

Understanding Vaccination Behaviours within Workplaces in Sandwell

January 2022

Acknowledgements

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Disclaimer

The views in this report are the authors' own and do not necessarily reflect those of the Local Government Association.

Summary

This report presents the results from a study on how behavioural science can be used to increase the take up of COVID-19 vaccines across workplaces in Sandwell. The study includes two randomised trials: the first trial targeted non-vaccinated employees and tests an intervention aimed at increasing intentions to get the vaccine; the second trial targeted those who are already vaccinated and tests an intervention that encourages them to promote COVID-19 vaccines to their unvaccinated colleagues.

Methodology

In this study we first identified key barriers to vaccine uptake within workplaces in Sandwell. We did so by conducting interviews with relevant personnel, including private Sandwell-based organisations and local public-sector organisations (care homes and Sandwell council). After having studied and identified key barriers to vaccine uptake, we designed a series of interventions to tackle these barriers. The interventions were designed based on findings from a comprehensive literature review.

To evaluate those interventions, we conducted two Randomised Controlled Trials (RCTs) between July 2021 and November 2021. The RCTs were administered through the online survey platform Qualtrics. Participants were recruited by contacting local employers, who were invited to participate in the study. Those employers who accepted the invitation received a 'Survey Distribution Toolkit' so that they could distribute the survey among their employees. Employees could access the survey by one or more of the following means: by scanning a poster's QR code in their workplace facilities or by receiving the survey link via email or text message. The survey began by asking a few demographic questions and a screening question ('have you received the COVID-19 vaccine?'), which was used to assign them to Trial 1 or Trial 2. If their answer was 'No', they were included in Trial 1. If their answer was 'Yes' or 'No, but I've scheduled an appointment', they were assigned to Trial 2.

What is an RCT?

An RCT is a prospective study that help us measure the effectiveness of an intervention. An intervention can be different things. It might be a new policy, a programme, or a communication. For example, we might want to compare a new council communication against current communications, or we might want to compare two new council communications against each other.

The interventions are randomised into different groups of people. By randomly assigning people to groups we can eliminate the possibility of external factors affecting the results and demonstrate that any differences between the two groups are solely a result of differences in the interventions they receive.

In summary, RCTs work by dividing a population into two or more groups by random lot, giving one intervention to one group, the other to another, and measuring a pre-specified outcome for each group. This provides a very powerful response to questions of causality, helping evaluators, programme implementers or public servants to know that what is being achieved is a result of the intervention and not anything else.

Trial 1

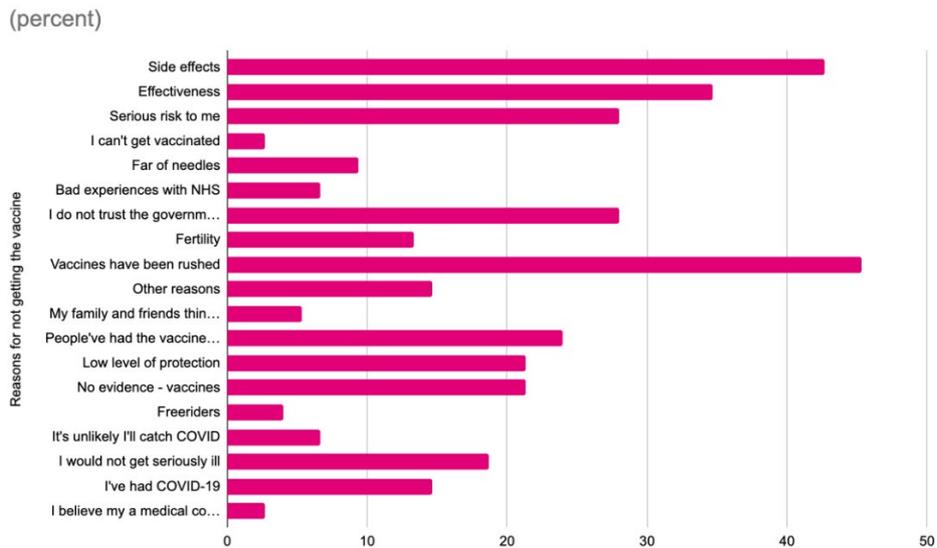
In this trial (n = 75), we hypothesised that we could encourage vaccinations by directly addressing the reasons why people say they do not want to get vaccinated. Participants were first asked to list and rank their main reasons for not getting the COVID-19 vaccine through an interactive online interface. If participants were randomised to the treatment group, they were shown a behaviourally-framed message that addressed their highest-ranked concern (e.g., if participant's highest ranked concern is "I think the vaccine is likely to have serious side effects", they are shown a message that includes: "More than 39 million people have already been vaccinated in the UK. For all vaccines, the majority of the side effects are mild and typically last 1 or 2 days").

Trial 2

The second trial (n = 694) was designed under the assumption that vaccine advocacy supports the acceptance and uptake of COVID-19 vaccines. Participants that declared themselves vaccinated were asked if they would encourage others to get the vaccine (this allowed us to understand their willingness to become vaccine advocates) and to specify their own reasons for getting the vaccine. If randomised to the treatment group, they were shown a behaviourally-framed message aimed at encouraging them to become vaccine advocates (e.g., "Thank you for playing your part in protecting everyone in our Sandwell community. (...) You can make a difference in Sandwell by talking to your friends, family, and co-workers about the benefits of the vaccine. Your support matters.").

Key findings and conclusions

- Most adults in our study sample (90.25%) had taken a COVID-19 vaccine or had already scheduled a vaccine appointment. A small proportion of survey participants (9.75%) had not received a COVID-19 vaccine.
- We did not reach our desired sample sizes for the trials which presented a handicap to find any significant effects of the trialled solutions. This might be due to several factors such as the rapidly changing circumstances of the COVID-19 pandemic and the sensitive nature of the topic of research as some employers were reluctant to address this topic in their workplaces. We have also found that some employers were experiencing some sort of 'pandemic fatigue'. Most workplaces had already invested considerable amounts of company resources in the pandemic by the time the experiment was launched and were reluctant to buy into another COVID-19-related project. This calls attention to the fact that the pandemic has posed a huge burden to local businesses across the UK.
- On a positive note, we have also established very fruitful relationships with some companies. We have found that making businesses part of the decision-making process and engaging them in the experiment and intervention design is a good practice to ensure the success of the project.
- In the first trial, we do not find that the behavioural intervention has a significant effect on vaccine behaviour (possibly due to the low sample size in this trial). However, the estimated coefficient is large and positive (a 9.6 percentage point increase in the share that intend to get vaccinated), which is encouraging. It may thus be a good idea to find ways of testing this intervention with larger numbers of participants in the future.
- The survey questions asked in the first trial provide us with important insights into the main concerns that participants have for not getting the COVID-19 vaccine. In particular, participants reported concerns related to the vaccine being rushed, its potential side effects, and concerns regarding the vaccines being ineffective. These findings can help inform the development of targeted communications and public health campaigns that encourage vaccine uptake.



- Our analysis shows that some concerns are more strongly associated with an unwillingness to get vaccinated. More specifically, those who think that the vaccine was rushed and not tested properly, those worried about side effects, those who hold perceptions that the vaccine is not effective, and those who think that COVID-19 does not pose a serious risk to them are especially unlikely to say that they will get vaccinated.
- In the second trial, we did not find a significant effect of the behavioural intervention on intentions to become vaccine advocates. To explain why this might happen, we need to look at the baseline outcome. The baseline outcome, which is the measurement of the outcome of interest (vaccine advocacy intentions) before the intervention, is considerably high. This means that when participants were asked at the beginning of the survey if they would be willing to become vaccine advocates, a very high share of survey participants (80%) stated “Yes, definitely”, and 10% answered “Probably”. It may thus be useful to explore ways of translating people’s stated intentions into actual advocacy behaviour.

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1 Introduction

Behavioural insights methods, tools, and techniques can be used to tackle challenges associated with the uptake of COVID-19 vaccines.

This report presents the results from a research study on how to use behavioural insights to encourage vaccinations and vaccine advocacy in the Metropolitan Borough of Sandwell. This piece of research was commissioned by Sandwell Metropolitan Borough Council and is part of the Local Government Association's Behavioural Insights Programme, a fund that supports council innovation in the UK.

The project began in March 2021 and was initially focused on designing and testing behavioural interventions that encourage adherence to protective behaviours (e.g., mask-wearing and hand washing) in workplaces across Sandwell. However, after conversations with key stakeholders from Sandwell Council and various Sandwell-based companies, we concluded that it would be more beneficial to focus on COVID-19 vaccine adoption, as the government was in the process of lifting most rules and regulations regarding protective behaviours in workplaces, and many companies were unwilling to continue implementing restrictions on a voluntary basis (the number of COVID-19 cases was falling at the time).

Following the project's re-scope, we held meetings with Sandwell-based companies and care homes. Some companies had the anticipated concern of not being able to reach sufficient vaccination rates among staff, as they found that risk perception among staff was relatively low. We met with staff involved in ongoing care home management and who were providing advice around infection prevention and outbreak control, including two IPC nurses, a nurse consultant, and a care home quality lead. Care home staff were included in the government's priority groups and were thus eligible for vaccination in March 2021. However, some staff members were misinformed about COVID-19 and COVID-19 vaccines and were hesitant to get vaccinated (e.g., believing that vaccines affect fertility or concerns around the speed of development of the vaccines).¹

After having studied and identified key barriers to vaccine uptake in Sandwell, we explored different solutions that could be used to tackle these barriers, and we assessed the feasibility of evaluating the efficacy of the solutions using a randomised controlled trial. Ultimately, we designed two behavioural interventions that were tested in, and delivered via, an online survey.

¹These findings were in line with those from publications such as the Oxford Coronavirus Explanations, Attitudes, and Narratives Survey (OCEANS II) and The Policy Institute. OCEANS II (Freeman et al. 2020) assessed provisional willingness to receive a coronavirus 2019 (COVID-19) vaccine, identify predictive socio-demographic factors, and, principally, determine potential causes in order to guide information provision. The Policy Institute (2020) survey was conducted in July 2020, 2,237 people were asked how likely they would be to get a coronavirus vaccine. It found that only half the population (53%) say they'd be certain or very likely to get a vaccine against coronavirus, if one becomes available, with one in five (20%) fairly likely. And 1 in 6 people (16%) say they are unlikely to or definitely won't get a COVID-19 vaccine, if one becomes available.

The remainder of the report is structured as follows. In Section 2, we present the behavioural interventions. In Section 3 we describe how the behavioural interventions were evaluated using two online randomised controlled trials. In Section 4, we present the results of the trials and examine data on vaccine attitudes to inform future policy initiatives. Section 5 concludes with a discussion of the findings. The annex includes supporting materials, such as background research (A and B), all the behaviourally-framed communications used in this study (C), survey flow (D) and supplementary analysis (E).

2 Behavioural Interventions

In this report, we present novel behavioural interventions aimed at improving intentions to get the vaccine among non-vaccinated participants and intentions to take action to promote the COVID-19 vaccine among vaccinated participants.

These interventions were designed based on findings from the literature review (Annex, Section 9, 'Research Background') and from insights gleaned from semi-structured interviews conducted with relevant personnel within Sandwell (e.g., individuals within Sandwell council, workplaces, and care homes).

In the first trial, we hypothesise that directly addressing peoples' specific reasons to not get vaccinated through behavioural framing techniques will make individuals more likely to intend to get vaccinated. In the second trial, we test the use of behavioural messaging techniques to encourage participants who are already vaccinated to become advocates for the COVID-19 vaccine and to increase their likelihood of speaking to their family, friends, and colleagues about the benefits of taking the vaccine.

2.1 Trial 1's research background in a nutshell

The reasons why people choose not to get vaccinated are complex (MacDonald, 2015). These reasons differ according to geographical and cultural contexts. However, misconceptions and concerns around vaccine safety remain key drivers of decreased vaccine uptake in most contexts (Larson et al., 2014). In addition, COVID-19 vaccines are facing additional hurdles, especially given the lack of a long-term safety record (Cornwall, 2020). The rapid pace of the Coronavirus vaccine development is a cause of misinformation regarding its safety and efficacy among vaccine hesitant groups.

Studies have shown that providing recommendations that aim to correct myths and misinformation strongly influence decision making around vaccines (Geoghegan et al., 2020;

Smith et al., 2017). However, the way misinformation is corrected, or myths are debunked is very important.

Through an interactive survey tool (see section 2.3 for more detail), individuals in the trial are provided with tailored information to address their specific vaccination concerns, which is a promising approach to improve vaccination intents (Gerend et al. 2013; Panozzo et al., 2020).

The tailored messages provided by the interactive survey tool use behavioural science techniques supported by relevant literature (go to section 7 'Annex' subsection 'A' for more detail). As a rule, messages were designed to repeat correct information without reinforcing the myth, keep communication simple and brief and aim to frame evidence in a worldview-affirming manner by endorsing the values of the targeted audience (Lewandowsky et al. 2012).

2.2 Trial 2's research background in a nutshell

In this trial, individuals are presented with an intervention that uses positive framing and prosocial appeals (Betsch et al. 2013) to encourage them to become vaccine advocates.

People's behaviour is influenced by others (Cialdini and Goldstein, 2004). Making one's behaviour visible to others can encourage both the signal sender and those who receive the signal to adopt the desired conduct (Rogers et al., 2016). This is supported by studies indicating that delivering positive vaccination messages via friends and family can be effective at increasing vaccine uptake (Quinn et al., 2017; Salali & Uysal, 2021). Other studies suggest that reporting the prevalence of those already or willing to be vaccinated may be sufficient to induce a cascade of others to abandon their vaccination hesitancy (Schmelz & Bowles, 2021).

2.3 An interactive survey tool

The behavioural interventions were delivered through an interactive survey tool which was developed and hosted in Qualtrics, an online survey software that allows the creation of highly customised user experiences. Participants were recruited through their employers. Employee's responses remain anonymous and were used for no purpose other than research.

In the following subsections first, we explain how we recruited participants and second, we show the user journey that individuals experienced when interacting with the tool.

2.3.1 Recruitment

Workplaces within Sandwell were contacted and offered participation in the study through different means. Some companies were contacted via the Business Development Coordinator of Sandwell council. Others were cold called or emailed through their publicly available contacts or were contacted through their website form. Care Homes were

contacted thanks to their close relationship with Sandwell Council. Sandwell Council did also participate in the study as it presented an interesting workplace to enrich the study results. During the recruitment process, we experienced several difficulties as numerous companies were reluctant to participate in the study. Some of the concerns raised by companies against taking part in the study were the topic's sensibility, conflicts with unions, and a lack of interest in the study, which was particularly the case for companies that already had many COVID-19 policies in place, including vaccination polls.

We established very fruitful relationships with some companies. After reflecting on why those alliances were successfully established, we have found that making companies part of the decision-making process including the intervention and experiment design is a good practice to increase their interest and engagement. We have also learned that establishing close relationships with relevant departments within the council is also crucial. For this project we held several meetings and communicated on a relatively frequent basis with the business development coordinator in Sandwell council, who acts as an intermediary between the council and private companies.

The companies that expressed interest in joining the study were sent a 'survey distribution package' that included an email template and/or a text message template, and a poster with a QR code that companies could put up in their facilities. Survey participants were able to click on a link or scan the QR code to access the survey. We also recommended workplaces to encourage their staff to participate in the study during team meetings or via their managers if possible. Promotional materials (e.g., leaflets) were also offered to workplaces upon request.

Both trials shared the same survey link. Because of this, they also shared the recruitment methods.

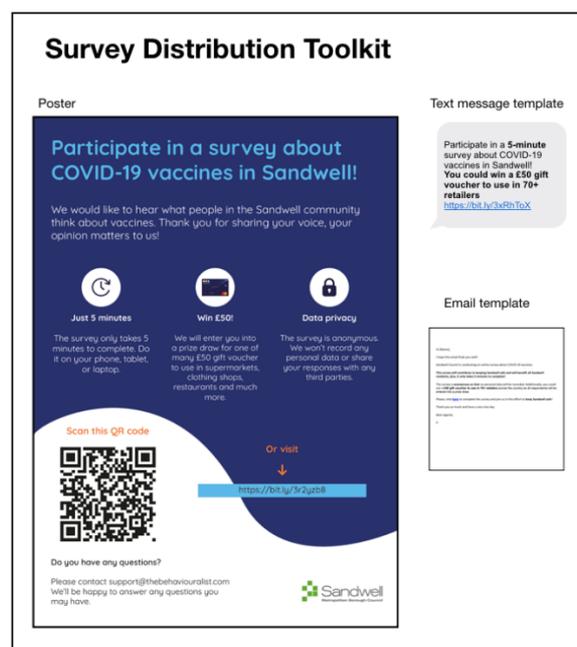


Figure 1 Survey distribution package

Other methods of recruitment

As a supporting recruitment strategy, we used council channels such as the council's website and social media channels and a Facebook ads campaign. Because the council's website and social media are open to the public, we used a series of strategies to ensure that the target audience of the study was reached and that participants that didn't comply with the inclusion criteria were excluded from the study. We included two screening questions at the start of the survey. First, we asked participants if they were employed in Sandwell. If participants answered 'No' to this question, the survey automatically ended for them. Second, participants were asked to input the company or organisation they work for. Responses from participants who do not work in a Sandwell-based company were considered invalid. Additionally, we employed a message that appealed to employees in Sandwell: 'Are you employed in Sandwell? We would love to hear about your experiences with COVID-19 vaccine' (see figure 2 below).

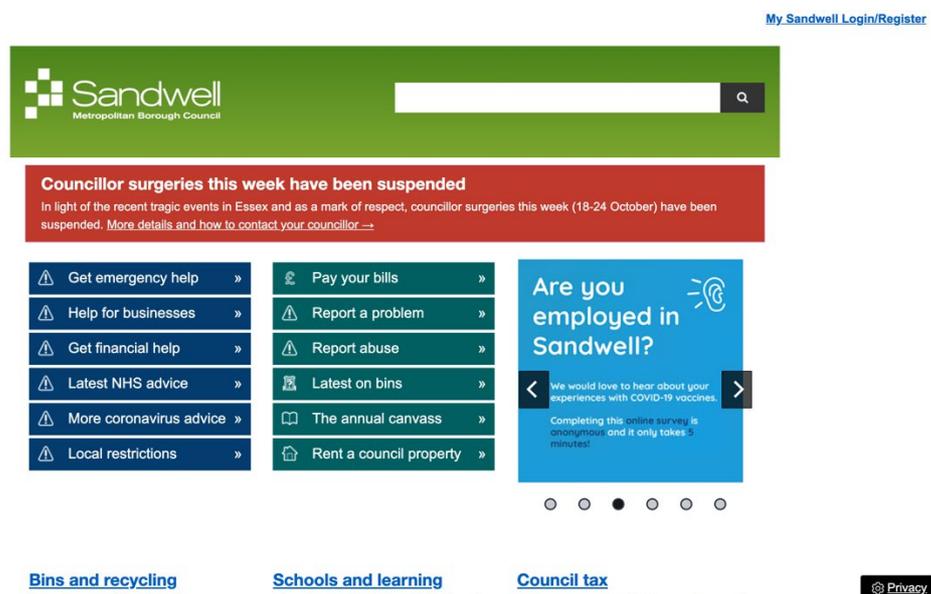


Figure 2 Detail of banner placed in Sandwell Council's website

2.3.2 User journey - Start

Once participants click on the survey link, they are brought to a website hosted in Qualtrics. Then, they are first informed of the topic of research and informed consent is recorded individually. Participants are also provided with an email address where they can send their concerns, questions, or suggestions.

