

Evaluation of the Liverpool COVID-19 Vaccination Promotion Programme

*Final Report for the Champs Public Health Collaborative
and Liverpool City Council*

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Evangelos Kontopantelis and Louise Roberts

January 2023

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Executive Summary

The Champs Public Health Collaborative, led by Cheshire and Merseyside's nine Directors of Public Health in partnership with Liverpool City Council commissioned the Unit for Evaluation and Policy Analysis (EPA) at Edge Hill University, in collaboration with colleagues from the University of Manchester to conduct an evaluation of the Liverpool COVID-19 Vaccination Promotion pilot. The pilot was developed and implemented by Liverpool City Council in partnership with the Champs Public Health Collaborative as part of a wider programme of COVID-19 vaccination promotion work.

The Liverpool COVID-19 Vaccination Promotion pilot combines an outbound call service with a key focus on communication through conversational techniques. These include detailed and specific calls tailored to individual citizens, and provision of reliable information to educate citizens to make informed choices about the vaccine. The COVID-19 Vaccination Promotion Service operates through a team of professionals who make individualised telephone calls to local citizens who have been identified as being non-vaccinated.

Call handlers can offer various options to those citizens who may be interested in taking the vaccine, such as help with the online booking system for a vaccine appointment, booking a taxi to the vaccination venue, forwarding their contact details to a team of clinical specialists for call back, or a home visit via a local vaccination team. The service views individualised telephone calls as the first step in supporting non-vaccinated citizens to consider vaccination against COVID-19. It recognises that a telephone call intervention will not always result in an immediate conversion and is just one aspect of a wider process. The importance of supporting the overall health protection journey of citizens and strengthening community messages are core aims of the service.

COVID-19 vaccination rates have been particularly low in Cheshire and Merseyside with 18.34% of eligible citizens remaining unvaccinated. The COVID-19 Vaccination Promotion pilot aimed to address vaccine inequalities through providing people with information, tackling misinformation and facilitating access to vaccinations. The service also aimed to identify and understand the main reasons why citizens may be hesitant to take up the vaccine offer, and which strategies are effective in supporting citizens to change their mind. In addition, the pilot aimed to reduce inequalities in take-up of the COVID-19 vaccine across Liverpool by prioritising citizens according to clinical risk and deprivation.

The aims of this evaluation were to:

- Assess the impact of the programme on vaccine inequalities
- Identify factors influencing vaccine inequalities
- Determine which approaches in vaccine tracing calls work and for whom
- Produce shared learning that can be utilised by other vaccine tracing approaches regionally and nationally

The evaluation utilised a mixed methods approach. In summary, the following activities were conducted:

1. Semi-structured interviews with strategic and management staff
2. A series of focus groups with call handlers
3. Statistical analysis of extracted service data

Our analysis showed that the service led to a significant number of vaccinations of 957 citizens in the period assessed (2 January 2022 to 15 May 2022). This represents a 5.3% conversion rate of calls to citizens.

The service achieved a number of vaccinations in some of the most vulnerable populations in the Liverpool area. Our analysis of calls going out to citizens living in areas ranked in the most deprived decile of the Index of Multiple Deprivation indicates that the service is well targeted, and conversions occurred in this important population. The dataset also contained JCVI information for 16,187 citizens. Some of those citizens (n=949) received a vaccination following some interaction with the service which represents a conversion rate of 5.9%. However, there was no prioritisation timetable for Liverpool against which we could map service conversions to assess how successful the COVID-19 Vaccination Promotion Service was to achieve higher vaccination rates for which JCVI group at what time.

The service reached a proportionately larger number of residents belonging to ethnic minorities compared to the overall population. Service approaches including prioritising deprived areas and using a language line to communicate with citizens who had limited understanding of the English language may help to explain this finding. However, we do not believe these data to be sufficiently robust to permit any conclusions about the reach of the service to different ethnic groups.

Analysis of qualitative data showed that reasons for vaccine hesitancy given by citizens include concerns regarding the safety and potential side effects from the vaccine, not seeing the vaccine as a priority, mistrust of government and concerns around misinformation or 'fake news'.

Effective strategies used by call handlers to address vaccine hesitancy with citizens include offering a personalised approach to conversations, giving citizens choice and autonomy over decisions and establishing mutual trust through transparency about the purpose of the call. Addressing issues of access and practical barriers (such as transport) was further seen as instrumental in achieving conversations.

Access to regular emotional support from team managers and colleagues was seen to be invaluable by call handlers in supporting them to manage the emotionally challenging nature of some calls. The service also accumulated a rich reservoir of call handler experiences which contributed to a unique set of skills and competencies amongst staff in conversational techniques with citizens.

To maximise the use of the learning the service has generated, a more systematic approach to shared learning is recommended. This would require external help and support as call handler information in the service data is uncoded and hence does not offer itself easily to conclusions without additional analysis. It would also require a

standardisation of data entry practices for call handlers since, at present, only about 15% of all calls answered contain additional notes by call handlers about the reasons for refusal of the vaccine. We make several suggestions for future service development below.

Service planning and implementation

1. Consider how accumulated call handler knowledge, skills and competencies can be sustained over time
 2. Examine and appraise call handler information as part of a Plan-Do-Study-Act (PDSA) service improvement cycle
 3. Build up a robust repository of effective conversational strategies in vaccine tracing
 4. Synthesise service learning through regular shared learning team sessions possibly using scenarios
 5. Ensure call handlers are well prepared for the emotional dimension of calls
-

System and Data

6. Utilise a case management system to standardise data entry by call handlers to build up a knowledge base for analysis of 'what works for whom'
 7. Review patient level data quality to support robust health inequalities analysis
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Future Assessment and Evaluation

8. Ensure early and continuous data quality monitoring and analysis for data quality improvement feedback
9. Conduct a cost effectiveness analysis of the service

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Preamble

The Champs Public Health Collaborative, led by Cheshire and Merseyside's nine Directors of Public Health in partnership with Liverpool City Council commissioned the Unit for Evaluation and Policy Analysis (EPA) at Edge Hill University, in collaboration with colleagues from the University of Manchester to conduct an evaluation of the COVID-19 Vaccination Promotion pilot. The COVID-19 Vaccination Promotion pilot was planned and implemented by Liverpool City Council in conjunction with the support of the Champs Public Health Collaborative. The COVID-19 Vaccination Promotion pilot sits within a wider programme of work which is led by the Champs Public Health Collaborative, with day-to-day management from the Champs Support Team. The Support Team, hosted by Wirral Council, is a small, agile team that works on behalf of the Directors of Public Health on agreed programmes of work. A team of Public Health Advisors from Liverpool City Council were involved in delivering the COVID-19 Vaccination Promotion pilot. Throughout this report we use various terms relating to the activities that Public Health Advisors undertook.

COVID-19 vaccination rates have been particularly low in Cheshire and Merseyside with 18.34% of eligible citizens remaining unvaccinated. Vaccination inequality is a multifaceted issue which requires learning generated through pilots utilising various approaches and methods. The COVID-19 Vaccination Promotion pilot was part of a wider vaccine inequalities plan to address barriers to vaccination comprising several projects. The pilot aimed to address vaccine inequalities through providing people with information, tackling misinformation and facilitating access to vaccinations.

The COVID-19 Vaccination Promotion pilot was part of the Integrated Contact Tracing Pilot Programme funded by the UK Health Security Agency to increase uptake of the COVID-19 vaccine among Liverpool residents. The service conceptualized as a 'journey of citizens' and aimed to identify and understand the main reasons why citizens may be hesitant to take up the vaccine offer, and which strategies are effective in supporting citizens to change their mind. In addition, the service aimed to reduce inequalities in take-up of the COVID-19 vaccine across Liverpool by prioritising citizens according to clinical risk and deprivation. The following report summarises the findings of the evaluation.

The report is divided into 4 sections. The first section provides a summary of existing definitions and approaches to vaccine hesitancy as well as presents an effect model for a vaccine tracing outbound call service. The section concludes with a description of the Liverpool COVID-19 Vaccination Promotion Service. The second section contains the specification of the evaluation, the evaluation activities we undertook and the methods we employed.

The third section of this report presents the findings. In the first part we provide a summary of the results of our data analysis of routinely collected service data (hence: service data). In the second part of this section we synthesise the findings of our thematic analysis of interviews and focus group transcripts with staff and key stakeholders. The report concludes with segments containing a discussion of findings, limitations of the evaluation and a list of recommendations.

1. Context and Background

1.1. Vaccine Hesitancy

Liverpool has a comparatively low level of vaccination in England. Vaccination levels in the area were at 69.3% for dose 1 and 62.9% for dose 2 on 2 January 2022 (the day the service started) which by the 15 May 2022 had increased to 71.3% for dose 1 and 66.3% for dose 2.¹ At mid-point during the service period (week 10, w/c 7 March 2022) the vaccination level in the English population was 91.6% for dose 1 and 85.3% for dose 2 whilst it was significantly lower in Liverpool with the local population vaccinated at the level of 70.7% for dose 1 and 65% for dose 2.¹ Low vaccination levels in a population may be a consequence of existing attitudes to vaccines, including vaccine hesitancy.

The World Health Organization (WHO) defines vaccine hesitancy as:

‘A 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’ (MacDonald, 2015: 4163).

Contributing to this complexity are contextual influences which may include ‘historic, social, cultural, environmental, economic, political, and institutional factors’ (Rapid literature review on motivating hesitant population groups in Europe to vaccinate, 2015: 4). Confidence, complacency, and convenience all play their part in influencing vaccine hesitancy (MacDonald, 2015).

In the current context, low confidence in COVID-19 vaccination is strongly associated with vaccine uptake (Razai et al., 2021). Confidence is defined as having trust in the effectiveness and safety of vaccines, the system that delivers them and the motivations of policymakers and their decision making (MacDonald, 2015). According to Razai et al. (2021: 2) drivers of low confidence in COVID-19 vaccination include:

- Socioeconomic and healthcare inequalities and inequities
- Structural racism and previous unethical research involving some ethnic minority groups
- Social disadvantages including lower levels of education and poor access to accurate information
- Misinformation, disinformation, rumours, and conspiracy theories, in particular through social media
- Lack of effective public health messages or targeted campaigns
- Barriers to access, including vaccine delivery time, location, and cost related to socioeconomic inequalities and marginalisation

Lack of knowledge or misconceptions about COVID-19 can result in complacency whereby the vaccine is considered to be unnecessary for those who believe they are at low risk (Coronavirus (COVID-19) vaccine barriers and incentives to uptake: literature review, 2022). Convenience in terms of vaccine accessibility and ability to

¹ <https://coronavirus.data.gov.uk/details/vaccinations?areaType=nation&areaName=England>

understand information and navigate digital booking systems can further affect vaccine uptake (Coronavirus (COVID-19) vaccine barriers and incentives to uptake: literature review, 2022).

