centre but not at their local doctor.<br>– Treatment (1): eligible citizens get vaccinated against Corona at the nearest vaccination centre or at their local doctor<br>3. Financial Incentives<br>Control (0): citizens who are vaccinated will not receive any allowance after receiving the vaccination.<br>– Treatment 1 (1): citizens who get vaccinated receive an expense allowance of 25 Euros after receiving the vaccination.<br>– Treatment 2 (2): citizens who get vaccinated receive an expense allowance of 50 Euros after receiving the vaccination |
| Population | • Age: 18-75<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 20,500<br>• Exclusion criteria: NR |
| Outcomes | • Willingness to get vaccinated<br>• Vaccine uptake |
| Notes | • COI: NR<br>• Funding: Deutsche Forschungsgemeinschaft |

### Kobayashi 2021

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: cross-sectional survey study<br>• Type of publication: preprint<br>• Setting and dates: LINE messenger app, between April 5–12, 2021<br>• Country: Japan<br>• Language: English |
| Interventions | Corowa-kun: a COVID-19 vaccine information chatbot in a popular messenger app in Japan that answers commonly asked questions |
| Population | • Age; median (range): 55 years (16–97)<br>• Gender: Female 74%, Male 26%<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 10,192<br>• Inclusion/exclusion criteria: NR |
| Outcomes | Primary outcome: COVID-19 vaccine hesitancy |
| Notes | COI: none declared<br>Funding:none |

### Kreps 2021

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised experiment<br>• Type of publication: journal publication<br>• Setting and dates: Online, October 29–30, 2020<br>• Country: USA<br>• Language: English |
| Interventions | Manipulated variables:<br>• Efficacy (50% vs. 70% vs. 90%)<br>• Risk of mild side effects (1 in 2 vs. 1 in 4 vs. 1 in 10)<br>• Vaccine approval (Full FDA approval vs. Emergency Use Authorisation)<br>• Manufacturer (AstraZeneca, Pfizer, Moderna, Johnson and Johnson)<br>• Cost or financial incentive ($20 co-pay, Free, $10 incentive, $100 incentive)* |
| Population | • Population: US adults<br>• Age; median (IQR): 43 (31–58)<br>• Gender: 49% Male, 51% Female<br>• Ethnicity: 75% white, 13% Black, 8% Latinx, 6% Asian, 3% Native American, 1% Other<br>• Number of participants (recruited/allocated/evaluated): 1096<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Vaccine choice<br>• Willingness to vaccinate |

**Kreps 2021** *(Continued)*

| | |
|---|---|
| Notes | Funding: Cornell Atkinson Center for Sustainability<br><br>COI: the authors declare no competing interests.<br><br>* This was the intervention we were interested in for this scoping review |

**Marquez 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: non-randomised intervention study<br>• Type of publication: preprint<br>• Setting and dates: Latinx community in San Francisco, February 1, 2021 to May 19, 2021.<br>• Country: USA<br>• Language: English |
| Interventions | Community-centered vaccination strategy that included mobilisation, vaccination, and activation components.<br><br>• Motivate: multi-method outreach approach to mobilise community members and generate demand for COVID-19 vaccination (door-to-door canvassing, outreach texts, posters, radio, newspaper, social media posts by community leaders)<br>• Vaccinate: provide vaccinations 4 days a week, provide evening hours, In-person scheduling co-located at the UeS neighbourhood vaccination site, provide timely vaccination, only on-site, low-barrier registration<br>• Activate: empower clients to become vaccine ambassadors (motivate friends and family to become vaccinated, debunk myths) |
| Population | • Population: Latinx individuals in San Francisco<br>• Age; mean (IQR): 43 (32-56)<br>• Gender: 53.9% Male, 46.1% Female<br>• Ethnicity: 70.5% Latinx, 14.1% white, 7.7% Asian, 2.4% Black, and 5.3% other<br>• Number of participants (recruited/allocated/evaluated): NR<br>• Inclusion/exclusion criteria: older than 16 years |
| Outcomes | COVID-19 vaccinations administered at the neighbourhood site during the evaluation period |
| Notes | Funding: SFDPH, UCSF, private donors, and the Chan-Zuckerberg Initiative<br><br>COI: none |

**Merkley 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal article<br>• Setting and dates: online survey platform (Qualtrics), March 24, 2021 to March 30, 2021.<br>• Country: Canada<br>• Language: NR |
| Interventions | • Information about brand: AstraZeneca or Johnson & Johnson |

**Merkley 2021** *(Continued)*

| | |
|---|---|
| | • Information about the vaccine's effectiveness against symptomatic infection (yes or no)<br>• Information about the vaccine's effectiveness at preventing death from COVID-19 (yes or no) |
| Population | • Age; range: ≥18, (34-63)<br>• Gender: 52% Female, 48% Male<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 2556 recruited<br>• Inclusion/exclusion criteria: Canadian adults (≥18 years of age) |
| Outcomes | • Willingness to get the assigned vaccine<br>• Rating the perceived effectiveness of the vaccine |
| Notes | • COI: NR<br>• Funding: 19toZero, Department of Canadian Heritage, University of Toronto |

**OCEAN**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: online, Jan 19 to Feb 5, 2021<br>• Country: UK<br>• Language: English |
| Interventions | Control condition 1: Safety and effectiveness statement taken from the NHS website<br>Condition 2: Adding the collective vaccination benefit of not personally getting ill<br>Condition 3: Adding the collective vaccination benefit of not transmitting the virus to others<br>Condition 4: Adding the collective vaccination benefits of not getting ill and not transmitting the virus (i.e.combining conditions 2 and 3)<br>Condition 5: Adding the personal benefit of getting vaccinated<br>Condition 6: Adding the seriousness of the pandemic (and that it is much more serious than seasonal influenza)<br>Condition 7: Directly addressing concerns about vaccine safety related to the speed of development<br>Condition 8: Indirectly addressing concerns about vaccine safety related to the speed of development<br>Condition 9: Adding the collective and personal benefits together (i.e. combining conditions 4 and 5)<br>Condition 10: Adding the information on the collective and personal benefits, the seriousness of the virus, and the information that indirectly addresses concerns about the speed of development (i.e. combining conditions 4, 5, 6, and 8) |
| Population | • Age: 43.2 (18.1)<br>• Gender: 55.8% Female, 43.3% Male, 0.5% non-binary, 0.5% prefer not to say<br>• Ethnicity: 81% White, 3.8% multiple ethic groups, 7.3% Asian or Asian British, 5.5% Black, African, Caribbean, or Black British, 2.4% Other ethnic group<br>• Number of participants (recruited/allocated/evaluated): 18 855<br>• Inclusion/exclusion criteria: UK adults (≥18 years of age) |

**OCEAN** *(Continued)*

| | |
|---|---|
| Outcomes | Primary outcome:<br>• Willingness to be vaccinated, as measured by the Oxford COVID-19 Vaccine Hesitancy Scale |
| Notes | Funding: NIHR Oxford Biomedical Research Centre and the NIHR Oxford Health Biomedical Research Centre.<br>COI: AJP is Chair of UK Department Health and Social Care's Joint Committee on Vaccination & Immunisation, but does not participate in discussions on COVID-19 vaccines, and is a member of the WHO's SAGE. Oxford University has entered into a partnership with AstraZeneca for the development of a coronavirus vaccine. All other authors declare no competing interests.. |

**Palm 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised online experiment<br>• Type of publication: journal publication<br>• Setting and dates: online survey platform, August 2020<br>• Country: USA<br>• Language: English |
| Interventions | Message in short article format on COVID-19 vaccines were manipulated in the following conditions:<br>• Safe and effective condition<br>• Unsafe and ineffective condition<br>• Willing condition<br>• Unwilling condition<br>• Agenda condition<br>• Trump condition<br>Control condition: no information |
| Population | • Population: US residents<br>• Age; mean (SD): NR<br>• Gender: 55% Female, 45% Male<br>• Ethnicity: 66.3% White, 17.1% African American, 9.4% Asian American, 4.8% Hispanic, 2.3% other<br>• Number of participants (recruited/allocated/evaluated): 1123<br>• Inclusion/exclusion criteria: US residents who had successfully completed at least 100 tasks and had at least a 95% approval rating on MTurk |
| Outcomes | Willingness to get vaccinated |
| Notes | Funding: NR<br>COI: none |

**Peng 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: Randomised controlled trial<br>• Type of publication: journal publication |

**Peng 2021** *(Continued)*

| | |
|---|---|
| | • Setting and dates: online survey, NR<br>• Country: China<br>• Language: NR |
| Interventions | Framing<br>• Gain vs. loss |
| Population | • Population: general population<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 280<br>• Inclusion/exclusion criteria: NR |
| Outcomes | Vaccination Intention measured on a Likert 5-point scale |
| Notes | • COI: NR<br>• Funding: The National Social Science Fund of China |

**Pfattheicher 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: online platform, NR<br>• Country: UK<br>• Language: English |
| Interventions | Education about herd immunity or empathy condition<br>• Herd immunity condition<br>• Empathy condition<br>• Empathy + herd immunity condition<br>• Control condition |
| Population | • Population: general population<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 2005<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Vaccination intention<br>• Knowledge about and belief in herd immunity<br>• Empathy<br>• Personality |
| Notes | • COI: NR<br>• Funding: NR |

### Pink 2021

| *Study characteristics* | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: online survey, March 17 to 24, 2021<br>• Country: USA<br>• Language: English |
| Interventions | • Republicans endorse condition (2-minute excerpt from a speech given by former President Donald Trump in which he claimed credit for the vaccine development, criticised the Biden administration's role, and encouraged people to get vaccinated)<br>• Democrats endorse condition (2-minute excerpt from a speech given by President Joseph Biden, in which he detailed efforts to increase vaccinations and encouraged all Americans to get vaccinated)<br>• Neutral control condition (essay about the history of neckties and a video about how to tie a tie) |
| Population | • Population: Republicans<br>• Age (Median): 47<br>• Gender: 59% Female, 41% Male<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 1480<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Vaccination intention<br>• Attitudes toward the vaccine<br>• Willingness to encourage family and friends to vaccinate<br>• Belief that Republicans deserve credit for the vaccination program<br>• Belief that party leaders would want the respondent to vaccinate<br>• Percentage of Republicans the respondent believed will vaccinate |
| Notes | • COI: NR<br>• Funding: Stanford Center on Philanthropy and Civil Society |

### Reichardt 2021

| *Study characteristics* | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal article<br>• Setting and dates: online platform (Repondi), October 2020<br>• Country: Germany<br>• Language: German |
| Interventions | Framing<br>• Gain vs. loss |
| Population | • Population: general population<br>• Age; Male: 18-30 (25.5 years) and 60+ (71.1 years)<br>• Gender: 50.9% Female, 49.1% Male<br>• Ethnicity: NR |

**Reichardt 2021** *(Continued)*

| | |
|---|---|
| | • Number of participants (recruited/allocated/evaluated): 301 recruited, 281 assessed<br>• Inclusion criteria: German adults from 18 to 30 years and 60 years and older |
| Outcomes | • Psychological reactance<br>• Vaccination attitudes<br>• Recognition |
| Notes | • COI: NR<br>• Funding: NR |

**Robertson 2021a**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal article<br>• Setting and dates: online platforms (Qualtrics, Provo, UT), December 2020<br>• Country: USA<br>• Language: English |
| Interventions | Financial incentives<br>• $1000<br>• $1500<br>• $2000<br>• No incentive condition |
| Population | • Population: general population<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 1000<br>• Inclusion criteria: NR |
| Outcomes | Willingness to get vaccinated |
| Notes | • COI: NR<br>• Funding: NR |

**Robertson 2021b**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal article<br>• Setting and dates: online platform, NR<br>• Country: USA<br>• Language: English |
| Interventions | Source of information |

**Robertson 2021b** *(Continued)*

| | |
|---|---|
| | • Expert (Dr. Frieden)<br>• Political claims delivered by President Trump<br>• Control condition |
| Population | • Population: non-vaccinated Trump voters<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 387<br>• Inclusion criteria: Trump voters, not vaccinated |
| Outcomes | Vaccination intention |
| Notes | • COI: NR<br>• Funding: NR |

**Ryoo 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: psychological experiments<br>• Type of publication: journal article<br>• Setting and dates: online platform (Amazon Turk), February 2021<br>• Country: USA<br>• Language: English |
| Interventions | Framing<br>• Descriptive norms: compliant vs. noncompliant<br>• Norm salience: high vs. low |
| Population | • Population: general population<br>• Age: 18 and older<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 209<br>• Inclusion criteria: NR |
| Outcomes | • Likelihood of delaying, skipping, and rejecting vaccines<br>• Likelihood to focus on the status of vaccination appointments |
| Notes | • COI: NR<br>• Funding: NR |

**Santos 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled experiments<br>• Type of publication: research letter<br>• Setting and dates:large Pennsylvania health system, December 2020 to January 2021 |

**Santos 2021** *(Continued)*

| | |
|---|---|
| | • Country: USA<br>• Language: English |
| Interventions | • Intervention:<br>  ○ Email, that framed the decision to be vaccinated by noting that many US residents and fellow employees had chosen to be vaccinated, i.e. social norms,<br>  ○ Email reframing risks of COVID-19 vaccine as small<br>• Delayed control: email received 3 days later |
| Population | • Population: healthcare workers<br>• Age: 18 and older<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 9273<br>• Inclusion criteria: Employees of the Geisinger Health System, who had not scheduled a COVID-19 vaccination |
| Outcomes | Primary outcome:<br>• Percentage of participants registered on the vaccination scheduling portal<br>Secondary outcomes:<br>• Number of employees who opened emails after 3 days<br>• Number of employees who clicked scheduling links after 3 days |
| Notes | Funding: NR<br>COI: None |