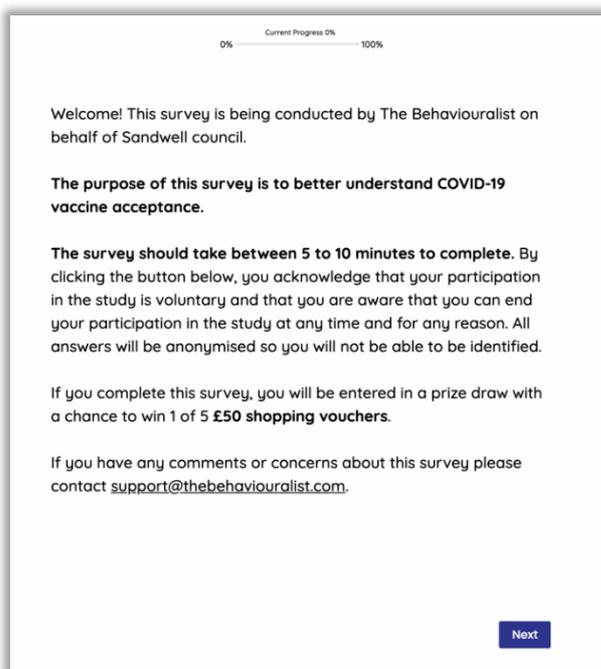


Figure 3 Consent screen (desktop)

After giving their consent, all participants are asked a few socio-demographic questions: age group, ethnicity, gender, education level. These demographic questions provide us with background information on research participants which will be essential for the data analysis.

In the next screen participants are asked the following question: 'Have you received a COVID-19 vaccine?'. Then participants are assigned to Trial 1 if their answer is 'No' and to Trial 2 if they respond, 'Yes' or 'No, but I have scheduled an appointment.' The structure of both trials is further explained in section 4, 'Evaluation Design.'

Once participants are assigned to Trial 1 or Trial 2, they are split into two different user journeys, as explained in the following subsections.

2.3.3 Methods of Recruitment

Both trials shared the same survey link. Because of this, they also shared the recruitment methods. As explained in section 4.2.4, several workplaces within Sandwell were contacted and offered participation in the study. As a supporting recruitment strategy, we used council channels such as the council's website. For more detail, please go to section 6.2.4 'Methods of recruitment.'

2.3.4 Non-vaccinated Participants Journey – Trial 1

Participants assigned to trial 1, namely those that express not having received a COVID-19 vaccine, are first asked to express their intention to get the vaccine. If their answer is 'yes' or 'leaning towards yes', participants are asked to select their reasons for not having their

vaccination appointment yet. The listed reasons are related to the practicalities of getting the vaccine such as 'I do not know how to get a vaccine', 'I tried to schedule an appointment, but it didn't work', or 'I do not have time to get the vaccine'.

If participants' answer is 'no' or 'leaning towards no', participants are asked to select their main reasons for not wanting to get the vaccine from a list. These reasons are known in the literature as 'vaccine hesitancy determinants' and were selected drawing upon academic publications such as 'Vaccine hesitancy: definition, scope and determinants' by the SAGE Working Group on Vaccine Hesitancy, materials from the 'Keep London Safe' campaign provided by the NHS and based on interviews with stakeholders who shared their local knowledge with us.

Next, all participants are asked to rank the reasons they previously selected. After that, if participants are randomised to the treatment group (for more detail, go to section 4, 'Evaluation Design'), they are shown a behaviourally-framed message that addresses their highest-ranked reason.

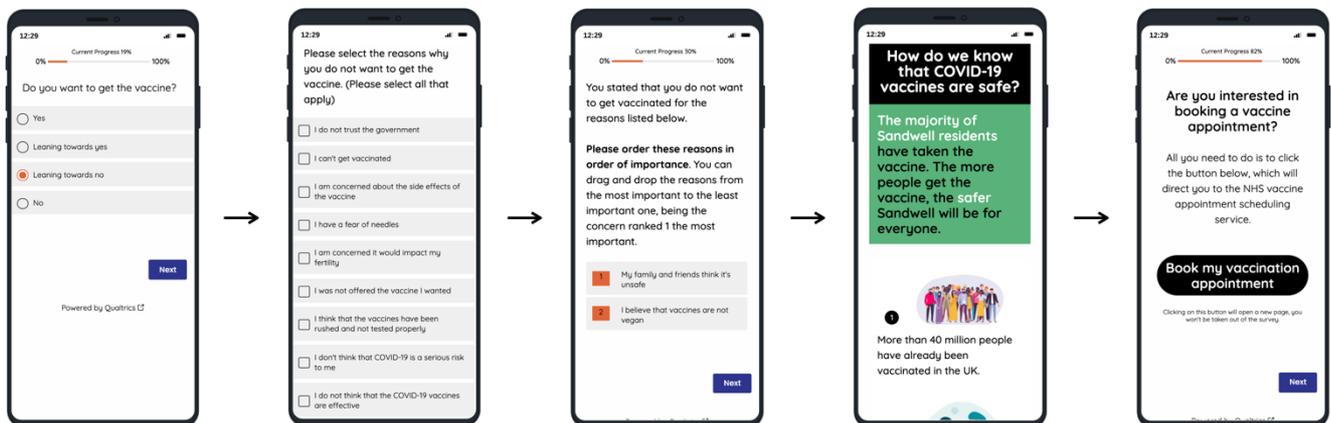


Figure 4. Un-vaccinated journey (mobile)

2.3.5 Trial 2: Vaccinated Participants Journey – Trial 2

Participants that declare themselves vaccinated are assigned to trial 2. After, participants are asked if they would encourage others to get the vaccine (this allows us to understand their willingness to become vaccine advocates) and to specify their own reasons for getting the vaccine.

If randomised to the treatment group, participants are shown a behaviourally-framed message aimed at encouraging them to become vaccine advocates. If randomised to the control group, they are not shown anything.

In the next screen, both groups (control group and treatment group) are prompted to save a pro-vaccination badge that they can share with their family, friends, and co-workers. They

could also share the badge directly through three social media channels: WhatsApp, Twitter, and Facebook.

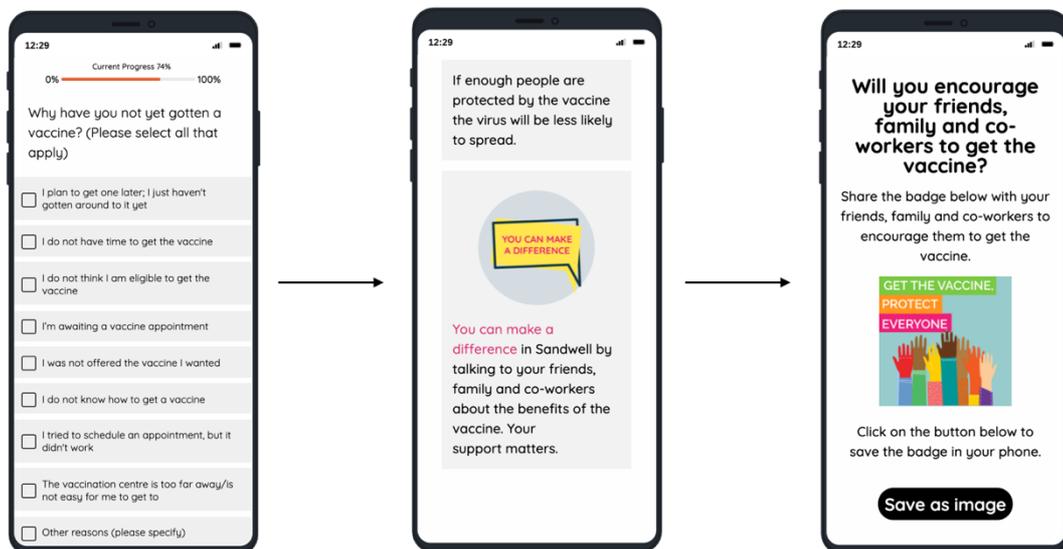


Figure 5. Vaccinated journey (mobile)

2.3.6 End of the Journey

After participants are shown the behaviourally-framed messages, a series of outcome questions are asked. This allows us to measure the outcome of interest as explained in section 4, 'Evaluation Design.'

In the following section we describe the rationale or set of design principles that guided the creation of this intervention.

2.4 Behaviourally-framed messages

This section shows a breakdown of the behavioural interventions that study participants are shown as explained in the previous subsections.

2.4.1 Non-vaccinated Participants Journey – Trial 1

In the previous section we explained how participants first select and then rank their concerns when using the interactive survey tool. After that, participants randomised to the intervention group are shown a piece of information that addresses their highest-ranked concern. The following infographics show in detail how those interventions were designed. Note that communications are organised by concern (e.g., side effects) and that each participant is shown only one communication.

Side Effects

If participants' highest ranked concern is either one of the following:

'My family and friends think it's unsafe'

'I think the vaccine is likely to have serious side effects'

They are shown this screen:

The infographic is titled "How do we know that COVID-19 vaccines are safe?". It features a green header with the text: "The majority of Sandwell residents have taken the vaccine. The more people get the vaccine, the safer Sandwell will be for everyone." This is annotated with "Social norms (Source: NHS; data accessed in June 2021)" and "Prosocial appeals and positive framing". Below the header are three numbered points: 1. "39 million people have already been vaccinated in the UK." 2. "For all vaccines, the majority of the side effects are mild (sore arm or 'flu-like' symptoms for example) and typically last 1 or 2 days." 3. "As with all vaccines and medicines, the safety of COVID-19 vaccines is being continuously monitored." This section is annotated with "Clear information (Source: NHS)".

Needle Phobia

If participants' highest ranked concern is:

'I have a fear of needles'

They are shown this screen:

The infographic is titled "What can I do to overcome my fear of needles?". It features a blue header with the text: "Fear of needles is **very common**, affecting at least 1 in 10 people. Fortunately, **simple exercises and practice** can help to overcome it." This is annotated with "Social norms" and "Positive framing". Below the header are seven numbered steps: 1. "Don't be ashamed of being scared of injections - you are not alone." 2. "Tell health professionals about your worries." 3. "Think about what helped you in the past." 4. "Learn applied tension technique if you faint or feel very faint, or breathing for relaxation exercise if you feel panicky." 5. "Once you have mastered the exercises, develop a 'fear ladder' - a list of all of the situations related to needles which you fear, arranged in order of difficulty." 6. "Overcoming your fear will take some time and practice, but it will make life less stressful and you will feel less anxious." 7. "Learn more about how to overcome your fear of needles here." This section is annotated with "Clear information (Source: Guy's and St Thomas' NHS Foundation Trust, Leaflet number 3820/VER2 Reviewed October 2020)".

Effectiveness

If participants' highest ranked concern is either one of the following:

'I think that the vaccine provides only a low level of protection'

'I think there is no evidence to show that the vaccines work'

They are shown this screen:

The infographic is titled "Are COVID-19 vaccines effective?". It features an orange header with the text: "Yes, vaccines are the single most effective way to reduce deaths and risk of severe illness from COVID-19." This is annotated with "Prosocial appeals" and "Positive framing". Below the header is another orange box with the text: "You can protect others and avoid a resurgence of COVID-19 in the Sandwell by getting the vaccine." This is annotated with "Loss framing". Below this is a photograph of a diverse group of people, with the text "10,400 lives saved." and "10,400 grandparents, neighbours, friends, siblings, children." This is annotated with "Gain framing". At the bottom, it says "As a result of the COVID-19 vaccination programme an estimated 10,400 deaths in England have been prevented." This is annotated with "Loss framing". The source is "Data up to the end of March 2021, Public Health England".

Effectiveness

If participants' highest ranked concern is:

'I know people who've had the vaccine and still gotten COVID-19'

They are shown this screen:

The infographic is titled "What happens once you are vaccinated?". It features an orange header with the text: "It may take a few weeks for your body to build up some protection from the vaccine." This is annotated with "Clear information (Source: NHS)". Below the header is another orange box with the text: "Some people may still get COVID-19 despite having a vaccination, but this should be less severe." This is annotated with "Loss framing". Below this is a photograph of a diverse group of people, with the text "10,400 lives saved." and "10,400 grandparents, neighbours, friends, siblings, children." This is annotated with "Gain framing". At the bottom, it says "As a result of the COVID-19 vaccination programme an estimated 10,400 deaths in England have been prevented." This is annotated with "Loss framing". The source is "Data up to the end of March 2021, Public Health England".

Low Risk Perception

If participants' highest ranked concern is either one of the following:

'I don't think that COVID-19 is a serious risk to me'

'I think the pandemic will pass soon because so many other people have gotten the vaccine'

'I have already had COVID-19'

They are shown this screen:

The screenshot shows a white background with a black header: "Everyone should get the vaccine." Below the header, there is text: "Everyone, including people who already had COVID-19 and healthier people, should get the vaccine once they are eligible." A blue arrow points to this text with the label "Clear information with an actionable message". Below this is another paragraph: "There are still many people at risk of COVID-19 in Sandwell. Herd immunity can only be achieved when enough people are protected through vaccination, which means that the virus will be less likely to spread." A blue arrow points to this paragraph with the label "Prosocial appeal that mentions herd immunity (Source: Betsch et al., 2013)". In the center, there is an illustration of a diverse group of people. Below the illustration, it says "10,400 lives saved." A blue arrow points to this text with the label "Gain framing". Below that, it says "10,400 grandparents, neighbours, friends, siblings, children." A blue arrow points to this text with the label "Loss framing". At the bottom, it says "As a result of the COVID-19 vaccination programme an estimated 10,400 deaths in England have been prevented." A blue arrow points to this text with the label "Loss framing". At the very bottom, in small text, it says "Source: Data up to the end of March 2021. Public Health England".

Low Risk Perception

If participants' highest ranked concern is:

'I do not think I would get seriously ill if I catch COVID-19'

'I think it's unlikely I will catch COVID-19'

They are shown this screen:

The screenshot shows a white background with a black header: "COVID-19 still poses a serious risk, even for young and healthy people." Below the header, there is text: "Everyone, including younger and healthier people, should get the vaccine once they are eligible." A blue arrow points to this text with the label "Clear information with an actionable message". Below this is another paragraph: "Younger and healthier people can also get sick from the disease that they require hospitalisation, and some may even that die. They might also experience 'long covid', when symptoms last for weeks and months after the infection has gone." A blue arrow points to this paragraph with the label "Risk framing (Source: NHS)". In the center, there is an illustration of a diverse group of people. Below the illustration, it says "1 in 9 Sandwell residents" in red. A blue arrow points to this text with the label "Risk framing". Below that, it says "Since the beginning of the pandemic, at least 1 in 9 Sandwell residents have been infected. 1 in 327 didn't survive." A blue arrow points to this text with the label "Risk framing".

Religious concerns

If participants' highest ranked concern is:

'Getting a vaccine is against my cultural or religious beliefs'

They are shown this screen:

The screenshot shows a white background with a purple header: "All major religions support vaccines". Below the header, there is text: "Faith leaders across Sandwell have shown their support for the vaccine." A blue arrow points to this text with the label "Messenger effect: religious leaders". Below this, there are several quotes from religious leaders in purple speech bubbles. A blue arrow points to the first quote with the label "Quotes from religious leaders (Source: Community faith leaders in Sandwell urge everyone to take up COVID-19 vaccine, Sandwell Leisure Trust, February 2021)". The quotes include: "I have received both doses of the Covid-19 vaccine. It was fine. I had no side effects and I feel much more protected.", "We all need to get the Covid 19 vaccine when we're offered it.", "I would encourage everyone, including all Muslim families in Sandwell, to get with me and take the vaccine when it is offered to you.", "Better days will come sooner if we all take up the offer of the Covid-19 vaccine when it's our turn.", "Please have the Covid-19 vaccine when it's offered to you.", "Please join me and take up the offer of the vaccine when it's your turn.", "By taking up the vaccine when it is offered to us, we'll be protecting ourselves and our loved ones from becoming seriously ill from the virus."

Veganism

If participants' highest ranked concern is:

'I believe that vaccines are not vegan'

They are shown this screen:

The screenshot shows a white background with a black header: "Veganism and COVID-19 vaccines". Below the header, there is text: "Vaccination plays a fundamental role in tackling the COVID-19 pandemic and saving thousands of lives." A blue arrow points to this text with the label "Prosocial appeal, gain framing". Below this, there is a paragraph: "Since all medications currently go through animal testing, decisions around taking medication can be complex for vegans." A blue arrow points to this paragraph with the label "Affirming framing, audience value endorsement". Below that, there is a paragraph: "As The Vegan Society recognises, it might not always be possible or practicable for vegans to avoid participating in animal use." A blue arrow points to this paragraph with the label "Messenger effect". Below that, there is a paragraph: "Numerous organisations like Animal Free Research UK are working on this issue so that in the future vaccines can be developed without animal use." A blue arrow points to this paragraph with the label "Positive framing, prosocial appeal". At the bottom, there is a paragraph: "At this point in time all citizens, including vegans, are encouraged to look after their health and that of others." A blue arrow points to this paragraph with the label "Positive framing, prosocial appeal". At the very bottom, in small text, it says "For more information you can read the statements from both the Vegetarian Society and the Vegan Society."

Medical condition

If participants' highest ranked concern is:

'I believe that my medical condition doesn't allow me to get the vaccine'

They are shown this screen:

The screenshot shows a screen titled "Who cannot have the vaccine?". It contains the following text: "A very small number of people, who are at risk of COVID-19 cannot have the vaccine - this includes people who have severe allergies to a component in the vaccine." Below this, it lists "Women of childbearing age, those who are pregnant, planning a pregnancy or breastfeeding can have the COVID-19 vaccine." At the bottom, there is a call to action: "For more information please read the COVID-19 vaccines guidance by the NHS or contact your GP." Annotations include: "Risk framing" pointing to the first paragraph, "Clear information" pointing to the second paragraph, and "Call to action" pointing to the bottom text.

How to get a vaccine

If participants' highest ranked concern are either one of the following:

'I can't book a vaccination appointment'

'I do not know how to get a vaccine'

They are shown this screen:

The screenshot shows a screen titled "How do I get the COVID-19 vaccine?". It features a teal header with the text "Getting the vaccine is easy. It is the best way to protect you and others." Below this, there are three sections: "Check the eligibility", "Currently the vaccine is being given to people aged 16 and over (before 1 July 2021), people at high risk, people who live or work in care homes, health and social care workers, people with a learning disability and people who are a main carer for someone at high risk from COVID-19.", and "How to get my vaccine?". The "How to get my vaccine?" section lists "You need 2 doses of the COVID-19 vaccine:" followed by bullet points: "Choose a vaccination centre or a pharmacy", "Set a day and time", and "The second appointment will automatically be scheduled 12 weeks after". Below this is a timeline diagram: "Select a vaccination site" -> "Set a date and a time" -> "1st dose" -> "8 to 12 weeks" -> "2nd dose". Annotations include: "Prosocial appeal, positive framing" pointing to the teal header, and "Clear information (Source: NHS)" pointing to the "How to get my vaccine?" section.

Fertility concerns

If participants' highest ranked concern is:

'I am concerned it would impact my fertility'

They are shown this screen:

The screenshot shows a screen titled "Do vaccines affect fertility?". It contains the following text: "Vaccines are being continuously monitored by the World Health Organisation and other regulatory bodies." Below this, it states: "Millions of women have been vaccinated globally and there is no evidence to say that vaccines impact fertility." The next section reads: "Fertility experts such as the British Fertility Society have confirmed that there is no biological mechanism by which having the vaccine could affect your chances of conceiving." Below this is a quote from Raj Mathur, executive committee chair of the British Fertility Society: "Vaccination does not stop you getting pregnant, and is the best way of reducing the risk of getting Covid when you are pregnant." At the bottom, there is a call to action: "Get the vaccine to ensure your pregnancy is going to be safe for both you, and your baby." Annotations include: "Clear information from a credible source" pointing to the first two paragraphs, "Messenger effect: health authority" pointing to the first paragraph, "Social norm" pointing to the second paragraph, "Messenger effect: health authority" pointing to the quote, and "Positive framing" pointing to the bottom call to action.