1.2. Differential Impact of Low Vaccination Levels

Minority ethnic groups in the UK have been disproportionately affected by COVID-19, with recent research by Kamal, Hodson and Pearce (2021) evidencing higher vaccine hesitancy and lower vaccine uptake for minority ethnic groups as compared to White British groups. The UK Household Longitudinal Study conducted in 2020, revealed that Black or Black British ethnic groups had the highest rate of vaccine hesitancy at 71.8% followed by Pakistani or Bangladeshi ethnic groups (42.3%) (Robertson et al., 2021). Reasons for vaccine hesitancy amongst minority ethnic groups include mistrust, misinformation, lack of access to information and practical barriers including accessibility of vaccine centres (Kamal, Hodson and Pearce, 2021). Females and younger adults (aged 25-34) further reported higher rates of vaccine hesitancy in the UK Household Longitudinal Study (Robertson et al., 2021). This suggests that vaccine hesitancy differs across population subgroups.

1.3. Vaccination Promotion and Outbound Tracing Calls

Addressing vaccine hesitancy is therefore complex and requires multi-component approaches tailored to local populations (Jarrett et al., 2015; Razai et al., 2021). Interventions are variously defined but may include specific communication strategies, improving access to vaccines, community engagement, and training and engagement of those involved with engagement activities at a local level (Razai et al., 2021). A systematic review on strategies to address vaccine hesitancy (Jarrett et al., 2015) found that the most effective interventions were those that directly targeted unvaccinated or under-vaccinated populations, aimed to increase vaccination knowledge and awareness through dialogue-based techniques and aimed to improve convenience and access to vaccination. Engaging individuals in dialogue about vaccine safety, efficacy and importance and responding to their concerns can help to build confidence and trust in vaccines (Razai et al., 2021).

The COVID-19 Vaccination Promotion pilot was developed by Liverpool City Council in partnership with the Champs Public Health Collaborative as part of a wider programme of COVID-19 vaccination promotion work. For the purpose of this evaluation, we use the term 'vaccine tracing' which refers to the operation of outbound calls to unvaccinated citizens to promote and facilitate COVID-19 vaccination. The aim of the vaccine tracing calls is to engage with each citizen to better understand the reasons why they have not taken up the offer of the COVID-19 vaccine, and to use conversational techniques to influence behaviour change.

The service aimed to improve access to vaccination through the provision of up to date, reliable information, offering support to access the online booking system, arranging transport to and from appointments and arranging a home visit via a local vaccination team. Research suggests that motivational interviewing (MI) can be effective in reducing vaccine hesitancy (Gagneur, 2020; Breckenridge, Burns and Nye, 2021; Gabarda and Butterworth, 2021). MI is a 'collaborative conversational style for strengthening a persons own motivation and commitment to change' (Miller and Rollnick, 2013: 12). It can be used to frame vaccination conversations and to better

understand different knowledge and belief systems around vaccination (Breckenridge, Burns and Nye, 2021). It further offers flexibility allowing information to be tailored to each individual (Gagneur, 2020), and supporting professionals to identify any concerns, fears and misconceptions individuals may have around vaccination (Gabarda and Butterworth, 2021).

1.4. Service Effect Model for Vaccine Tracing Calls

For a vaccine tracing outbound call service to be effective in raising vaccination levels amongst communities it is important to understand how it can influence decision making amongst its citizens. The service in question operated outbound telephone calls to citizens. During the calls, call handlers tried to ascertain whether or not citizens were intent on receiving the vaccine, and, if not, what the reasons were for not being vaccinated.

The Figure 1 below is an illustration of a simple effect model for a vaccine tracing outbound call service based on the review of literature, and the findings from our qualitative interviews. It does not capture any other projects that may have been undertaken in the wider portfolio of the Vaccination Promotion Programme.

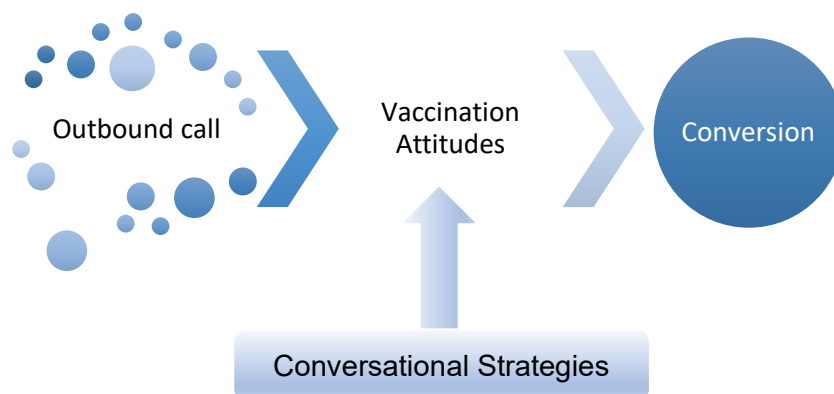


Figure 1 Effect model of vaccine tracing calls

To ensure that call handlers are using the most efficacious conversational strategies, a service would need to maximise the learning that is accumulating gradually through calls to citizens and disseminate to call handlers. An effective learning mechanism that increases call handler’s knowledge and skills would, in theory, be able to demonstrate improving rates of conversions over time. A simple logic model of such a service is presented in the figure 2 below.

For systemic learning to occur certain conditions have to be met. There are many learning cycle models available for organisations to choose from. A well-known example is the ‘study’ component in the Plan-Do-Study-Act (PDSA) cycle which requires organisations to ‘observe and learn’ from change activities. Applying this to the present vaccine tracing outbound call service, the service would have to record in a standardised manner, as well as appraise and analyse call handler data, in order to

subsequently draw conclusions and test these for their rigour and validity. This would produce transferable learning for the service and for the wider system.

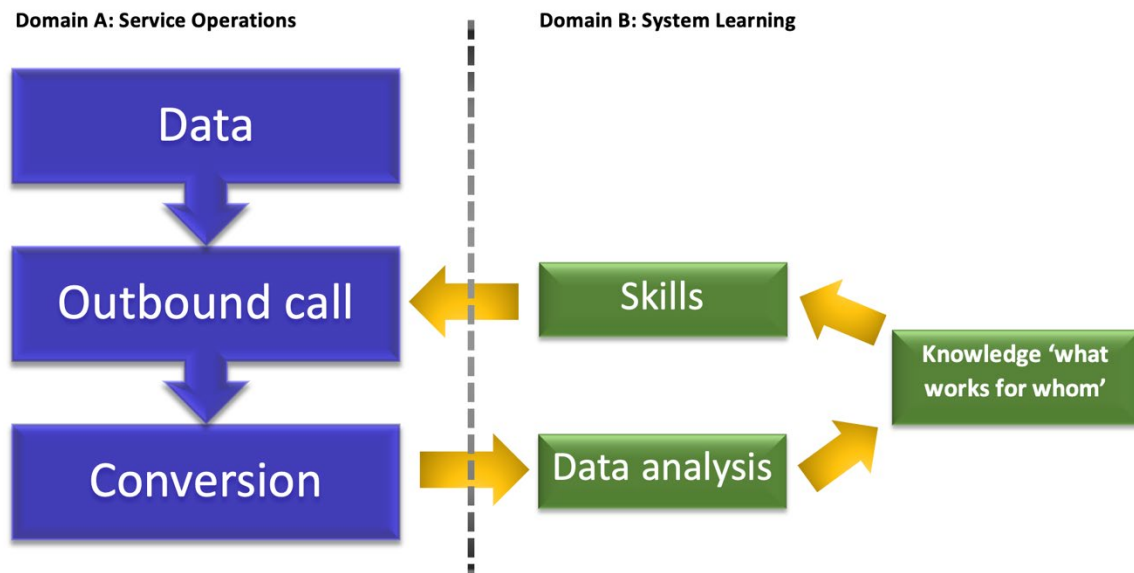


Figure 2 Service Logic Model

Note that services which do not systematically gather, appraise and utilise the accumulated knowledge at call handler level about ‘what works for whom’ are unlikely to develop a robust learning process required to improve service effectiveness over time.

1.5. Liverpool COVID-19 Vaccination Promotion Service Description

The wider national context comprises various elements that should be taken into account for an analysis of the impact of a vaccine tracing outbound call service. In the year prior to the service, Merseyside was in Tier 4 of social contact restrictions (December 2020) and the UK had entered its third national lockdown on 6 January 2021. By 19 July 2021 however the government removed all remaining legal restrictions for social contact in England (‘Freedom Day’). Throughout December 2021, the Omicron variant of COVID-19 became the dominant form of the pandemic virus in the UK. The Prime Minister announced ‘Plan B’ measures to counter the spread of the Omicron variant of the virus on 8 December 2021. During the last month of the year and the beginning of 2022, the national media began to report that the Omicron variant may cause milder episodes of COVID-19 potentially leading to fewer hospitalisations associated worldwide and nationally.

The Liverpool COVID-19 Vaccination Promotion pilot was part of a wider vaccine inequalities plan to address barriers to vaccination comprising several projects. The pilot’s development and training commenced in December 2021, with calls beginning in January 2022. Service data contains calls from 2 January 2022. The Liverpool COVID-19 Vaccination Promotion pilot combines an outbound call service with a key focus on communication through conversational techniques. These include detailed

and specific calls tailored to individual citizens, and provision of reliable information to educate citizens to make informed choices about the vaccine. The COVID-19 Vaccination Promotion Service operates through a team of professionals who make individualised telephone calls to local citizens who have been identified as being non-vaccinated. Although the team were new to Liverpool City Council and vaccine tracing work, they brought with them a range of different skills and experience of working across multi-disciplinary sectors.