**Schwarzinger 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised survey<br>• Type of publication: journal publication<br>• Setting and dates: online Survey, July 2021<br>• Country: France<br>• Language: English |
| Interventions | Survey section1<br>Variable 1: Information on herd immunity<br>• >50% of adults aged 18–64 years must be immunised (either by vaccination or infection)<br>• >50% of adults must be immunised (either by vaccination or infection)<br>• No information on herd immunity<br>Variable 2: General practitioner (GP) recommendation<br>• GP recommends vaccination<br>• GP expresses no opinion<br>Survey section 2:<br>Vaccine with differing attributes: |

**Schwarzinger 2021** *(Continued)*

| | |
|---|---|
| | • Reduction in infection risk (50%, 80%, 90%, or 100%)<br>• Risk of serious side-effects (1 in 10 000 or 1 in 100 000 vaccinated people)<br>• Vaccine manufacturer (headquarters in the EU, USA, or China)<br>• Where vaccinations are given (GP practice, local pharmacy, or mass vaccination centre) |
| Population | • Age: 18 and older<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 1942<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • COVID-19 vaccine acceptance in the working-age population in France<br>• Outright vaccine refusal |
| Notes | COI: none declared<br><br>Funding: French Public Health Agency (Santé Publique France) |

**Sehgal 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: cohort study<br>• Type of publication: journal publication<br>• Setting and dates: Ohio State, announced on May 12, 2021, for 5 weeks<br>• Country: USA<br>• Language: English |
| Interventions | "Vax-a-Million" lottery |
| Population | • Population: general population<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): NR<br>• Inclusion/exclusion criteria: Ohio State residency |
| Outcomes | Vaccine uptake |
| Notes | • COI: NR<br>• Funding: NR |

**Senderey 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled study<br>• Type of publication: journal publication<br>• Setting and dates: CHS (largest healthcare provider in Israel), February 15, 2021<br>• Country: Israel |

**Senderey 2021** *(Continued)*

| | |
|---|---|
| | • Language: NR |
| Interventions | Reminders and nudging<br>• Nudge reminders (social benefit vs. personal benefit from vaccination)<br>• Regulation that increases the benefit from vaccination |
| Population | • Population: general population<br>• Age: 16 and older<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): NR<br>• Inclusion: CHS membership |
| Outcomes | Vaccine uptake (CHS members who received (or reserved an appointment to receive) the first dose of the COVID-19 vaccine |
| Notes | • COI: NR<br>• Funding: NR |

**Serra-Garcia 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled experiments<br>• Type of publication: preprint<br>• Setting and dates: online survey platform, between December 2020 and February 2021<br>• Country: USA<br>• Language: English |
| Interventions | Measures to increase support of COVID-19 vaccination and testing<br>• Opt-out condition (asked whether they would take the vaccine, if an appointment had been scheduled for them to receive it; or whether they would keep a PCR test, if they had been randomly assigned one, could opt-out from "default" option)<br>• Opt-in condition (not taking the test or vaccine was the default, but participants were asked whether they wanted to receive it)<br>• Active choice condition (had to decide what they wanted without a default)<br>• No compensation vs. 8 different compensation levels for taking the vaccine (from $0 to $500) |
| Population | • Population: US residents<br>• Age (mean): 47<br>• Gender: NR<br>• Ethnicity: 61% white, 13% Black<br>• Number of participants (recruited/allocated/evaluated): 51% women, 49% men<br>• Inclusion criteria: Individuals born and residing in the USA, whose participation in previous studies had been approved in more than 95% of the case |
| Outcomes | • Hypothetical vaccine uptake |
| Notes | COI: NR<br>Funding: NR |

### Sinclair 2021

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: online survey platform (Prolific)<br>• Country: UK<br>• Language: English |
| Interventions | Information saying that<br>1. It is now estimated that among people in general, 85% plan to take the vaccine against the coronavirus<br>2. It is now estimated that among people in general, 45% plan to take the vaccine<br>3. It is now estimated that among people who are 18– 30 years old, 85% plan to take the vaccine<br>4. It is now estimated that among people who are 18– 30 years old, 45% plan to take the vaccine<br>5. "The National Health Service (NHS) declares that the coronavirus vaccine is safe and effective and that it gives you the best protection against the coronavirus"<br>6. Baseline condition (nothing was mentioned about other people's plans, and no information about the vaccine was provided) |
| Population | • Population: UK residents<br>• Age; mean (SD): 18-30; 24,60 (3,61)<br>• Gender: 31.9% Male, 67.9% Female, 0.2% other and prefer not to say<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 661 recruited, 654 assessed<br>• Inclusion criteria: Native English speakers |
| Outcomes | • Intention to take the COVID-19 vaccine<br>• Vaccine Hesitancy |
| Notes | • COI: NR<br>• Funding: NR |

### Sotis 2021

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: online survey, May 15, 2021<br>• Country: USA<br>• Language: English |
| Interventions | Nudging<br>• Control: basic information on the features and the purpose of a COVID pass for international travel<br>• Status quo: were also informed that requiring proof of vaccination for international travel is not unprecedented + shown a picture of the International Certificate of Vaccination or Prophylaxis, or more simply the Yellow Card<br>• Peer effect: were informed that only one third of Americans oppose a COVID pass for international travelling |

**Sotis 2021** *(Continued)*

| | |
|---|---|
| | • Status quo + Peer effect: were informed about both the fact that requiring proof of vaccination is not a novel idea and that only one third of Americans oppose a COVID pass for international travel |
| Population | • Age (range): 18 and older (18-75+)<br>• Gender: Male, Female, other<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 4000 assessed<br>• Inclusion/exclusion criteria: US residency |
| Outcomes | • Agreement with COVID-19 Vaccine Passport<br>• Likelihood of getting a COVID-19 Vaccine Passport |
| Notes | • COI: NR<br>• Funding: NR |

**Sprengholz 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled experiments<br>• Type of publication: journal publication<br>• Setting and dates: survey, December 22 and 23, 2020<br>• Country: Germany<br>• Language: English |
| Interventions | Study 1<br>• Unrestricted vaccination condition: vaccination recommended but voluntary<br>• Mandatory vaccination condition: vaccination mandatory, 2,000 Euro penalty<br>• Scarce vaccination condition: vaccine scarce, have to wait until 2022 if they want to be vaccinated<br>Study 2<br>• Unrestricted (contrast to unrestricted condition for Study 1: emphasis not only on voluntariness, but also availability)<br>• Mandatory<br>• Scarce condition |
| Population | • Age (mean, SD): 44.07 (15.25)<br>• Gender: 494 Males and 479 Females<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 973<br>• Inclusion/exclusion criteria: NR |
| Outcomes | Study 1:<br>• Reactance (how frustrated, annoyed and disturbed participants felt about the vaccination situation)<br>Study 2:<br>• Reactance (as above)<br>• Activism (Willingness to take action against the scarce/ mandatory vaccine)<br>• Avoidance (avoid COVID-19 vaccine)<br>• Intentions to vaccinate against chickenpox, if this was recommended by a doctor |

**Sprengholz 2021** *(Continued)*

| | |
|---|---|
| | • Intentions of showing COVID-19 health behaviour during the next week (wearing a mask when shopping, keeping physical distance in public, avoiding close personal contact, staying home when feeling sick, getting tested for COVID- 19 when feeling sick, entering a positive test result in a tracing app) |
| Notes | COI: the authors declare that they have no conflicts of interest.<br><br>Funding: Supported by the German Research Foundation (BE3970/12-1), the Federal Centre for Health Education, the Robert Koch Institute, the Leibniz Institute for Psychology, the Klaus Tschira Stiftung, the University of Erfurt, and the University of Copenhagen |

**Sprengholz 2021c**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: December 20, 2020<br>• Country: Germany<br>• Language: NR |
| Interventions | Incentives and prosocial communication<br><br>• Payment vs. no payment condition (25, 50, 75, 100, 125, 150, 175, 200 Euro)<br>• Communication vs. no communication condition |
| Population | • Population: general population<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 1349<br>• Inclusion/exclusion criteria: NR |
| Outcomes | Intention to get vaccinated against COVID-19 |
| Notes | • COI: NR<br>• Funding: NR |

**Stein 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: uncontrolled, prospective observational design<br>• Type of publication: letter to the editor<br>• Setting and dates: North Carolina Cancer Hospital, January and March 2021<br>• Country: USA<br>• Language: English |
| Interventions | Targeted vaccine outreach via informational telephone calls |
| Population | • Population: cancer patients<br>• Age: NR<br>• Gender: NR |

**Stein 2021** *(Continued)*

| | |
|---|---|
| | • Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 536<br>• Inclusion criteria: patients who received cancer therapy during the past year with follow-up scheduled, without an active patient portal account, no valid email on file, or who lived in a county with a greater than 20% poverty rate across multiple census points |
| Outcomes | • Received vaccinations<br>• Scheduled vaccine appointments |
| Notes | • COI: NR<br>• Funding: NR |

**Strickland 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: preprint<br>• Setting and dates: Amazon Mechanical Turk, July 2020 (Experiment 6), and September 2020 (Experiment 7)<br>• Country: USA<br>• Language: English |
| Interventions | • Experiment 6: scenarios in which one is going to a healthcare provider for one vaccine and having an option to bundle another vaccine at that visit<br>  ○ Efficacy of COVID-19/Influenza Vaccine from 0% to 100% in 10% increments, opt-in vs. opt-out condition (required to change preselected no/yes to yes/no if they want the vaccine, between-subject)<br>  ○ No preselected response version before or after choice framed condition (all participants)<br>• Experiment 7: Scenarios in news media<br>  ○ Varied development timeline 7-month vs. 12-month process (within-subject)<br>  ○ Positive vs. negative safety framing (95% of the scientific community declares the vaccine safe vs. 5% of the scientific community declares the vaccine unsafe, between-subject) |
| Population | • Population: US residents<br>• Age; mean (SD): 40.0 (11.4)<br>• Gender: 56.9% Female, 53.1% Male<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 497<br>• Inclusion criteria: participants were required to have a 95% or higher approval rate on Amazon Mechanical Turk, 100 or more previously approved tasks, and current United States residence to view and complete the study. |
| Outcomes | • Vaccination intention measured on a questionnaire with yes/no answer option |
| Notes | Funding: Supported by the National Institute on Drug Abuse (NIDA) of the National Institutes of Health, General Research Fund award from the University of Kansas, and NIDA grant<br><br>COI: None declared |

### Sudharsanan 2021

| *Study characteristics* | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: preprint<br>• Setting and dates: online, 26 July 2021 to August 10, 2021<br>• Countries: USA and UK<br>• Language: English |
| Interventions | The risk of a future COVID-19 vaccine is presented:<br>(1) with a qualitative label<br>(2) with a comparison risk<br>(3) in absolute or relative terms<br>(4) Status quo framing where the side effect risk mimics the media's communication in early April 2021 |
| Population | • Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 9000<br>• Inclusion/exclusion criteria: Participants must be 18 years old or over (male, female, or other), have current residence in the US or UK, and be able to speak English |
| Outcomes | Primary:<br>• individuals' willingness to take the hypothetical COVID-19 vaccine<br>Secondary<br>• Perceived safety of vaccine |
| Notes | • COI: NR<br>• Funding: Heidelberg Institute of Global Health at the Heidelberg University, Germany |

### Takamatsu 2021

| *Study characteristics* | |
|---|---|
| Methods | • Study design: uncontrolled, prospective observational design<br>• Type of publication: journal publication<br>• Setting and dates: Tokyo Metropolitan Tama Medical Center, January 2021 to March 2021<br>• Country: Japan<br>• Language: NR |
| Interventions | Multifaceted intervention<br>• Distribution of informational leaflets<br>• Hospital-wide announcements encouraging vaccination<br>• Mandatory lecture<br>• Educational session about the vaccine for pregnant or breastfeeding HCP<br>• Allergy testing for HCP at risk of allergic reactions to the vaccine |
| Population | • Population: Healthcare personnel |

**Takamatsu 2021** *(Continued)*

| | |
|---|---|
| | • Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 1,576 HCP were included; of these, 1,224 HCP (77.7%) answered the pre-vaccination questionnaire<br>• Inclusion criteria: HCP at the Tokyo Metropolitan Tama Medical Center |
| Outcomes | Vaccine uptake |
| Notes | • COI: NR<br>• Funding: NR |

**Talmy 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: retrospective cohort study<br>• Type of publication: journal publication<br>• Setting and dates: military vaccine roll-out, December 30 and 31, 2020<br>• Country: Israel<br>• Language: English |
| Interventions | • Frontal group lectures: non-mandatory 45-minute frontal lecture given by the unit's primary care physician and 15-minute Q&A session<br>• On-site Consultation: soldiers refusing to or unsure regarding vaccination upon initial questioning were encouraged by their commanders to arrive for physician. Consultation at the vaccination site during their respective platoon's time-slot.<br>• Primary care office visits: soldiers who refused vaccination following the initial roll-out of the first dose between January 3 and 7, 2021, were contacted to set voluntary appointments for clinic visits to discuss their specific concerns on vaccination in a confidential and discrete manner. |
| Population | • Population: Israeli defence forces soldiers<br>• Age: 21.5 years (± 3.6)<br>• Gender: 325 (63.6%) males, 186 (36.4%) females<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 511<br>• Inclusion criteria: soldiers within the unit |
| Outcomes | Vaccination rate |
| Notes | COI: T.T. reports being an employee of Emedgene Technologies between 2017 and 2019, this affiliation has no connection or relevance to the currently submitted work. B.C, I.N and Y.B.M have no conflicts of interests to disclose.<br><br>Funding: this research did not receive any specific grant or funding from any agency. |