System trust

If participants' highest ranked concern is either one of the following:

'I had bad experiences with the healthcare system'

'I do not trust the government'

They are shown this screen:

The screenshot shows a screen titled "A challenging time for all of us.". It contains the following text: "The COVID-19 pandemic has been challenging for all of us, also for the NHS staff. It has uncovered many inequalities that need to be addressed by both the NHS and the government." Below this, it states: "The NHS staff continues to work hard to ensure that vaccines are offered to everyone so all of us are protected against the virus." The next section reads: "Getting the vaccine is the best way to protect yourself and your loved ones from the virus and the key to return to a normal life." Below this is an illustration of a diverse group of people. At the bottom, it states: "19 million people have already been vaccinated in the UK by the NHS." Annotations include: "Prosocial appeal" pointing to the text about NHS staff, "Affirming framing, audience value endorsement" pointing to the text about NHS staff, "Gain framing" pointing to the text about getting the vaccine, and "Social norm" pointing to the bottom statistic.

Vaccine brand

If participants' highest ranked concern is:

'I was not offered the vaccine I wanted'

They are shown this screen:

Vaccines development concerns

If participants' highest ranked concern is:

'I think that the vaccines have been rushed and not tested properly'

They are shown this screen:

2.4.2 Vaccinated Participants Journey – Trial 2

Participants in trial 2 are asked to select their vaccination motivators. If randomised to the intervention group, participants are shown a behaviourally-framed communication that encourages them to become vaccine advocates. All participants in this journey are shown the same communication as shown in the infographic below.

Vaccine advocacy

Every vaccinated participant is shown the following screen:

2.5 Rationale

The behavioural interventions in this study are created under the theory that providing information that directly addresses an individual's specific reasons for vaccine hesitancy will make them more likely to intend to get vaccinated. It also tests if a behavioural messaging approach will be effective in encouraging vaccinated participants to become advocates for the COVID-19 vaccine within their social networks. We also attempt to collect information to understand participants' reasons for not getting or for getting the vaccine as well as their knowledge, beliefs, and attitudes towards the COVID-19 vaccine.

Our approach makes the following assumptions:

- i) Individuals have a few specific concerns that prevent them from getting vaccinated.
- ii) For a large proportion of the participant population, misinformation and practical reasons will be the main barrier to vaccination.
- iii) Individuals will pay attention to and believe the informational interventions being provided through the survey.
- iv) The interventions provided through the survey will help remove the barriers to vaccination, making it more likely that individuals intend to get vaccinated.
- v) Using behavioural framing techniques to convey the information will make the interventions more persuasive and effective.
- vi) Individuals who have had the vaccine have positive attitudes and beliefs about the COVID-19 vaccine and will be more likely to become vaccine advocates.
- vii) Individuals who have been vaccinated require encouragement to become advocates, and there are no other barriers preventing them from becoming vaccine advocates within their social networks.
- viii) The behavioural messaging and action prompts used within the tool remove the barrier to becoming vaccine advocates and make participants more likely to follow through on their intentions to speak to peers about getting vaccinated.

In the next section we provide more detail about the evaluation design.

3 Evaluation Design

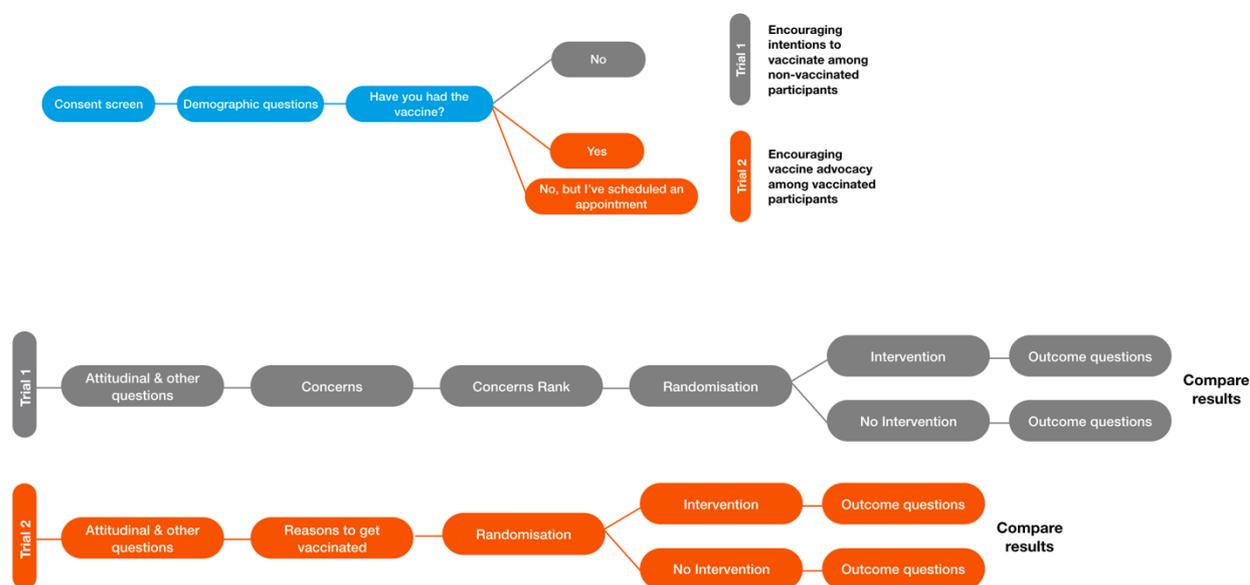


Figure 6 Evaluation design

3.1 Introduction

The study's evaluation design consists of two Randomised Control Trials (RCTs): trial 1 and trial 2.

3.2 Trial 1

In this section, we explain the evaluation design of trial 1. This includes study objectives, study design, study population, recruitment methods, variables, sample size, methods and tools of data collection, and analysis of data.

3.2.1 Study Objectives

The study objectives or research questions for this trial are as follows:

1. What are the reasons among participants for not getting the COVID-19 vaccine?
2. How are those concerns distributed across different population groups? Are there any relationships or patterns?
3. Can a targeted behavioural insights approach to combatting vaccine misinformation improve intentions to get the COVID-19 vaccine?

3.2.2 Study Design

The study design is an online Randomised Controlled trial (RCT). The RCT was administered through the online survey platform Qualtrics, and it was actively collecting data for 5 months, from July to the end of November 2021. As explained in the previous section, upon clicking the survey link, participants were asked a screening question ('have you received the COVID-19 vaccine?') to assign them to Trial 1 or Trial 2. If their answer was 'No', they were included in Trial 1. After, participants were randomly assigned into a treatment group (which will receive a tailored behavioural intervention) or a control group.

3.2.3 Study Population

The study population is working-age adults who have not had the COVID-19 vaccine within workplaces in the Sandwell council.

3.2.4 Variables

The independent variable is a behavioural message (presented within the online survey interface) targeted to combat participant-specific vaccine misinformation or reason to not get vaccinated. The outcome variable is intentions to get the COVID-19 vaccine. The study outcome is measured through survey responses (responses to Likert-scale questions within the survey) and through indirect measures of intention to get the vaccine collected within the online survey (such as clicking on the link to book or find out more about getting a vaccine appointment). Below we list the precise definition of the outcome variables:

Stated intention to get the vaccine

A COVID-19 vaccine is now available through the NHS. It is being offered to priority groups first. If it were offered to you tomorrow, would you accept?

- Yes, definitely
- Unsure but leaning towards yes
- Unsure but leaning towards no
- No, definitely not

Behavioural outcomes – intention to get vaccinated

- a) Clicking on a link to book a vaccination appointment (if currently eligible to receive a vaccine)
- b) Clicking on a link to find out more about how to get the vaccine (if currently ineligible to receive a vaccine)

Beliefs and attitudes towards COVID-19 and vaccination

On a scale from 1-5, to what extent do you agree with the following statements?

- a) COVID-19 poses a risk to people in my community
- b) COVID-19 poses a risk to me personally
- c) I believe that the COVID-19 vaccines are generally safe

- d) I believe that the COVID-19 vaccines are effective in providing protection against COVID-19
- e) The benefits of protection received from the COVID-19 vaccines far outweigh potential side effects

3.2.5 Sample Size

The table below shows the initial sample size calculations in order to achieve statistical power of 70%. We assumed that for non-vaccinated participants, the baseline outcome (express intention to vaccinate by clicking on a survey link) in the control group is 10%. For the purpose of conducting the sample size calculation, the outcome of interest is a binary variable that tells us whether a participant intends to get the vaccine or not. The sample size achieved by this trial was 75 as shown in the next section ‘Results’.

	Estimated sample sizes			Actual sample size
	Low-MDE	Mid-MDE	High-MDE	
Min sample per group	1396	540	157	37
No. of groups	2	2	2	2
Alpha	0.05	0.05	0.05	0.05
Power	70%	70%	70%	70%
Baseline outcome	10%	10%	10%	10%
MDE	3%	5%	10%	24%

3.2.6 Methods and Tools of Data Collection

All data collection was done automatically through the online survey platform Qualtrics. The data collected included participants’ responses to the survey questions as well as their survey interaction behaviour, such as whether they clicked on certain links or features of the intervention.

The study used Qualtrics as the main data collection tool.

3.2.7 Analysis of Data

A few different statistical techniques were used for analysing the survey data including linear (ordinary least squares) and logistic regression, segment and heterogeneity analysis, orthogonal regression, and analysis of interaction effects. The analysis of main effects was done using ordinary least squares (OLS) regression. The regression model uses the outcome variables specified in section 6.2.5 as the dependent variables and the independent variable is solely treatment assignment. Probit and Logit regression models were used for robustness checks. Heterogeneity analysis was conducted to analyse the efficacy of the treatments based on the different misinformation concerns. This was done through the analysis of interaction effects between the specific vaccine concerns and the treatment information that participants were shown.

3.3 Trial 2

In this section we explain the evaluation design of trial 2. This includes study objectives, study design, study population, methods of recruitment, variables, sample size, methods and tools of data collection, and analysis of data.

3.3.1 Study Objectives

The study objectives or research questions for this trial are as follows:

1. What are the specific reasons among participants to get the COVID-19 vaccine?
2. How are those reasons distributed across different population groups? Are there any relationships or patterns?
3. Can a behavioural insights approach tailored to vaccinated participants improve attitudes towards vaccine advocacy and encouraging others to get the COVID-19 vaccine?

3.3.2 Study Design

As discussed in section 4.2.2 'Study Design,' the study design is an online Randomised Controlled trial (RCT). Both RCTs were administered through the online survey platform Qualtrics and both surveys shared the same survey link. Participants were asked a screening question ('have you received the COVID-19 vaccine?') to assign them to Trial 1 or Trial 2. If their answer was 'Yes' or 'No, but I have scheduled an appointment,' they were included in Trial 2. Then, they were randomly assigned into a treatment group (which will receive an encouragement for vaccine advocacy) or a control group.

3.3.3 Study Population

The study population is working-age adults who have already been vaccinated within workplaces in Sandwell council.

3.3.4 Variables

The independent variable is a behavioural message (presented within the online survey interface) aimed at emphasising the importance of vaccine advocacy and encouraging others to get the vaccine. The outcome variable is intentions to become advocates for the COVID-19 vaccine. The study outcome is measured through survey responses (responses to Likert-scale questions within the survey) and through indirect measures of intention to become vaccine advocates collected within the online survey (such as downloading and sharing a post with contacts, signing up to a list of vaccine advocates, post a badge on Facebook or other social media, writing a vaccine-encouragement message to share with colleagues).

Below we provide a list of the specific outcome variables:

Stated intention to become vaccine advocates

Would you encourage others to receive a COVID-19 vaccine?

- Yes definitely
- Probably
- Not sure
- Probably not
- No, definitely not

Behavioural outcome – intention to become vaccine advocates

- Click on a link to download a vaccine advocacy badge to share with contacts
- Click on links to social media to share a vaccine advocacy message with their social networks

3.3.5 Sample Size

The table below shows the sample size calculations in order to achieve statistical power of 70%. We assumed that for vaccinated participants the baseline outcome (express intention to become a vaccine advocate) in the control group is 20%. For the purpose of conducting the sample size calculation, the outcome of interest is a binary variable that tells us whether a participant intends to become a vaccine advocate or not. The sample size achieved by this trial was 694 as shown in the next section 'Results'.

	Estimated sample sizes			Actual sample size
	Low-MDE	Mid-MDE	High-MDE	
Min sample per group	2315	861	231	347
No .of groups	2	2	2	2
Alpha	0.05	0.05	0.05	0.05
Power	70%	70%	70%	70%
Baseline outcome	20%	20%	20%	20%
MDE	3%	5%	10%	8%

3.3.6 Methods and Tools of Data Collection

Data collection was completed automatically through the online survey platform Qualtrics. The data collected included the participants' responses to the survey questions as well as their survey interaction behaviour, such as whether they clicked on certain links or features of the intervention.

3.3.7 Analysis of Data

A few different statistical techniques were used for analysing the survey data including linear (ordinary least squares) and logistic regression, segment and heterogeneity analysis,

orthogonal regression, and analysis of interaction effects. The analysis of main effects was done using ordinary least squares (OLS) regression. The regression model used the outcome variables specified in section 4.3.5 as the dependent variables and the independent variable is solely treatment assignment. Probit and Logit regression models were used for robustness checks.

4 Results

In this section we present the results of the data analysis for Trials 1 and 2. The results are structured as follows. Section 5.1 presents the demographic data for the entire survey sample. Section 5.2 presents the data analysis for Trial 1 (Using behavioural interventions to encourage intentions to take the COVID-19 vaccine among non-vaccinated participants). Finally, Section 5.3. presents the data analysis for Trial 2 (Using a behavioural intervention to encourage vaccine advocacy among vaccinated participants). Additional supplementary analyses are presented in Annex E.

5.1. Demographic data for the entire survey sample

We collected survey responses from a total of 769 participants across Trials 1 and 2. Participants were excluded from the analysis if they qualified on the following exclusion criteria:

- a) Incomplete survey – Participants were excluded if the survey was incomplete (295 observations were excluded).
- b) Not employed in Sandwell – Participants were excluded if they responded “No” to the question asking if they were employed in Sandwell (3 observations were excluded).

Participants were asked to complete demographic questions stating their age group, gender, ethnicity, level of education and vaccination status. Table 5.1. shows the distribution of age groups across the survey sample. Table 5.2. shows the distribution of gender across the survey sample. Table 5.3 shows the ethnicity distribution and table 5.4 shows the level of education across the survey sample.

Table 5.1. Demographic data: Distribution of age group across the entire survey sample

What is your age group?	Freq.	Percent	Cum.
18 – 24	38	4.94	4.94
25 – 29	62	8.06	13.00
30 – 34	82	10.66	23.67
35 – 39	107	13.91	37.58
40 – 44	88	11.44	49.02
45 – 49	108	14.04	63.07
50 – 54	108	14.04	77.11
55 – 59	92	11.96	89.08
60 – 64	62	8.06	97.14
65 – 69	19	2.47	99.61
70 – 74	2	0.26	99.87
80+	1	0.13	100.00

Total	769	100.00
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Table 5.2. Demographic data: Distribution of gender across the entire survey sample

What is your gender?	Freq.	Percent	Cum.
Female	341	45.11	45.11
Male	415	54.89	100.00
Total	756	100.00	

Table 5.3. Demographic data: Distribution of ethnicity across the entire survey sample

Which ethnicity do you most identify with?	Freq.	Percent	Cum.
White British	550	71.52	71.52
Asian or Asian British	105	13.65	85.18
Black or Black British	22	2.86	88.04
Mixed	22	2.86	90.90
Other ethnic groups	48	6.24	97.14
Prefer not to say	22	2.86	100.00
Total	769	100.00	

Table 5.4. Demographic data: Distribution of education level across the entire survey sample

What is the highest level of education you have completed?	Freq.	Percent	Cum.
Primary school	7	0.91	0.91
Secondary school up to 16	139	18.10	19.01
Higher or secondary or further education (A-levels, BTEC, etc.)	162	21.09	40.10
College or university	341	44.40	84.51
Post-graduate degree	87	11.33	95.83
Prefer not to say	32	4.17	100.00
Total	768	100.00	

Participants were also asked to self-report their vaccine status. Table 5.5. shows the vaccination status across all survey participants. Table 5.6. present the vaccination status by age-group across the survey sample. Table 5.7 present the vaccination status by ethnicity across the survey sample. A table presenting vaccination status by level of education is included in Annex E.

Table 5.5. Vaccination status across the entire survey sample

Have you received a COVID-19 vaccine?	Freq.	Percent	Cum.
Yes	685	89.08	89.08
No, but I have scheduled an appointment	9	1.17	90.25

No	75	9.75	100.00
Total	769	100.00	

Table 5.6. Vaccination status by age-groups across the entire survey sample

What is your age group?	Have you received a COVID-19 vaccine?			Total
	Yes	No, but I have scheduled an appointment	No	
18 – 24	26	3	9	38
25 – 29	55	1	6	62
30 – 34	60	3	19	82
35 – 39	91	1	15	107
40 – 44	76	0	12	88
45 – 49	104	0	4	108
50 – 54	104	1	3	108
55 – 59	89	0	3	92
60 – 64	60	0	2	62
65 – 69	18	0	1	19
70 – 74	2	0	0	2
80+	0	0	1	1
Total	685	9	75	769

Table 5.7. Vaccination status by ethnicity across the entire survey sample

Which ethnicity do you most identify with?	Have you received a COVID-19 vaccine?			Total
	Yes	No, but I have scheduled an appointment	No	
White British	513	3	34	550
Asian or Asian British	93	3	9	105
Black or Black British	13	0	9	22
Mixed	16	1	5	22
Other ethnic groups	38	0	10	48
Prefer not to say	12	2	8	22
Total	685	9	75	769

5.2. Results of the data analysis for Trial 1

Trial 1 examined the effect of using tailored behavioural interventions on encouraging intentions to get the vaccine among non-vaccinated participants. Trial 1 included a total of 75 participants who had not received the COVID-19 vaccine. The demographic data for participants in Trial 1 including age-group, gender, level of education and ethnicity are presented in Annex E.

Participants in Trial 1 were asked to state their main concerns about the COVID-19 vaccine (main reasons for not getting the vaccine). Table 5.8. presents the main reasons for not getting the COVID-19 vaccine among survey participants.

Table 5.8. Main reasons that participants do not want to get the vaccine

Please select the reasons why you do not want to get the vaccine. (Please select all that apply).	Freq.	Percent
I am concerned about the side effects of the vaccine	32	42.67
I do not think that the COVID-19 vaccines are effective	26	34.67
I don't think that COVID-19 is a serious risk to me	21	28.00
I can't get vaccinated	2	2.67
I have a fear of needles	7	9.33
I had bad experiences with the healthcare system	5	6.67
I do not trust the government	21	28
I am concerned it would impact my fertility	10	13.33
I think that the vaccines have been rushed and not tested properly	34	45.33
Other reasons	11	14.67
My family and friends think it's unsafe	4	5.33
I know people who've had the vaccine and still gotten COVID-19	18	24.00
I think that the vaccine provides only a low level of protection	16	21.33
I think there is no evidence to show that the vaccines work	16	21.33
I think the pandemic will pass soon because so many other people have gotten the vaccine	3	4.00
I think it's unlikely I will catch COVID-19	5	6.67
I do not think I would get seriously ill if I catch COVID-19	14	18.67
I have already had COVID-19	11	14.67
I believe that my medical condition doesn't allow me to get the vaccine	2	2.67

We also look at the share of participants that have different number of concerns for not getting the vaccine. Table 5.9. presents the share of participants with multiple number of concerns for not getting the vaccine. The table shows that most participants have between 0 and 1 concerns.

Table 5.9. Share of participants that have different number of concerns for not getting the vaccine

No. of concerns	Freq.	Percent	Cum.
1	22	34.38	34.38
2	3	4.69	39.06
3	7	10.94	50.00
4	2	3.13	53.13
5	10	15.63	68.75
6	9	14.06	82.81
7	4	6.25	89.06
8	1	1.56	90.63
9	3	4.69	95.31
10	1	1.56	96.88
11	1	1.56	98.44
13	1	1.56	100.00

Total	64	100.00
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We also examine the demographic variables as predictors of number of concerns among non-vaccinated participants. Table 5.10. shows the demographic variables as predictors of number of concerns. We find that older age groups (in the survey sample, age groups of 40 – 44, 50 – 54 and 65 – 69) are more likely to have a greater number of concerns when compared to younger age groups (18 – 24). We find no association between ethnicity or gender and number of concerns. We find that compared with participants having an education level of primary school, participants with higher levels of education are more likely to have a greater number of concerns.