Call handlers can offer various options to those citizens who may be interested in taking the vaccine, such as help with the online booking system for a vaccine appointment, booking a taxi to the vaccination venue, or forwarding their contact details to a team of clinical specialists for call back, or a home visit via a local vaccination team. The service views individualised telephone calls as the first step in supporting non-vaccinated citizens to consider vaccination against COVID-19. It recognises that a telephone call intervention will not always result in an immediate conversion and is just one aspect of a wider process. The importance of supporting the overall health protection journey of citizens and strengthening community messages are core aims of the service.

The service consists of 15 staff, with 13 call handlers and 2 managers who occasionally also conducted calls to citizens. The service works closely with the Clinical Commissioning Group (CCG), Primary Care Networks (PCNs) and GP Practices in the local area obtaining individual level data for citizens. Over time, the service has prioritised PCNs who have the lowest uptake of COVID-19 vaccination, as identified by the CCG. Data of unvaccinated citizens for all GP practices within a particular PCN is securely shared by the CCG with service managers. The service focuses on one PCN at a time.

All call handlers received training prior to placing calls to citizens. Call handlers work from an Excel worksheet from a shared drive. The spreadsheet is accessed by call handlers through a secure intranet portal. Call handlers are able to self-allocate up to ten individual citizens at a time to be contacted to ensure there is no duplication of calls to citizens. Following a conversation with a citizen call handlers record the outcome of the telephone call intervention and the reason given for not wanting the vaccine in the spreadsheet. The service was hoping to use a standardised call recording system early on in the pilot but its implementation was delayed

Data are recorded in the spreadsheet manually. Manual notes of call handlers do not align with standardised outputs and the service manager cleans the data again manually before producing a combined Excel spreadsheet containing data for all service calls. To measure the primary outcomes of the service, the number of vaccinations achieved, the CCG checks the list of calls actioned against vaccinations received within the time period and reports this figure to the service.

Certain groups of individuals were identified by the CCG as a priority due to low uptake of the vaccine. Prioritising clinical risk groups was intended but proved infeasible with the exception of carers and pregnant women. A smaller group of staff within the wider COVID-19 Vaccination Promotion service were therefore set up to focus on contacting unvaccinated carers. Data of unvaccinated carers within each PCN was shared in the same way by the CCG. However, records were checked against existing data held by

the COVID-19 Vaccination Promotion service to check for and remove any duplicates for citizens who had already been contacted by the team. Calls to pregnant women were requested but so far only one citizen was identified as a pregnant women which generated no outcome at this stage.

Through contacting carers, the team were able to identify unmet needs and signpost carers, who were struggling, to access support services (i.e., carers centre, social services). They were able to feed this information back to CCG commissioners. Incorrect data relating to contact details, people no longer living in the local area or country etc. were changed by call handlers in the spreadsheet to reflect up to date personal information. PCNs were asked if they would like to receive these amended datasets to update their own systems. This enabled PCNs to conduct a data cleansing exercise.

Service Learning

All call handlers work remotely and communicate through video calls with each other. They meet twice daily to exchange ideas and views, and to address any questions or challenges. The team also meets weekly virtually to plan and review service practices. Whilst team meetings are a forum for exchanging personal views and opinions of 'what works', there is no systematic information available to managers based on a consistent analysis and appraisal of call data which would allow the implementation of a routine learning process with the team.

Wider shared learning takes place through weekly meetings with the Liverpool multi-agency vaccination planning team, where insights about barriers and supportive factors are shared with the team. Call handlers further attend learning events in relation to wider work on vaccine hesitancy delivered by community innovation teams. Team members have become a part of the community innovation team working with local communities to better understand barriers to vaccination and co-design local solutions with the community. Learning has further been shared with some local authorities regionally to support them to set up their own vaccine promotion services.

2. Evaluation Specification

2.1. Evaluation Aims

The aims of this evaluation were to:

- Assess the impact of the programme on vaccine inequalities
- Identify factors influencing vaccine inequalities
- Determine which approaches in vaccine tracing calls work and for whom
- Produce shared learning that can be utilised by other vaccine tracing approaches regionally and nationally

2.2. Evaluation Methods

To answer the evaluation questions, a mixed methods approach was used. In summary, we conducted the following activities:

1. Semi-structured interviews with strategic and management staff
2. A series of focus groups with call handlers
3. Statistical analysis of extracted service data

Further details of the data collected are outlined below. The evaluation did not conduct observations or systematic analysis of the multiple extraneous factors influencing vaccine inequalities. Our analysis was based exclusively on the analysis of routinely collected service data, focus groups and interviews with staff. Since these data do not provide detailed information about wider contextual factors influencing vaccination rates, we operationalised the evaluation aim 'identify factors influencing vaccine inequalities' as 'reasons for refusal' of vaccine on which we have obtained some information through the analysis of service data.

2.2.1. Data Collection

2.2.1.1. *Semi-structured Interviews*

The evaluation team undertook a series of semi-structured scoping interviews (n=9) with strategic and management staff. Participants included consultants in public health, senior public health practitioners, project leads and strategic staff from Liverpool CCG (a breakdown of participant demographic information is provided in table 1 below).

Table 1 Number of participants by role

Participant group	Number of participants
Consultants in Public Health	2
Senior Public Health Practitioners	2
Project Leads	3
Strategic staff from Liverpool Clinical Commissioning Group (CCG)	2
Focus groups with call handlers	7

All interviews were conducted remotely online using Microsoft Teams, at a time convenient to the participants between April and June 2022. A semi-structured approach was followed, with the evaluators utilising an interview schedule and exploring concepts and responses in more depth through follow up questions. The interviews lasted between 16 minutes and 52 minutes and were on average approximately 31 minutes long. All interviews were recorded with the consent of participants, transcribed and anonymised.

2.2.1.2. Focus Groups

Interviews with strategic and management staff were complimented by undertaking a series of focus groups with frontline staff who were involved in making vaccine tracing calls (call handlers). Two (n=2) individual focus groups were conducted in June 2022, with 7 participants in total (n=7). Focus groups took place remotely using Microsoft Teams, lasting approximately 45 minutes. A semi-structured interview schedule was followed, with the evaluators utilising the interview schedule to explore the working experiences of call handlers. All focus groups were recorded with the consent of participants, transcribed and anonymised.

2.2.2. Data Analysis

2.2.2.1. Thematic Analysis of Interview and Focus Group Data

The anonymised interview and focus group transcripts were analysed using thematic analysis (Braun and Clarke, 2006). For the analysis, two researchers read through the transcripts independently and identified initial codes. These codes were then compared and refined into a series of key themes. Disagreements were resolved and consensus achieved through in-depth discussions. The themes were then mapped against the evaluation aims.

2.2.2.2. Statistical Analysis of Call Service Data

We used SPSS (IBM SPSS Statistics for Windows, Version 25.0., IBM Corp., Chicago, IL.) to conduct descriptive and inferential statistics.

2.2.3. Data Set

Identifying in the dataset whether a call led to a vaccination was challenging. Call handlers had no standardised reporting portal and whilst there was training for call handlers, in practice, information about calls were added manually into Excel spreadsheets with call handlers often adding free text to various spreadsheet cells. Whether a call/conversation with a citizen actually took place is thus based on our assessment of information available in four different variables/columns. This required substantial cleaning and recoding of the data set.

The dataset contained 44,715 entries with each entry normally denoting one call. Each entry contained a date variable although, due to various reasons, a substantial number of calls were not dated. We are confident however that the calls in the data set occurred between 2 January 2022 and 15 May 2022.

Some cells of the data set were prepopulated with information originating at source, the GP data set. Call handlers could overwrite these data and sometimes did so resulting in a loss of data.

2.2.4. Defining Primary Service Outcome

To assess the effectiveness of the service we defined the primary outcome of the service as *vaccinations emerging from those calls that were connected and led to a conversation with a citizen*. There is a substantial number of conversations that have led to bookings of appointments although, subsequently, for unknown reasons, a vaccination did not take place. We did not count these as primary outcome. This means that *three conditions were necessary conditions* for the primary outcome measure in this report:

1. A call had to be answered;
2. A conversation had to take place; and
3. A vaccination had occurred after the call had taken place.

In the report below we will use the term *conversion* where all three conditions above have been met. A *conversion* may be a vaccination with either dose 1 or dose 2. Where practicable we report separately for vaccinations with either dose below.

3. Findings

3.1. Analysis of Service Data

Out of 44,715 entries in the data set it appears that 17,915 calls (40.1%) have been 'actioned' one way or another indicating that a conversation with a citizen took place. 26,800 calls (59.9%) were not answered, or, alternatively, no meaningful interaction between call handlers and citizens took place. 17,915 calls thus represent the baseline for our analysis of conversions.

3.1.2. Conversions and Dose

In settings with complex interventions, it is important to set out the rationale of how the analysis may link routine service data to measurable outcomes. Since there is no direct evidential link between call data and vaccination data, we reconstructed forensically the relationship between a call to a citizen and a subsequent vaccination. Below we outline how we did this. The summary results are on page 26.

3.1.3. Linking Service Calls with Conversions

It is important to recognise that not all calls result in vaccinations. Citizens may have booked an appointment but, during the appointment, a vaccination may not have taken place for various reasons, such as the individual's health. We did not count as a conversion where appointments did not lead to a vaccination. Out of 1,629 appointments for dose 1, 1,339 (82.2%) led to vaccinations. 290 appointments (17.8%) for dose 1 vaccinations did not result in a conversion. All appointments made for dose 2 (n=943) led to a conversion. In total, for dose 1 and 2, 2,572 appointments were utilised by citizens for vaccinations leading to 2,282 conversions.

This means that, during the period the service data covered, 2,282 vaccinations occurred. However, some citizens taking the dose 2 vaccination have also received the dose 1. The actual number of citizens successfully vaccinated with either dose 1, dose 2, or both is thus lower.

Our analysis revealed that in 976 cases dose 1 and in 653 cases dose 2 vaccinations were administered to discrete individuals during the service period, which means that, in total, 1,629 citizens were successfully vaccinated in the population the service wanted to reach.

We then cross checked whether citizens who got vaccinated during the time of the service were actually reached by the service (call and conversation condition). We correlated the notes of call handlers in the data set with regard to 'call success' and noted that a different picture emerges if we cross-tabulated the 'call success' variable to conversions.

Our analysis showed that there were 830 calls to citizens which call handlers noted as 'successful', i.e., conversations had taken place and which led to vaccinations of dose 1, whilst there were 526 conversations with citizens leading to vaccinations with dose 2. As this conflicts with the number of total vaccinations in the population (n=2,282) during the time the service operated we tried to verify whether all individuals vaccinated had actually received a call from a call handler and a conversation had

occurred. We found that 477 citizens who had been vaccinated had in fact not been spoken to.