**Thirumurthy 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: cohort study<br>• Type of publication: preprint |

**Thirumurthy 2021** *(Continued)*

| | |
|---|---|
| | • Setting and dates: NR<br>• Country: USA<br>• Language: English |
| Interventions | Lottery |
| Population | • Population: general population<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): NR<br>• Inclusion criteria: US residency |
| Outcomes | Vaccine uptake (vaccine doses administered daily per 100,000 individuals) |
| Notes | • COI: NR<br>• Funding: NR |

**Thorpe 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: preprint<br>• Setting and dates: veterans and general population, March 8, 2021 to March 23, 2021.<br>• Country: USA<br>• Language: English |
| Interventions | Information messaging:<br>• Message 1: a fact-box styled message comparing the risks of getting COVID-19 compared to the vaccine<br>• Message 2: a timeline styled message describing the development process of the COVID-19 mRNA vaccines<br>• Control group: no message |
| Population | • Population: veterans and general US population<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (assessed): 1075 |
| Outcomes | • Vaccine intention measured on a 5-point scale |
| Notes | • COI: NR<br>• Funding: NR |

**Thunström 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised controlled trial |

**Thunström 2021** *(Continued)*

| | |
|---|---|
| | • Type of publication: journal publication<br>• Setting and dates: online survey<br>• Country: USA<br>• Language: English |
| Interventions | Framing and Information source<br>• Probability of the average American catching the coronavirus<br>• The IFR, i.e. the probability of the average American dying if infected<br>• Source of information for the probability of catching COVID-19 (CDC only/CDC jointly with the White House) |
| Population | • Population: general population<br>• Age (Mean): 46<br>• Gender: 52% Female, 48% Male<br>• Ethnicity: NR<br>• Number of participants (assessed): 3133<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Vaccine intention<br>• Prevalence of COVID-19 Vaccine Avoidance |
| Notes | • COI: NR<br>• Funding: University of Wyoming |

**Tran 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: pre-post intervention questionnaire<br>• Type of publication: journal publication<br>• Setting and dates: January 8 and 14, 2021<br>• Country: France<br>• Language: French |
| Interventions | Interactive web tool<br>• Aimed at offering individualised information on the risks of death, hospitalizations, symptom persistence at 2 months, in case of COVID-19 infection, with and without vaccination, and on the risks vaccination-related serious adverse events<br>• Output of the tool could be personalised according to gender, age, and types of vaccine and used 10 000-person pictographs to illustrate the absolute risk reduction and the serious adverse effects associated with vaccination |
| Population | • Population: adult patient population<br>• Age (Mean): 18 and older<br>• Gender: 52,9% Female, 47,1% Male<br>• Ethnicity: NR<br>• Number of participants (assessed): 3152<br>• Inclusion/exclusion criteria: adult patients reporting having at least on chronic condition |
| Outcomes | • Vaccination intention |

**Tran 2021** *(Continued)*

| | |
|---|---|
| | • Respondents' perception of the tool's usefulness and of the importance of vaccination at the individual and population levels |
| Notes | • COI: NR<br>• Funding: NR |

**Ugwuoke 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: controlled cohort study<br>• Type of publication: journal publication<br>• Setting and dates: IDP (internally displaced person) camps<br>• Country: Nigeria<br>• Language: NR |
| Interventions | Visual illustration communications<br>• Treatment group: exposure to visual illustrations on the importance of COVID-19 vaccination<br>• Control group (no exposure to treatment) |
| Population | • Population: victims of insecurity<br>• Age (mean): 18 and older (Control group: Mean=32, range = 22-42, Treatment group: Mean = 40, range 25-55<br>• Gender: Female, Male<br>• Ethnicity: NR<br>• Number of participants (assessed): 470<br>• Inclusion criteria: Internally displaced person in the participating camps |
| Outcomes | • Reported self-efficacy<br>• Reported task efficacy<br>• Reported outcome expectancy from the vaccine<br>• Reported intention to make oneself available for vaccination |
| Notes | • COI: NR<br>• Funding: NR |

**Walkey 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: cohort study<br>• Type of publication: journal publication<br>• Setting and dates: Ohio State, announced on May 12, 2021, for 5 weeks<br>• Country: USA<br>• Language: English |
| Interventions | "Vax-a-Million" lottery |
| Population | Population |

**Walkey 2021** *(Continued)*

| | |
|---|---|
| | • Population: general population<br>• Age: 18 years and older<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): NR<br>• Inclusion/exclusion criteria: Ohio State residency |
| Outcomes | Vaccine uptake |
| Notes | • COI: NR<br>• Funding: National Institutes of Health |

**Witus 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: preprint<br>• Setting and dates: online Survey Platform, February 25th and 26th, 2021<br>• Country: UK<br>• Language: English |
| Interventions | Animated YouTube video explaining how COVID-19 mRNA vaccines work:<br>• Watching the video with a male narrator<br>• Watching the video with a female narrator<br>• Reading the text of the video transcript<br>• No information (control group) |
| Population | • Population: US located Mechanical Turk workers<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 1632<br>• Inclusion criteria: participants must be located in the US |
| Outcomes | Vaccination intention |
| Notes | COI: none declared<br>Funding: LSW is supported by a Cottrell Scholar Award from the Research Corporation for Science Advancement |

**Ye 2021**

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: online survey platform<br>• Country: China |

**Ye 2021** *(Continued)*

| | |
|---|---|
| Interventions | Framing<br>• Message framing: gain vs. loss<br>• Message presentation: Narrative vs. non-narrative |
| Population | • Population: college students<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 298 assessed |
| Outcomes | • Intention to get COVID-19 vaccine, 3 questions adapted from previous research<br>• Health beliefs towards vaccine |
| Notes | • COI: NR<br>• Funding: The National Social Science Fund of China |

**Yu 2021**

| | |
|---|---|
| ***Study characteristics*** | |
| Methods | • Study design: randomised survey<br>• Type of publication: journal publication<br>• Setting and dates: telephone survey, September 16-30, 2020<br>• Country: China<br>• Language: English |
| Interventions | Nine different scenarios of the COVID-19 vaccine availability in Hong Kong:<br>• The vaccines have 80% effectiveness while mild side effects (MSE) rarely occur (S1)<br>• The vaccines have 80% effectiveness while MSE commonly occur (S3)<br>• The vaccines have 50% effectiveness while MSE rarely occur (S5)<br>• The vaccines have 50% effectiveness while MSE commonly occur<br>• The questions were repeated for the other four scenarios (S2, S4, S6, S8) that involved a fee of HK$ 500, instead of free vaccination*<br>• The vaccines have 80% effectiveness while severe side effects rarely occur (S9) |
| Population | • Population: Hong Kong residents<br>• Age: 18-35: 14.0%, 36-65:54.0%, >65: 32.0%<br>• Gender: 31.1% Male, 68.9% Female<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 450<br>• Inclusion criteria: Chinese-speaking Hong Kong residents |
| Outcomes | • Intention of getting the COVID-19 Vaccination<br>• Attitudes towards the COVID-19 Vaccination |
| Notes | COI: None declared<br>Funding: The study was supported by internal research funding of the Centre for Health Behaviours Research. The funding source has no role in this study<br>* For this scoping review, we are only interested in this intervention |

### Yu 2021b

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: preprint<br>• Setting and dates: five hospitals in three provinces (two in Hunan, two in Guangdong, and one in Yunnan), October 19 to November 26, 2020<br>• Country: China<br>• Language: English |
| Interventions | Eight scenarios (S1–S8) combining vaccines' effectiveness (80% versus 50%), safety (rare mild side effects versus common mild side effects), and cost (free versus 600 Yuan), and two scenarios of free or self-paid COVID-19 vaccination involving recommendations given by the government/hospitals (S9–S10)*. |
| Population | • Population: Chinese healthcare workers<br>• Age; mean (SD): 32.7 (7.4)<br>• Gender: 89 % Female, 11% Male<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 2254<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Behavioural intention of COVID-19 vaccination: Perceived chance of taking up COVID-19 vaccination during the first six months since the vaccines' availability (1 = definitely not to 5 = definitely yes)<br>• Attitude towards the timing of taking up COVID-19 vaccination (one item: at the soonest/wait until obtaining comprehensive knowledge of the vaccines' effectiveness and safety/as late as possible/avoid vaccination as much as possible/definitely not)<br>• Perceived levels of impact of attributes of COVID-19 vaccines on COVID-19 vaccination decision (0 = no impact at all to 10 = extremely large impact). |
| Notes | COI: none declared<br>Funding: The study was supported by the internal research funding of the Centre for Health Behaviour Research, the Chinese University of Hong Kong<br><br>*For this scoping review, we are only interested in the two scenarios of free or self-paid COVID-19 vaccination involving recommendations given by the government/hospitals. |

### Yuan 2021

| ***Study characteristics*** | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: journal publication<br>• Setting and dates: online, March 2021<br>• Country: US<br>• Language: English |
| Interventions | Distance framing via different videos:<br><br>• Individual-centred message<br>• Community-centred message<br>• Country-centred message |

**Yuan 2021** *(Continued)*

| | |
|---|---|
| Population | • Population: general population<br>• Age: NR<br>• Gender: NR<br>• Ethnicity: NR<br>• Number of participants (recruited/allocated/evaluated): 702<br>• Inclusion/exclusion criteria: NR |
| Outcomes | • Willingness to vaccinate measured by a single item question respectively on the scale of 1 (very unlikely) to 5 (very likely)<br>• Support vaccine mandate |
| Notes | • COI: NR<br>• Funding: NR |

**COI:** conflict of interest;**FDA:** Food and Drug Administration; **HCP:** healthcare personnel;**IQR:** interquartile range; **mRNA:** messenger ribonucleic acid; **NHS:** National Health Service;**NR:** none reported;**NI:** no information**; SD:** standard deviation; **vs.:** versus.

## Characteristics of excluded studies *[ordered by study ID]*

| Study | Reason for exclusion |
|---|---|
| Ali 2021 | Single-arm study with less than 100 participants (53) |
| American Society of Safety Professionals 2021 | Not an intervention study |
| Batteux 2021 | Investigates scenarios that cannot be manipulated |
| Bell 2021 | Not an intervention study |
| ChiCTR2100043018 | Not an intervention study |
| Community Practitioner 2021 | Not an intervention study |
| Crawshaw 2021 | Does not summarise interventions to increase uptake |
| Crawshaw 2021b | Does not summarise interventions to increase uptake |
| Davis 2021 | Hypothetical scenario that cannot be manipulated (vaccine efficacy) |
| Gakuba 2021 | Uncontrolled study with less than 100 participants (n = 61) |
| Gehrau 2021 | Not an intervention study |
| Guelmami 2021 | Not an intervention study |
| Hofer 2021 | Wrong publication type (opinion piece) |
| Kaplan 2021 | Investigates scenarios that cannot be manipulated |
| Kirkpatrick 2021 | Wrong vaccine (MMR) |
| Knight 2021 | Development but not testing of an intervention |

| Study | Reason for exclusion |
|---|---|
| Kumar 2021 | Not an intervention study |
| Lim 2020 | Not an intervention study |
| Loomba 2021 | Wrong publication type (correction) |
| Loomba 2021a | Measures the effect of misinformation on vaccine intent and thus not relevant to the research objective |
| NCT04694651 | Not an intervention study |
| Rahmandad 2021 | Not an intervention study |
| Salali 2021 | Not an intervention study |
| Shmueli 2021 | No intervention |
| Sprengholz 2021b | Wrong publication type |
| Thaker 2021 | Measures effect of vaccine misinformation |
| Vasquez 2021 | Not an intervention study |
| Wagner 2021 | Not an intervention study |
| Yousuf 2021 | Intervention targets influenza vaccine, not COVID-19 vaccine |
| Yuen 2021 | Not an intervention study |

**MMR:** measles, mumps and rubella.

### Characteristics of studies awaiting classification *[ordered by study ID]*

#### INFORMED

| | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: NR<br>• Country: USA<br>• Language: English |
| Objective | Develop and evaluate "INdividual and Family-Oriented Responsive Messaging EDucation" (INFORMED) intervention in increasing knowledge about COVID-19 testing and decreasing decisional conflicts of getting tested for COVID-19. |
| Notes | Funding: University of California, San Francisco<br>COI: NR |

#### Larson 2020

| | |
|---|---|
| Methods | • Study design: NI<br>• Type of publication: other |

**Larson 2020** *(Continued)*

| | |
|---|---|
| | • Setting: global<br>• Country: global<br>• Language: English |
| Objective | CONVINCE – COVID-19 New Vaccine Information, Communication and Engagement – a rapidly expanding, voluntary global initiative to promote the use of effective public communications and engagement to build vaccine literacy and expedite immunisation programs to protect communities against the COVID-19 Pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). |
| Notes | Funding: NR<br><br>COI: NR |

**NCT04460703**

| | |
|---|---|
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registry<br>• Setting: online<br>• Country: USA<br>• Language: English |
| Objective | This study tests different messages about vaccinating against COVID-19 once the vaccine becomes available. Participants are randomised to 1 of 12 arms, with one control arm and one baseline arm. We will compare the reported willingness to get a COVID-19 vaccine at 3 and 6 months of it becoming available between the 10 intervention arms to the 2 control arms. |
| Notes | Funding: Yale University<br>COI: NR |