Table 5.10. Demographic variables as predictors of number of concerns among non-vaccinated participants

Variables	(1) No. of. Concerns
Age group	
25 - 29	3.813
30 - 34	-0.214
35 - 39	2.135
40 - 44	3.231*
45 - 49	-2.248*
50 - 54	2.867*
55 - 59	-0.440
60 - 64	0.0826
65-69	3.326*
Ethnicity	
Asian or Asian British	0.123
Black or Black British	-1.083
Mixed	0.892
Other ethnic groups	0.309
Prefer not to say	-0.960
Gender	0.384
Education	
Secondary school up to 16	2.469
Higher or secondary or further education (A-levels, BTEC, etc.)	5.153***
College or university	4.229***
Post-graduate degree	5.306***
Prefer not to say	5.035***
Constant	-1.520 (1.500)
Observations	58
R-squared	0.424

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

We also examine demographic variables as predictors for the top 8 main reasons for not getting vaccinated among participants, this table is presented in Annex E. We are also interested in examining whether there exists any correlations between the concerns for not getting vaccinated in a way such that if a participant selects a particular concern then they are also more like to have other concerns. We conduct correlation matrixes for all reasons

and top 8 reasons among participants for not getting the vaccine. These are presented in Annex E. We find that no correlations exist among the different concerns for not getting the vaccine.

Next, we look at the main reasons (top 8) among participants for not getting vaccinated as predictors of vaccination intent (Do you want to get the COVID-19 vaccine?). Table 5.11. shows the reasons for not getting vaccinated as predictors of vaccination intent. We find that participants whose concerns were “I think that the vaccines have been rushed and not tested properly”, “I am concerned about the side effects of the vaccine”, “I do not think that the COVID-19 vaccines are effective” and “I don't think that COVID-19 is a serious risk to me” were significantly less likely to intend to get the COVID-19 vaccine.

Table 5.11. Main reasons for not vaccinating (Top 8) as predictors of vaccination intent

Variables	(1) Do you want to get the vaccine?
I think that the vaccines have been rushed and not tested properly	-0.225***
I am concerned about the side effects of the vaccine	-0.279***
I do not think that the COVID-19 vaccines are effective	-0.318**
I don't think that COVID-19 is a serious risk to me	-0.173**
I know people who've had the vaccine and still gotten COVID-19	0.129
I think that the vaccine provides only a low level of protection	0.0392
I think there is no evidence to show that the vaccines work	0.105
I do not think I would get seriously ill if I catch COVID-19	0.113
Constant	0.523*** (0.0855)
Observations	75
R-squared	0.384

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

We examine the main treatment effect of the tailored behavioural interventions on the intention to book a vaccine appointment. Table 5.12. shows the treatment effects on intention to book a vaccine appointment. We find that the effect is positive and large, but it is not statistically significant. Due to the sample size being very small, we do not have enough statistical power to make a strong conclusion from this result.

Table 5.12. Treatment effect on intention to book the vaccine appointment

Variables	(1) How likely is it that you will book an appointment in the next week?
Treatment	0.0964 (0.0602)

Constant 0.0286
(0.0285)

Observations 75
R-squared 0.031

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

We also look at the treatment effect on participants' responses to the COVID-19 perceptions questions. Table 5.13. shows the treatment effect on responses to the COVID-19 perceptions questions. We find no significant associations between the behavioural intervention treatment and participants' responses to the questions.

Table 5.13. Treatment effect on responses to the COVID-19 perceptions questions

Variables	(1) COVID-19 poses a risk to people in my community	(2) COVID-19 poses a risk to me personally	(3) I believe that it would be safe for me to take the COVID-19 vaccine	(4) I believe that the COVID-19 vaccines would protect me against COVID-19	(5) I believe that the vaccine reduces the chance that I transmit COVID-19 to others	(6) The benefits of protection received from the COVID-19 vaccines far outweigh potential side effects
Treatment	0.107 (0.114)	0.116 (0.109)	0.0279 (0.0866)	0.0607 (0.0817)	0.157 (0.0948)	0.0357 (0.0790)
Constant	0.343*** (0.0813)	0.226*** (0.0762)	0.147** (0.0616)	0.114** (0.0545)	0.143** (0.0600)	0.114** (0.0545)
Observations	75	69	74	75	75	75
R-squared	0.012	0.016	0.001	0.007	0.035	0.003

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Finally, we examine participants' responses to the COVID-19 perceptions statements as predictors on their vaccination intent. Table 5.14. shows the results of this analysis. We find that participants that agreed with the statement "I believe that the COVID-19 vaccines would protect me against COVID-19" were more likely to intend to get the vaccine. Participants who agreed with the statement "The benefits of protection received from the COVID-19 vaccines far outweigh potential side effects" were more likely to intend to not get the vaccine. Due to the very small sample size however, it is difficult to form any strong conclusions based on this result.

Table 5.14. COVID-19 perceptions statements as predictors of intention to get the vaccine

Variables	(1) Do you want to get the vaccine?
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COVID-19 poses a risk to people in my community	0.130
COVID-19 poses a risk to me personally	0.0243
I believe that it would be safe for me to take the COVID-19 vaccine	0.115
I believe that the COVID-19 vaccines would protect me against Covid-19	0.795***
I believe that the vaccine reduces the chance that I transmit COVID-19 to others	0.117
The benefits of protection received from the COVID-19 vaccines far outweigh potential side effects	-0.302*
Constant	0.0403 (0.0338)
Observations	69
R-squared	0.486

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.3. Results of the data analysis for Trial 2

Trial 2 examined the effect of using a behavioural intervention on encouraging vaccine advocacy among vaccinated participants. Trial 2 included a total of 694 participants that had either already got the vaccine or had scheduled a vaccine appointment at the time of taking the survey. The demographic data for participants in Trial 2 including age-group, gender, level of education and ethnicity are presented in Annex E.

We examine the demographic variables of age, gender, ethnicity, and education as a predictor of advocacy. The results show that:

- Age – We find age to be a predictor of vaccine advocacy such that participants belonging to older age groups (above 18 – 24 years) were significantly more likely to intend to become vaccine advocates within the study.
- Ethnicity – In the survey sample we find that participants who identify as mixed ethnicity and those that selected “prefer not to say” were significantly less likely to become vaccine advocates within the study.
- Gender – We find no association between gender and vaccine advocacy within the survey sample.
- Education – We find that participants who selected “prefer not to say” were significantly less likely to become vaccine advocates within the study.

Table 5.15. shows the demographic variables as predictors of vaccine advocacy.

Table 5.15. Demographic variables of age, gender, ethnicity, and education as a predictor of advocacy

Variables	(1) Advocacy	(2) Advocacy	(3) Advocacy	(4) Advocacy
Age group				

25 - 29	0.204***			
30 - 34	0.149**			
35 - 39	0.113*			
40 - 44	0.184***			
45 - 49	0.151**			
50 - 54	0.209***			
55 - 59	0.265***			
60 - 64	0.226***			
65 - 69	0.276***			
70 - 74	0.276			
Ethnicity				
Asian or Asian British		0.0143		
Black or Black British		-0.0666		
Mixed		-0.207***		
Other ethnic groups		0.00826		
Prefer not to say		-0.199**		
Education				
Secondary school up to 16			-0.0923	
Higher or secondary or further education (A-levels, BTEC, etc.)			-0.116	
College or university			-0.0839	
Post-graduate degree			-0.0633	
Prefer not to say			-0.261*	
Gender				
Constant	0.724*** (0.0537)	0.913*** (0.0128)	1*** (0.131)	-0.00571 0.910*** (0.0165)
Observations	694	694	694	687
R-squared	0.043	0.022	0.014	0.000
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Participants in Trial 2 were asked to state their main reasons for wanting to take the COVID-19 vaccine. Table 5.16 shows the main reasons for getting vaccinated among participants in Trial 1.

Table 5.16. Main reasons to get the COVID-19 vaccine among vaccinated participants

Which of the following statements best describes your main reasons for getting the COVID-19 vaccine? (Select all that apply)	Freq.	Percent
To help get the economy going again	238	34.29
To allow myself to go out and do all the things I used to be able to do	371	53.46
To protect the NHS	379	54.61
To protect others against the coronavirus	463	66.71
To protect myself against the coronavirus	538	77.52

To allow society to start functioning normally again	356	51.30
To reduce the spread of the coronavirus	442	63.69
Other reasons	36	5.19

We examine the reasons for getting vaccinated as predictors of vaccine advocacy among Trial 2 participants. We find that participants who selected “To help get the economy going again”, “To reduce the spread of the coronavirus” and “To protect myself against the coronavirus” were more likely to intend to become vaccine advocates in the study. Participants who selected “To allow myself to go out and do all the things I used to be able to do” and “Other reasons” were less likely to intend to become vaccine advocates. A table showing the analysis for the reasons to get vaccinated as predictors of vaccine advocacy is included in Annex E.

Next, we examine the main treatment effects on intention to become a vaccine advocate among survey participants. Table 5.17 shows the treatment effect on vaccine advocacy among vaccinated participants. The results show that the estimated effect is zero. We do not find a significant effect of the behavioural intervention treatment on vaccine advocacy and do not detect an association. A couple of potential reasons could explain this finding. First, the sample size is relatively low and this would not enable us to detect any small associations that may exist. Due to the small sample size, we do not have sufficient statistical power to detect small effects that might be present. However, we can conclude from the results that there are no large effects of the treatment on vaccine advocacy. Second, the baseline rates of vaccine advocacy in the sample were already quite high. This might have made it difficult to increase the rates of vaccine advocacy in the survey group by a significant amount using the behavioural intervention.

Table 5.17. Treatment effect on vaccine advocacy

Variables	(1) Advocacy
Treatment	-0.00274 (0.0223)
Constant	0.906*** (0.0156)
Observations	694
R-squared	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We also examine the main treatment effect on participants’ perceptions of the importance of vaccine advocacy. Table 5.18. presents the treatment effect on vaccine advocacy among

Trial 2 participants. We do not find any significant effects of the behavioural intervention treatment on importance of advocacy.

Table 5.18. Treatment effect on importance of vaccine advocacy

Variables	(1) Importance of advocacy
Treatment	-0.0151 (0.0610)
Constant	4.547*** (0.0404)
Observations	691
R-squared	0.000
Robust standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

We find that participants who agreed on the importance of vaccine advocacy were also more likely to become vaccine advocates, thus suggesting that there is a correlation between the two variables. A table showing this analysis is included in the Annex E.

We also look at the baseline rates for participants' intentions to become a vaccine advocate. Participants in the survey were also asked a pre-advocacy question, in which they were asked to state whether they would encourage others to receive a Covid-19 vaccine before the treatment was shown to them. Table 5.19 shows the advocacy rates (pre-intervention) among survey participants. We see that the pre-intervention advocacy rates are high among participants, with 80% of participants answering, "Yes definitely" and 10% answering "Probably".

Table 5.19. Pre-intervention advocacy rates among participants

Would you encourage others to receive a COVID-19 vaccine?	Freq.	Percent	Cum.
No definitely not	4	0.58	0.58
Probably not	16	2.31	2.88
Not sure	44	6.34	9.22
Probably	72	10.37	19.60
Yes definitely	558	80.40	100.00
Total	694	100.00	

5.4. Survey completion summary statistics

In this section, we present the survey completion summary statistics including survey completion rates, average time taken by participants to complete the survey and survey progress of participants.

Table 5.19. shows the survey completion rates. We can see that 1,063 respondents opened the survey and 72% of them (769) completed the survey while 28% (294) did not complete the survey.

Table 5.19. Survey completion rates

Survey completion	Freq.	Percent	Cum.
No	294	27.66	27.66
Yes	769	72.34	100.00
Total	1063	100.00	

Table 5.20 shows the descriptive statistics for the duration of time (in seconds) taken by participants to complete the survey. The average time taken to complete the survey was 20.2 minutes.

Table 5.20. Descriptive statistics for duration of survey completion

Variable	Obs	Mean	Std. Dev.
Duration (in seconds)	769	1212	15316.716

Next, we look at the descriptive statistics for the survey progress made by those participants who did not complete the survey and dropped out before finishing the survey. Table 5.21. shows the descriptive statistics for survey progress for participants who did not complete the survey. The table shows that the mean survey completion progress was 37% before dropping off. The minimum survey completion progress was 2% and the maximum survey completion progress was 98% before dropping off.

Table 5.21. Descriptive statistics for survey progress of participants who did not complete the survey

Variable	Obs	Mean	Std. Dev.	Min	Max
Survey Progress	294	37.361	41.831	2	98

We also look at a more detailed breakdown of survey completion progress among those participants who did not complete the survey. Table 5.22. shows a detailed tabulation of survey progress for participants who did not complete the survey. We see that the majority of these participants (26%) dropped off at 4% survey completion progress, followed by 16% of participants dropping off at the 93% survey completion progress point.

Table 5.22. Tabulation of survey progress for participants who did not complete the survey

Progress	Freq.	Percent	Cum.
2	27	9.18	9.18
3	16	5.44	14.63
4	77	26.19	40.82
5	5	1.70	42.52
7	14	4.76	47.28
9	1	0.34	47.62
11	4	1.36	48.98
12	5	1.70	50.68
14	20	6.80	57.48
16	2	0.68	58.16
18	11	3.74	61.90
19	3	1.02	62.93
20	1	0.34	63.27
21	3	1.02	64.29
23	1	0.34	64.63
30	2	0.68	65.31
67	1	0.34	65.65
82	2	0.68	66.33
86	1	0.34	66.67
89	6	2.04	68.71
91	1	0.34	69.05
93	48	16.33	85.37
95	5	1.70	87.07
98	38	12.93	100.00
Total	294	100.00	

5 Conclusion

The present study provides important insights into vaccination behaviours within working-age adults employed in Sandwell.

General conclusions:

- We did not reach our desired sample sizes for the trials which presented a handicap to find any significant effects of the trialled solutions. This might be due to several factors such as the rapidly changing circumstances of the COVID-19 pandemic and the sensitive nature of the topic of research as some employers were reluctant to address this topic in their workplaces. We have also found that some employers were experiencing some sort of 'pandemic fatigue'. Most workplaces had already invested considerable amounts of company resources in the pandemic by the time the experiment was launched and were reluctant to buy into another COVID-19-related project. This calls attention to the fact that the pandemic has posed a huge burden to local businesses across the UK.
- Another factor that hindered the process of obtaining a sufficient sample size was variability in response rates. For one workplace where we had more control over the survey distribution channels, the response rate was estimated around 68%. In contrast, other workplaces presented response rates of around 14%. However, due to a lack of control over the distribution channels, it was not possible for us to clearly identify the causes of the low response rates. It is important to note that multiple

stakeholders took part in this research and that a more realistic assessment of response rates would have been crucial to calculate sample sizes more accurately.

- The survey completion rate was 72%. Looking at a more detailed breakdown of survey completion progress among those participants who did not complete the survey, we see that most of these participants (40.82%) dropped off between 2 and 4% survey completion progress. However, a considerable proportion of people (30.96%) dropped off between 93 and 98% survey completion progress. This might be indicative that most people were not sufficiently motivated to complete the survey, but it also suggests that some users might have experienced technical issues at the end of the survey.
- On a positive note, we have also established very fruitful relationships with some companies. We have found that making businesses part of the decision-making process and engaging them in the experiment and intervention design is a good practice to ensure the success of the project.

From the trial on non-vaccinated participants, we form the following main conclusions:

- We gain important insight into the main concerns that participants have for not getting the COVID-19 vaccine. Participants reported concerns around the vaccine being rushed, its potential side effects, concerns regarding the ineffectiveness of the vaccine and perceptions that COVID-19 was not a serious risk to them, as some of the main concerns for not getting the vaccine. These findings are very useful for the Council in being able to develop communications targeted to these specific concerns in future vaccination and public health campaigns.
- We also find that the most frequent number of vaccination concerns among survey participants (29.33%) was 1. This offers useful insight into the idea that most participants who do not want to take the vaccine do so for maybe one main reason that they are concerned about, which if effectively targeted by public health campaigns, could be addressed in an effective manner (e.g., creating campaigns that focus on only one public health message).
- We also find that there are no significant correlations between the different reasons for not getting the vaccine. This finding suggests that participants who hold one concern regarding the vaccine are not more likely to also hold another concern. In this case, this finding suggests that vaccine encouragement campaigns focusing on different concerns can be developed separately and can be tailored according to the population.
- The findings also suggest that participants that hold certain concerns are less likely to intend to get the vaccine. These concerns were around the vaccine being rushed and not tested properly, concerns regarding its side effects, perceptions that the vaccine is not effective, and that COVID-19 does not pose a serious risk to them.

- In this study, we do not find a statistically significant effect of the interventions delivered through the tool. However, we find that the effect size is positive and very large at 9%. It is possible that we are not able to detect a significant effect due to the very low sample size and not having sufficient statistical power. These results however, lead to interesting avenues for future research where the interactive survey tool can be trialled with larger numbers of participants to determine its efficacy in encouraging vaccination uptake.

From the trial on vaccinated participants, we form the following main conclusions:

- The majority of adults in our study sample (90.25%) had taken the COVID-19 vaccine or had already scheduled a vaccine appointment. A small proportion of survey participants (9.75%) had not received the COVID-19 vaccine. This is a positive finding for employers within the study which indicates that most of their staff have been vaccinated, as employers did not hold information on vaccination rates among their staff.
- We gain insight into the main reasons that participants have for getting the COVID-19 vaccine. The top reasons were – “To protect myself against the Coronavirus”, “to protect others against the Coronavirus”, “to reduce the spread of the Coronavirus” and “to protect the NHS”. These findings are important as they will enable employers and the Council to prioritise these reasons while developing future vaccination campaigns, or for example, encouraging take-up of the COVID-19 booster vaccines.
- We find that a very high percentage of survey participants state that they are willing to become vaccine advocates and encourage their friends, family, and colleagues to take the vaccine. In our survey, 80% of participants answered “Yes, definitely” and 10% answered “Probably” when asked if they would be willing to be advocates. This is an important finding as employers and the Council could make use of community-advocacy or peer advocacy programs for future vaccination and public health campaigns. An interesting avenue for further research would be to trial the effectiveness of programs where peer advocates are matched with colleagues who have concerns about vaccination, to enable discussions around topics of concern.
- Another avenue for further research would be to design and evaluate solutions that prompt people to take action and to actively advocate for vaccination. However, in doing so, these solutions should consider that intentions often do not translate into actions, or what behavioural scientist call ‘the intention-action gap’. Therefore, responding to the question of which strategies are more effective in bridging this gap presents a promising approach to increase vaccination rates.
- In the study, we do not find a significant effect of the behavioural intervention treatment on intention to become vaccine advocates. Due to the small sample size of the study, we cannot form a strong conclusion regarding the effect of the behavioural intervention, as there was not sufficient statistical power to be able to detect any small effects that may have been present.

6 Next Steps and Recommendations for the Council

This study was the first behavioural insights experiment conducted by Sandwell Council. Getting started with a new research methodology is not easy and it has come with valuable insights but also challenges.

First, the council has acquired to a certain extent the knowledge and expertise for conducting behavioural insights research. This is very valuable, and we encourage the Council to continue applying this approach to other areas of research within Public Health.

Second, this project shows that RCTs can work and that they can provide readily available knowledge for Sandwell and other councils across the UK. We gained important insight into the main concerns that participants have for not getting the COVID-19 vaccine. We also found that most participants who do not want to take the vaccine do so for maybe one main reason that they are concerned. This insight could help with communication campaigns for other councils to help target in a more effective manner, for example, they could create campaigns that address the most frequent vaccination concerns one by one.

We have also learned that a high share of vaccinated participants was willing to promote vaccination among their closest circles. We strongly recommend that any community champion programmes pay special attention at designing and evaluating effective strategies that encourage community champions to actively promote vaccination (e.g., using commitment devices). Additionally, Councils could also make-use of this finding for developing similar community-advocacy initiatives with local businesses.