This means that, verifiably, the service created 830 conversions for Dose 1 and 526 conversions for dose 2, which are 1,356 conversions in total, through calls and conversations between citizens and call handlers. Again, since some citizens received dose 1 and dose 2, the actual number of citizens is slightly lower, with 558 citizens receiving dose 1 and another 399 citizens having received both. For the total number of 17,915 calls leading to interaction with citizens, the conversion rate for the service is thus 7.5% (for 1,356 conversions), 3.1% (citizens receiving dose 1) and 2.2% (citizens receiving dose 1 and dose 2).

3.1.4. Conversions over Time

As call handlers are accumulating knowledge about which conversational strategies work with citizens, the service could be expected to increase the rate of conversions over time. We wanted to understand if call handlers get better over time at achieving conversions. However, we recognise that conversions may also become harder over time due to reaching those who are easier to influence first and those who are more hesitant at a later stage. Wider contextual factors including changes to national policy and messaging, changes in risk and perceptions of risk from COVID-19 and COVID-19 fatigue further reduce the likelihood for conversion over time.

As a measure of service effectiveness, conversions are influenced by contextual factors such as population vaccination rate (saturation), call capacity (number of calls per day), and wider aspects relating to societal and community circumstances such as news and media coverage. Our analysis is based on the number of calls leading to conversions for which we have had reliable date information (n=906).

Our results indicate that the service converted fewer calls to citizens into vaccinations as time progressed (see Figure below), which is to be expected given the complex interplay of factors leading to vaccinations. What is less clear is whether or not a dedicated learning cycle for the call handlers could have improved the call success rate.

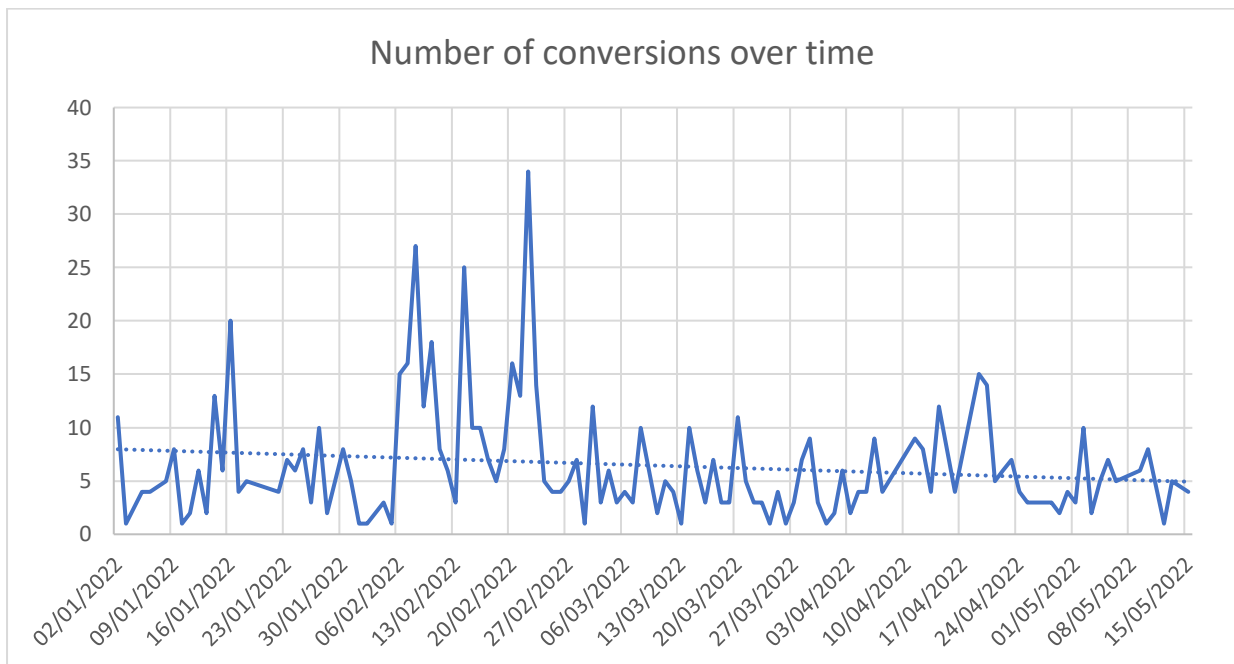


Figure 3 Number of Conversions by day over time (n=906)

3.2. Citizens' Demographic Characteristics

We conducted additional analysis to ascertain a range of selected demographic characteristics of the citizens reached through the service. Since the extent to which demographic information on individuals is provided in the data set, each analysis is based on a different cohort size. The baseline for each cohort is indicated in each Figure below.

3.2.1. Sex

Out of 1,629 individuals vaccinated, 792 were females, 827 were males, whilst 10 had not identified their sex or gender in the data set. This means that 50.8% of citizens vaccinated were males, 48.6% females, and 0.6% were not known.

3.2.2. Ethnicity

The data set contained information on the ethnicity for 37,923 citizens (total n=44,715). However, for those who have answered a call (total n=17,915), the data contained ethnicity data for only 14,722 citizens. This is due to a conscious decision taken by the service not to make calls that could be seen as too invasive by asking for personal information relating to citizens ethnicity. 804 of those were vaccinated, which represents a conversion rate of 5.5%. One individual was not identified by ethnicity but by a specific nationality. In this case, a call handler had overwritten ethnic information and we removed this information. This means there are 803 citizens in our descriptive analysis.

The table below specifies the number of citizens vaccinated by each ethnicity category, including the conversion by ethnicity in percent and total number of citizens in each group spoken to by a call handler. The ethnic categories have been adopted

from the data set that we analysed. They appear to be a mixture of ethnic, cultural, and national belonging. They appear to originate in the GP data set which prepopulated the 'ethnicity' cells in the service data set for each citizen. Whilst we report the results of our analysis below, we caution to treat these categories as validated by citizens' experience, perceptions, or attitudes to ethnic identities. We also do not believe these data to be sufficiently robust to permit any conclusions about the reach of the service to different ethnic groups.

The majority of conversions occurred with citizens denoted as British (n=421). However, the percentages of conversions indicate that most calls were converted into vaccinations with citizens of the following ethnicity: Chinese (11.2%), Bangladeshi or British Bangladeshi (10%) and Pakistani or British Pakistani (10.2%).

Table 2 Ethnicity analysis results

Ethnicity	Number citizens	of Vaccinated citizens	Conversions in percent
<i>British</i>	7434	421	5.7
<i>Any other White background</i>	2000	47	2.4
<i>Any other ethnic group</i>	1575	108	6.9
<i>Any other Asian background</i>	668	48	7.2
<i>African</i>	657	41	6.2
<i>Any other Black background</i>	646	32	5.0
<i>Any other mixed background</i>	461	16	3.5
<i>Irish</i>	244	10	4.1
<i>Chinese</i>	224	25	11.2
<i>Indian or British Indian</i>	165	14	8.5
<i>White and Black African</i>	154	7	4.5
<i>Pakistani or British Pakistani</i>	118	12	10.2
<i>White and Black Caribbean</i>	112	7	6.3
<i>White and Asian</i>	98	6	6.1
<i>Caribbean</i>	84	2	2.4
<i>Bangladeshi or British Bangladeshi</i>	70	7	10.0
<i>Arab</i>	9	0	0.0
<i>Traveller</i>	2	0	0.0
Total	14721	803	5.5

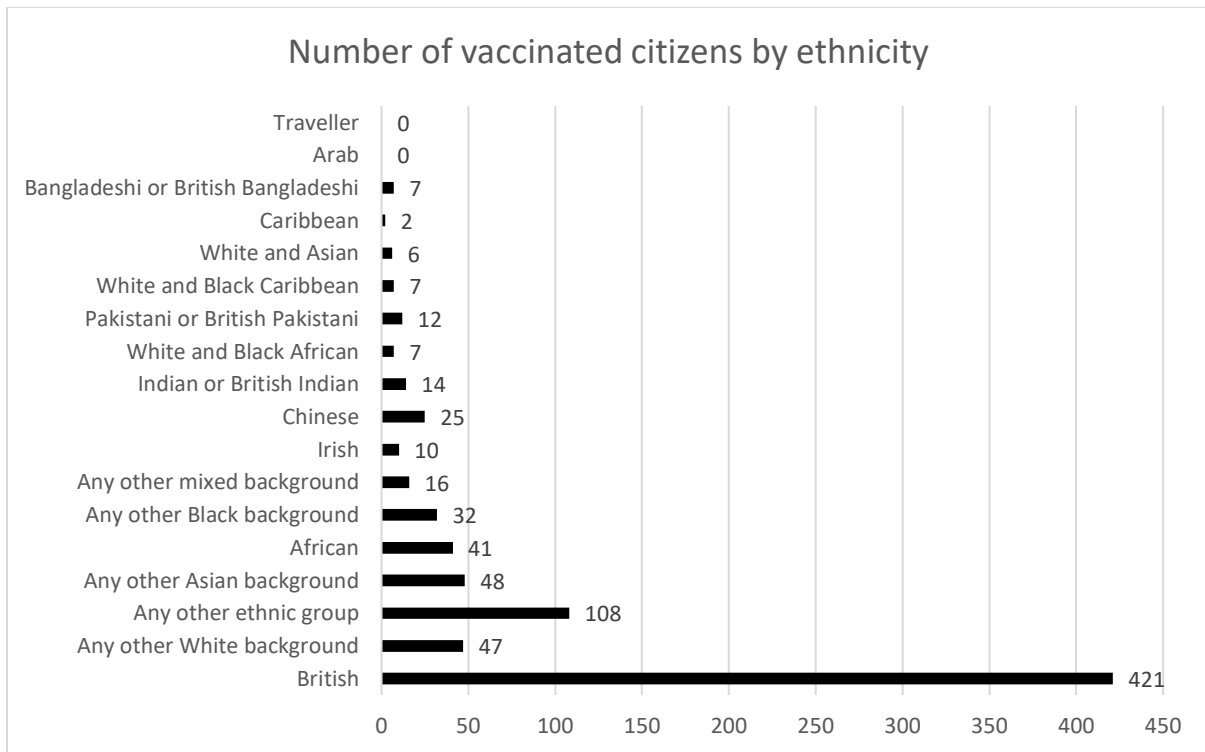


Figure 4 Number of vaccinated citizens by ethnicity (n=803)