**NCT04731870**

| | |
|---|---|
| Methods | • Study design: cross-sectional cohort study<br>• Type of publication: trial registry<br>• Setting: rural South<br>• Country: USA<br>• Language: English |
| Objective | Explore perceptions, confidence, trust, and uptake of potential COVID-19 vaccines among healthcare providers (nurses and doctors) and key at-risk population subgroups (minority populations living in the rural south) and will develop and test vaccine messaging that boosts vaccine confidence and trust among these key at-risk subgroups. |
| Notes | Funding: East Carolina University<br>COI: NR |

**Supraneni 2021**

| | |
|---|---|
| Methods | • Study design: cross-sectional study<br>• Type of publication: protocol |

| | |
|---|---|
| **Supraneni 2021** *(Continued)* | • Setting: urban and rural settings of Chennai<br>• Country: India<br>• Language: English |
| Objective | The study will help explore the burden of vaccine acceptance and hesitancy among individuals living in urban and rural settings of Chennai. Further, it will help to examine the variables that influence vaccine acceptance and hesitancy. Lastly, the findings will help to design and develop a user-centred informatics platform that can deliver multimedia-driven health education modules tailored to facilitate vaccine uptake in varied settings. |
| Notes | Funding: NI<br><br>COI: none declared |

**COI:** conflict of interest;**NR:** not reported.

## Characteristics of ongoing studies *[ordered by study ID]*

**DRKS00023650**

| | |
|---|---|
| Study name | An entertainment-education approach to improve vaccine confidence during the COVID-19 pandemic: an online randomised controlled experiment with 24,000 participants |
| Starting date | April 2021 |
| Contact information | Stanford University, Ms. Dr. Maya Adam, 291 Campus Drive Li Ka Shing Building, 94305-510 Stanford, USA |
| Methods | • Study design: randomised controlled experiment<br>• Type of publication: trial registration<br>• Setting: online<br>• Country: China and the USA<br>• Language: English |
| Intervention | • Intervention arm A: receives the storytelling-informational approach video followed by the survey<br>• Intervention arm B: receives the storytelling-analogy approach video followed by the survey<br>• Intervention arm C: receives the storytelling-emotion-focused approach video followed by the survey<br>• Control arm: receives the survey first, followed by a collage of the three videos. |
| Population | • Population: 12,000 online participants in each of two countries, China and the USA.<br>• Inclusion criteria: 18 to 65 years; registered on the ProA or Kurundata platform. |
| Outcomes | Primary outcome<br><br>• Establish the effectiveness of the video in reducing COVID-19 vaccine hesitancy.<br><br>Secondary outcomes<br><br>• Establish the effectiveness of each of the videos in increasing behavioural intent towards COVID-19 vaccination.<br>• Establish the effectiveness of each of the videos in increasing participants' level of hope. |
| Estimated completion date and number of participants | NR |
| Notes | COI: NR |

| | |
|---|---|
| **DRKS00023650** *(Continued)* | Sponsor: Heidelberg Institute of Global Health, University of Heidelberg (Institutional funding) |

**ISRCTN15317247**

| | |
|---|---|
| Study name | Using text messages to boost COVID-19 vaccine booking rate |
| Starting date | 3 June 2021 |
| Contact information | Hannah Behrendt, hannah.behrendt@bi.team |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: via phone messages<br>• Country: UK<br>• Language: English |
| Intervention | Behaviourally-informed SMS vaccination information<br>• Control SMS invitation<br>• behaviourally-informed SMS vaccination invitation<br>  ◦ Top of queue<br>  ◦ Convenience<br>  ◦ Reserved<br>  ◦ Top of queue + convenience<br>  ◦ Reserved + convenience<br>  ◦ Front of queue |
| Population | • Population: general population<br>• Inclusion criteria: 18 to 29 years, registered in the NHSEI system with a mobile phone number |
| Outcomes | Primary outcome<br>• Booking of COVID-19 vaccination appointments within 72 hours following the invitation<br>Secondary outcomes<br>• Receiving the first-dose within 14 day following the SMS invitation<br>• Booking of COVID-19 vaccination appointment within 14 days following the SMS invitation |
| Estimated completion date and number of participants | 4270,000 planned, completed 1 July 2021 |
| Notes | • COI: NR<br>• Funding: National Health Service |

**NCT04542395**

| | |
|---|---|
| Study name | COVID-2019 testing and vaccination among African American and Latinx public housing residents |
| Starting date | 1 June 2021 |
| Contact information | Mohsen Bazargan, (323) 563 5902, mohsenbazargan@cdrewu.edu |

**NCT04542395** *(Continued)*

| | |
|---|---|
| Methods | • Study design: one group pre-test-post-test<br>• Type of publication: trial registration<br>• Setting: south Los Angeles<br>• Country: USA<br>• Language: English |
| Intervention | Provide/enhance knowledge, modify attitudes, motivate and provide skills and resources to reduce COVID-19 related risk and challenges and increase willingness and uptake in COVID-19 testing and vaccination. |
| Population | • Population: public housing residents in south Los Angeles.<br>• Inclusion criteria: Identify as Latino/Hispanic or African American/Black; Reside in one of the six collaborating public housing; 18 years old and older; Speak either English or Spanish. |
| Outcomes | Primary outcomes<br>• Prevalence of COVID-19 testing, pneumococcal and influenza vaccinations using Test History Self-Report [Time frame: intervention: 3 months; follow-up point: 6 months post-intervention]<br>• Percentage of participants achieving decreased levels of COVID-19 Risk using the NIH Toolbox Surveys on COVID-19 [Time frame: intervention: 3 months; follow-up point: 6 months post-intervention ]<br>• Percentage of participants achieving decreased levels of COVID-19 Mistrust and Barriers using the NIH Toolbox Surveys on COVID-19 [Time frame: intervention: 3 months; Follow-up point: 6 months post-intervention] |
| Estimated completion date and number of participants | 30 November 2022 with 310 participants |
| Notes | Funding: Charles Drew University of Medicine and Science<br>COI: NR |

**NCT04604743**

| | |
|---|---|
| Study name | Clinic-based HPV and COVID-19 vaccine promoting intervention for AfAm adolescents in Alabama |
| Starting date | 20 April 2021 |
| Contact information | Henna Budhwani, 205-975-7613, budhwani@uab.edu |
| Methods | • Study design: cluster-randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: rural Alabama<br>• Country: USA<br>• Language: English |
| Intervention | The intervention will target adolescents aged 15-17 years who have not received at least one dose of the HPV vaccine. The intervention, when developed, will improve knowledge of HPV, COVID-19, the HPV vaccine, and the COVID-19 vaccine (Information), reduce stigma and distrust improving motivation (Motivation), leading to improved vaccine confidence and higher vaccination rates and lower vaccine hesitancy (Behavioural Skills). |
| Population | • Population: adolescents in rural Alabama<br>• Inclusion criteria: ages 15-17 years; Have not completed HPV vaccination schedule; Located in a rural, non-urban setting; able to provide informed consent. |

**NCT04604743** *(Continued)*

| | |
|---|---|
| Outcomes | • HPV Vaccination [Time frame: within 6 months from intervention]<br>• Reduction in vaccine hesitancy [Time frame: within 6 months from intervention] |
| Estimated completion date and number of participants | 30 June 2023 with 120 participants |
| Notes | Funding: University of Alabama at Birmingham |

**NCT04706403**

| | |
|---|---|
| Study name | If we build it, will they come? A pilot study to develop and test messages to maximize uptake of coronavirus vaccine when available |
| Starting date | 12 January 2021 |
| Contact information | NR |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: online<br>• Country: USA<br>• Language: English |
| Intervention | Participants who express hesitation about getting vaccinated for COVID-19 will be randomised to receive one of five different versions of messages from a healthcare provider (experimental groups) or a control message (control group). The messages that participants in each experimental group receive will vary slightly and systematically. Specific content and wording of these messages will be developed to address and mitigate concerns of those at risk for not being vaccinated. |
| Population | Inclusion criteria: adult (age 18 and over) who are members of an online panel (Prolific); able to complete an on-line survey in English. |
| Outcomes | Primary outcome<br>• Intent to be vaccinated against COVID-19. [Time frame: through survey completion, an average of 12 minutes<br>Secondary outcome<br>• Predictors of intent to be vaccinated against COVID-19. [Time frame: through survey completion, an average of 12 minutes] |
| Estimated completion date and number of participants | 1 February 2021 with 1706 participants |
| Notes | Sponsor: University of Massachusetts, Worcester<br>COI: NR |

**NCT04732819**

| | |
|---|---|
| Study name | IMPACT-C: Improving vaccine uptake in skilled nursing facilities |
| Starting date | 4 January 2021 |

**NCT04732819** *(Continued)*

| | |
|---|---|
| Contact information | NR |
| Methods | • Study design: randomised controlled experiment<br>• Type of publication: trial registration<br>• Setting: nursing homes<br>• Country: USA<br>• Language: English |
| Intervention | • Intervention: high touch multi-pronged behavioural intervention<br>• Control: standard of care |
| Population | • Population: nursing home residents and staff<br>• Inclusion criteria: long-stay residents who have been in one of the participating skilled nursing facilities (SNFs) for at least 100 days and who are alive on the date that the first round of vaccines is available. |
| Outcomes | Primary outcome<br>• Patient vaccine counts [Time frame: 15 weeks]<br>Secondary outcomes<br>• Staff vaccine counts [Time frame: 15 weeks] |
| Estimated completion date and number of participants | 16 April 2021 with 23,768 participants enrolled |
| Notes | Funding: Brown University<br>COI: NR |

**NCT04761692**

| | |
|---|---|
| Study name | Improving vaccine acceptance and uptake among underresourced African American and Latinx older adults: a multidisciplinary and culturally-based training program for minority churches |
| Starting date | 1 October 2021 |
| Contact information | Mohsen Bazargan, 3233573655, mohsenbazargan@cdrewu.edu |
| Methods | • Study design: randomised cohort study<br>• Type of publication: trial registration<br>• Setting: churches<br>• Country: USA<br>• Language: English |
| Intervention | • Arm 1: this arm will include 5 churches that will receive all study activities in the Vaccine Education Promotion Management Plan.<br>• Arm 2: this arm will include 5 churches that will receive some study activities in the Vaccine Education Promotion Management Plan.<br>• Arm 3: this arm will include 5 churches that will receive all study activities in the Vaccine Education Promotion Management Plan following completion of Arm 1 and 2. |
| Population | • Population: parishioners at a minority church |

**NCT04761692** *(Continued)*

| | |
|---|---|
| | • Inclusion criteria: identify as African American or Latinx; at least 65 years and older; have not received a vaccine for COVID-19, influenza, or pneumonia within the previous 24 months; agrees to study terms, which include follow-up interviews 9 and 18 months after study enrolment. |
| Outcomes | Primary outcome<br>• Prevalence of vaccination uptake for COVID-19, influenza, and pneumonia using vaccination historysSelf report [Time frame: Intervention: 12 months; follow-up point: 9 & 18 months post-intervention]<br>Secondary outcomes<br>• Percentage of participants achieving adherence to COVID-19, influenza, and pneumonia vaccination schedules risk using the NIH Toolbox Surveys on COVID-19 [Time frame: intervention: 12 months; follow-up point: 9 & 18 months post-intervention]<br>• Percentage of participants achieving decreased vaccine hesitancy levels of COVID-19, influenza, and pneumonia using the NIH Toolbox Surveys on COVID-19, influenza, and pneumonia [Time frame: intervention: 12 months; follow-up point: 9 & 18 months post-intervention]<br>• Percentage of participants achieving decreased levels of COVID-19, influenza, and pneumonia Mistrust and Barriers using the NIH Toolbox Surveys on COVID-19, influenza, and pneumonia [Time frame: Intervention: 12 months; follow-up point: 9 & 18 months post-intervention] |
| Estimated completion date and number of participants | 31 December 2026 with 570 participants |
| Notes | Sponsor: Charles Drew University of Medicine and Science<br>COI: NR |

**NCT04779138**

| | |
|---|---|
| Study name | Community partnered intervention to increase COVID-19 vaccine uptake in low income underresourced African Americans and Latinx public housing residents |
| Starting date | 11 September 2021 |
| Contact information | Sharon Cobb, 3235683329, sharoncobb1@cdrewu.edu |
| Methods | • Study design: one group pre test-post-test<br>• Type of publication: trial registration<br>• Setting: south Los Angeles<br>• Country: USA<br>• Language: English |
| Intervention | The proposed intervention will employ (1) culturally sensitive, (2) theoretically-based intervention that will be jointly delivered by our ACTIVATE triad leaders and our researchers. We will use the Information, Motivation, and Behavioral Skills (IMB) model and the Transtheoretical Model to implement the intervention. |
| Population | • Population: public housing residents<br>• Inclusion criteria: identify as Latinx or African American; age 18 or older; reside in one of the six collaborating public housing area; speak either English or Spanish. |
| Outcomes | Primary outcome<br>• Prevalence of vaccination uptake for COVID-19, influenza, and pneumonia using vaccination history self report [Time frame: Intervention: 4 months; follow-up point: 3 months post-intervention ] |

**NCT04779138** *(Continued)*

| | |
|---|---|
| | Secondary outcomes<br>• Percentage of participants achieving decreased vaccine hesitancy levels of COVID-19 vaccine using the NIH Toolbox Surveys on COVID-19 [Time frame: intervention: 4 months; follow-up point: 3 months post-intervention]<br>• Percentage of participants achieving increased level of behavior change toward COVID-19 vaccinationuUsing the NIH Toolbox Surveys on COVID-19 [Time frame: intervention: 4 months; follow-up Point: 3 months post-intervention] |
| Estimated completion date and number of participants | 30 November2023 with 600 participants |
| Notes | Funding: Charles Drew University of Medicine and Science<br>COI: NR |