However, conducting RCTs could also be costly and resource intensive, especially when it involves multiple stakeholders. We recommend councils and any stakeholders involved in designing and planning RCTs (e.g., specialist agencies) to pay close attention at stakeholder engagement when planning future RCTs with local businesses. As we have learned from this study, this is something that can be achieved by involving local businesses throughout the entire RCT design process, from intervention design to data analysis. Once those successful relationships have been established, we also recommend councils to keep those excellent relationships and to lay the groundwork for future collaborations.

Finally, we recommend the Council to continue using this tool to collect more data and to evaluate the effectiveness of this approach more robustly.

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8 Annex

This appendix includes the following sections A) Research background, B) Extended research background, C) Behaviourally-framed messages, D) Survey flow and, E) Supplementary analyses.

A Research Background

Our investigative approach entails asking participants their specific concerns around vaccination or, alternatively, their reasons to get vaccinated. We then present them with behaviourally-framed messages that are specific to their stated concerns if they are not vaccinated or that encourage them to become advocates for the COVID-19 vaccine if they are already vaccinated.

In this section we first touch on the topic of vaccine hesitancy through the perspective of misinformation that people hold around vaccine safety. This was identified as one of the key reasons for vaccine hesitancy and has informed the design of the solution presented in this study. Second, we show that information approaches have been successful in addressing vaccine hesitancy in the past. Third, we discuss the types of behavioural messaging techniques that have been effective in improving vaccination uptake. Fourth, we discuss evidence for the effectiveness of using community advocates to promote pro-vaccination beliefs and their efficacy in increasing vaccination uptake. Finally, we discuss some behavioural techniques that can be used to encourage participants to become vaccine advocates within their communities and social networks.

A.1 Vaccine Misinformation as a Cause of Vaccine Hesitancy

Even before the Coronavirus (COVID-19) pandemic, public health organisations had been facing the challenges associated with anti-vaccination beliefs. The World Health Organisation (WHO) in 2019 listed 'vaccine hesitancy' as one of the top 10 major global threats.

Vaccine Hesitancy, as defined by the SAGE Working Group on Vaccine Hesitancy, refers to *'delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place, and vaccines. It is influenced by factors such as complacency, convenience and confidence.'* The Working Group also concludes that *'while communication is not a specific factor, like confidence, complacency and convenience, when it is poor or inadequate it can negatively influence vaccination uptake and contribute to vaccine hesitancy.'* Thus, developing communications

that are effective in addressing hesitancy issues is a promising strategy to combat vaccine hesitancy and to improve vaccination uptake.

As noted by the SAGE Working Group, vaccine hesitancy is complex and context specific. However, misconceptions and concerns around vaccine safety remain key drivers of decreased vaccine uptake in most contexts (Larson et al., 2014). These concerns are driven by vaccine misinformation that is often propagated through social media, organised anti-vaccination groups, and celebrity media endorsements (Geoghegan et al., 2020). Despite a wealth of scientific research and evidence supporting the safety and efficacy of currently recommended vaccines, counteracting false information and beliefs among vaccine-hesitant groups continues to be challenging public.

In 1998 one of the most common vaccine safety concerns emerged from a speculated link between the MMR (Measles, mumps, rubella) vaccine and autism spectrum disorders due to a misrepresentation of clinical and biological data in a paper (Geodert et al., 1998). Although the UK Department of Health and other health organisations immediately pointed out the lack of evidence for those claims (the article was later retracted), broad media coverage led to widespread concern around the safety of the MMR vaccine.

Other common misconceptions regarding vaccine safety include the belief that receiving multiple vaccines can weaken the immune system; receiving vaccines in the first 24 months of life impacts neurodevelopmental outcomes; the excipients used in vaccines are unsafe, vaccines can cause autoimmune diseases; and the notion that vaccines given during pregnancy are unsafe. Other common vaccine safety controversies are linked to vaccines causing life-threatening side effects (Geoghegan et al., 2020).

In addition to these common misconceptions, the Coronavirus vaccines are facing additional hurdles, especially given the lack of a long-term safety record (Cornwall, 2020). The rapid pace of the Coronavirus vaccine development is a cause of misinformation regarding its safety and efficacy among vaccine hesitant groups. Furthermore, the Coronavirus vaccines have been associated with several other misinformation controversies, which have been circulated through social media platforms. These include claims that the COVID-19 vaccines could kill millions of people; that they have been tested unethically in Africa and subjects from minority communities; associations with the 5G technology conspiracy theories; and conspiracy theories that claimed the vaccine as global population control measures (Evanega et al., 2020). Social media and the internet have led to the fractionation of information, which also plays a major role in facilitating the spread of misinformation, by skipping conventional 'gate-keeping' mechanisms, such as professional editors or validation from experts, among other things.

A.2 Importance of information interventions to tackle misinformation

Individuals with strongly held scientific-sounding misinformation beliefs are strongly associated with decline in vaccination intent (Loomba et al., 2021). Therefore, tackling vaccine misinformation remains a key challenge to address in order to increase vaccine uptake in various contexts.

Studies have shown that providing recommendations that aim to correct myths and misinformation strongly influence decision making around vaccines (Geoghegan et al., 2020; Smith et al., 2017). However, the way misinformation is corrected or myths are debunked is very important. Lewandowsky et al. (2012) showed that correcting misinformation not always works and can backfire. Furthermore, they provide a range of recommendations to successfully tackle misinformation such as 1) pre-expose, or warn individuals upfront that misleading information is coming; 2) provide alternative explanations to the misinformation being corrected, 3) repeat and/or reinforce the correct information without reinforcing the myth, 4) keep information simple and brief, 5) foster scepticism about information source, 6) frame evidence in worldview-affirming manner by endorsing values of targeted audience, and 7) affirm the identity/values of the target audience to increase receptivity to evidence.

Another study, a systematic review of strategies to tackle vaccine hesitancy, showed that educational interventions that aim primarily to inform or to educate about vaccination are effective in addressing vaccine hesitancy (Dubé et al., 2015). Brief written educational interventions (e.g., pamphlets) are also associated with a statistically significant uptake in vaccination rates. Evaluations of these interventions have shown that the effectiveness of promotional communications can positively change knowledge, attitudes, and behaviours regarding vaccination (Cairns et al., 2012).

Similar to the recommendation provided by Lewandowsky et al. (2012) to pre-emptively warn individuals that misleading information is coming, Bavel et al. (2020) identified that preparing people for misinformation and ensuring they have accurate information and counterarguments against false information before they encounter conspiracy theories, fake news, or other forms of misinformation, can help inoculate them against false information.

Another promising approach to combat misinformation is to provide tailored information. A study tested nontailored messages and tailored messages on mothers who did not intend to vaccinate their 11- to 14-year-old child against HPV. The results show that tailored messages addressing HPV concerns improve behavioural intent to have children vaccinated among mothers (Panozzo et al., 2020). A similar study that tested whether tailored information increased women's intentions to receive the HPV vaccine reported that participants in the tailored condition reported greater increases in intentions to vaccinate (Gerend et al. 2013).

A.3 Behavioural Messaging to Promote Vaccine Intentions

We have established from the literature that vaccine misinformation is an important barrier to uptake. We have also demonstrated the importance of informational interventions in tackling misinformation in order to promote vaccination uptake. In this section, we list some behavioural messaging techniques that will make informational interventions more effective and increase the likelihood of them being more persuasive in combatting misinformation.

A.3.1 Keep messages short and clear

Shorter messages are more likely to be read in full. They are also more easily recalled and perceived as more credible (Godinho et al., 2016; Lawes-Wickwar et al., 2020). Adding more information, even if it is useful, may distract from the key message.

A.3.2 Transparency

Provide transparent and factual information about the vaccine's effectiveness and safety. Messages should convey that the vaccine is effective (both in terms of reducing the risk of infection and serious illness), safe, and has undergone the same rigorous testing as other vaccines. Messages should also be transparent about potential side effects. Balanced communications that set out the costs and benefits of vaccination are more credible and trustworthy (Rubinstein et al., 2015; Godinho et al., 2016; Freeman et al., 2020).

A.3.3 Framing

There is a wide spectrum of often contradictory research about the effectiveness of different framing techniques in messages that promote vaccination.

Some studies show that people are more likely to get vaccinated if they believe COVID-19 is a serious disease that they are at risk of contracting and if they view the vaccine as risk-reducing (Brewer et al., 2017; Godinho et al., 2016; Williams et al., 2020). Therefore, communicating the health consequences and risk of contracting the virus and framing the vaccine as a protection against these risks could be an effective strategy to address vaccine hesitancy.

Ferguson and Gallagher (2007) found that for participants at high perceived risk of the flu, a gain-framed message (e.g., the flu shot is effective in 80% of cases) was more effective than a loss-framed message (e.g., flu shot is ineffective in 20% of cases). In addition, a negatively framed goal message (e.g., if you don't get a flu shot, you fail to take advantage of an 80% chance of preventing flu) was more effective than a positively framed goal message (e.g., if you get a flu shot, you reduce your risk of the flu by 80%). Participants at low perceived risk showed no framing effects.

However, other studies show that positive messages about COVID-19 vaccines lead to more positive attitudes towards vaccines and such messages are more likely to be shared with others. They can also be an effective strategy to counteract the negative emotions usually employed by anti-vaccine communications (Chou et al., 2020; Petersen et al., 2020; Attay & Mercier, 2020).

A.3.4 Employ descriptive social norms

Emphasise the number of people that have already been vaccinated. Further, it is beneficial to emphasise that intentions to get vaccinated are growing and that the majority of people approve vaccinations; in addition, make vaccination visible to others as much as possible. People are more likely to get vaccinated if they know that most other people have done so as well and that others approve of taking this action (Moehring et al., 2021; Palm et al., 2021; Bish et al., 2011; WHO, 2020; Bavel et al., 2020).

A.3.5 Incorporate prescriptive social norms

Vaccine hesitancy can be the product of social influences such as one's beliefs about what others approve or disapprove of. Brunson (2013) reports results from an online survey

asking parents in the US to self-report both their own vaccination decisions and the vaccination attitudes of members of their social networks. Parents who failed to meet the recommended vaccination schedule believed that a larger fraction of their social network recommended non-vaccinating; this was a better predictor of vaccination than were demographic characteristics. Therefore, reducing the gap between what one believes others do or approve of, and what others actually think and do, may be a powerful tool to encourage decisions such as vaccine uptake.

A.3.6 Prosocial norms

The communication of social (rather than individual) benefits from vaccinations increases the vaccination intention, particularly when the risk associated with vaccination is low and vaccination comes with low effort (Betsch, Böhm, & Korn, 2013; Shim et al., 2012).

Messages that 1) emphasize benefits to the recipient, 2) focus on protecting others, 3) align with the recipient's moral values, 4) appeal to social consensus or scientific norms and/or 5) highlight the prospect of social group approval tend to be persuasive (Bavel et al., 2020). These norms of prosocial behaviour are more effective when coupled with the expectation of social approval and modelled by in-group members who are central in social networks. It also may be helpful to make people aware that they benefit from others' access to preventative measures.

A.3.7 Set goals and intention implementation prompts

Prompting people to set goals makes it more likely that they will achieve them (Gollwitzer, 2011). Using public or private commitment increases the likelihood that people will go through with an action. In one study, employees who received a postcard about available workplace flu shots were more likely to vaccinate if they were prompted to write down when they planned to come for the vaccination (Milkman et al., 2011).

A.3.8 Apply Positive Reinforcement

Provide positive messages about the vaccine, linked with the hope it provides. Praise those that get vaccinated. Positive messages about COVID-19 vaccines lead to more positive attitudes towards vaccines and such messages more likely to be shared with others. They can also be an effective strategy to counteract the negative emotions usually employed by anti-vaccine communications (Chou et al., 2020; Petersen et al., 2020, Attay & Mercier, 2020).

A.3.9 Build on past COVID-19 behaviours

Building on past experiences or efforts related to COVID-19 gives people confidence in getting vaccinated. It also frames vaccination as an action that is consistent with their past behaviours (Williams et al., 2020).

A.3.10 Identity leaderships and authorities

Identity leadership can enhance self-efficacy. Leaders and authorities who treat people with respect, and who communicate that they trust people to do as they are told, tend to be more successful in eliciting cooperation (Tyler, 2011). Building a strong sense of shared social identity can help coordinate efforts to manage threats and foster in-group commitment and adherence to norms (Ellemers et al., 2002).

In relation to building a shared sense of identity, Bavel et al. (2020) propose that this could be achieved by addressing the public in collective terms and by urging 'us' to act for the common good. It also proposes that identifying sources (for example, religious or community leaders) that are credible to different audiences to share public health messages can be effective, and that leaders and the media might try to promote cooperative behaviour by emphasizing that cooperating is the right thing to do and that other people are already cooperating. These leaders also should highlight that bipartisan support for COVID-related measures, where they exist, have reduced polarization and led to less-biased reasoning.

A.4 Vaccine advocates to increase vaccination uptake

Vaccine advocacy is expected to support the acceptance and uptake of COVID-19 vaccines among communities and individuals, as well as the promotion of vaccine safety.

People's behaviour is influenced by others (Cialdini and Goldstein, 2004). Making one's behaviour visible to others can encourage both the signal sender and those who receive the signal to adopt the desired conduct (Rogers et al., 2016). When an individual can be recognized as receiving a vaccination either physically (e.g., wearing a pin) or online (e.g., Instagram post) in their social group it would send a signal to those in their social network that vaccination is the norm.

A study about the influence of social norms on flu vaccination among African American and White Adults found that individuals who reported that a majority of people around them want them to be vaccinated were significantly more likely to be vaccinated suggesting subjective norms are influential for both White and African American adults in the U.S. These results suggests that health promotion efforts may benefit from focusing on subjective norms and encouraging friends and family members to talk about the benefits of influenza vaccination (Quinn et al., 2017).

Another study that examined the relative effectiveness of prestige-based incentives (vaccination of an expert scientist, president, politician, celebrity, or religious leader), conformist incentives (vaccination of friends and family) and risk-based incentives (witnessing death or illness of a person from the disease) for increasing participants' chances of getting vaccinated with respect to their COVID-19 vaccine intention, suggested that positive vaccination messages delivered by expert scientists, vaccination of friends and family and witnessing the risk of disease can be effective at increasing vaccine uptake (Salali & Uysal, 2021). This is supported by other studies that suggest that reporting the prevalence of those already or willing to be vaccinated may be sufficient to induce a cascade of others to abandon their vaccination hesitancy (Schmelz & Bowles, 2021).

An alternative approach to leverage social influences is to employ community advocates. A study conducted in the state of Washington showed that a community advocacy programme that engaged parent volunteers to be immunisation advocates among other parents successfully reduced vaccine hesitancy (Schoeppe et al., 2017).

A similar study that tested the effectiveness of engaging community members as health advocates showed significant increases in knowledge and confidence about cervical cancer and HPV vaccination (Chhabra et al., 2018).

A.5 Behavioural Techniques to Encourage Vaccine Advocacy

After carefully considering vaccine advocacy as an effective strategy to tackle vaccine hesitancy, we explored different behavioural techniques that would help us to give form to intervention ideas.

A.5.1 Leverage social networks

Create social networks to support and encourage people to become vaccine advocates in their communities. Social networks can amplify the impact of an intervention. Getting people that are well connected to encourage others to vaccinate can be an effective approach (Bavel et al., 2020). For example, The London Borough of Havering is planning on launching a volunteer ambassador programme. The goal of the programme will be to provide peer-support on how to book a vaccine and address any related concerns people might have. The council is also encouraging residents that have already received their vaccine to encourage their peers to do the same.

A.5.2 Pro-social Benefits

Emphasise the collective, societal importance of getting vaccinated in achieving herd immunity and protecting vulnerable people. Appeal to the common good and elicit empathy towards those that are vulnerable. Highlighting the social benefits of vaccination is an important motivation for getting a vaccine (Betsch et al., 2017). Combining informational content about herd immunity with emotional content about protecting those that are vulnerable can be particularly effective (Pfattheicher et al., 2020).

A.5.3 Role Models

Promote vaccination by using people that got vaccinated as role models. Choose people that are relatable to your target audience. People are more likely to vaccinate if others, who are similar to them, have done so (Bish et al., 2011; Cialdini & Trost, 1998).

Implementation Intentions and Planning

Encouraging people to make plans (specifying the when, where, and how of an action) makes it more likely that they will follow through with it (Milkman et al., 2011).

A.6 Background Research Conclusion

Given the potential of vaccine hesitancy to undermine vaccination coverage, local governments must take steps to understand the extent and nature of hesitancy and to start promoting approved COVID-19 vaccines. This project endeavours to contribute to tackling vaccine hesitancy. It is the first study that combines a behavioural insights approach that focuses on the personalisation of information in a workplace setting. This study targets workplaces as a potential location to deliver effective interventions aimed at encouraging a behavioural change in relation to COVID-19 vaccines.

B Extended Background Research

In this section we provide further information about the barriers to COVID-19 vaccine up-take and discuss how a behavioural science approach might be effective to increase vaccine acceptance.

B.1 Understanding the barriers to COVID-19 vaccine take up

In this section we describe previous research regarding drivers and barriers to vaccination and/or vaccination intentions, as well as previous studies that analysed socio-demographic distributions around vaccine hesitancy.

A study examined the public's perceived barriers and facilitators around COVID-19 vaccination in the UK (Williams et al., 2020). There is 86% acceptance among the high-risk population. Facilitators of vaccination included feeling at risk of contracting the virus and seeing the vaccine as a protection/risk-reducing; perceiving the virus as serious; being aware of the health consequences to others. The barriers to vaccination included concerns over vaccine safety and concerns that the development and/or testing of the vaccine is rushed. Recommended interventions include improving knowledge of susceptibility and severity of the virus and the effectiveness of vaccination; the use descriptive and injunctive norms in communications; and building upon the public's prior compliance with the lockdown and preventive behaviours with vaccination compliance (Williams et al., 2020).

Another study sought to understand willingness to get vaccinated among a representative sample of UK residents (Freeman et al., 2020). 71.7% of the population responded in a consistently positive way towards taking a COVID-19 vaccine, 16.6% were very unsure or ambivalent about taking a COVID-19 vaccine, and 11.7% were strongly hesitant in the UK.

This study found vaccine hesitancy to be spread evenly in the population, outlined the main drivers of vaccine take up, and summarised the following: 1) socio-demographics do not explain vaccine hesitancy to any helpful degree; 2) fused with acceptance of a vaccine are beliefs about the collective importance: that a vaccine will save lives, help the community, and that it will be dangerous if many people do not get vaccinated. emphasising collective – rather than personal – responsibility may lead to greater change in individuals' behaviour; 3) the modelling indicated a key higher-order factor of excessive mistrust that was associated with vaccine hesitancy; 4) public health communication may need to be carefully attuned to the different kinds of collective identities and benefits in order to resonate with pro-social motives; and 5) the survey findings also indicate that materials may benefit from highlighting the many positive contributions that NHS staff make. There is an urgent need to counter misinformation, ideally by 'prebunking' or inoculation and provide strong presentation of accurate information.

A similar study investigated the factors associated with intention to be vaccinated against COVID-19 in the UK (Sherman et al., 2020). 64% of participants reported being very likely to be vaccinated against COVID-19, 27% were unsure, and 9% reported being very unlikely to

be vaccinated. Intention to be vaccinated was associated with more positive general COVID-19 vaccination beliefs and attitudes, weaker beliefs that the vaccination would cause side effects or be unsafe, greater perceived information sufficiency to make an informed decision about COVID-19 vaccination, greater perceived risk of COVID-19 to others (but not risk to oneself), older age, and having been vaccinated for influenza last winter (2019-20) (Sherman et al., 2020).

