

Technical Appendix B

Survey data impact analysis

Produced by BPSR

The evaluation included surveys of individuals in both CVC-funded and comparison areas. These surveys captured a range of information, including take up and attitudes towards vaccinations and more general health services, retrospective data on vaccination and attitudes at the start of January 2022 (which gives crude baseline data), and demographics (see Appendix 2.2 for the full questionnaire). The two groups of respondents (across CVC-funded and comparison areas) were matched at the analysis stage (via propensity score matching)¹ to ensure the comparison group was similar to the CVC-funded group on their demographics and baseline variables.

For the propensity score matching, the probability (or propensity) of an individual being in the CVC-funded group (rather than the comparison group) was estimated from a logistic regression model of the data, using predictors such as baseline neighbourhood resilience, health attitudes and behaviour outcomes, baseline vaccination status, and demographic profiles. The comparison group was then weighted so that the distribution of propensity scores in the comparison group is the same as in the CVC-funded group.

Having made the two groups comparable in this way, any significant differences between the two groups on their current vaccination status and attitudes can reasonably be interpreted as impacts of the CVC programme.

Overall, this analysis did not find strong evidence of impacts across the populations in CVC-funded areas, with none of the observed differences between the two matched groups reaching statistical significance. To test whether this could be explained by the fact that only a proportion of CVC respondents would have been reached by the programme, the analysis was repeated restricting the CVC sample to those who might have been reached, namely those who in the survey said they were aware of, or had engaged with, activities that could have been CVC funded. Specifically, those who said 'yes' to at least one of the following survey questions:

- Excluding any communications from your doctor or local NHS service, since January 2022 have you heard or seen anything about people or organisations in your local community...encouraging people to receive the COVID-19 vaccination?
- Excluding any communications from your doctor or local NHS service, since January 2022 have you heard or seen anything about people or organisations in your local community...sharing information in support of COVID-19 vaccination?

¹ Propensity Score Matching (PSM) is a technique used to estimate the causal effect of a treatment by matching units who received the treatment with units who did not, but who have similar characteristics (propensity scores) that may affect the outcome.

- Have you heard or seen anything about 'Community Vaccine/Health Champions' specifically?
- Since January 2022, have you personally... had any dealings with people or organisations in your local community, who were encouraging people to receive the COVID-19 vaccination?
- Since January 2022, have you personally... had any dealings with people or organisations in your local community, who were sharing information in support of COVID-19 vaccination?
- Are you aware of any local meetings or events that have taken place since January 2022, that talked about COVID-19 vaccines?
- You say you remember seeing or hearing something else about COVID-19 vaccines, since January 2022. Was this from... Talking to people in your local community who were encouraging people to receive the COVID-19 vaccination, or sharing information in support of COVID-19 vaccination (sometimes known as 'Community Health Champions' or 'Community Vaccine Champions')?

This is essentially an 'impact on the treated' although we cannot be sure how many of the 'treated' group were, in fact, reached by CVC activities rather than by other, more general, health-related local activities. The expectation was that by focussing on those who might have come into contact with the programme, we would be concentrating on the group where impacts were most likely to be observed. Narrowing the focus of the impact study in this way still, however, did not find strong evidence of impacts.

A series of sub-group analyses were subsequently undertaken to establish whether there was evidence of impact amongst sub-groups that were specifically targeted by the programme. This covered: gender, age, ethnic group (white British vs. all other ethnicities because of small sample sizes), religion, whether the respondent had a long-standing physical or mental health condition, social class, and whether the respondent was a carer or parent of a child under 16. This sub-group analysis focussed on impact on trust in vaccinations and local health information as well as awareness of local health information and services (measures for which the CVC and comparison samples were both relatively lower at the baseline, giving greater scope for impacts to be observed).

This analysis gave some tentative evidence of positive CVC impacts for one key sub-group, namely a group made up of those giving their religion as Muslim, Buddhist, Hindu, Sikh, Jewish or 'other'. The sample size for this group is small, just 92 in CVC-funded areas who were in our 'treated' group, and 99 in comparison areas. Nevertheless, after matching the samples from the two groups (CVC and comparison), those in the CVC-funded area gave more positive responses across the outcomes being considered. The differences do not reach statistical significance (a p-value of less than 0.05 being the

standard threshold for significance)², perhaps because of the small sample sizes. But given that the findings align with the qualitative research they are presented here.

% agreeing they trust having a COVID-19 vaccine making you less likely to catch it in Autumn 2022		ppt diff.	P-value	Impact?
CVC-aware	 66%	+11	0.167	 No significant impact
Non-CVC	 55%			
% agreeing they see or hear information about what health services are available in their local area, in Autumn 2022		ppt diff.	P-value	Impact?
CVC-aware	 73%	+12	0.057	 Approaching significance
Non-CVC	 61%			
% agreeing they see or hear information about ways to look after their health, in Autumn 2022		ppt diff.	P-value	Impact?
CVC-aware	 68%	+6	0.297	 No significant impact
Non-CVC	 62%			
% agreeing they <u>trust</u> information on ways to look after their health, in Autumn 2022		ppt diff.	P-value	Impact?
CVC-aware	 75%	+6	0.201	 No significant impact
Non-CVC	 69%			

Base: Religious minority groups – CVC aware group (92); comparison group (99). Note: percentage point differences may not appear aligned with percentages shown in the charts due to rounding.