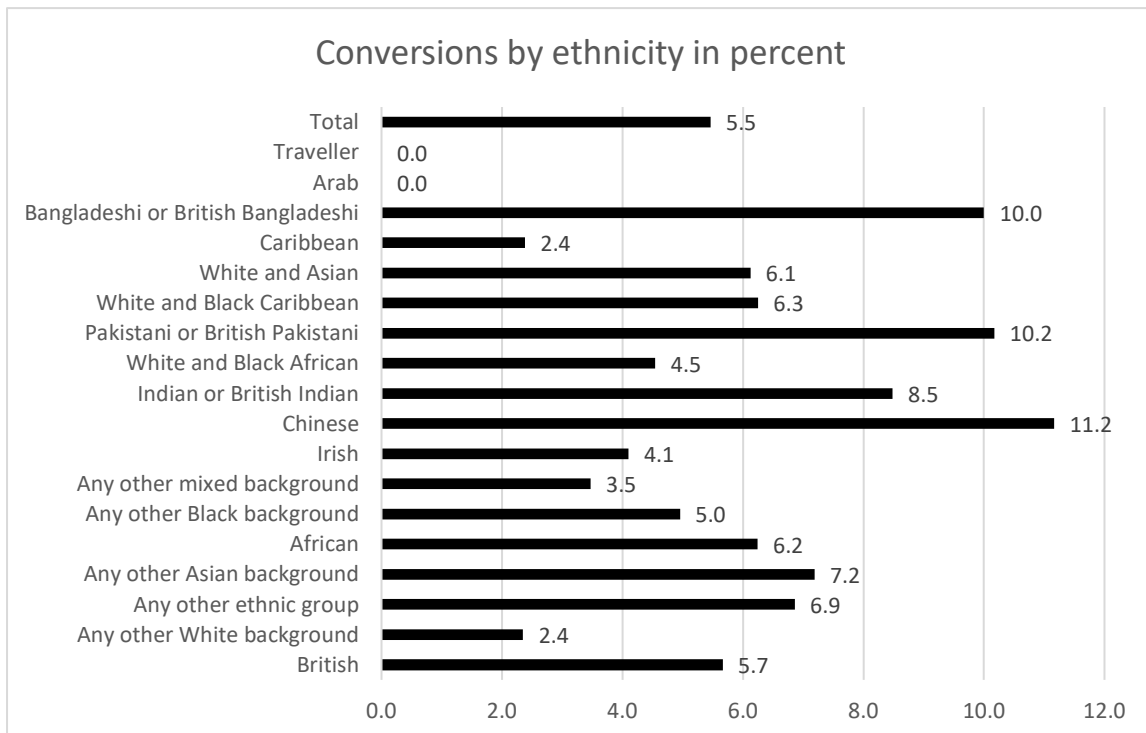


Figure 5 Conversions by ethnicity in percent

The 2011 Census data shows that the Liverpool population comprises 88.91% residents identifying as White; 2.52% of residents identifying Mixed; as well as 4.16% and 2.64% identifying as Asian or Black respectively. This means that the service

reached a proportionately larger number of residents belonging to ethnic minorities compared to the overall population. Service approaches including prioritising deprived areas and using language line to communicate with citizens who had limited understanding of the English language may help to explain this finding.

3.2.3. Vulnerable Populations

The dataset contained JCVI information of 16,187 citizens. 949 of those citizens have had a vaccination which represents a conversion rate of 5.9%. The table below lists the number of vaccinations for each JCVI category and the percent of conversions by each category. These data could act as a baseline for developing a robust model of the estimated risk of hospitalisation and, ultimately, calculating the cost effectiveness of the service. Vaccinations of citizens in JCVI categories were prioritised differently over time.

As the risk of mortality was the priority of the COVID-19 vaccination programme, and this increases with age, prioritisation was primarily based on age. However, there was no prioritisation timetable for Liverpool against which we could map service conversions to assess how successful the COVID-19 Vaccination Promotion Service was to achieve higher vaccination rates in which JCVI group at what time.

Table 3 JCVI analysis results

JCVI category	Number of Citizens	Number of conversions	Percent of conversion by group
12-15 at Risk	27	1	3.7
16-17	616	52	8.4
18-29	4476	385	8.6
30-39	3718	196	5.3
40-49	1913	65	3.4
12-15	81	3	3.7
5-11	161	19	11.8
5-15 at Risk	10	2	20.0
50-54	601	16	2.7
55-59	406	18	4.4
60-64	463	14	3.0
65-69	258	5	1.9
70-74	187	5	2.7
75-79	107	3	2.8
80+	148	4	2.7
Carers – DWP	462	36	7.8
Carers – LA	30	3	10.0
Clinically Extremely Vulnerable	692	23	3.3
COVID-19 at risk	1831	99	5.4

Total	16187	949	5.9
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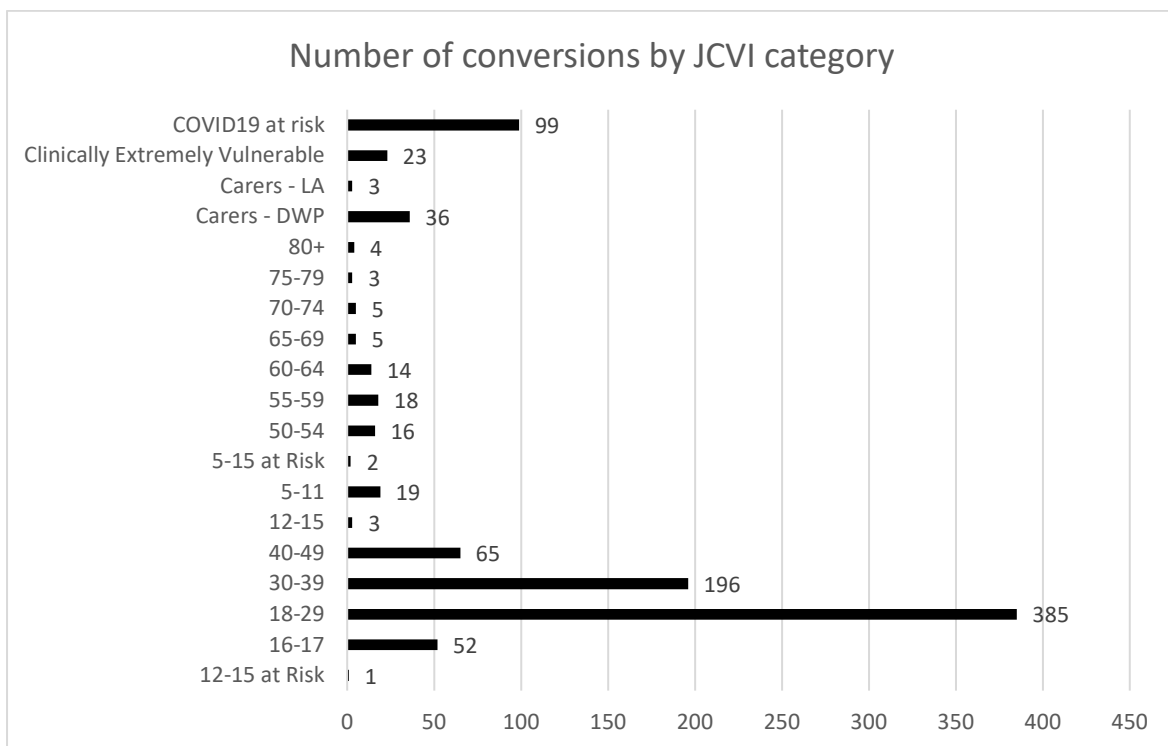


Figure 6 Number of conversions by JCVI category (n=949)

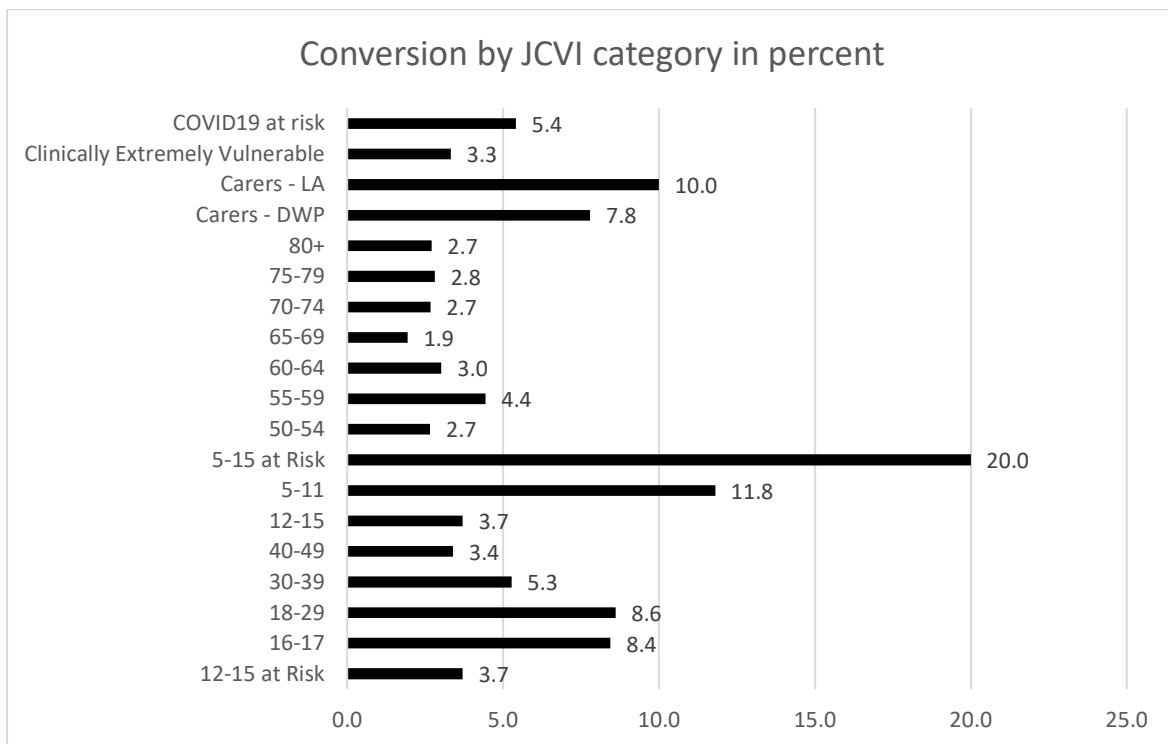


Figure 7 Conversions by JCVI category in percent

3.2.4. Health Inequalities

We also conducted analysis of the number of calls going out to various areas classified by the Index of Multiple Deprivation (IMD). We merged publicly available data on IMD

with those entries in the service data set for which a postcode was available (n=44,490).