Another study showed that among the sample group, 69% of individuals were vaccine acceptant, 25% vaccine hesitant, and 6% were vaccine resistant in the UK (Murphy et al., 2020). Individuals in the vaccine hesitant group were more likely to be female and younger than 65. On the other hand, those in the vaccine resistant were more likely to be in younger age brackets, reside in suburbs, and are in the three lowest income brackets. The vaccine hesitant and resistant groups had lower levels of trust in healthcare professionals, scientists, and the state, higher levels of paranoia, religious beliefs, lower levels of altruism, etc. The report indicated lower levels of trust in information in newspapers, television, doctors, healthcare professionals, government agencies. The subgroups to consider are women, younger adults, ethnic minorities, those with existing health conditions, and pregnant women. Health messaging might be more effective if delivered via individuals in alternative positions of authority and expertise than government, scientists, and medical professionals and via other communication channels (Murphy et al., 2020).

A similar study showed that individuals who were older (vs. younger); from white ethnic groups (vs. BAME groups); married or cohabiting (vs. single, widowed, divorced); unemployed (vs. in full or part-time employment); educated to degree level or above (vs. below degree level); a non-smoker or an ex-smoker (vs. a current smoker, for both comparisons) and; had not had COVID-19 (vs. has or has had COVID-19) were significantly more likely to be willing to have a COVID-19 vaccine. The largest difference in willingness was for ethnicity; individuals from white ethnic background were more likely to be willing to receive a COVID-19 vaccine compared with those from BAME groups (79.9% vs. 55.9%, respectively) (Thorneloe et al., 2020).

Another study showed that vaccine hesitancy profiles among non-key workers are middle-aged adults (25-54), on low-to-average incomes who do not know any individuals diagnosed with COVID-19. Within the key-worker group, vaccine hesitancy was associated with being female and perceiving oneself as having relatively low risk of infection. Communicating that being unvaccinated leads to increased risk of infection status and highlighting individuals' social responsibility to act in a way that protects the vulnerable might be effective (Butter et al., 2020).

Bish et al. (2011) conducted a systematic review of the psychological and demographic factors associated with vaccine take up for an influenza pandemic. People who perceived vaccines as an effective coping strategy towards the virus, where influenced by the social pressure of getting vaccinated and received and/or consumed information from official health sources were more likely to get vaccinated. Past vaccination behaviour also was an important predictor of vaccination. Demographic factors associated with higher intentions and uptake of vaccination were older age, male gender, being from an ethnic minority and, for health professionals, being a doctor. Potential interventions to improve uptake of vaccination include highlighting the risk posed by pandemic influenza while offering tactics to

ameliorate this risk, i.e. vaccination; reducing the omission bias (i.e., a perception that harm caused by action is worse than harm caused by inaction); increasing seasonal influenza vaccination in advance of a future pandemic may be an effective strategy (Bish et al., 2011).

Paul et al. (2020) highlights the main concerns around COVID-19 vaccine hesitancy and shows that distrustful attitudes towards vaccination were higher amongst individuals from ethnic minority backgrounds, with lower levels of education, lower annual income, poor knowledge of COVID-19, and poor compliance with government COVID-19 guidelines. Amongst vaccine attitudes, intermediate to high levels of vaccine benefit mistrust and concerns about future unforeseen side effects were the most important determinants of both uncertainty and unwillingness to vaccinate against COVID-19 (Paul et al., 2020).

However, many people are concerned about government policies for perfectly legitimate reasons, and not because they are misinformed or believe in conspiracy theories. Some people may be concerned about vaccines because of the role played by western government agencies in the Global South. A general mistrust in governmental initiatives is also rooted in racialized history (Jamison et al., 2019).

Khan et al. (2021) noted that describing immigrant groups and ethnic minorities as more vaccine hesitant places emphasis on minority groups becoming less hesitant rather than public health systems become more accessible and trustworthy. The lack of accessibility to public health services and a mistrust towards health authorities found in ethnic groups is often a major contributing factor to their lower vaccine uptake. Thus, failure to address these concerns undermines the barriers to vaccine access for these populations.

As explained in *The COVID-19 Vaccine Communication Handbook. A practical guide for improving vaccine communication and fighting misinformation*, policy makers should strive to understand and effectively respond to the unique needs of communities with lower vaccine uptake and aim to reduce discriminatory practices which contribute to mistrust towards the government and public services, rather than simply labelling them as 'hesitant.'

B.2 A Behavioural Science Approach to Encourage Vaccine Take up

The pandemic has involved large-scale behaviour change; therefore, insights from behavioural sciences appeared as a promising approach to align human behaviour with the recommendations of governments, epidemiologists, and public health experts. In the following section we summarise some of the most useful strategies from behavioural sciences to increase vaccine take up.

B.2.1 Making behavioural change salient

We may leverage the impact of any behaviour change effort by targeting well-connected individuals and making their behaviour change visible and salient to others. To effectively counter fake news about COVID-19 around the world, governments and social media companies must rigorously develop and test interventions. This includes identifying treatments that effectively reduce belief in misinformation while not undermining belief in

accurate information. Local voices can amplify these messages and help build the trust that is needed to spur behavioural change (Bavel et al., 2020).

B.2.2 Coordinated efforts to combat the spread of the virus

Coordinated efforts across individuals, communities, and governments to fight the spread of disease can send strong signals of cooperation and shared values, which could facilitate reorganization of previously considered out-groups and in-groups into a single community with a common destiny. This 'superordinate categorization' is most effective when everyone is of equal status (Dovidio et al., 2007).

Bavel et al. (2020) highlight that there is a need for more targeted public health information within marginalized communities and for partnerships between public health authorities and trusted organizations that are internal to these communities.

B.2.3 Incentives

Several studies have assessed the use of incentives as an approach to promote health behaviours with varied results. In a study with college students, results showed that they were more likely to get a flu shot when offered a US\$20 reward (19% vs. 9%; Bronchetti et al., 2015). A study by Moran et al. (1996) showed that a US\$50 gift certificate for groceries offered for vaccination increased vaccine uptake from 20% in the baseline to 29%. However, it also points to potential motivational crowding-out effects, that is, the phenomenon that voluntary behaviour may decrease when it is rewarded (see also Gneezy & Rustichini, 2000).

Another study that reviews evidence regarding interventions to improve vaccination coverage, concludes that available studies provide insufficient evidence to assess the effectiveness of client or family incentives for improving vaccination coverage, and points out at reducing out-of-pocket costs for vaccinations as an evidence-based strategy to improving vaccination coverage (Briss et al., 2000).

In addition, a recent study by Chang et al. (2021) provides evidence that financial incentives and other behavioural nudges do not meaningfully increase COVID-19 vaccination rates amongst the vaccine hesitant, and provides some suggestive evidence on the potential for financial incentives and messaging to backfire.

B.2.4 Changing defaults (default effect).

People who are pre-scheduled for a flu shot appointment (which they can cancel if they do not want it) are more likely to get vaccinated than those who are not prescheduled but who can make an appointment if they want one (Chapman et al., 2010).

Mandatory or compulsory vaccination that acts as a type of opt-out default are met with high compliance rates (Pitts et al., 2014; Rakita et al., 2010). The easier opting-out processes, the lower vaccination rates.

B.2.5 Remove Practical Barriers

Address practical or logistical barriers that can get in the way of vaccination. Do people know where vaccine centres are located and how to reach them? Can they take time off work and get vaccinated? Reducing barriers and making it easy to get vaccinated increases vaccine uptake (WHO, 2020; Brewer et al., 2017).

B.2.6 Help people plan for their vaccination

Making plans helps people commit to their intentions and can encourage vaccine uptake (Milkman et al., 2011; Brewer et al., 2017). For example, during the first lockdown, Norfolk council designed a communication aimed at helping people use public transportation safely. Similarly, the London Borough of Hackney designed a communication that prompts people to plan their vaccination.

B.2.7 Reminders

Reminders are particularly effective if 1) they come from a trusted source, 2) people can choose their preferred channel of communication, and if 3) they provide information on how to take action. Reminders are an effective way to help people act upon their vaccination intentions (Briss et al., 2020; Brewer et al., 2017). The top performing message in Milkman et al. (2021) stated, “reminder that a flu shot is waiting for you at Walmart.” The underlying theory behind this intervention emphasising that a vaccine has been “reserved” for the patient is the concept of mental accounting. The second highest performing message in Milkman et al.’s (2021) study increased uptake by 1.7% by aiming to promote feelings to protect others with a message including ‘If you get it, you’ll help protect family and friends from the flu and possible hospitalization.’ The third highest performing message was identical to the top performing message of a ‘flu shot waiting for you’ and had an additional message of ‘will you encourage 1 person to vaccinate?’ This message increased uptake by 1.7%.

There is large support for the effectiveness of reminders on vaccine uptake (for meta-analysis/review, see Briss et al., 2000; Groom et al., 2015; Szilagyi et al., 2000).

B.2.8 Pre-bunking

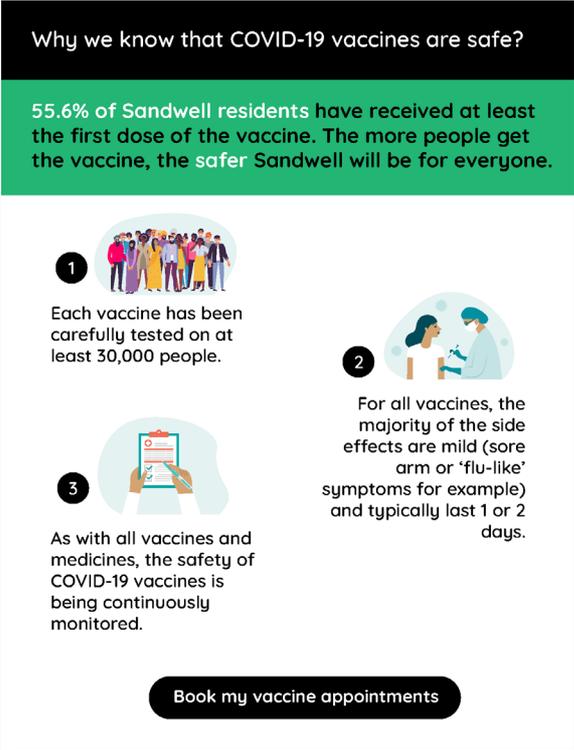
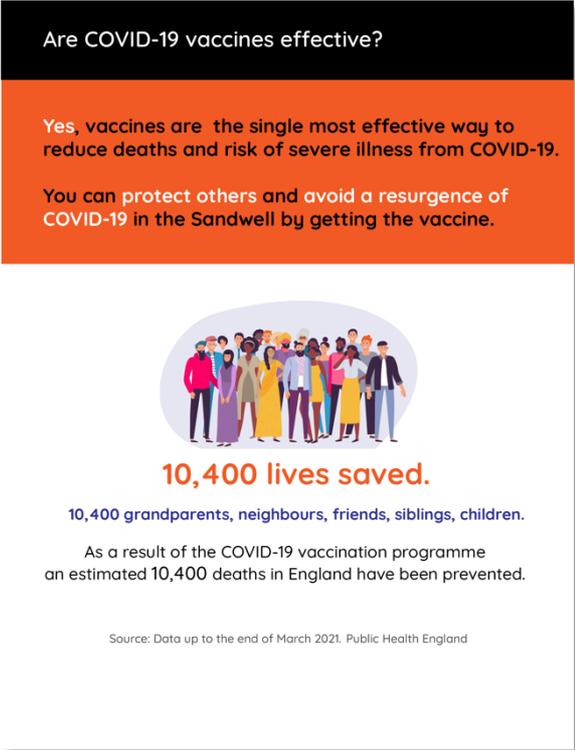
The pre-bunking approach can be achieved by explaining misleading or manipulative argumentation strategies to people, a technique known as ‘inoculation’ or ‘prebunking’ that makes people resilient to subsequent manipulation attempts. The process of inoculation includes a warning that people may be misled, followed by a pre-emptive refutation of the misleading argument. Inoculation thus follows the biomedical analogy: by exposing people to a weakened dose of the techniques used in misinformation and pre-emptively refuting them, ‘cognitive antibodies’ can be stimulated (van der Linden et al. 2020).

C Behaviourally-framed messages

The interactive survey tool that we present in this report offers a tailored approach of providing information. In this section we show the tailored messages that study participants are shown as explained in the previous subsections.

C.1 Non-vaccinated Participants Journey – Trial 1

We designed 15 behaviourally-framed messages aimed at addressing participant’s specific concerns over COVID-19 vaccination. In this section we show each concern and/or reason to get the vaccine and its correspondent behaviourally-framed message. Note: participants were asked to rank their concerns around vaccinations, so they were only shown the message that addressed their highest-ranked concern.

SIDE EFFECTS (INTERVENTION 1)	EFFECTIVENESS (INTERVENTION 2)
<p>Participants whose highest ranked concern is ‘My family and friends think it’s unsafe’ or ‘I think the vaccine is likely to have serious side effects’, are shown the following screen:</p>  <p>Why we know that COVID-19 vaccines are safe?</p> <p>55.6% of Sandwell residents have received at least the first dose of the vaccine. The more people get the vaccine, the safer Sandwell will be for everyone.</p> <ol style="list-style-type: none"> Each vaccine has been carefully tested on at least 30,000 people. For all vaccines, the majority of the side effects are mild (sore arm or ‘flu-like’ symptoms for example) and typically last 1 or 2 days. As with all vaccines and medicines, the safety of COVID-19 vaccines is being continuously monitored. <p>Book my vaccine appointments</p>	<p>Participants whose highest ranked concern is ‘I think that the vaccine provides only a low level of protection’ or ‘I think there is no evidence to show that the vaccines work’, are shown the following screen:</p>  <p>Are COVID-19 vaccines effective?</p> <p>Yes, vaccines are the single most effective way to reduce deaths and risk of severe illness from COVID-19.</p> <p>You can protect others and avoid a resurgence of COVID-19 in the Sandwell by getting the vaccine.</p> <p>10,400 lives saved.</p> <p>10,400 grandparents, neighbours, friends, siblings, children.</p> <p>As a result of the COVID-19 vaccination programme an estimated 10,400 deaths in England have been prevented.</p> <p><small>Source: Data up to the end of March 2021. Public Health England</small></p>
EFFECTIVENESS (INTERVENTION 3)	LOW RISK PERCEPTION (INTERVENTION 4)

Participants whose highest ranked concern is 'I know people who've had the vaccine and still gotten COVID-19', are shown the following screen:

What happens once you are vaccinated?

It may take a few weeks for your body to build up some protection from the vaccine.

Some people may still get COVID-19 despite having a vaccination, but this should be less severe.

Vaccines are the single most effective way to reduce deaths and risk of severe illness from COVID-19.



10,400 lives saved.

10,400 grandparents, neighbours, friends, siblings, children.

As a result of the COVID-19 vaccination programme an estimated 10,400 deaths in England have been prevented.

Source: Data up to the end of March 2021. Public Health England

Participants whose highest ranked concern is 'I think it's unlikely I will catch COVID-19' or 'I do not think I would get seriously ill if I catch COVID-19', are shown the following screen:

COVID-19 still poses a serious risk, even for young and healthy people.

Everyone, including younger and healthier people, should get the vaccine once they are eligible.

Younger and healthier people can also get sick from the disease that they require hospitalisation, and some may even that die. They might also experience "long covid", when symptoms last for weeks and months after the infection has gone.



1 in 9 Sandwell residents

Since the beginning of the pandemic, at least 1 in 9 Sandwell residents have been infected.
1 in 327 didn't survive.

LOW RISK PERCEPTION (INTERVENTION 5)

Participants whose highest ranked concern is 'I don't think that COVID-19 is a serious risk to me', 'I think the pandemic will pass soon because so many other people have gotten the vaccine' or 'I have already had COVID-19', are shown the following screen:

FAITH / RELIGION (INTERVENTION 6)

Participants whose highest ranked concern is 'Getting a vaccine is against my cultural or religious beliefs', are shown the following screen:

Everyone should get the vaccine.

Everyone, including people who already had COVID-19 and healthier people, should get the vaccine once they are eligible.

There are still many people at risk of COVID-19 in Sandwell. Herd immunity can only be achieved **when enough people are protected through vaccination**, which means that the virus will be less likely to spread.



10,400 lives saved.

10,400 grandparents, neighbours, friends, siblings, children.

As a result of the COVID-19 vaccination programme an estimated 10,400 deaths in England have been prevented.

Source: Data up to the end of March 2021. Public Health England

All major religions support vaccines

Faith leaders across Sandwell have shown their support for the vaccine.

Heminder Singh Bhatts MBE - Community faith leader
"I have received both doses of the Covid-19 vaccine, it was fine, I had no side effects and I feel much more protected."

Hema Patel - Community faith leader
"We all need to get the Covid-19 vaccine when we're offered it."

Rajib Bhalla - Chair of Sandwell Inclusive Muslim Action Network (SIKAN)
"I would encourage everyone, including all Arabic speakers in Sandwell, to join with me and have the vaccine when it is offered to you."

Nilly O'Connor - Sandwell Council Councillor
"Better days will come sooner if we all take up the offer of the Covid-19 vaccine when it's our turn."

Jasvirinder Singh - President of Guru Nanak Gurbans Sewa Bhawan
"Please have the Covid-19 vaccine when it's offered to you."

Reverend David Gould - Vicar at Holy Trinity Church, Smethwick
"Please join me and take up the offer of the vaccine when it's your turn."

Imam Ghulam Rasool - Community faith leader
"By taking up the vaccine when it is offered to us, we'll be protecting ourselves and our loved ones from becoming seriously ill from the virus."

VEGANISM (INTERVENTION 7)

Participants whose highest ranked concern is 'I believe that vaccines are not vegan', are shown the following screen:

Veganism and COVID-19 vaccines

Vaccination plays a fundamental role in tackling the COVID-19 pandemic and **saving thousands of lives.**

Since all medications currently go through animal testing decisions around taking medication can be complex for vegans.

As The Vegan Society recognises, it might not always be possible or practicable for vegans to avoid participating in animal use.

Numerous organisations like [Animal Free Research UK](#) are working on this issue so that in the future vaccines can be developed without animal use.

At this point in time all citizens, including vegans, are **encouraged to look after their health and that of others.**

For more information you can read the statements from both the [Vegetarian Society](#) and the [Vegan Society](#).

MEDICAL CONDITION (INTERVENTION 8)

Participants whose highest ranked concern is 'I believe that my medical condition doesn't allow me to get the vaccine', are shown the following screen:

Who cannot have the vaccine?

A very small number of people who are at risk of COVID-19 cannot have the vaccine - this includes people who have severe allergies to a component in the vaccine.

Women of childbearing age, those who are pregnant, planning a pregnancy or breastfeeding can have the COVID-19 vaccine.



For more information please read the [COVID-19 vaccines guidance by the NHS](#) or contact your GP.

VACCINES HAVE BEEN RUSHED
(INTERVENTION 9)

Participants whose highest ranked concern is 'I think that the vaccines have been rushed and not tested properly', are shown the following screen:

How were the COVID-19 vaccines developed so quickly?

COVID-19 Vaccines have gone through the **same number of phases, same safety checks and same numbers of volunteers** in trials than any other vaccines.

- Scientist built on years of knowledge and research for other coronaviruses including SARS and MERS.
- Vaccines were tested on thousands of people from all walks of life.
- Companies also made use of the latest technology which helped vaccines to get better and better
- Many of the processes were also done at the same time.

All together this helped to reduce the time needed to develop a COVID-19 vaccine

The figure shows two horizontal timelines. The top timeline, labeled 'Typical vaccine development timeline', has four stages: Research, Clinical trials, Regulatory approvals, and Manufacturing, with a total duration of 5-10 years. The bottom timeline, labeled 'Accelerated timeline: COVID-19 vaccine development', has the same four stages but compressed into a total duration of 1-2 years.

BAD EXPERIENCES / SYSTEM TRUST
(INTERVENTION 10)

Participants whose highest ranked concern is 'I had bad experiences with the healthcare system' or 'I do not trust the government', are shown the following screen:

A challenging time for all of us.

The COVID-19 pandemic has been challenging for all of us, also for the NHS staff. It has uncovered many inequalities that need to be addressed by both the NHS and the government.