**NCT04800965**

| | |
|---|---|
| Study name | Text-based interventions to promote COVID-19 vaccinations |
| Starting date | 31 January 2021 |
| Contact information | NR |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: UCLA health<br>• Country: USA<br>• Language: English |
| Intervention | • Holdout arm: patients will not receive text messages about COVID-vaccine.<br>• Simple Text sub-arm: participants will not receive any additional information.<br>• Simple Text+Video sub-arm: together with the appointment link, participants will also receive a link to a 2-minute video in the text message.<br>• Enhanced Text sub-arm: in addition to the appointment link, the text message will use enhanced language aimed at reducing psychological barriers that prevent patients from scheduling their appointment.<br>• Enhanced Text+Video sub-arm: in addition to the appointment link, the text message will encourage patients to watch a 2-minute video (the same as in the Simple Text+Video sub-arm) and use enhanced language aimed at reducing patients' psychological barriers of following through on scheduling an appointment. |
| Population | • Population: students at UCLA<br>• Inclusion criteria: participants have a mobile phone number or SMS capable phone number in UCLA Health's database; are eligible for receiving the COVID-19 vaccine at UCLA Health; have not already scheduled an appointment the day before the scheduled time of text message; are at or above 18 years old. |
| Outcomes | Primary outcome<br>• First COVID-19 vaccine appointment scheduled at UCLA Health [Time frame: 6 days]<br>Secondary outcomes<br>• First COVID-19 vaccine obtained at UCLA Health [Time frame: 1 month from text message] |

**NCT04800965** *(Continued)*

| | |
|---|---|
| | • Time of obtaining the first COVID-19 vaccine at UCLA Health [Time frame: 1 month from text message]<br>• First COVID-19vVaccine obtained at UCLA Health or any organisation reporting to CAIR [Time frame: 2 months from text message]<br>• Time of obtaining the first COVID-19 at UCLA Health or another location reporting to CAIR [Time frame: 2 months from text message] |
| Estimated completion date and number of participants | 1 January 2022 with 400,000 participants |
| Notes | Sponsors: University of California, Los Angeles and Carnegie Mellon University<br>COI: NR |

**NCT04801030**

| | |
|---|---|
| Study name | Using multi-strategies to address COVID-19 vaccine hesitancy among African Americans |
| Starting date | 1 June 12021 |
| Contact information | Jennifer C Erves, PhD6153275692, jerves@mmc.edu |
| Methods | • Study design: non-randomised intervention study<br>• Type of publication: trial registration<br>• Setting: Nashville<br>• Country: USA<br>• Language: English |
| Intervention | • Intervention: participants will receive a multi-layered, social marketing campaign which is deemed culturally appropriate. This will occur over a 6 month -time period. Rates will be observed at 0, 6, and 12 months.<br>• Control: participants will receive no intervention, only to serve as a control site. Rates will be observed at 0, 6, and 12 months. |
| Population | Population: African American<br>Inclusion criteria: unvaccinated for COVID-19; Vaccine hesitant; 18 years and older; Speaks English. |
| Outcomes | Primary outcomes<br>• Recruitment rates [Time frame: 6 months ]<br>• Retention rates [ Time frame: 1 year ]<br>• Data collection processes [ Time frame: 1 year ]per cent ascertained COVID 19 vaccine status post-intervention<br>Secondary outcome<br>• COVID-19 vaccine rates [Time frame: 6 months ] |
| Estimated completion date and number of participants | 30 May 2023 with 300 participants |
| Notes | Funding: Meharry Medical College<br>COI: NR |

**NCT04801524**

| | |
|---|---|
| Study name | NCT04801524 |
| Starting date | 7 February 2021 |
| Contact information | UCLA Health Department of Medicine, Quality OfficeWestwood, California, United States, 90095 |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: UCLA health<br>• Country: USA<br>• Language: English |
| Intervention | • Self-benefit sub-arm: participants will be reminded that the vaccine helps protect them from COVID.<br>• Prosocial-benefit sub-arm: participants will be reminded that the vaccine helps protect their family, friends, and community from COVID.<br>• Early access + self-benefit sub-arm: participants will be reminded that they have early access to COVID-19 vaccine and should take the opportunity to protect themselves from COVID.<br>• Early access + prosocial-benefit sub-arm: participants will be reminded that they have early access to COVID-19 vaccine and should take the opportunity to protect their family, friends, community from COVID.<br>• Fresh start + self-benefit sub-arm: participants will be reminded that the vaccine offers the promise of a fresh start and they should take the opportunity to protect themselves from COVID and chart a new path forward.<br>• Early access + prosocial-benefit sub-arm: participants will be reminded that the vaccine offers the promise of a fresh start and they should take the opportunity to protect their family, friends, community from COVID and help our nation chart a new path forward. |
| Population | • Population: students at UCLA<br>• Inclusion criteria: Participants have a mobile phone number or SMS capable phone number in UCLA Health's database; are eligible for receiving the COVID-19 vaccine at UCLA Health; have not already scheduled an appointment the day before the scheduled time of text message; are at or above 18 years old. |
| Outcomes | Primaryooutcome<br>• First COVID-19 Vaccine appointment scheduled at UCLA Health [Time frame: 6 days]<br>Secondary outcomes<br>• First COVID-19 Vaccine obtained at UCLA Health [Time frame: 1 month from text message]<br>• Time of obtaining the first COVID-19 vaccine at UCLA Health [Time Ffame: 1 month from text message]<br>• First COVID-19 Vaccine obtained at UCLA Health or any organisation reporting to CAIR [Time frame: 2 months from text message]<br>• Time of obtaining the first COVID-19 at UCLA Health or another location reporting to CAIR [Time frame: 2 months from text message] |
| Estimated completion date and number of participants | 1 January 2022 with 250,000 participants |
| Notes | Sponsors: University of California, Los Angeles and Carnegie Mellon University<br>COI: NR |

**NCT04805931 (VEText)**

| | |
|---|---|
| Study name | VEText message framing and COVID-19 vaccine uptake among at-risk veterans (VEText) |
| Starting date | 15 March 2021 |
| Contact information | Alaina Mori, BA(206) 247-6782, alaina.mori@va.gov |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Veterans Health Administration<br>• Country: USA<br>• Language: English |
| Intervention | • Control: will receive a text message with standard messaging used to alert veterans that they are eligible for the COVID-19 vaccine and offer scheduling embedded within the text message.<br>• Intervention A: will receive a text message with a behavioural scarcity message used to alert veterans that they are eligible for the COVID-19 vaccine and offer scheduling embedded within the text message.<br>• Intervention B: will receive a text message with a behavioural social good message used to alert veterans that they are eligible for COVID-19 vaccine and offer scheduling embedded within the text message. |
| Population | • Population: veterans.<br>• Inclusion criteria: must be enrolled into VHA care; Veterans must meet age or illness institutional priority guidelines for eligibility for COVID-19 vaccine receipt. |
| Outcomes | Primary outcome<br>• Vaccine appointments scheduled/completed [ Time frame: 7 days post-randomisation] |
| Estimated completion date and number of participants | 1 November 2021 with 4311 participants |
| Notes | Funding: VA Puget Sound Health Care System<br>COI: none |

**NCT04813770**

| | |
|---|---|
| Study name | The impact of theory-based messaging on COVID-19 vaccination intentions |
| Starting date | 6 April 2021 |
| Contact information | NR |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: NR<br>• Country: UK<br>• Language: English |
| Intervention | • Experimental: theory-based messages about COVID-19 and COVID-19 vaccination<br>• Active comparator: general messages about COVID-19 and COVID-19 vaccination |

**NCT04813770** *(Continued)*

| | |
|---|---|
| Population | • Population: Scottish residents<br>• Inclusion criteria: willing and able to give informed consent for participation in the trial; aged 18 years or above. |
| Outcomes | Primary outcome<br>• Covid-19 vaccination intention measured by a single item and aggregated as the proportion of intenders. [Time frame: immediately post-intervention] participants will be asked: "If you were invited to have a COVID-19 vaccination would you take the vaccine?" Those responding "yes, probably" or "yes, definitely" will be treated as intenders. Those responding "don't know", "probably not" or "definitely not" will be treated as non-intenders.<br>Secondary outcomes<br>• Mean COVID-19 illness coherence score as assessed by the IPQ-R [Time frame: immediately post-intervention]<br>• Mean perceived necessity score as assessed by the BMQ [Time frame: immediately post-intervention]<br>• Mean perceived concerns score as assessed by the BMQ [Time frame: immediately post-intervention] |
| Estimated completion date and number of participants | 26 April 2021 with 113 participants |
| Notes | Funding: University of Glasgow<br>COI: NR |

**NCT04834726**

| | |
|---|---|
| Study name | Pragmatic trial of COVID vaccine text outreach interventions |
| Starting date | 29 April 2021 |
| Contact information | NR |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Penn Medicine<br>• Country: USA<br>• Language: English |
| Intervention | • Behavioral: Opt-In (Call-Back)<br>• Behavioral: Opt-in (In-Bound)<br>• Behavioral: Standard Message<br>• Behavioral: Clinician Endorsement<br>• Behavioral: Scarcity<br>• Behavioral: Opt-Out Framing<br>• Behavioral: Phone Call |
| Population | • Population: patients of Penn Medicine<br>• Inclusion criteria: Aged 18+; reside in Philadelphia; who have had at least 1 visit in the past 5 years with a Penn Medicine primary care provider (PCP). |
| Outcomes | Primary outcome |

**NCT04834726** *(Continued)*

| | |
|---|---|
| | • Dose 1 completion [ Time frame: 1 month]<br><br>Secondary outcomes<br><br>• Dose 1 completion [ Time frame: 2 months]<br>• Vaccine completion [ Time frame: 2 months] |
| Estimated completion date and number of participants | 30 July 2021 with 19,554 participants |
| Notes | Funding: University of Pennsylvania<br>COI: NR |

**NCT04867174**

| | |
|---|---|
| Study name | COVID-19 vaccination take-up in a county-run Medicaid managed care population |
| Starting date | 24 May 2021 |
| Contact information | Mireille Jacobson, 213-986-6076, mireillj@usc.edu |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: health services<br>• Country: USA<br>• Language: English |
| Intervention | • Behavioural: financial incentives<br>• Behavioural: convenient scheduling link<br>• Behavioural: race concordant<br>• Behavioural: gender concordant |
| Population | Population: ethnically diverse minority populations; members of Contra Costa Health Plan (CCHP).<br><br>Inclusion criteria: age 18 and over; no contraindications to vaccination, as determined by county health plan or other medical staff. |
| Outcomes | Primary outcome<br><br>• Rate of COVID-19 vaccination at 1 month [Time frame: 1 month]<br><br>Secondary outcomes<br><br>• Rate of COVID-19 vaccination at 6 months [Time frame: 6 months]<br>• COVID-19 vaccination [Time frame: 1 year]<br><br>Other outcome<br><br>• Vaccine intentions [ Time frame: 30 days] |
| Estimated completion date and number of participants | 24 May 2022 with 2825 participants |
| Notes | Funding: University of Southern California<br>COI: NR |

**NCT04870593**

| | |
|---|---|
| Study name | What works to get the elderly vaccinated against COVID-19? Experimental evidence from India |
| Starting date | 17 April 2021 |
| Contact information | Esther Duflo, Professor, National Bureau of Economic Research, Inc. |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: phone-based<br>• Country: India<br>• Language: NR |
| Intervention | • Behavioural: vVaccination information<br>• Behavioural: buddy system<br>• Behavioural: gossip intervention<br>• Behavioural: Information assigned in community<br>• Behavioural: buddy assigned in community |
| Population | Elderly population (≥55) of India (with a phone number)<br>Inclusion criteria<br>• At least 55 years of age<br>• Has phone number<br>Exclusion criteria<br>• Not part of the experiments registered under protocol IDs 223749 or 172020 |
| Outcomes | Primary outcomes<br>• Received at least one shot [Time frame: 8 weeks after intervention]<br>• Received two shots [Time frame: 8 weeks after intervention] |
| Estimated completion date and number of participants | 10 July 2021 with 3006 participants |
| Notes | Funding: National Bureau of Economic Research, Inc.<br>COI: NR |

**NCT04871776**

| | |
|---|---|
| Study name | Use of construal level theory to inform messaging to increase vaccination against COVID-19 |
| Starting date | June 2021 |
| Contact information | Nancy Haff, 9782011244, nhaff@partners.org |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Mass General Brigham (MGB) health system<br>• Country: USA |

**NCT04871776** *(Continued)*

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|---|---|
| | • Language: English |
| Intervention | • Behavioural: "Why" messaging informed by construal level theory<br>• Behavioural: "How" messaging informed by construal level theory<br>• Behavioural: "How" messaging with a vaccine marked as reserved<br>• Active comparator: usual care |
| Population | Population: patients in the Mass General Brigham system<br><br>Inclusion criteria: aged 18 and older; have not received a dose of any COVID vaccine; home address inside Massachusetts |
| Outcomes | Primary outcome<br><br>• Rate of receipt of at least one dose of a COVID vaccine [Time frame: 6 weeks after the first message is sent]<br><br>Secondary outcomes<br><br>• Rate of receipt of at least one dose of a COVID vaccine [ Time frame: 3 months after the first message is sent]<br>• Rate of completion of full vaccine series [Time frame: 3 months after the first message is sent] |
| Estimated completion date and number of participants | June 2022 with 10,000 participants |
| Notes | Funding: Brigham and Women's Hospital<br><br>COI: NR |