We list the percentage of calls by IMD decile below, with decile 1 representing the most deprived areas and decile 10 the least deprived areas in England. In general, Liverpool is ranked the 3rd most deprived local authority area in England on the overall IMD 2019 data set on the most commonly used 'Rank of Average Score' measure. Liverpool was ranked 1st in 2004, 2007 and 2010, and 4th in 2015. As of 2019, the city area is ranked behind Blackpool and Knowsley. There are various components of the IMD offering various angles for analysis. In our analysis, we used the Index of Multiple Deprivation decile data.

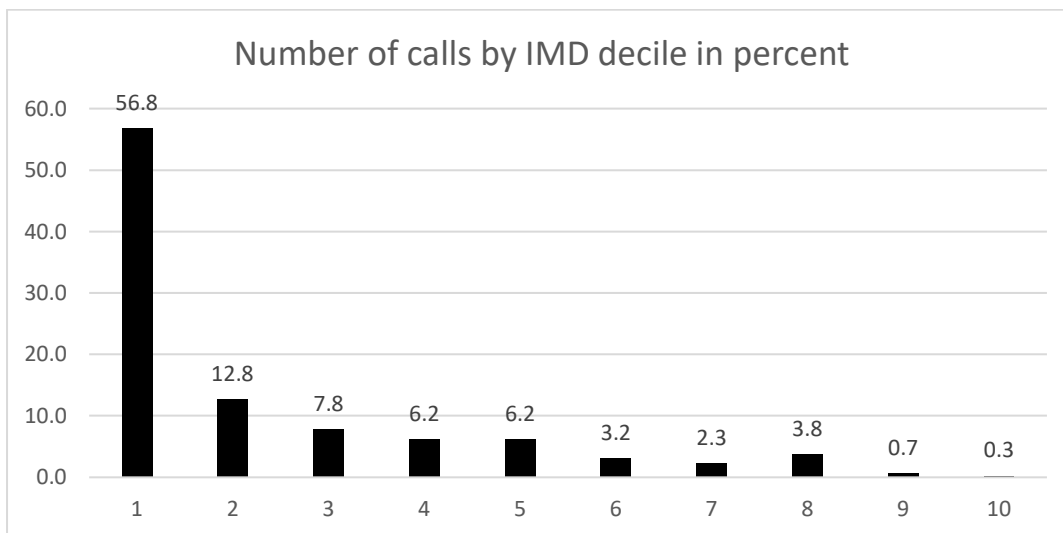


Figure 8 Number of calls by IMD decile in percent (1=most deprived) (n=44,490)

To compare, 49% of areas in Liverpool are in the top 10 most deprived areas in the country. Since 56.8% of calls went to citizens living in areas in the top 10% most deprived locations in England, the service attempted to contact marginally more people in this decile of deprivation. The figures below indicate the number of conversions for dose 1 (n=448) and dose 2 (n=331) in areas grouped by IMP decile. Our analysis shows that the service led to proportionately more conversions with citizens in areas of the most deprived decile.

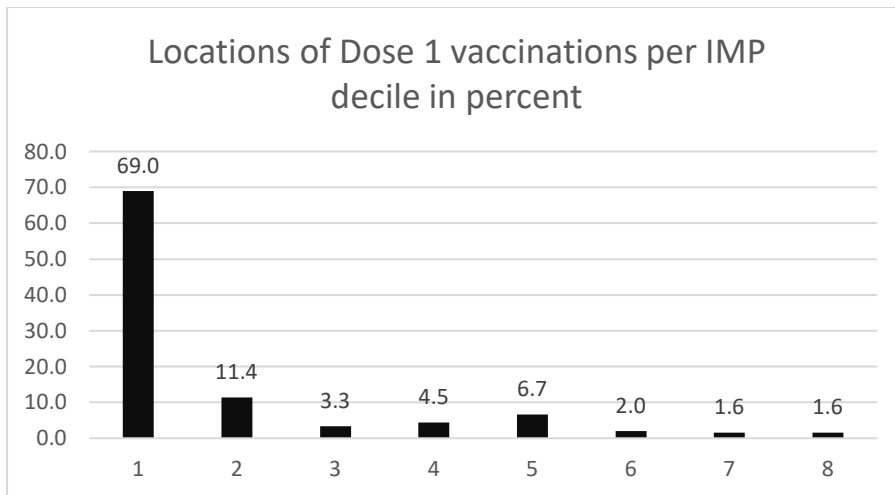


Figure 9 Locations of Dose 1 vaccinations per IMP decile in percent

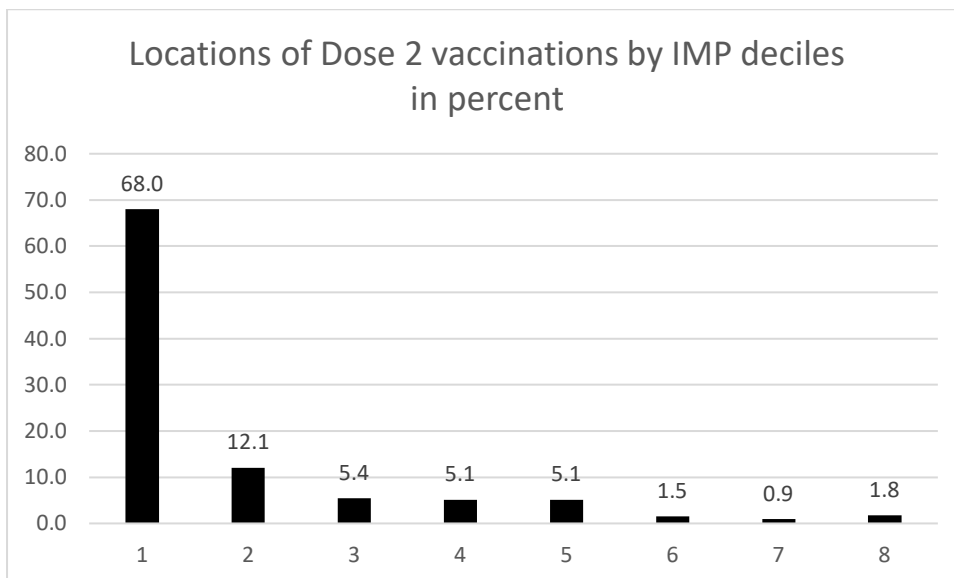


Figure 10 Locations of Dose 2 vaccinations by IMP deciles in percent

In the table below, we provide a summary of the main findings of our analysis.

Table 4 Summary of analysis

Item	Details (Conversion rate in %)
Service period covered in data set	2 January 2022 to 15 May 2022 (134 days; 19 weeks and 1 day)
Number of calls placed	44,715
Number of calls with interactions with citizens	17,915
Number of conversions	1,356 (7.5%)
Number of Dose 1 vaccinations	830 (3.1%)
Number of Dose 2 vaccinations	526 (2.2%)

Number of citizens vaccinated with either dose	957 (5.3%)
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3.3. Reasons for Vaccine Hesitancy

Qualitative information that featured within the data was coded independently by two researchers. The analysis was guided by the themes which had been identified from the thematic analysis of interview and focus group data. However, the approach to analysis was flexible with attention being given to data that did not necessarily fit with the themes.

Following the cleaning of the dataset we undertook an analysis of call handlers' notes (free text) and coded all notes relating to reasons why citizens declined to take up the offer of vaccination.

We identified 11 different codes which represent broad themes under which we subsumed various responses from citizens. The type of reasons categorised under each code are noted in the Appendix A. We identified 2,370 calls for which call handlers noted 'reasons for refusal' which are summarised in the table below. That means that call handlers took some notes in 15.5% of cases where calls were answered but no conversion occurred (n=15,343).

Table 5 Reasons for Refusal analysis

Codes	Frequency	Percent
No explanation offered	590	24.9
Already vaccinated or booked in	455	19.2
Concerns about vaccine safety	396	16.7
Underlying health conditions	291	12.3
Personal reasons	242	10.2
No need for vaccination	240	10.1
Disbelief in COVID-19 or mistrust in the Vaccine	113	4.8
Not a priority/too busy	38	1.6
'Anti-Vaxxer'	5	0.2
Total	2370	100.0

3.4. Thematic Findings from Interviews and Focus Groups

We will report our findings from the analysis of interviews and focus groups with key stakeholders and staff in three sections below.

We identified three overarching themes which relate to the evaluation aims. These are: 1) Vaccine hesitancy, 2) Effective strategies to address vaccine hesitancy, and 3) Challenges encountered. In this section of the report, we use the term ‘participants’ to refer to interviewees who may be key stakeholders or call handlers.

3.4.1. Vaccine Hesitancy

3.4.1.1. *Reasons for vaccine hesitancy*

This section should be read in conjunction with the results of our analysis of recoded call handler data on ‘reasons for refusal’ in section 3.3 above.

Summary

- Concerns regarding the safety of the vaccine
- Concerns regarding side effects from the vaccine
- Not seeing the vaccine as a priority
- Mistrust of the government, and
- Misinformation and ‘false news’

Participants commonly described how citizens’ expressed concerns relating to the overall safety of the vaccine, with many believing that the vaccine was still in an experimental stage. Concerns regarding potential side effects also featured strongly in conversations with call handlers. One participant described how concerns over the safety of the vaccine were at times influenced by what had happened to individual citizens in local communities. The issue of blood clots, which was prominent in national media during the vaccination campaign, also came up repeatedly.

In addition, some participants communicated that concerns over side effects were commonly reported by carers. Participants described how carers often expressed their worries about how the vaccine might impact on their caring responsibilities which influenced their decision making. Conversations with carers also revealed that vaccination against COVID-19 was not always considered to be a priority for this group given the wider context of their situation.