² The p-values are based on an ordinal test. That is, they test whether the difference in responses across the five-point scale can have occurred by chance. A low p-value (less than 0.05 being the standard default) suggests that ‘chance differences’ can be reasonably confidently ruled out, and that it is likely the observed differences reflect a genuine underlying difference between the groups. The test looks at whether there is more of a skew towards one end of the scale for one group compared to the other.

As a validation check of the survey findings of potential impacts on trust in COVID vaccinations for this sub-group, a follow-up analysis checked the impact on vaccination uptake during 2022, the hypothesis being that if trust had genuinely increased because of the programme, then this would be reflected in higher uptake of vaccinations during 2022. This seems to be borne out. Whilst there is no evidence of an impact on first vaccinations, there is statistically significant evidence that, for religious minority groups, receipt of a booster vaccination during 2022 was higher amongst the CVC treated group than for the matched comparison group (46 per cent for the CVC-funded group versus 27 per cent for the matched comparison group.) The p-value for the difference is 0.028.

Impact on:	% received in CVC period		ppt diff.	P-value	Impact?
1st dose	CVC-aware	 17%	+2	0.807	<input checked="" type="checkbox"/> No significant impact
	Non-CVC	 16%			
Booster	CVC-aware	 46%	+20	0.028	<input checked="" type="checkbox"/> Significant impact
	Non-CVC	 27%			
Booster appointment	CVC-aware	 26%	+9	0.198	<input checked="" type="checkbox"/> No significant impact
	Non-CVC	 17%			

Base: Religious minority groups – CVC aware group (92); comparison group (99). Note: percentage point differences may not appear aligned with percentages shown in the charts due to rounding.

1 Technical details of the propensity score matching

Propensity Score Matching (PSM) is a technique used to estimate the causal effect of a treatment by matching units who received the treatment with units who did not, but who have similar characteristics (propensity scores) that may affect the outcome.

In this instance, the impact estimates derived from the survey compare outcomes for survey respondents in CVC-funded areas (n=750) with those of a matched comparison group of survey respondents from a set of comparison areas (n=745). The raw matched comparison group data is then weighted, with the purpose being to generate a weighted comparison sample that has a similar profile, and a similar beginning-of-January 2022 'starting position' to the CVC respondents. Any difference in the degree of change for these two groups (CVC-funded, and matched comparison), is then assumed to give an estimate of impact.

A separate matched comparison group was created for the subset of those in the CVC-funded areas defined as 'treated' (n=417), namely those who:

- Excluding communications from the NHS, since January 2022 had heard or seen anything about people or organisations in their local community either encouraging COVID-19 vaccination or sharing information in support of vaccination; or
- Had seen or heard anything about Community Health Champions; or
- Since January 2022, had dealings with people or organisations in their local community who were encouraging people to receive COVID-19 vaccinations; or
- Had dealings with people or organisations in their local community who were sharing information in support of COVID-19 vaccinations; or
- Were aware of any local meetings of events that had taken place since January 2022 that talked about COVID-19 vaccinations; or
- Since January 2022 had talked to people in their local community who were encouraging people to receive COVID-19 vaccinations, or sharing information in support of COVID-19 vaccination.

In addition, separate matched comparison groups were created for each separate sub-group for which impacts were estimated.

The matched comparison groups were generated using propensity score matching, the main steps of which were:

- The probability (or propensity) of an individual being in the CVC-funded group (rather than the comparison group) was estimated from a logistic regression model of the data. The binary outcome variable per model is the group (1=CVC; 0=comparison). The predictors were:

- The December 2021 versions of the neighborhood resilience, and health attitudes and behaviour outcomes (entered as categorical variables);
 - Vaccination status at December 2021;
 - Gender;
 - Age-group;
 - Ethnic group;
 - Religion;
 - Language;
 - Social class;
 - Whether have a long-standing illness or disability;
 - Ward level vaccination rate at January 2022.
- The comparison group was then weighted so that the distribution of propensity scores in the comparison group is the same as in the CVC-funded group.

Given that the December 2021 versions of the neighbourhood resilience, and health attitudes and behaviour outcomes were collected retrospectively and could, hence, be inaccurate, separate models were run without these variables to test the sensitivity of the impact estimates to their inclusion. There was no real evidence that the estimates were affected so these variables were retained in the models.

The technical details of the matching undertaken are as follows:

- The logistic regression model was fitted within SPSS with the predictors entered forward stepwise. A p-value of 0.1 was set for inclusion, and 0.2 for exclusion.
- The weights for the comparison group were calculated as inverse propensity weights (i.e. $p/1-p$). Comparison group members that are very similar to CVC respondents, and hence have a high propensity score are given a large weight; comparison group members that are dissimilar to CVC respondents, and hence have a low propensity score, are given a small weight.
- Having calculated the comparison group weights, a check was made that there were no significant differences across the full range of matching variables each time.

The p-values around the estimates of impact were calculated using the complex samples module of SPSS. The statistics generated via that module account for the weights attached to the comparison groups from the propensity score matching as well as the standard weight applied to the CVC sample to account for observed biases in the sample by age and ethnic group.