**NCT04876885**

| | |
|---|---|
| Study name | The future of viral communications: video-based health promotion strategies for COVID-19 vaccinations |
| Starting date | 6 May 2021 |
| Contact information | Sarrah M Lal, 289.808.8597, lals2@mcmaster.ca |
| Methods | • Study design: non-randomised intervention study<br>• Type of publication: trial registration<br>• Setting: NR<br>• Country: USA<br>• Language: English |
| Intervention | • For the general public: three two-minute educational videos about COVID-19 vaccine development and dissemination<br>• For healthcare professionals and public health professionals: three two-minute educational videos about COVID-19 vaccine development and dissemination |
| Population | Population: general public and healthcare professionals<br><br>Inclusion criteria<br><br>• For the general public arm<br>  ○ An understanding of the English language at a grade 8 written level<br>  ○ Reside in Ontario |

**NCT04876885** *(Continued)*

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|---|---|
| | • For the healthcare professionals and public health professionals arm<br>  ○ Licensed to practice as a healthcare professional in Ontario<br>  ○ An understanding of the English language at a grade 8 written level<br>  ○ Reside in Ontario |
| Outcomes | Primary outcome<br>• Number of participants indicating intent to vaccinate against COVID-19 [Time frame: one month<br>Secondary outcome<br>• Change in score regarding vaccine hesitation after exposure to educational materials [Time frame: one month] |
| Estimated completion date and number of participants | 6 June2021 with 100 participants |
| Notes | Funding: McMaster University<br>COI: NR |

**NCT04884750**

| | |
|---|---|
| Study name | Community-based design and evaluation of a conversational agent to promote SARS-COV2 vaccination in black churches |
| Starting date | July 1, 2022 |
| Contact information | Lin Shi, 408-828-7588, l.shi@northeastern.edu |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Black churches<br>• Country: USA<br>• Language: English |
| Intervention | Intervention: a smartphone-based embodied conversational agent that educates users and motivates them to obtain vaccinations for SARS-CoV-2 and Influenza, according to Boston Public Health Commission guidelines<br>• Arm A: low-engagement mechanisms, tailored content<br>• Arm B: high-engagement mechanism, non-tailored content<br>• Low engagement mechanism, non-tailored content |
| Population | • Population: BMATP (Black Ministerial Alliance TenPoint community)<br>• Inclusion criteria: over 18 years old; speak English fluently; able to independently consent; adequate corrected vision to use the ECA system (based on a 1 minute ECA functional screener deployed over the web); adequate hearing to use the ECA system; own a recent model iPhone or Android smartphone; do not meet current Boston Public Health commission guidelines for SARS-CoV-2 vaccination; do not meet current Boston Public Health commission guidelines for Influenza vaccination. |
| Outcomes | Primary outcomes<br>• Change of SARS-CoV-2 vaccination status assessed via self-report [Time frame: baseline, 6months, 12months] |

**NCT04884750** *(Continued)*

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|---|---|
| | • Change of Influenza vaccination status Influenza vaccination status assessed via self-report [Time frame: baseline, 6months, 12months]<br><br>Secondary outcomes<br><br>• Change of Satisfaction Status [ Time frame: 6 months, 12 months]<br>• Stage of Change for Vaccination [Time frame: baseline, 6months,12months]<br>• Self-Efficacy for Vaccination [Time frame: baseline,6months,12months]<br>• Decisional Balance for Vaccination [Time frame: baseline,6months,12months]<br>• Knowledge of COVID-19 and influenza [Time frame: baseline,6months,12months] |
| Estimated completion date and number of participants | 31 January 2025 with 600 participants |
| Notes | Funding: Northeastern University<br>COI: NR |

**NCT04895683**

| | |
|---|---|
| Study name | Can Behavioural-science Informed Text Messages Improve COVID-19 Vaccination Uptake in North West London? A RCT |
| Starting date | May 11, 2021 |
| Contact information | Sarah Huf, 07496632732, s.huf@imperial.ac.uk |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Central London<br>• Country: UK<br>• Language: English |
| Intervention | • Active comparator: current practice; text message invitation<br>• Experimental: Behavioural Science informed SMS content<br>• Experimental: Pre-alert and behavioural science-informed SMS content |
| Population | • Population: residents registered with a GP practice in the Central London (Westminster) Clinical Commissioning Group (CCG)<br>• Inclusion criteria: age 18-49; Not previously invited for COVID-19 vaccination<br>• Exclusion criteria: patients who have notified their GP that they wish to decline the COVID-19 vaccination; Patients' whose medical records report a severe allergy to medicines (as per the JCVI guidance). |
| Outcomes | Primary outcome<br><br>• COVID-19 vaccination uptake at 3 weeks [ Time frame: 3 weeks from invitation text message]<br><br>Secondary outcomes<br><br>• COVID-19 vaccination uptake at 8 weeks [Time frame: 8 weeks from invitation text message]<br>• COVID-19 vaccination uptake by demographics [Time frame: 3 and 8 weeks] |
| Estimated completion date and number of participants | 11 May 2022 with 120,000 participants |
| Notes | Funding: Imperial College Healthcare NHS Trust |

**NCT04895683** *(Continued)*

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| | COI: NR |

**NCT04924803**

| | |
|---|---|
| Study name | Community developed technology-based messaging to increase COVID-19 vaccine uptake among people who inject drugs |
| Starting date | 14 June 2021 |
| Contact information | Ian D Aronson, ia14@nyu.edu |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: via phone messages<br>• Country: USA<br>• Language: English and Spanish |
| Intervention | weekly text messages and intervention videos<br>• No video condition: weekly text messages designs to increase vaccination<br>• Video text condition: weekly text messages along with links to intervention videos |
| Population | • Population: people who inject drugs<br>• Inclusion criteria: 18 and older, drug use, English or Spanish speaking<br>• Exclusion criteria: NR |
| Outcomes | • Vaccine uptake (at baseline, at follow-up)<br>• Vaccination series completion |
| Estimated completion date and number of participants | December 2023, 500 planned |
| Notes | • COI: NR<br>• Funding: New York University |

**NCT04930965 (LA-CEAL: HALT COVID)**

| | |
|---|---|
| Study name | Impact of LA-CEAL HALT COVID-19 Ambassador Program on likelihood to vaccinate |
| Starting date | June 18, 2021 |
| Contact information | Erin Peacock, epeacoc@tulane.edu<br>Leslie Craig, lcraig1@tulane.edu |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Federally Qualified Health Centers (FQHC)<br>• Country: USA<br>• Language: NR |
| Intervention | HCW Vaccine Ambassadors |

**NCT04930965 (LA-CEAL: HALT COVID)** *(Continued)*

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|---|---|
| | • no intervention: usual care<br>• intervention: community healthcare worker engagement (training to answer common vaccine questions & address misconceptions; conduct motivational interviewing; and implement basic behavioural economics and related strategies to remove barriers to vaccination) |
| Population | • Population: patient population<br>• Inclusion criteria: 18 and older, Black or African American, FQHC patients in Louisiana<br>• Exclusion criteria: NR |
| Outcomes | • Willingness to get vaccinated (difference in proportion of participants "likely to vaccinate" between study arms at month 1 and 2)<br>• Vaccine uptake (difference in proportion of participants who have received >=1 dose of vaccine between study arms at Month 2) |
| Estimated completion date and number of participants | 31cMarch 2022, 100 planned |
| Notes | • COI: NR<br>• Funding: Tulane University |

**NCT04939506**

| | |
|---|---|
| Study name | COVID-19 vaccine education at the point of testing to increase vaccine uptake in vulnerable communities in SE Louisiana |
| Starting date | 25 June, 2021 |
| Contact information | Sara Al-Dahir, PharmD 5045205766 saaldah@xula.edu |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: vulnerable communities in the Southeastern Louisiana region<br>• Country: USA<br>• Language: NR |
| Intervention | Rapid education<br>• Behavioral: COVID-19 Vaccine Education at the Point of COVID-19 Testing |
| Population | • Population: unvaccinated adults<br>• Inclusion criteria: 18 to 99 years, unvaccinated, vulnerable communities in the Southeastern Louisiana region<br>• Exclusion criteria: NR |
| Outcomes | Primary outcome<br>• Vaccine uptake (COVID-19 Vaccine completion)<br>Secondary outcome<br>• Vaccine hesitancy (Vaccine Hesitancy Likelihood Scale) |
| Estimated completion date and number of participants | June 2023, 375 planned |

**NCT04939506** *(Continued)*

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| Notes | • COI: NR<br>• Funding: Xavier University of Louisiana |

**NCT04939519 (SCALE-UP Utah)**

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|---|---|
| Study name | SCALE-UP Utah: Community-Academic Partnership to address COVID-19 vaccination rates among Utah Community Health Centers |
| Starting date | 25 June 2021 |
| Contact information | David Wetter |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Utah Community Health Center<br>• Country: USA<br>• Language: English and Spanish |
| Intervention | Outreach text messages<br>• Text-messaging (bi-directional text messaging to help connect patients to a vaccination site)<br>• text-messaging + patient navigation (e.g. motivating patients, addressing logistics and barriers) |
| Population | • Population: patient population<br>• Inclusion criteria: 18 and older, patients of the participating Community Health Centers, English or Spanish speaking<br>• Exclusion criteria: NR |
| Outcomes | • Proportion of eligible patients who receive a COVID-19 vaccine<br>• Proportion of patients who receive a COVID-19 vaccine out of the total patient population<br>• Proportion of patients that respond to the text messaging intervention<br>• Proportion of patients that engage with a patient navigator |
| Estimated completion date and number of participants | 22 September 2022, 110,270 recruited |
| Notes | • COI: NR<br>• Funding: University of Utah |

**NCT04951310**

| | |
|---|---|
| Study name | COVID-19 Vaccinations with a sweepstake |
| Starting date | 6 July 2021 |
| Contact information | University of Pennsylvania |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: City of Philadelphia<br>• Country: USA |

**NCT04951310** *(Continued)*

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|---|---|
| | • Language: English |
| Intervention | Lottery ("Philly Vax Sweepstakes")<br>• Citywide sweepstakes, 36 vaccinated Philadelphians will win among three cash prize packages, these 36 will be chosen over three drawings, with 12 residents chosen in each drawing |
| Population | • Population: general population<br>• Inclusion criteria: 18 and older, Residency of the City of Philadelphia<br>• Exclusion criteria: NR |
| Outcomes | • Vaccine uptake (weekly vaccination rate) |
| Estimated completion date and number of participants | 14 August 2021, 3827,656 participants |
| Notes | • COI: NR<br>• Funding: University of Pennsylvania |

**NCT04952376**

| | |
|---|---|
| Study name | Equitable access to COVID-19 vaccines |
| Starting date | 7 July 2021 |
| Contact information | Farhia Omar, Omar.Farhia@mayo.edu<br>Idali Cuellar, Cuellar.Idali@mayo.edu |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Adelante Healthcare<br>• Country: USA<br>• Language: English |
| Intervention | Personalised text messages<br>• SMS (active comparator): vaccine availability and appointment information, Links to information or phone for scheduling will be provided<br>• Personalised text message: vaccine availability and appointment information via a personalized message text from the primary care provider<br>• interactive or 2-way SMS: vaccine availability and appointment information via interactive 2-way SMS options, personalized messaging |
| Population | • Population: patient population<br>• Inclusion criteria: 18 and older, receiving Adelante Healthcare<br>• Exclusion criteria: NR |
| Outcomes | Vaccine uptake (Dose 1 COVID-19 Vaccine (after 30 days),<br>Dose 2 COVID-19 Vaccine (after 60 days),<br>Engagement (after 30 days). |
| Estimated completion date and number of participants | June 2022, 1500 planned |
| Notes | • COI: NR |

**NCT04952376** *(Continued)*

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|---|---|
| | • Funding: Mayo Clinic |

**NCT04960228**

| | |
|---|---|
| Study name | Exploring changes in COVID-19 vaccination intentions by prompting altruistic motives using a video Intervention |
| Starting date | 13 July 2021 |
| Contact information | Zeev Rosberger, Sir Mortimer B. Davis - Jewish General Hospital |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: NR<br>• Country: Canada<br>• Language: English and French |
| Intervention | Video<br>• Altruism video<br>• COVID-19 informational text (active comparator) |
| Population | • Population: young adults<br>• Inclusion criteria: 20-39 years old<br>• Exclusion criteria: have already received a COVID-19 vaccine |
| Outcomes | Willingness to get vaccinated (Change in Vaccine Intentions - Pre-Post Intervention) |
| Estimated completion date and number of participants | 13 September 2021, 2630 planned |
| Notes | • COI: NR<br>• Funding: Zeev Rosberger |

**NCT04963790**

| | |
|---|---|
| Study name | Enabling family physicians to reduce vaccine hesitancy andiIncrease Covid-19 vaccine uptake |
| Starting date | 15 July 2021 |
| Contact information | Stephanie Chenail, stephaniechenail@montfort.on.ca |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Canadian Practice Information Network<br>• Country: Canada<br>• Language: English and French |
| Intervention | Personalised text messages<br>• Tailored COVID-19 vaccine messaging (messages meaningful to the recipients in the different segments (age, language, education level, rurality, sex, gender, …)) |

**NCT04963790** *(Continued)*

| | |
|---|---|
| | • Active comparator: other health-related messaging |
| Population | • Population:general population<br>• Inclusion criteria: 18 years and older, non-vaccinated, enrolled in a participating CPIN primary care practice<br>• Exclusion criteria: patients who do not speak one of Canada's official languages (English and French) |
| Outcomes | • Vaccine uptake: proportion of hesitant individuals who received a COVID-19 vaccine<br>• WIllingness to get vaccinated:iIndividual willingness to receive a COVID-19 vaccine |
| Estimated completion date and number of participants | September 2022, 7200 planned |
| Notes | • COI: NR<br>• Funding: Hopital Montfort |