Mistrust of the government and misinformation about the vaccine were additionally reported by participants to be a primary reason given by citizens for refusal of the vaccine. One participant suggested that mistrust of the government appeared to be stronger in older, well-established communities within Liverpool. Several participants communicated that they had seen an increase over the past six months in ‘mistrust of the government’ being given as a reason for vaccine hesitancy amongst citizens. Participants further suggested that some citizens were hesitant due to accessing incorrect information about the vaccine through social media and other unreliable sources.

3.4.1.2. *Service implications and learning*

Summary

- Personalised approach to conversations appears to work well
 - Interviews with specific groups require particular conversational techniques
 - Call handlers appeared to fulfil a public education role with regard to information about vaccine
 - Articulating distance to government and stressing public health helped in conversations
 - Sharing experiences between team members provided informal learning
-

Our interviews and focus groups explored how the service responds conversationally to citizens and how staff shared learning. The analysis shows that call handlers approach each interaction with citizens in a personalised way influenced by each person's individual situation. An example of this commonly provided by participants is conversations with carers. Participants reported that when contacting carers, they firstly establish a rapport with the carer to determine their current situation. This information is used by the call handler to decide whether it is an appropriate time to engage carers in a conversation about the vaccine. Participants highlighted how quite often conversations with carers focus on what support they require and what services they can be signposted on to, rather than the initial purpose of the call. Call handlers thus provide additional emotional and practical support to carers.

Participants also described how they respond to more challenging conversations with citizens who express concerns around the safety of the vaccine, those who have been misinformed and where there is mistrust of the government. Call handlers noted that focusing on providing information about the role of public health, its overall purpose and its separation from central government worked at times.

Participants commonly described how they provide up to date, reliable information about the safety and reliability of the vaccine through both the telephone call itself and via follow up email (if the citizen agrees to this). Some participants highlighted how they have been able to draw on information provided to them as part of their initial work-based training. Several participants commented on the usefulness of the factsheet provided during their training. One participant described how having 'knowledge at their fingertips' supported them to build confidence in the early days of the service. A buddying scheme set up to support training of new call-handlers was also highlighted by participants as beneficial.

However, other participants suggested that conversations with citizens had changed over time due to the different issues surrounding COVID-19 and the vaccination. Therefore, previous training was not always felt to be up to date and effective in equipping call handlers to manage newer conversations. Instead, several participants reported that daily team meetings, discussions and sharing of

information which formed part of their ongoing training were more helpful in supporting them to remain up to date.

Participants commonly reported how they valued opportunities to share experiences during daily meetings with the team. The shared knowledge was considered to be a key resource in supporting staff to develop and adjust their approaches to call handling. This suggests that call handlers have learned how to adapt their conversational style through engaging in informal learning opportunities with their peers. However, due to the short-term nature of the service there appeared to be no ongoing formal training and learning opportunities available to support shared learning.

3.4.2. Effective Strategies to address Vaccine Hesitancy

3.4.2.1. What works for whom

Summary

- Giving citizens choice and autonomy over decisions, whilst building mutual trust were reasons repeatedly cited for successful conversions
 - Opening up a meaningful dialogue with citizens was critical to achieving conversions
 - Listening to citizens appeared to be an important part of the job
 - Call handler knowing individual needs of citizens created opportunities to establish rapport
 - Establishing mutual trust was perceived as key foundation for successful conversations
 - Trust appeared to be, amongst others, a function of transparency about the call's purpose
 - Addressing issues of access and practical barriers (such as transport) was seen as instrumental in achieving conversions
 - The National online booking system, which existed outside of the local system, appeared to be a significant barrier to citizens to get the vaccine
 - Talking about personal experiences by call handlers of COVID-19 or the vaccine proved a successful conversational technique
 - Younger adults required different conversational approaches to older adults
 - Language Line was deemed to be useful but also encountered some technical difficulties at times
-

Being able to offer flexible and accessible options for citizens to have their vaccine was considered by participants to be an effective strategy. Participants highlighted how citizens appeared to be more likely to have their vaccine if vaccination centres were in community places and they were given choice and autonomy to make their own arrangements.

Participants reported that through understanding individual reasons for hesitancy call handlers were able to draw on the most appropriate interventions which fitted individual circumstances.

Listening to citizens' concerns, being non-judgmental and making each telephone call individualised were reported by participants to be a core aspect of the primary intervention. Several participants suggested that targeting calls to individual needs supported call handlers to open up personal discussions about the COVID-19 vaccine and build a rapport and sense of trust with citizens.

Trust was described by one participant as an integral aspect of the telephone call intervention. Participants also highlighted the importance of clearly communicating to citizens the purpose of the telephone call. Being clear about the reasons why they were calling and not being forceful in conversations was viewed by participants as vital to the success of the intervention.

There was strong agreement amongst participants that telephone calls with citizens were most successful when the reason given for not taking the vaccine related to accessibility and convenience. Participants reported that difficulties in accessing and navigating the National online booking system for COVID-19 vaccines, which existed outside of the local system, was commonly communicated by citizens as a reason for not having the vaccine. Through the telephone call intervention call handlers were able to remove this barrier by booking citizens into vaccine clinics which were accessible to them.

Call handlers were able to take away the inconvenience for people through offering practical solutions which fitted individual needs. Practical support offered included providing taxi transportation to and from appointments, support to book a vaccination appointment over the telephone and the offer of a home visit via the local vaccination team for citizens who were unable to leave their own homes. One participant described how useful they had found the home visit service for citizens who were unable to leave their home due to physical or mental health needs.

Yet, participants further acknowledged that the same strategies were not always effective in meeting the needs of different groups of citizens. Several participants highlighted how more difficult conversations required a different approach. There was some agreement amongst participants that using personal experience of COVID-19 and the vaccine was at times effective in challenging misconceptions and reassuring citizens.

Participants also reported differences between how they approach a conversation with older adults as compared to younger adults. One participant suggested that older adults were more likely to engage in a conversation whereas younger adults may be of the view that COVID-19 was no longer an issue.

Use of a translator through the 'Language Line' was reported by one participant to be helpful when engaging with citizens who had limited understanding of the English language. However, a different participant communicated that they had found it more difficult to engage in a three-way conversation with a translator present.

3.4.2.2. *Service implications and learning*

Summary

- Training was critical and perceived as a useful stepping stone in preparing call handlers for outbound calls
 - There was no formal appraisal of call handler experience with conversational techniques
-

There appeared to be some agreement amongst call handlers that the work-based training, which provided both factual information and psychological strategies to manage difficult conversations, was effective in supporting them to engage in conversations with citizens. Some participants highlighted how they used factual information provided to them during their training to provide citizens with reliable information which could inform their decision making. There was consensus amongst participants that having informed conversations played an important role within each individual's journey and could lead to citizens choosing to take the vaccine at a later stage. However, at this stage we do not know yet how an informed conversation may have shaped future decision making of citizens.

3.4.3. **Challenges Encountered**

Summary

- Good relationships with GP practices were seen as critical for a quality service
 - Engagement from GP practices was overall good; however, some initial difficulties were reported
 - General access issues with primary care influenced citizens' decision making with regard to the vaccine at times
 - Data given to make contact with citizens was at times inaccurate
 - Call handlers felt an emotional toll of some calls at times for which they were not prepared however valued the regular emotional support offered by managers and team members
 - National media messages and what citizens perceived as mixed messages from government made for difficult conversations
-

The final theme evident across interview and focus group data related to the challenges that participants had encountered prior to and during the implementation of the COVID-19 vaccination promotion programme. It is important to note that the COVID-19 Vaccination Promotion service was a pilot project and therefore learning took place throughout the duration of the pilot. Participants reported that some challenges were experienced at a local level whilst others resulted from changes that were happening to COVID-19 nationally. Several participants commented on the importance of engagement from and relationships with GP practices.

For the vaccine tracing programme to work effectively, the active engagement and participation of GP practices was essential. Good relationships and communication

sharing with GP practices were reported by participants to be key to achieving this. Engagement from GP practices was reported to be good overall. However one participant noted that there had been some difficulties initially in engaging one PCN with the work of the service. This did not appear to affect the implementation of the service.

Our evaluation further found that reasons given by citizens for refusal of the vaccine did not always relate to hesitancy but instead resulted from appointments being inaccessible and inconvenient for people to get to. Due to the demand on primary care services resulting from the COVID-19 pandemic, participants reported that some citizens had experienced difficulties when attempting to access primary care services which negatively affected their perception on the importance of the vaccine. This is understandable given the impact of the pandemic on access to primary care services.

One participant also highlighted how completed COVID-19 vaccinations were not always recorded in a timely manner on a patient's record. Inaccuracy of data was reported to have a considerable impact on resources invested into the programme. However, call handlers were able to record the correct details for citizens and offer this data to PCNs. This enabled PCNs to conduct a data cleansing exercise.

Focus groups with call handlers also highlighted the emotionally challenging nature of some telephone calls to citizens. One call handler described how they had not been emotionally prepared for some of the conversations they encountered. Being able to access support from team managers and colleagues which frequently took place through informal meetings and discussions were reported to be valuable.

Further challenges to implementation identified by participants resulted from national policy changes to COVID-19. Participants described how mixed messages from central government influenced the public's perception on COVID-19 and impacted on call handlers' ability to influence citizens decision making. This appeared to be exacerbated by political scandals involving key government players. Participants further suggested that a lack of focus on COVID-19 by the British media due to more pressing international issues further downplayed citizens perceptions of the importance of the COVID-19 vaccine.

4. Discussion

The evaluation revealed that the service has accumulated an enormous amount of, as yet, unsystematic and un-appraised learning. To realise its potential, the evaluation has synthesised call handler perceptions of ‘what works for whom’ and we have amended our initial effect model of vaccine tracing below with our findings. This model requires further modification and adaptation through evidence gathered in other contexts and settings. It would then need to be tested in order to produce robust conclusions and recommendations for services about successful conversational techniques to address vaccine hesitancy.