The NHS staff continues to work hard to ensure that vaccines are offered to everyone so all of us are protected against the virus.

Getting the vaccine is the best way to **protect yourself and your loved ones** from the virus and the key to **return to a normal life**.

39 million people have already been vaccinated in the UK by the NHS

If participants selected 'My GP told me not to get the vaccine as I have legitimate health reasons,' they were not shown any intervention.

FERTILITY (INTERVENTION 11)

Participants whose highest ranked concern is 'I am concerned it would impact my fertility', are shown the following screen:

TYPES OF VACCINES (INTERVENTION 12)

Participants whose highest ranked concern is 'I was not offered the vaccine I wanted', are shown the following screen:

Do vaccines affect fertility?

Vaccines are being **continuously monitored** by the World Health Organisation and other regulatory bodies.

Millions of women have been vaccinated globally and there is **no evidence** to say that vaccines impact fertility.

Fertility experts such as **the British Fertility Society** have **confirmed** that there is **no biological mechanism** by which having the vaccine could affect your chances of conceiving.



Raj Mathur, executive committee chair of the British Fertility Society

"Vaccination does not stop you getting pregnant, and is the best way of reducing the risk of getting Covid when you are pregnant."

Get the vaccine to ensure your pregnancy is going to be safe for both you, and your baby.

Types of COVID-19 vaccines

All vaccines offer high levels of protection against COVID-19.

The more people get the vaccine, the safer Sandwell will be for everyone.

What vaccines are currently being offered in the UK?

There are four vaccines currently approved for use in the UK: Pfizer/BioNTech, Oxford-Astrazeneca, Moderna and Janssen.

The four have shown to be safe and offer high-levels of protection against COVID-19.

The four have been approved by the MHRA.

Remember

Once you have been offered a COVID-19 vaccine, that offer remains open.

Get your COVID-19 vaccine as soon as possible to protect you, your family and community.

How do I get my vaccine?

Go to the NHS website to book your appointments:

- Choose a vaccination centre or a pharmacy
- Set a day and time
- The second appointment will automatically be scheduled 12 weeks after


Select a vaccination site


Set a date and a time




1st dose



8 to 12 weeks


2nd dose

FEAR OF NEEDLES (INTERVENTION 13)

Participants whose highest ranked concern is 'I have a fear of needles', are shown the following screen:

HOW TO GET THE JAB (INTERVENTION 14)

Participants whose highest ranked concern is 'I can't book a vaccination appointment', 'I do not know how to get a vaccine', 'the vaccination centre is too far away/is not easy for me to get to', 'I plan to get one later; I just haven't gotten around to it yet', 'I tried to schedule an appointment, but it didn't work', 'I do not think I am eligible to get the vaccine', or 'I do not have time to get the vaccine' are shown the following screen:

What can I do to overcome my fear of needles?

Fear of needles is **very common**, affecting at least 1 in 10 people. Fortunately, **simple exercises** and practice can help to overcome it.

- 1 Don't be ashamed of being scared of injections - you are not alone.
- 2 Tell health professionals about your worries.
- 3 Think about what helped you in the past.
- 4 Learn applied tension technique if you faint or feel very faint, or breathing for relaxation exercise if you feel panicky.
- 5 Once you have mastered the exercises, develop a "fear ladder" - a list of all of the situations related to needles which you fear, arranged in order of difficulty.
- 6 Overcoming your fear will take some time and practice, but it will make life less stressful and you will feel less anxious.
- 7 Learn more about how to overcome your fear of needles [here](#)

How do I get the COVID-19 vaccine?

Getting the vaccine is **easy**.
It is the best way to protect you and others.

Can I get the vaccine?

If eligible

Yes, you are eligible because you are aged 25 and over (before 1 July 2021).

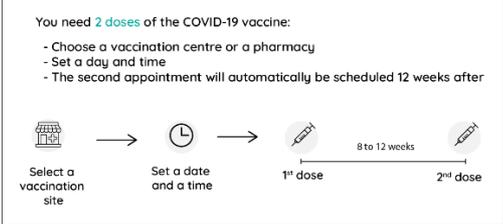
If ineligible

Currently the vaccine is being given to people aged **25 and over** (before 1 July 2021), people at high risk, people who live or work in care homes, health and social care workers, people with a learning disability and people who are a main carer for someone at high risk from COVID-19.

How do I get my vaccine?

You need **2 doses** of the COVID-19 vaccine:

- Choose a vaccination centre or a pharmacy
- Set a day and time
- The second appointment will automatically be scheduled 12 weeks after



C.2 Vaccinated Participants Journey – Trial 2

We designed one behaviourally-framed communication aimed at encouraging vaccine advocacy.

VACCINE ADVOCACY INTERVENTION

All vaccinated participants were shown the following screen:

Your support is key.

It's fantastic that you got your vaccine! Thank you for playing your part in protecting everyone in our Sandwell community.

However, there are still many people at risk of COVID-19 in Sandwell.

Herd immunity can only be achieved when enough people are protected through vaccination, which means that the virus will be less likely to spread.



YOU CAN MAKE A DIFFERENCE

You can make a difference in Sandwell by talking to your friends, family and co-workers about the benefits of the vaccine. Your support matters.

D Survey Flow

In this section we include a transcription of all the screens participants were exposed to in this study.

Start of Block: 1. Introduction

Q1 Welcome! This survey is being conducted by The Behaviouralist on behalf of Sandwell council. **The purpose of this survey is to better understand COVID-19 vaccine acceptance. The survey should take between 5 to 10 minutes to complete.** By clicking the button below, you acknowledge that your participation in the study is voluntary and that you are aware that you can end your participation in the study at any time and for any reason. All answers will be anonymised so you will not be able to be identified. If you have any comments or concerns about this survey please contact info@thebehaviouralist.com.

End of Block: 1. Introduction

Start of Block: 2. Socio-demographics

Q2 We will first ask you some questions about yourself.

Q3 What is your age group?

▼ 80+ ... Under 16

Q4 Which ethnicity do you most identify with?

- White British (1)
 - Asian or Asian British (2)
 - Black or Black British (3)
 - Mixed (4)
 - Other ethnic groups (5)
 - Prefer not to say (6)
-

Q5 What is your gender?

- Male (1)
 - Female (2)
 - Non-binary (3)
 - Prefer not to say (4)
-

Q6 What is the highest level of education you have completed?

- Primary school (1)
- Secondary school up to 16 (2)
- Higher or secondary or further education (A-levels, BTEC, etc.) (3)
- College or university (4)
- Post-graduate degree (5)
- Prefer not to say (6)

End of Block: 2. Socio-demographics

Start of Block: 3. Get vaccine

Q7 Next, we will ask you some questions related to COVID-19 vaccines.

Q8 Have you received a COVID-19 vaccine?

- Yes (1)
- No (2)

End of Block: 3. Get vaccine

If Yes (vaccinated) → TRIAL 1: Vaccinated Participants

Q9 Which of the following statements best describes your main reasons for getting the COVID-19 vaccine? (Select all that apply)

- To help get the economy going again (1)
- To allow myself to go out and do all the things I used to be able to do (2)
- To protect the NHS (3)
- To protect others against the coronavirus (4)
- To protect myself against the coronavirus (5)
- To allow society to start functioning normally again (6)
- To allow society to start functioning normally again (7)
- To reduce the spread of the coronavirus (8)

Q10 Would you encourage others to receive a COVID-19 vaccine?

- Yes definitely (1)
- Probably (2)
- Not sure (3)
- Probably not (4)
- No definitely not (5)

End of Block: 4a. Vaccinated

Start of Block: Intervention - Yes

Intervention - Vaccinated

Your support is key

It's fantastic that you got your vaccine! Thank you for playing your part in protecting everyone in our Sandwell community.

However, there are still many people at risk of COVID-19 in Sandwell. Herd immunity can only be achieved when enough people are protected by the vaccine.

You can make a difference in Sandwell by talking to your friends, family and co-workers about the benefits of the vaccine. Your support matters.

End of Block: Intervention - Yes

If No (non-vaccinated) → TRIAL 2: Non-vaccinated Participants

Q11 Do you want to get the vaccine?

- Yes (1)
- Leaning towards yes (2)
- Leaning towards no (4)
- No (3)

End of Block: 4b. Not vaccinated

Start of Block: 4b. Not vaccinated - No/Leaning towards no

Q12 Please select the reasons why you do not want to get the vaccine. (Please select all that apply)

- I am concerned about the side effects of the vaccine (1)
 - I do not think that the COVID-19 vaccines are effective (2)
 - I don't think that COVID-19 is a serious risk to me (3)
 - I can't get vaccinated (4)
 - I have a fear of needles (5)
 - I do not know how to get a vaccine (6)
 - I had bad experiences with the healthcare system (7)
 - I do not trust the government (8)
 - I am concerned it would impact my fertility (9)
 - I think that the vaccines have been rushed and not tested properly (10)
 - I was not offered the vaccine I wanted (11)
 - Other reasons (please specify) (12)
-

Display This Question:

*If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) =
I am concerned about the side effects of the vaccine*

Q13 What concerns do you have about the side effects of COVID-19 vaccines? (Please select all that apply)

- My family and friends think it's unsafe (1)
- I think the vaccine is likely to have serious side effects (2)

Display This Question:

*If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) =
I do not think that the COVID-19 vaccines are effective*

Q14 Why don't you think the COVID-19 vaccines are effective? (Please select all that apply)

- I know people who've had the vaccine and still gotten COVID-19 (1)
- I think that the vaccine provides only a low level of protection (2)
- I think there is no evidence to show that the vaccines work (3)

Display This Question:

*If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) =
I don't think that COVID-19 is a serious risk to me*

Q15 Why do you think that COVID-19 is not a serious risk to you? (Please select all that apply)

- I think the pandemic will pass soon because so many other people have gotten the vaccine (1)
- I think it's unlikely I will catch COVID-19 (2)
- I do not think I would get seriously ill if I catch COVID-19 (3)
- I have already had COVID-19 (4)

Display This Question:

*If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) =
I can't get vaccinated*

Q16 Why can you not get the vaccine? (Please select all that apply)

- Getting a vaccine is against my cultural or religious beliefs (1)
- I believe that vaccines are not vegan (2)
- I believe that my medical condition doesn't allow me to get the vaccine (3)
- My GP told me not to get the vaccine as I have legitimate health reasons (4)
- I can't book a vaccination appointment (5)

End of Block: 4b. Not vaccinated - No/Leaning towards no

Start of Block: 5. Ranking concerns - No

Q17 You stated that you do not want to get vaccinated for the reasons listed below. **Please order these reasons in order of importance.** You can drag and drop the

reasons from the most important to the least important one, being the concern ranked 1 the most important.

Display This Choice:

If What concerns do you have about the side effects of COVID-19 vaccines? (Please select all that apply) = My family and friends think it's unsafe

- _____ INTERVENTION 1

Display This Choice:

If What concerns do you have about the side effects of COVID-19 vaccines? (Please select all that apply) = I think the vaccine is likely to have serious side effects

- _____ INTERVENTION 1

Display This Choice:

If Why don't you think the COVID-19 vaccines are effective? (Please select all that apply) = I think that the vaccine provides only a low level of protection

- _____ INTERVENTION 2

Display This Choice:

If Why don't you think the COVID-19 vaccines are effective? (Please select all that apply) = I think there is no evidence to show that the vaccines work

- _____ INTERVENTION 2

Display This Choice:

If Why don't you think the COVID-19 vaccines are effective? (Please select all that apply) = I know people who've had the vaccine and still gotten COVID-19

- _____ INTERVENTION 3

Display This Choice:

If Why do you think that COVID-19 is not a serious risk to you? (Please select all that apply) = I think it's unlikely I will catch COVID-19

- _____ INTERVENTION 4

Display This Choice:

If Why do you think that COVID-19 is not a serious risk to you? (Please select all that apply) = I do not think I would get seriously ill if I catch COVID-19

- _____ INTERVENTION 4

Display This Choice:

If Why do you think that COVID-19 is not a serious risk to you? (Please select all that apply) = I think the pandemic will pass soon because so many other people have gotten the vaccine

- _____ INTERVENTION 5

Display This Choice:

If Why do you think that COVID-19 is not a serious risk to you? (Please select all that apply) = I have already had COVID-19

- _____ INTERVENTION 5

- Display This Choice:

If Why can you not get the vaccine? (Please select all that apply) = Getting a vaccine is against my cultural or religious beliefs

- _____ INTERVENTION 6

Display This Choice:

If Why can you not get the vaccine? (Please select all that apply) = I believe that vaccines are not vegan

- _____ INTERVENTION 7

Display This Choice:

If Why can you not get the vaccine? (Please select all that apply) = I believe that my medical condition doesn't allow me to get the vaccine

- _____ INTERVENTION 8

Display This Choice:

If Why can you not get the vaccine? (Please select all that apply) = My GP told me not to get the vaccine as I have legitimate health reasons

- _____ NO INTERVENTION

Display This Choice:

If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) = I think that the vaccines have been rushed and not tested properly

- _____ INTERVENTION 9

Display This Choice:

If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) = I had bad experiences with the healthcare system

- _____ INTERVENTION 10

Display This Choice:

If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) = I do not trust the government

- _____ INTERVENTION 10

Display This Choice:

If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) = I am concerned it would impact my fertility

- _____ INTERVENTION 11

Display This Choice:

If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) = I was not offered the vaccine I wanted

- _____ INTERVENTION 12

Display This Choice:

If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) = I have a fear of needles

- _____ INTERVENTION 13

Display This Choice:

If Why can you not get the vaccine? (Please select all that apply) = I can't book a vaccination appointment

- _____ INTERVENTION 14

Display This Choice:

If Please select the reasons why you do not want to get the vaccine. (Please select all that apply) = I do not know how to get a vaccine

- _____ INTERVENTION 14

End of Block: 5. Ranking concerns - No

Start of Block: 6. Intervention - No - General Side Effects

Intervention 1

How do we know that COVID-19 vaccines are safe?

The majority of Sandwell residents have taken the vaccine. The more people get the vaccine, the safer Sandwell will be for everyone.

More than 40 million people have already been vaccinated in the UK.

For all vaccines, the majority of the side effects are mild (sore arm or 'flu-like' symptoms for example) and typically last 1 or 2 days.

End of Block: 6. Intervention - No - General Side Effects

Start of Block: 6. Intervention - No - Effectiveness

Intervention 2

Are COVID-19 vaccines effective?

Yes, vaccines are the single most effective way to reduce deaths and risk of severe illness from COVID-19.

You can protect others and avoid a resurgence of COVID-19 in the UK by getting the vaccine.

10,400 lives saved.

10,400 grandparents, neighbours, friends, siblings, children.

As a result of the COVID-19 vaccination programme an estimated 10,400 deaths in England have been prevented.

Source: Data up to the end of March 2021. Public Health England

End of Block: 6. Intervention - No - Effectiveness

Start of Block: 6. Intervention - No - Immunity

Intervention 3

What happens once you are vaccinated?

It may take a few weeks for your body to build-up some protection from the vaccine.

Some people may still get COVID-19 despite having a vaccination, but this should be less severe.

Vaccines are the single most effective way to reduce deaths and risk of severe illness from COVID-19.

10,400 lives saved.

10,400 grandparents, neighbours, friends, siblings, children.

As a result of the COVID-19 vaccination programme an estimated 10,400 deaths in England have been prevented.

Source: Data up to the end of March 2021. Public Health England

End of Block: 6. Intervention - No - Immunity

Start of Block: 6. Intervention - No - Serious Risk

Intervention 4

COVID-19 still poses a serious risk, even for young and healthy people.

Everyone, including younger and healthier people, should get the vaccine once they are eligible.

Younger and healthier people can also get so sick from the disease that they require hospitalisation, and some may even die. They also might experience “long covid”, when symptoms last weeks and months after the infection has gone.

1 in 9 Sandwell residents

Since the beginning of the pandemic, at least 1 in 9 Sandwell residents have been infected.

1 in 327 didn't survive.

End of Block: 6. Intervention - No - Serious Risk

Start of Block: 6. Intervention - No - Free riders

Intervention 5

Everyone should get the vaccine.

Everyone, including people who already had COVID-19 and healthier people, should get the vaccine once they are eligible.

There are still many people at risk of COVID-19 in Sandwell. Herd immunity can only be achieved when enough people are protected by the vaccine.

10,400 lives saved.

10,400 grandparents, neighbours, friends, siblings, children.

As a result of the COVID-19 vaccination programme an estimated 10,400 deaths in England have been prevented.

Source: Data up to the end of March 2021. Public Health England.

End of Block: 6. Intervention - No - Free riders

Start of Block: 6. Intervention - No - Religion

Intervention 6

All major religions support vaccines

Faith leaders across Sandwell have shown their support for the vaccine.

Harmohinder Signh Bhatia MBE - Community faith leader "I have received both doses of the Covid-19 vaccine, it was fine, I had no side effects and I feel much more protected."

Hema Patel - Community faith leader "We all need to get the Covid-19 vaccine when we're offered it."

Ragih Myflihi - Chair of Sandwell Inclusive Muslim Action Network "I would encourage everyone, including all Arabic speakers in Sandwell, to join with me and have the vaccine when it is offered to you."

Mille O'Connor - Sandwell Council Chaplain "Better days will come sooner if we all take up the offer of the Covid-19 vaccine when it's our turn."

Jaswinder Singh - President of Guru Nanak Gurdwara Smethwick "Please have the Covid-19 vaccine when it's offered to you."

Reverend David Gould - Vicar at Holy Trinity Church, Smethwick "Please join me and take up the offer of the vaccine when it's your turn."

Imam Ghulam Rasool - Community faith leader "By taking up the vaccine when it is offered to us, we'll be protecting ourselves and our loved ones from becoming seriously ill from the virus."

End of Block: 6. Intervention - No - Religion

Start of Block: 6. Intervention - No - Vegan

Intervention 7

Veganism and COVID-19 vaccines

Vaccination plays a fundamental role in tackling the COVID-19 pandemic and saving thousands of lives.

Since all medications currently go through animal testing, decisions around taking medication can be complex for vegans.

As The Vegan Society recognises, it might not always be possible or practicable for vegans to avoid participating in animal use.

All citizens, including vegans, are encouraged to look after their health and that of the people around them.

For more information you can read the statements from both the [Vegetarian Society](#) and the [Vegan Society](#).

End of Block: 6. Intervention - No - Vegan

Start of Block: 6. Intervention - No - Medical condition

Intervention 8

Who cannot have the vaccine?

A very small number of people who are at risk of COVID-19 cannot have the vaccine – this includes people who have severe allergies to a component in the vaccine.

Women of childbearing age, those who are pregnant, planning a pregnancy or breastfeeding can have the COVID-19 vaccine.

For more information please read the [COVID-19 vaccines guidance by the NHS](#) or contact your GP.

End of Block: 6. Intervention - No - Medical condition

Start of Block: Intervention - No - Vaccine development

Intervention 9

How were the COVID-19 vaccines developed so quickly?

COVID-19 Vaccines have gone through the same number of phases, same safety checks and same numbers of volunteers in trials than any other vaccines.

Scientists built on years of knowledge and research for other coronaviruses including SARS and MERS.

Vaccines were tested on thousands of people from all walks of life.

Companies also made use of the latest technology which helped vaccines to get better and better

Many of the processes were also done at the same time.

All together this helped to reduce the time needed to develop a COVID-19 vaccine

End of Block: 6. Intervention - No - Vaccine development

Start of Block: Intervention - No - System trust

Intervention 10

A challenging time for all of us.

The COVID-19 pandemic has been challenging for all of us, also for the NHS staff. It has uncovered many inequalities that need to be addressed by both the NHS and the government.

The NHS staff continues to work hard to ensure that vaccines are offered to everyone so all of us are protected against the virus.

Getting the vaccine is the best way to protect yourself and your loved ones from the virus

and the key to return to a normal life.

39 million people have already been vaccinated in the UK by the NHS

End of Block: Intervention - No - System trust

Start of Block: 6. Intervention - No - Fertility

Intervention 11

Do vaccines affect fertility?