**NCT04964154 (BRAVE)**

| | |
|---|---|
| Study name | Building Resiliency and Vital Equity (BRAVE) project: understanding Native Americans' perceptions-bBeliefs about COVID-19 testing and vaccination study (BRAVE) |
| Starting date | 15 July 2021 |
| Contact information | Deepak Kumar, dkumar@ad.nccu.edu<br>Tracie Locklear, tlockl12@nccu.edu |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: NR<br>• Country: US<br>• Language: NR |
| Intervention | Cultural appropriate educational information<br>• BRAVE intervention: participants will receive cultural appropriate educational information about COVID-19 testing and vaccination: e.g. informational pamphlets, flyers, town halls<br>• BRAVE non-intervention: participants will not receive information about COVID-19 testing and vaccination |
| Population | • Population: Native American or American Indian Community<br>• Inclusion criteria: 18 years and older, Self-reports as Native American or American Indian<br>• Exclusion criteria: does not self-report as Native American or American Indian |
| Outcomes | • Increase in COVID-19 testing<br>• Increase in COVID-19 vaccination |
| Estimated completion date and number of participants | 30 June 2022, 4000 planned |
| Notes | • COI: NR<br>• Funding: North Carolina Central University |

**NCT04979416**

| | |
|---|---|
| Study name | Video messages and vaccination intention |
| Starting date | 28 July 2021 |
| Contact information | Mireille Jacobson, mireillj@usc.edu |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: online (Prolicif.co panel)<br>• Country: USA<br>• Language: NR |
| Intervention | Video messaging<br>• video message 1-3 (video messages aimed at increasing vaccination)<br>• control: no video message |
| Population | • Population: general population<br>• Inclusion criteria: 18 years and older, adults in the Prolific.co panel, unvaccinated against COVID-19<br>• Exclusion criteria: indicated to Prolific.co that they have received a COVID-19 vaccination |
| Outcomes | Vaccine intention (probability of getting vaccinated in the next 30 days) |
| Estimated completion date and number of participants | 22 July 021 1000 planned |
| Notes | • COI: NR<br>• Funding: University of Southern California |

**NCT04981392**

| | |
|---|---|
| Study name | Intervention to promote COVID-19 vaccination |
| Starting date | 29 July 2021 |
| Contact information | Kimberly Fisher, kimberly.fisher@umassmemorial.org |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Primary Care Clinics from 3 health systems: Umass Memorial Health Care, Family Health Center of Worcester, Edward M. Kennedy Community Health Center, September 2021-September 2023<br>• Country: USA<br>• Language: NR |
| Intervention | HCW Vaccine Ambassadors<br>• Online library of brief videos: primary care providers responding to common questions & concerns, PCP text messaging with evidence-based recommendations, educational material/educational session for PCPs to support their patient conversations |
| Population | • Population: patient population |

**NCT04981392** *(Continued)*

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|---|---|
| | • Inclusion criteria: 18 years and older, patients and providers at a participating clinic site<br>• Exclusioncriteria: NR |
| Outcomes | • Vaccine uptake (COVID-19 complete vaccination rate)<br>• Potential gap in COVID-19 vaccination rates between minority racial groups |
| Estimated completion date and number of participants | 29 February 2024, 38,292 participants |
| Notes | • COI: NR<br>• Funding: University of Massachusetts, Worcester |

**NCT05022472 (2VIDA!)**

| | |
|---|---|
| Study name | Project 2VIDA! COVID-19 Vaccine Intervention Delivery for Adults in southern California (2VIDA!) |
| Starting date | 26 August 2021 |
| Contact information | Argentina E Servin, MD,MPH; 6195767211; arservin@ucsd.edu |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Latino and African American (AA) communities in Southern California, NR<br>• Country: USA<br>• Language: English and Spanish |
| Intervention | Multidimensional community intervention<br>• Behavioral: COVID-19 Individual Awareness and Education.<br>• Behavioral: COVID-19 Community Outreach & Health Promotion.<br>• Behavioral: COVID-19 Individual Health Education & Linkages to Medical and Supportive Services.<br>• Biological: Pop-up community vaccination sites<br>• No intervention: standard care (Standard for vaccine delivery) |
| Population | • Population: general population<br>• Inclusion criteria:<br>  ◦ age 18 years or older<br>  ◦ identify as Latinx and/or AA<br>  ◦ biologically male or female<br>  ◦ be a resident of one of the six communities selected for this study (National City, Lincoln Park, Logan Heights, Valencia Park, Chula Vista or San Ysidro)<br>  ◦ literate in English or Spanish<br>  ◦ no known history of severe allergic reactions to any components of the vaccine<br>  ◦ no history of immune disease<br>  ◦ not pregnant<br>  ◦ no plans to move from the area in the following 30 days<br>  ◦ able to provide voluntary informed consent<br>  ◦ able to provide complete contact information for themselves and two additional contact individuals (for follow-up 2nd vaccine shot)<br>• Exclusion criteria:<br>  ◦ under 18 years old<br>  ◦ pregnant women |

**NCT05022472 (2VIDA!)** *(Continued)*

| | |
|---|---|
| | ○ adults unable to consent |
| Outcomes | Primary outcomes<br>• COVID-19 vaccine acceptance<br>• Vaccine hesitancy<br>Secondary outcomes<br>• Change in health literacy<br>• Change in COVID-19 risk perception<br>• Change in preparedness and perceived self-efficacy<br>• Change in prevention (own behaviours)<br>• Testing and tracing<br>• Access to health care and utilisation<br>• Health history<br>Other outcomes<br>• Affect<br>• Use of sources of information<br>• Policies and interventions (perceptions)<br>• Trust in sources of information<br>• Frequency of information<br>• Perceptions of government responses to COVID-19 pandemic<br>• Trust in institutions (perceptions)<br>• Conspiracies (perceptions)<br>• Resilience (perceptions) |
| Estimated completion date and number of participants | 31 January 2026, 1000 participants |
| Notes | • COI: NR<br>• Funding: Argentina Servin, MD, MPH |

**NCT05027464 (CoVAcS)**

| | |
|---|---|
| Study name | Developing and testing a COVID-19 Vaccination Acceptance intervention (CoVAcS) |
| Starting date | 30 August 2021 |
| Contact information | Yasmin Jolly, Yasmin.Jolly@va.gov<br>Nicole McCamish, Nicole.McCamish@va.gov |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: VA Medical Centers, NR<br>• Country: USA<br>• Language:NR |
| Intervention | Outreach calls<br>• multi-pronged approach, research team will train Health Behavior Co-ordinators (HBCs), HBCs will then train PACT teams at their site and Whole Health Coaches, Peer Specialists and other VA |

**NCT05027464 (CoVAcS)** *(Continued)*

| | |
|---|---|
| | Staff in VAI strategies to use with unvaccinated Veterans, will conduct outreach calls, using strategies, with unvaccinated Veterans)<br>• No intervention: usual care (no specific trial intervention requirements beyond their usual level of participation in national and local initiatives to improve COVID-19 vaccine acceptance) |
| Population | • Population: veterans<br>• Inclusion criteria by aim:<br>  ○ For all aims: 18 years and older<br>  ○ Aim 1: primary care clinic visit in VISN 16 or 21<br>  ○ Aim 2: =1 visit(s) at a participating VISN 16 or 21 primary care clinic or CBOC after the start of the trial at their site, and at the time of recruitment, COVID-19 vaccination status is verified as one of the following:<br>  ■ has not initiated COVID-19 vaccination<br>  ■ has initiated one of the two mRNA vaccines and is outside the window for the second dose<br>  ■ recently completed COVID-19 vaccination (has completed two doses of mRNA vaccination or has completed the single-dose Janssen/Johnson & Johnson vaccine within the past 60 days)<br>  ○ Aim 3: Implementation-focused Interviews with VISN 16 and 21 Staff and HCPs<br>• Exclusion criteria by aim:<br>  ○ Aim 1: Per VISN or VAMC leadership, the clinic or CBOC has extreme staffing shortages such that it would not be feasible or in the best interests of patient care to allow clinic or CBOC staff release time to participate in training or other meetings related to the trial<br>  ○ Aim 2: Has initiated COVID-19 vaccination with one of the mRNA vaccines and is within the window to complete the second dose on schedule (< 42 days since dose 1)<br>  ■ Serious allergic reaction or other contraindication to COVID-19 vaccination or other vaccines (e.g. flu vaccine)<br>  ■ Currently in hospice care or < 6 months to live<br>  ■ No consistent ability to be contacted by phone<br>  ■ Participating in another COVID-19 trial or study (research study flag)<br>  ■ Moderate to severe dementia as documented in the patient's VA medical record<br>  ■ Increased suicide risk as indicated by behavioral health flag<br>  ○ Aim 3: Staff or HCPs declines invitation to participate in the interview |
| Outcomes | Primary outcome<br>• Vaccine uptake (COVID-19 vaccination status)<br>Secondary outcomes<br>• Seasonal Influenza vaccination status<br>• Survey of Vveterans from intervention and usual care who did and did not receive COVID-19 vaccination<br>• Qualitative Interview with purposive subset of Veterans from Intervention and usual care who did and did not receive COVID-19 vaccination<br>• Qualitative Interviews with VA staff and healthcare providers<br>• Secondary analysis of VA National Data |
| Estimated completion date and number of participants | 30 September 2023, 2500 participants |
| Notes | • COI: NR<br>• Funding: VA Office of Research and Development |

**NCT05037201**

| | |
|---|---|
| Study name | Text message nudges for COVID-19 vaccination |
| Starting date | 8 September, 2021 |
| Contact information | Mitesh Patel, MD, MBA 7343550817 Mitesh.Patel3@Ascension.org |
| Methods | • Study design: randomised controlled trial<br>• Type of publication: trial registration<br>• Setting: Ascension health facilities, NR<br>• Country: USA<br>• Language: English |
| Intervention | Nudging<br>• text message stating that the vaccine is reserved for them on a specific date, they will have the ability to reschedule to a different day, opt-out of this text messaging intervention, or if previously vaccinated they can upload documentation to the Ascension website<br>• control: usual health system messaging about the importance and deadlines for receiving COVID-19 vaccination |
| Population | • Population: healthcare workers<br>• Inclusion criteria: 18 years and older, Ascension Associate Employee<br>• Exclusion criteria: prior vaccination for COVID-19, Exemption from COVID-19 vaccination |
| Outcomes | • Willingness to get vaccinated (per cent receiving COVID-19 vaccine)<br>• Time to receive COVID-19 vaccine |
| Estimated completion date and number of participants | 8 November 2021, 2000 participants |
| Notes | • COI: NR<br>• Funding: Ascension South East Michigan |

**PACTR202102846261362**

| | |
|---|---|
| Study name | Using community influencer groups to address COVID-19 misinformation and potential vaccine hesitancy in Uganda |
| Starting date | February 2021 |
| Contact information | Freddy Kitutu, kitutufred@gmail.com, +256705791777 |
| Methods | • Study design: Non-randomised intervention study<br>• Type of publication: trial registration<br>• Setting: villages<br>• Country: Uganda<br>• Language: English |
| Intervention | Implementing community influencer groups (5 men, 5 women) that are educated to respond to COVID-19 vaccine hesitancy and misinformation |
| Population | Population: Ugandans living in selected villages. |

| | |
|---|---|
| **PACTR202102846261362** *(Continued)* | |
| | Inclusion criteria: healthy men and women aged 18 years to 65 years older who normally reside in households in the selected villages, domestic servants who have slept for five nights a week or more in the households, and visitors who have slept in the household for at least the past four weeks.<br><br>Exclusion criteria: men and women from households that are under COVID-19 isolation or quarantine at the time of data collection will be excluded from the study if they do not have access to a phone for phone interviews to be conducted. |
| Outcomes | Primary outcomes<br>• The proportion of community members with COVID-19 misinformation.<br>• The proportion of community members with hesitancy towards a future COVID-19 vaccine<br><br>Secondary outcome<br>• The psychological antecedents of vaccination: confidence, complacency, constraints, calculations and collective responsibility. |
| Estimated completion date and number of participants | NR |
| Notes | Funding: Sabin Vaccine Institute, Makerere University |

## ADDITIONAL TABLES

**Table 1. Inclusion criteria**

| Criteria | Details |
|---|---|
| Study designs | • RCTs<br>• Observational studies (case-control, cohort, cross-sectional)<br>• Prospective and retrospective design<br>• Controlled pre-post studies<br>• Interrupted time-series studies<br>• Non-comparative/non-controlled: Single-arm studies with more than 100 participants<br>• Case studies with 100 or more participants<br>• Rapid/living/scoping/systematic reviews/ meta-analyses<br>• Psychological experiments |
| Population | Any population, no restrictions |
| Setting | No restrictions |
| Interventions | • Interventions to enhance the willingness to get vaccinated with a COVID-19 vaccine<br>• Intervention to decrease vaccine hesitancy for a COVID-19 vaccine |
| Outcomes | No restrictions |

**RCTs:** randomised controlled trials

**Table 2. Exclusion criteria**

| Criteria | Details |
|---|---|
| Study designs | • Modelling studies<br>• Case studies with less than 100 participants<br>• Publications that do not report study results (e.g. commentaries, editorials, etc.)<br>• Empirical studies without quantitative measures (e.g. qualitative studies) |
| Population | No exclusion criteria |
| Setting | No exclusion criteria |
| Interventions | • Interventions to enhance the willingness to get vaccinated with a vaccine other than a COVID-19 vaccine (e.g. influenza, measles, HPV)<br>• Interventions to decrease vaccine hesitancy for a vaccine other than a COVID-19 vaccine (e.g. influenza, measles, HPV) |
| Outcomes | No exclusion criteria |