Vaccines are being continuously monitored by the World Health Organisation and other regulatory bodies.

Millions of women have been vaccinated globally and there is no evidence to say that vaccines impact fertility.

Fertility experts such as the British Fertility Society [have confirmed](#) that there is no biological mechanism by which having the vaccine could affect your chances of conceiving.

Raj Mathur, executive committee chair of the British Fertility Society “Vaccination does not stop you getting pregnant, and is the best way of reducing the risk of getting Covid when you are pregnant.”

Get the vaccine to ensure your pregnancy is going to be safe for both you, and your baby.

End of Block: 6. Intervention - No - Fertility

Start of Block: 6. Intervention - Offered Vaccine

Intervention 12

Types of COVID-19 vaccines

All vaccines offer high levels of protection against COVID-19.

The more people get the vaccine, the safer Sandwell will be for everyone

What vaccines are currently being offered in the UK?

There are four vaccines currently approved for use in the UK: Pfizer/BioNTech, Oxford-Astrazeneca, Moderna and Janssen.

All four have shown to be safe and offer high levels of protection against COVID-19.

The four have been approved by the [MHRA](#).

Remember

Once you have been offered a COVID-19 vaccine, that offer remains open, even though you said no in the past.

Get your COVID-19 vaccine as soon as possible to protect you, your family and your community.

End of Block: 6. Intervention – Offered Vaccine

Start of Block: 6. Intervention - No - Needle Phobia

Intervention 13

What can I do to overcome my fear of needles?

Fear of needles is very common, affecting at least 1 in 10 people. Fortunately, simple exercises and practice can help to overcome it.

Don't be ashamed of being scared of injections - you are not alone.

Tell health professionals about your worries.

Think about what helped you in the past.

Learn applied tension technique if you faint or feel very faint, or breathing for relaxation exercise if you feel panicky.

Once you have mastered the exercises, develop a 'fear ladder' – a list of all of the situations related to needles which you fear, arranged in order of difficulty.

Overcoming your fear will take some time and practice, but it will make life less stressful and you will feel less anxious.

Learn more about how to overcome your fear of needles [here](#)

End of Block: 6. Intervention - No - Needle phobia

Start of Block: Intervention - How to get a vaccine - not eligible

Intervention 14

How do I get the COVID-19 vaccine?

Getting the vaccine is easy.

It is the best way to protect you and others.

Can I get the vaccine?

Currently the vaccine is being given to people aged 30 and over (before 1 July 2021), people at high risk, people who live or work in care homes, health and social care workers, people with a learning disability and people who are a main carer for someone at high risk from COVID-19.

How do I get my vaccine?

You need 2 doses of the COVID-19 vaccine: Choose a vaccination centre or a pharmacy
Set a day and time The second appointment will automatically be scheduled 12 weeks after

End of Block: Intervention - How to get a vaccine - not eligible

Start of Block: Intervention - How to get a vaccine - eligible

Intervention 14

How do I get the COVID-19 vaccine?

Getting the vaccine is easy.

It is the best way to protect you and others.

Can I get the vaccine?

Yes, you are eligible because you are aged 25 and over.

How do I get my vaccine?

You need 2 doses of the COVID-19 vaccine: Choose a vaccination centre or a pharmacy
Set a day and time The second appointment will automatically be scheduled 12 weeks after

End of Block: Intervention - How to get a vaccine - eligible

Start of Block: 4b. Not vaccinated - Yes/Leaning towards yes

Q18 Why have you not yet gotten a vaccine? (Please select all that apply)

- I was not offered the vaccine I wanted (1)
 - The vaccination centre is too far away/is not easy for me to get to (2)
 - I plan to get one later; I just haven't gotten around to it yet (3)
 - I tried to schedule an appointment, but it didn't work (4)
 - I do not think I am eligible to get the vaccine (5)
 - I do not have time to get the vaccine (6)
 - I do not know how to get a vaccine (7)
 - Other reasons (please specify) (9)
-

End of Block: 4b. Not vaccinated - Yes/Leaning towards yes

Start of Block: 5. Ranking concerns - Yes



Q19 You stated that you were not able to get vaccinated for the reasons listed below. **Please order these reasons in order of importance.** You can drag and drop the reasons from the most important to the least important one, being the reason ranked 1 the most important.

Display This Choice:

If Why have you not yet gotten a vaccine? (Please select all that apply) = I was not offered the vaccine I wanted

- _____ INTERVENTION 12

Display This Choice:

If Why have you not yet gotten a vaccine? (Please select all that apply) = The vaccination centre is too far away/is not easy for me to get to

- _____ INTERVENTION 14

Display This Choice:

If Why have you not yet gotten a vaccine? (Please select all that apply) = I plan to get one later; I just haven't gotten around to it yet

- _____ INTERVENTION 14

Display This Choice:

If Why have you not yet gotten a vaccine? (Please select all that apply) = I tried to schedule an appointment, but it didn't work

- _____ INTERVENTION 14

Display This Choice:

If Why have you not yet gotten a vaccine? (Please select all that apply) = I do not think I am eligible to get the vaccine

- _____ INTERVENTION 14

Display This Choice:

If Why have you not yet gotten a vaccine? (Please select all that apply) = I do not have time to get the vaccine

- _____ INTERVENTION 14

Display This Choice:

If Why have you not yet gotten a vaccine? (Please select all that apply) = I do not know how to get a vaccine

- _____ INTERVENTION 14

End of Block: 5. Ranking concerns - Yes

Behavioural outcomes -Trial 2 - Non- vaccinated - Eligible

Outcome: book a vaccine (if eligible)

Q20

Are you interested in booking a vaccine appointment?

All you need to do is to click the button below, which will direct you to the NHS vaccine appointment scheduling service.

[Book my vaccination appointment](#)

Clicking on this button will open a new page, you won't be taken out of the survey.

End of Block: 7. Outcome - Book vaccine

Behavioural outcomes -Trial 2 - Non- vaccinated – Non eligible

Outcome: book a vaccine (if not eligible)

Q21

Would you like to know more about how to get the vaccine?

Please click on the link below to learn more about how to get the vaccine.

[How do I get the vaccine?](#)

Clicking on this button will open a new page, you won't be taken out of the survey.

End of Block: 7. Outcome - More info

Outcome questions -Trial 2 - Non- vaccinated (eligible and non-eligible)

Display This Question:

If eligible_vaccine = 1

Q22 How likely is it that you will book your vaccine appointment in the next week?

- Very likely (1)
 - Somewhat likely (2)
 - Unsure (3)
 - Somewhat unlikely (4)
 - Very unlikely (5)
-

Display This Question:

If eligible_vaccine = 0

Q23 How likely is it that you will book your vaccine appointment when you are eligible?

- Very likely (1)
 - Somewhat likely (2)
 - Unsure (3)
 - Somewhat unlikely (4)
 - Very unlikely (5)
-

Q24 To what extent do you agree with the following statements?

	Completely disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Completely agree (5)
Covid-19 poses a risk to people in my community (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Covid-19 poses a risk to me personally (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that it would be safe for me to take the Covid-19 vaccine (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that the Covid-19 vaccines would protect me against Covid-19 (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that the vaccine reduces the chance that I transmit Covid-19 to others (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The benefits of protection received from the Covid-19 vaccines far outweigh potential side effects (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q25 Do you have any other concerns about the vaccine that haven't been covered in this survey?

End of Block: 8. Outcome questions - not vaccinated

Behavioural outcomes Trial 1 - Vaccinated

Outcome: Vaccine Advocacy

Q26

Will you encourage your friends, family and co-workers to get the vaccine?

Share the badge below with your friends, family and co-workers to encourage them to get the vaccine.

Click on the button below to save the badge in your phone.

[Save as image](#)

Or share it directly via Whatsapp, Facebook or Twitter by clicking the icons below.

End of Block: Outcome - Advocate

Outcome questions Trial 1 - Vaccinated

Q27 Will you encourage your friends, family and co-workers to receive a COVID-19 vaccine?

- Yes definitely (1)
 - Probably (2)
 - Not sure (3)
 - Probably not (4)
 - No definitely not (5)
-

Q28 How important is it to encourage others to get the Covid-19 vaccine?

- Very Important (1)
- Important (2)
- Unsure (3)
- Not Important (4)
- Not at all important (5)

End of Block: 8. Outcome questions - vaccinated

E Supplementary Analyses

E.1.1 Vaccination status by education – total survey population

What is the highest level of education you have completed?	Have you received a COVID-19 vaccine?			Total
	Yes	No, but I have scheduled an appointment	No	
Primary school	5	0	2	7
Secondary school up to 16	129	1	9	139
Higher or secondary or further education (A-levels, BTEC, etc.)	144	3	15	162
College or university	306	4	31	341
Post-graduate degree	78	1	8	87
Prefer not to say	23	0	9	32
Total	685	9	74	768

E.1.2 Demographic variables for participants in the advocacy trial group

What is your age group?	Freq.	Percent	Cum.
18 – 24	29	4.18	4.18
25 – 29	56	8.07	12.25
30 – 34	63	9.08	21.33
35 – 39	92	13.26	34.58
40 – 44	76	10.95	45.53
45 – 49	104	14.99	60.52
50 – 54	105	15.13	75.65
55 – 59	89	12.82	88.47
60 – 64	60	8.65	97.12
65 – 69	18	2.59	99.71
70 – 74	2	0.29	100.00
Total	694	100.00	

Which ethnicity do you most identify with?	Freq.	Percent	Cum.
White British	516	74.35	74.35
Asian or Asian British	96	13.83	88.18
Black or Black British	13	1.87	90.06
Mixed	17	2.45	92.51
Other ethnic groups	38	5.48	97.98
Prefer not to say	14	2.02	100.00
Total	694	100.00	

What is your gender?	Freq.	Percent	Cum.
Female	311	45.27	45.27
Male	376	54.73	100.00
Total	687	100.00	

What is the highest level of education you have completed?	Freq.	Percent	Cum.
Primary school	5	0.72	0.72
Secondary school up to 16	130	18.73	19.45
Higher or secondary or further education (A-levels, BTEC, etc.)	147	21.18	40.63
College or university	310	44.67	85.30
Post-graduate degree	79	11.38	96.69
Prefer not to say	23	3.31	100.00
Total	694	100.00	

E.1.3 Reasons for getting the vaccine as a predictor of advocacy

Variables	(1) Advocacy
To help get the economy going again	0.0499*
To allow myself to go out and do all the things I used to be able to do	-0.0752**
To protect the NHS	-0.00171
To protect others against the coronavirus	-0.00382
To protect myself against the coronavirus	0.0866**
To allow society to start functioning normally again	0.0467
To reduce the spread of the coronavirus	0.102***
Other reasons	-0.183**
Constant	0.782*** (0.0355)
Observations	596
R-squared	0.114

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

E.1.4 Importance of advocacy as a predictor of advocacy

Variables	(1) Advocacy
Importance of advocacy	0.764*** (0.0529)
Constant	0.213*** (0.0525)
Observations	594
R-squared	0.593

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

E.1.5 Demographic variables for participants in the non-vaccinated trial group

What is your age group?	Freq.	Percent	Cum.
18 – 24	9	12.00	12.00
25 – 29	6	8.00	20.00
30 – 34	19	25.33	45.33
35 – 39	15	20.00	65.33
40 – 44	12	16.00	81.33
45 – 49	4	5.33	86.67
50 – 54	3	4.00	90.67
55 – 59	3	4.00	94.67
60 – 64	2	2.67	97.33
65 – 69	1	1.33	98.67
80+	1	1.33	100.00
Total	75	100.00	

Which ethnicity do you most identify with?	Freq.	Percent	Cum.
White British	34	45.33	45.33
Asian or Asian British	9	12.00	57.33
Black or Black British	9	12.00	69.33
Mixed	5	6.67	76.00
Other ethnic groups	10	13.33	89.33
Prefer not to say	8	10.67	100.00
Total	75	100.00	

What is your gender?	Freq.	Percent	Cum.
Female	30	43.48	43.48
Male	39	56.52	100.00
Total	69	100.00	

What is the highest level of education you have completed?	Freq.	Percent	Cum.
Primary school	2	2.70	2.70
Secondary school up to 16	9	12.16	14.86
Higher or secondary or further education (A-levels, BTEC, etc.)	15	20.27	35.14
College or university	31	41.89	77.03
Post-graduate degree	8	10.81	87.84
Prefer not to say	9	12.16	100.00
Total	74	100.00	

E.1.6 Vaccine intention among non-vaccinated participants

Do you want to get the vaccine?	Freq	Percent	Cum.
	.		
Yes	5	6.67	6.67
Leaning towards yes	12	16.00	22.67
No	45	60.00	82.67
Leaning towards no	13	17.33	100.00
Total	75	100.00	

E.1.7 Correlation matrix for reasons to not get the vaccine – all reasons

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
I am concerned about the side effects of the vaccine	1.00																		
I do not think that the COVID-19 vaccines are effective	0.22	1.00																	
I don't think that COVID-19 is a serious risk to me	0.18	0.41	1.00																
I can't get vaccinated	0.19	-	-	1.00															
I have a fear of needles	0.27	0.05	0.00	0.23	1.00														
I had bad experiences with the healthcare system	0.09	0.36	0.07	-	0.28	1.00													
I do not trust the government	0.36	0.41	0.20	0.08	0.10	0.19	1.00												
I am concerned it would impact my fertility	0.21	-	0.01	-	0.27	0.21	0.01	1.00											
I think that the vaccines have been rushed and not tested properly	0.40	0.46	0.32	-	-	0.18	0.44	0.11	1.00										
Other reasons	-	-	-	-	-	-	-	-	-	1.00									
My family and friends think it's unsafe	0.27	0.07	0.11	0.32	0.33	0.17	0.24	0.25	0.14	-	1.00								
I know people who've had the vaccine and still	0.27	0.77	0.20	-	0.03	0.47	0.34	0.05	0.42	-	0.14	1.00							

gotten COVID-19																			
I think that the vaccine provides only a low level of protection	0.14 3	0.71 5	0.32 8	- 0.08 6	- 0.05 5	0.38 3	0.25 5	- 0.01 3	0.37 6	- 0.21 6	0.16 6	0.62 2	1.00 0						
I think there is no evidence to show that the vaccines work	0.20 9	0.71 5	0.25 5	- 0.08 6	0.05 7	0.12 2	0.32 8	0.08 3	0.37 6	- 0.21 6	0.16 6	0.46 9	0.28 5	1.00 0					
I think the pandemic will pass soon because so many other people have gotten the vaccine	- 0.03 9	0.13 7	0.32 7	- 0.03 4	0.16 8	- 0.05 5	0.02 4	0.12 0	0.08 7	- 0.08 5	- 0.04 8	- 0.11 5	0.06 0	0.22 6	1.00 0				
I think it's unlikely I will catch COVID-19	- 0.01 4	0.14 2	0.42 9	- 0.04 4	0.09 8	- 0.07 1	0.07 1	- 0.10 5	- 0.02 9	- 0.11 1	- 0.06 3	- 0.15 0	0.12 2	0.12 2	0.49 1	1.00 0			
I do not think I would get seriously ill if I catch COVID-19	0.20 9	0.37 0	0.76 8	- 0.07 9	0.08 2	0.00 9	0.23 5	0.11 4	0.25 1	- 0.19 9	0.03 9	0.13 1	0.33 5	0.16 8	0.42 6	0.42 1	1.00 0		
I have already had COVID-19	0.25 2	0.33 2	0.66 5	- 0.06 9	- 0.00 3	0.19 1	0.24 5	0.05 9	0.30 4	- 0.17 2	0.23 7	0.29 7	0.33 6	0.24 4	0.10 8	0.04 0	0.28 5	1.00 0	
I believe that my medical condition doesn't allow me to get the vaccine	0.19 2	- 0.12 1	- 0.10 3	1.00 0	0.23 1	- 0.04 4	0.08 1	- 0.06 5	- 0.15 1	- 0.06 9	0.32 9	- 0.09 3	- 0.08 6	- 0.08 6	- 0.03 4	- 0.04 4	- 0.07 9	- 0.06 9	1.00 0

E.1.8 Correlation matrix for reasons to not get the vaccine – Top 8 reasons

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I think that the vaccines have been rushed and not tested properly	1.000							
I am concerned about the side effects of the vaccine	0.406	1.000						
I do not think that the COVID-19 vaccines are effective	0.462	0.221	1.000					
I don't think that COVID-19 is a serious risk to me	0.327	0.183	0.419	1.000				
I know people who've had the vaccine and still gotten COVID-19	0.429	0.273	0.771	0.206	1.000			
I think that the vaccine provides only a low level of protection	0.376	0.143	0.715	0.328	0.622	1.000		
I think there is no evidence to show that the vaccines work	0.376	0.209	0.715	0.255	0.469	0.285	1.000	
I do not think I would get seriously ill if I catch COVID-19	0.251	0.209	0.370	0.768	0.131	0.335	0.168	1.000

E.1.9 Demographic variables as predictors of top 8 reasons to not get vaccinated

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	I think that the vaccines have been rushed and not tested properly	I am concerned about the side effects of the vaccine	I do not think that the COVID-19 vaccines are effective	I don't think that COVID-19 is a serious risk to me	I know people who've had the vaccine and still gotten COVID-19	I think that the vaccine provides only a low level of protection	I think there is no evidence to show that the vaccines work	I do not think I would get seriously ill if I catch COVID-19
Age group								
25 - 29	0.424	0.707***	0.0421	0.106	0.0393	0.0870	0.106	0.256
30 - 34	0.270	0.530***	-0.156	-0.0392	-0.00651	-0.252	-0.0272	0.0508
35 - 39	0.440	0.515**	0.209	0.190	0.134	-0.0907	0.386*	0.160

40 - 44	0.144	0.635***	0.100	0.168	0.207	0.0434	0.218	0.218
45 - 49	0.540**	0.00955	-0.482**	-0.396*	-0.216	-0.318	-0.103	-0.127
50 - 54	0.280	0.748**	0.656**	-0.232	0.995***	0.0898	0.338	-0.137
55 - 59	0.0471	0.352	-0.0486	-0.299	0.157	0.0885	-0.0873	-0.113
60 - 64	0.413	0.252	0.208	-0.106	0.312	0.198	0.301	-0.0220
65 - 69	0.500	0.355	0.639**	-0.122	1.072***	-0.186	0.765***	-0.177
Ethnicity								
Asian or Asian								
British	-0.433**	-0.0217	-0.200	-0.556***	-0.0911	-0.136	0.0302	-0.338***
Black or Black								
British	-0.227	0.321	-0.266	-0.485***	-0.0789	-0.349**	0.0168	-0.271**
Mixed	-0.209	-0.303	0.0510	-0.192	0.165	0.0477	-0.0226	-0.258*
Other ethnic								
groups	-0.0302	0.0706	0.195	-0.252	0.173	0.0127	0.167	-0.212
Prefer not to say	-0.143	0.0414	0.125	-0.335	-0.238	-0.0622	0.188	-0.158
Education								
Secondary school								
up to 16	0.715**	0.0333	0.463	0.686***	0.0683	0.144	0.382	0.254
Higher or								
secondary or								
further education								
(A-levels, BTEC,								
etc.)	0.931***	0.761***	0.538*	0.796***	0.333	0.214	0.511*	0.590***
College or								
university	0.607***	0.156	0.657***	0.781***	0.311	0.357*	0.426**	0.514**
Post-graduate								
degree	0.888***	0.139	0.912***	0.691**	0.455	0.211	0.707*	0.252
Prefer not to say	0.552*	0.621***	0.509*	0.697***	0.272	0.458	0.637***	0.428
Gender								
Constant	-0.152	-0.359***	0.0929	0.151	0.0334	0.0571	0.0776	0.0961
	(0.287)	(0.226)	(0.261)	(0.219)	(0.240)	(0.219)	(0.198)	(0.206)
Observations	68	68	68	68	68	68	68	68
R-squared	0.276	0.531	0.309	0.394	0.295	0.221	0.328	0.338

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