**HPV:** human papillomavirus

**Table 3. Categorisation of interventions used in this review**

| Cetegory | Description |
|---|---|
| **Education** | Interventions aimed at educating or informing participants about COVID-19, COVID-19 vaccines, benefits of vaccine uptake and other aspects of the pandemic or vaccination. |
| **Policy interventions** | Interventions that can only be implemented across a whole jurisdiction by policymakers, such as mandatory vaccine policies. |
| **Communication strategies** | Interventions aiming to persuade people to get vaccinated. This can be in-person communication but also communication used in different forms of media such as videos or written information. |
| **Incentives** | • Incentives including financial incentives and other, non-financial, forms of incentives (e.g. food or gift cards)<br>• Sanctions including financial disincentives |
| **Interventions to improve access** | Multidimensional interventions are interventions using more than one strategy. For example, educational interventions and communication strategies can be used together. |

## APPENDICES

### Appendix 1. PRISMA- ScR Checklist for this review

| Item | PRISMA-ScR CHECKLIST ITEM | Done? | Section |
|---|---|---|---|
| 1 | Identify the report as a scoping review. | yes | Title |

*(Continued)*

| | | | |
|---|---|---|---|
| 2 | Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives. | yes | Abstract |
| 3 | Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach. | yes | Background |
| 4 | Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives. | yes | Objective |
| 5 | Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number. | yes | Methods |
| 6 | Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale. | yes | Methods |
| 7 | Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed. | yes | Methods |
| 8 | Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated. | yes | Appendix |
| 9 | State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review. | yes | Methods |
| 10 | Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators. | yes | Mehods |
| 11 | List and define all variables for which data were sought and any assumptions and simplifications made. | yes | Methods |
| 12 | If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate). | No; No critical appraisal conducted | |
| 13 | Describe the methods of handling and summarizing the data that were charted. | yes | Methods |
| 14 | Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram. | yes | Figure 1: Flow diagram |
| 15 | For each source of evidence, present characteristics for which data were charted and provide the citations. | yes | Characteristics of included studies Table |

*(Continued)*

| | | | |
|---|---|---|---|
| 16 | If done, present data on critical appraisal of included sources of evidence (see item 12). | No; No critical appraisal conducted | |
| 17 | For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives. | yes | Summary of findings table, Interactive scoping map |
| 18 | Summarize and/or present the charting results as they relate to the review questions and objectives. | yes | Results |
| 19 | Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups. | yes | Results |
| 20 | Discuss the limitations of the scoping review process. | yes | Discussion |
| 21 | Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps. | yes | Discussion |
| 22 | Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review. | yes | Sources of support, Acknowledgements |

[Enter text here]

## Appendix 2. Search Strategies for Evidence Syntheses

**Evidence Aid Coronavirus (Covid-19)** (evidenceaid.org/evidence/coronavirus-covid-19/)

searched by text word vaccin*

**Usher Network for COVID-19 Evidence Reviews** (www.ed.ac.uk/usher/uncover/register-of-reviews)

searched by text word vaccin*

**Epistemonikos L*OVE Covid-19** (app.iloveevidence.com/loves)

search by text word vaccin* and limited to broad syntheses and systematic review

**MEDLINE** (Ovid 1946 to present)

# Searches

1 (COVID or "COVID-19" or COVID19 or "SARS-CoV-2" or "SARS-CoV2" or SARSCoV2 or "SARSCoV-2").tw,kf.

2 (vaccin* adj5 (hesitanc* or hesitant* or hesitat* or uptake or "up-take" or "take up" or trust* or distrust* or misinformation or barrier* or refusal or resist* or "anti-vaccination" or "anti vaccine" or willing* or unwilling* or intent* or accept* or perception* or behaviour* or behavior* or belief* or view* or opinion or communication* or perspective* or attitude* or knowledge or concern or concerns or concerned or motivation or reject or confidence or "undecided" or "irresolute" or uncertain or nonintent or decide or deciding or decision* or consent* or perceiv* or aware*)).tw,kf.

3 cochrane database of systematic reviews.jn. or search*.tw. or meta analysis.pt. or medline.tw. or systematic review.tw. or systematic review.pt.

(Wong 2006 – systematic reviews filter – high specificity, 90,2% sens / 98,4% spec)

4 1 and 2 and 3

5 limit 4 to yr="2020 -Current"

## Appendix 3. Search Strategies for Primary Literature

### Cochrane COVID-19 study register

vaccin*

AND

hesitanc* or hesitant* or hesitat* or uptake or "up-take" or "take up" or trust* or distrust* or misinformation or barrier* or refusal or resist* or "anti-vaccination" or "anti vaccine" or willing* or unwilling* or intent* or accept* or perception* or behaviour* or behavior* or belief* or believ* or view* or opinion* or communication* or perspective* or attitude* or knowledge or concern or concerns or concerned or motivation or reject or confidence or "undecided" or "irresolute" or uncertain or nonintent or decide or deciding or decision* or consent* or perceiv* or aware* or vaxxer* or "vaccination rates" or intend* or message* or encourage* or framing*

### Web of Science

#1 TI=((vaccin* NEAR/5 (COVID OR COVID19 OR "SARS-CoV-2" OR "SARS-CoV2" OR SARSCoV2 OR "SARSCoV-2" OR "SARS coronavirus 2" OR "2019 nCoV" OR "2019nCoV" OR "2019-novel CoV" OR "nCov 2019" OR "nCov 19" OR "severe acute respiratory syndrome coronavirus 2" OR "novel coronavirus disease" OR "novel corona virus disease" OR "corona virus disease 2019" OR "coronavirus disease 2019" OR "novel coronavirus pneumonia" OR "novel corona virus pneumonia" OR "severe acute respiratory syndrome coronavirus 2")))) OR AB=((vaccin* NEAR/5 (COVID OR COVID19 OR "SARS-CoV-2" OR "SARS-CoV2" OR SARSCoV2 OR "SARSCoV-2" OR "SARS coronavirus 2" OR "2019 nCoV" OR "2019nCoV" OR "2019-novel CoV" OR "nCov 2019" OR "nCov 19" OR "severe acute respiratory syndrome coronavirus 2" OR "novel coronavirus disease" OR "novel corona virus disease" OR "corona virus disease 2019" OR "coronavirus disease 2019" OR "novel coronavirus pneumonia" OR "novel corona virus pneumonia" OR "severe acute respiratory syndrome coronavirus 2"))

#2 TI=((hesitanc* OR hesitant* OR hesitat* OR uptake OR "up-take" OR "take up" OR trust* OR distrust* OR misinformation OR barrier* OR refusal OR resist* OR "anti-vaccination" OR "anti vaccine" OR willing* OR unwilling* OR intent* OR accept* OR perception* OR behaviour* OR behavior* OR belief* OR believ* OR view* OR opinion* OR communication* OR perspective* OR attitude* OR knowledge OR concern OR concerns OR concerned OR motivation OR reject OR confidence OR "undecided" OR "irresolute" OR uncertain OR nonintent OR decide OR deciding OR decision* OR consent* OR perceiv* OR aware* OR vaxxer* OR "vaccination rates" OR intend* OR message* OR encourage* OR framing*))) OR AB=((hesitanc* OR hesitant* OR hesitat* OR uptake OR "up-take" OR "take up" OR trust* OR distrust* OR misinformation OR barrier* OR refusal OR resist* OR "anti-vaccination" OR "anti vaccine" OR willing* OR unwilling* OR intent* OR accept* OR perception* OR behaviour* OR behavior* OR belief* OR believ* OR view* OR opinion* OR communication* OR perspective* OR attitude* OR knowledge OR concern OR concerns OR concerned OR motivation OR reject OR confidence OR "undecided" OR "irresolute" OR uncertain OR nonintent OR decide OR deciding OR decision* OR consent* OR perceiv* OR aware* OR vaxxer* OR "vaccination rates" OR intend* OR message* OR encourage* OR framing*)

#3 #1 AND #2

### WHO COVID-19 global literature on coronavirus disease

Advanced search:

vaccin*

AND

hesitanc* or hesitant* or hesitat* or uptake or "up-take" or "take up" or trust* or distrust* or misinformation or barrier* or refusal or resist* or "anti-vaccination" or "anti vaccine" or willing* or unwilling* or intent* or accept* or perception* or behaviour* or behavior* or belief* or believ* or view* or opinion* or communication* or perspective* or attitude* or knowledge or concern or concerns or concerned or motivation or reject or confidence or "undecided" or "irresolute" or uncertain or nonintent or decide or deciding or decision* or consent* or perceiv* or aware* or vaxxer* or "vaccination rates" or intend* or message* or encourage* or framing*

### PscycINFO Ovid

Search Strategy:

| # | Searches |
|---|---|
| 1 | immunization/ |
| 2 | covid-19/ |
| 3 | (vaccin* adj8 (covid or covid-19 or covid19 or "SARS-CoV-2" or "SARS-CoV2" or SARSCoV2 or "SARSCoV-2" or "SARS coronavirus 2")).mp. |
| 4 | (hesitanc* or hesitant* or hesitat* or uptake or "up-take" or "take up" or trust* or distrust* or misinformation or barrier* or refusal or resist* or "anti-vaccination" or "anti vaccine" or willing* or unwilling* or intent* or accept* or perception* or behaviour* or behavior* or belief* or believ* or view* or opinion* or communication* or perspective* or attitude* or knowledge or concern or concerns or concerned or motivation or reject or confidence or "undecided" or "irresolute" or uncertain or nonintent or decide or deciding or decision* or consent* or perceiv* or aware* or vaxxer* or "vaccination rates" or intend* or message* or encourage* or framing*).mp. |
| 5 | 202*.up. |
| 6 | 1 and 2 |
| 7 | (3 or 6) and 4 and 5 |

**CINAHL EBSCO**

| | |
|---|---|
| S1 | MH "COVID-19 Vaccines" |
| S2 | MH "Anti-Vaccination Movement" |
| S3 | MM "Immunization" |
| S4 | MH "COVID-19" |
| S5 | TX (vaccin* N8 (covid or covid-19 or covid19 or "SARS-CoV-2" or "SARS-CoV2" or SARSCoV2 or "SARSCoV-2" or "SARS coronavirus 2")) |
| S6 | S1 OR ( S4 AND (S2 OR S3) ) OR S5 |
| S7 | TX hesitanc* or hesitant* or hesitat* or uptake or "up-take" or "take up" or trust* or distrust* or misinformation or barrier* or refusal or resist* or "anti-vaccination" or "anti vaccine" or willing* or unwilling* or intent* or accept* or perception* or behaviour* or behavior* or belief* or believ* or view* or opinion* or communication* or perspective* or attitude* or knowledge or concern or concerns or concerned or motivation or reject or confidence or "undecided" or "irresolute" or uncertain or nonintent or decide or deciding or decision* or consent* or perceiv* or aware* or vaxxer* or "vaccination rates" or intend* or message* or encourage* or framing* |
| S8 | S6 AND S7 |

## WHAT'S NEW

| Date | Event | Description |
|---|---|---|
| 5 August 2022 | Amended | Edits to faulty hyperlinks |

## HISTORY

Review first published: Issue 8, 2022

## CONTRIBUTIONS OF AUTHORS

MA: methodological expertise and conception and writing of the review

CI: methodological expertise, writing and conception

VP: methodological expertise and conception, revision of review draft, and approval of final review draft

IM: developing of search strategy and conducting the search

EB: methodological expertise and conception and writing of the review

JJM: methodological expertise and conception, revision of review draft, and approval of final review draft

NS: methodological expertise and conception and writing of the review

## DECLARATIONS OF INTEREST

MA: none known

CI: none known

VP: none known

EB: none known

JJM: member of the Standing Vaccination Committee (STIKO) in Germany

NS: none known

## SOURCES OF SUPPORT

### Internal sources

- University of Cologne, Germany

  University of Cologne, Faculty of Medicine and University Hospital Cologne, Department I of Internal Medicine, Evidence-based Oncology

### External sources

- Germany Research Foundation, Germany

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## DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We made several changes to the methods described in the protocol during the review process. The protocol was prospectively registered (Andreas 2021).

### Methods: inclusion criteria; study design

For psychological experiments with hypothetical scenarios being tested, we later decided to only include those studies that investigate scenarios that can be manipulated in a real-world setting. For example communication about vaccines can be manipulated, but vaccine efficacy cannot be manipulated. We made this change as we were unaware that this type of study exists and that it would be identified in our search.

In addition, we later decided not to include case studies, based on a suggestion with comprehensible reasoning from a reviewer.

### Methods: Summary and reporting of results

The original intervention categories proposed in the protocol were based on past research on intervention strategies for vaccine uptake. However, after intensive discussion with Co-authors and stakeholders, we realised that we would need more categories to adequately map our results. We, therefore, included the former subcategory "Education" of the category communication-based interventions as a separate category. This enabled us to better portray the differences in the very diverse interventions that were communication-based. Furthermore, we added the category of "multidimensional interventions", as many studies interventions use more than one strategy. We also added the category "interventions to improve access" because this was helpfully recommended by a peer-reviewer. Please see Table 3 for an overview of the categories described in the protocol and those used in this review.

## INDEX TERMS

### Medical Subject Headings (MeSH)

*COVID-19 [prevention & control]; COVID-19 Vaccines; Health Personnel [education]; Randomized Controlled Trials as Topic; *SARS-CoV-2; Vaccination

### MeSH check words

Adolescent; Child; Humans