- Systematic exchange of learning and feedback within service team
- Emotional support for call handlers

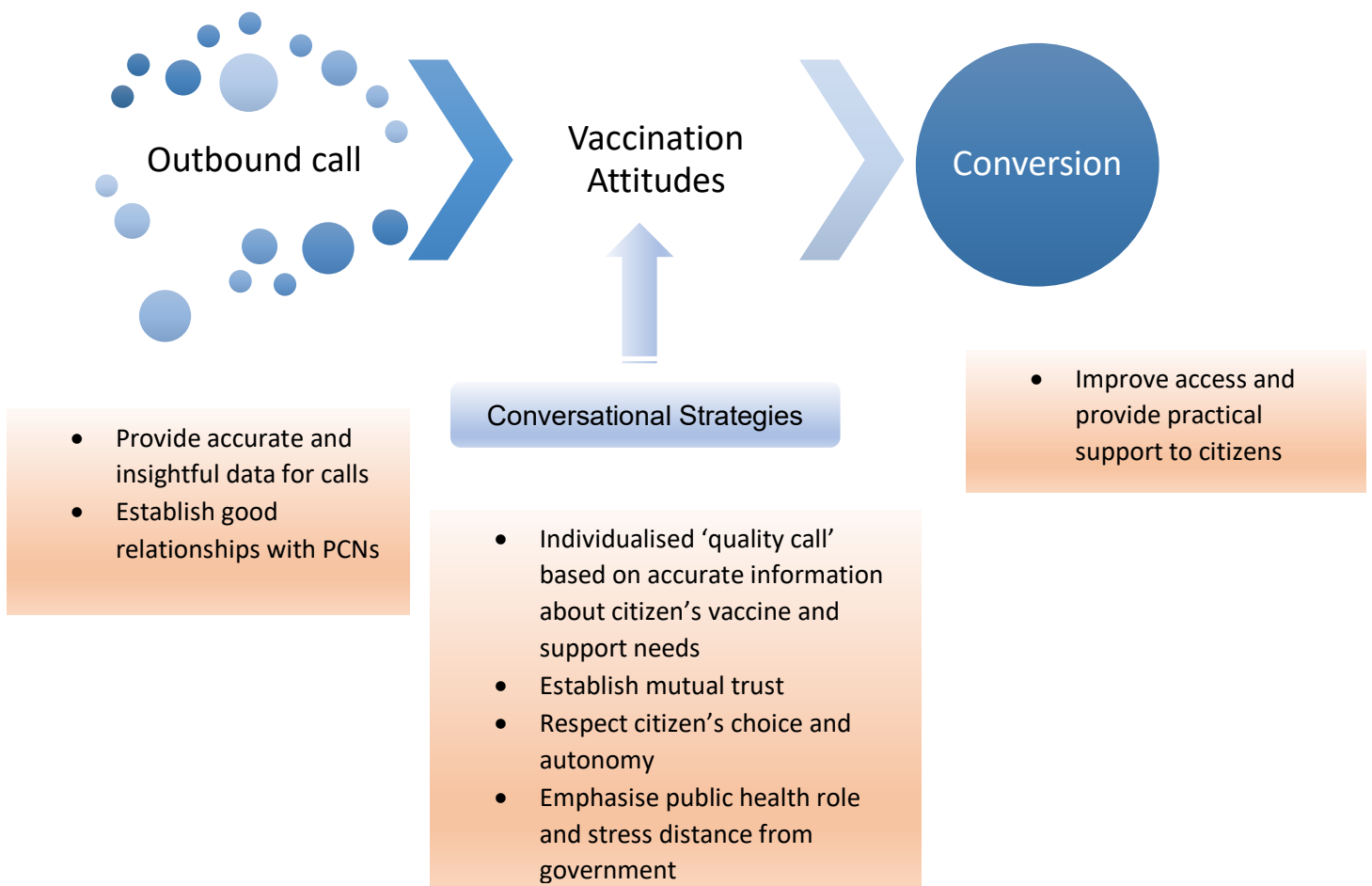


Figure 11 Amended Effect Model of Vaccine Tracing

Our data analysis also demonstrates that the service has clearly reached a significant number of citizens and achieved a number of vaccinations in some of the most vulnerable populations in the Liverpool area. Work is ongoing to identify additional opportunities to reach out to citizens. Calls to ethnic minorities appeared to be more successful than to other groups. However, at this stage, the evaluation is unable to ascertain a consistent picture of how effective the service has been with calls and with whom. There are various reasons for this. The service utilised existing patient level data from the GP data set (EMIS). Ensuring high data quality at source is essential for producing robust evidence on statistical associations between population characteristics and service outcomes. Since call handlers were entering data manually through free text, human error also occurred at times. The service was hoping to use a standardised call recording system early on in the pilot but its implementation was delayed which may have affected data collection quality.

The service has now moved to a standardised data entry protocol which brings opportunities utilising a Case Management System (CMS). This brings opportunities as well as risks. Standardising data entry is likely to produce better quality data for statistical analysis, but it may also reduce the amount of information available for learning of 'what works for whom' in conversational strategies. It is important the service strikes a pragmatic balance between these two objectives and frequently examines that this balance generates the intelligence it needs for continuous service improvements.

Our analysis shows that there are encouraging signs that the service effectively reached some underserved groups of citizens. Our analysis of calls going out to citizens living in areas ranked in the most deprived decile of the Index of Multiple Deprivation indicates that the service is well targeted, and conversions occurred in this important population. Given that many Liverpool areas are ranked in the most deprived decile, it is not clear however whether this is a result of explicit targeting of underserved populations or simply a consequence of the fact that most unvaccinated citizens happen to live in the most deprived areas with low vaccinations rates. The service did however prioritise the most deprived areas which may help to explain the findings of this evaluation.

Plotting the conversion rate over time revealed that the service converted fewer calls to citizens into vaccinations as time moved on. Given the multifactorial context of what brings about conversions, we cannot draw any reliable conclusions from this. Contextual factors, such as public media and debate, may have played a much more important role in reducing conversion rates over time than those factors in control of the service. It also appears sensible to assume that the service increasingly reached those citizens who have held more entrenched views about vaccination which makes it harder to achieve conversions.

It seems important to explore in future whether or not instituting a consistent learning and feedback process for call handlers would ultimately make a difference to conversion rates. At the moment, the service uses daily and weekly team meetings to share lessons and exchange views on what works during calls with citizens. Wider shared learning takes place weekly with the service sharing insights into barriers and supportive factors with a local multi-agency vaccination planning team. Service managers do not have available to them findings from a systematic appraisal and

analysis of call handler information which would be critical to establish a robust learning process for the service. Our focus groups and interviews indicate that call handlers have accumulated an enormous amount of knowledge and skills over time which the service would benefit to appraise systematically and frequently for future improvements.

Putting in place a systematic learning and feedback loop for call handlers appears essential to ensure the service is maximising the existing knowledge and expertise amongst call handlers to improve over time. This would require external help and support as call handler information in the service data is uncoded and hence does not offer itself easily to conclusions without additional analysis. It would also require a standardisation of data entry practices for call handlers since, at present, only about 15% of all calls answered contain additional notes by call handlers about the reasons for refusal of the vaccine.

We detected several trends and dominant themes in our analysis of 'reasons for refusal' noted by call handlers. This is a good initial step. The service could now develop and implement a plan for service improvement based on regular and frequent call handler data analysis. This will also make it possible to distil shared learning that can be utilised by similar services in England.

It appears important to ensure that the staff's skills, competencies, and accumulated expertise is safeguarded for the future and that the service develops a robust learning system to ensure continuous service improvement.

Our analysis further indicated the broader public benefits for communities through implementation and delivery of the Liverpool COVID-19 Vaccination Promotion Programme. The service provided wider signposting to carers services, the provision of up-to-date patient contact details to improve PCN health records and improved trust in general public health information. Good practice governance and data sharing arrangements with PCNs and CCGs were integral to effective delivery of the service.

4.1 Limitations

This evaluation had several limitations. The quantitative data available to us comprised a period of about 19 weeks. The quality of data also placed significant restrictions on the extent of the analysis we could conduct quantitatively. Since the data set had to be partially re-coded by the evaluation team, the chance of additional human error may have increased. Although we tried to automate some recoding tasks where possible, with a data set containing about 1.7 million cells, the opportunity for human error is not to be underestimated. The evaluation also did not undertake a cost benefit analysis, reducing the chance for system wide learning.

5. Recommendations

Service planning and implementation

1. Consider how accumulated call handler knowledge, skills and competencies can be sustained over time
 2. Examine and appraise call handler information as part of a Plan-Do-Study-Act (PDSA) service improvement cycle
 3. Build up a robust repository of effective conversational strategies in vaccine tracing
 4. Synthesise service learning through regular shared learning team sessions possibly using scenarios
 5. Ensure call handlers are well prepared for the emotional dimension of calls
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System and Data

6. Utilise a case management system to standardise data entry by call handlers to build up a knowledge base for analysis of 'what works for whom'
7. Review patient level data quality to support robust health inequalities analysis

Future Assessment and Evaluation

8. Ensure early and continuous data quality monitoring and analysis for data quality improvement feedback
9. Conduct a cost effectiveness analysis of the service

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Appendix A

CODE NUMBER	CODE NAME	REASONS INCLUDE
1	Already vaccinated or booked in	<ul style="list-style-type: none"> - Vaccinated in a different country - Vaccinated in the UK but NHS system does not reflect this - Has booked appointment for vaccination already <p>*This relates to first, second and booster vaccines</p>
2	No explanation offered	<ul style="list-style-type: none"> - Does not want to discuss - Does not want to engage in a conversation - Does not feel they have to have a reason – it's personal choice
3	Safety of vaccine	<ul style="list-style-type: none"> - Rushed through - Not enough is known about it - Some people have died from it - Not ready yet and need time to think about it
4	Underlying health conditions	<ul style="list-style-type: none"> - Physical health conditions - Mental health conditions (anxiety about vaccine, needle phobic, unable to leave the home) - Learning difficulties - Patient is asked to speak with their GP about vaccine
5	Personal reasons	<ul style="list-style-type: none"> - Death of a close relative - Concerns over side effects - Pregnant or just had a baby - Carers (vaccine is not a priority as they have a lot going on) - Going through a difficult time at the moment/not in the right frame of mind - Religious beliefs - Currently have COVID-19

		- Don't leave the house so not at risk
6	Disbelief or mistrust in the Vaccine	<ul style="list-style-type: none"> - Do not believe in COVID-19 or the vaccine - Do not trust the vaccine - Do not trust the Government - Will not be forced into having the vaccine
7	No need for vaccination	<ul style="list-style-type: none"> - Feel that they are in good health - Not necessary to have vaccine - They have already had COVID-19 so have natural immunity - Believe COVID-19 is over
8	Too busy/not a priority	<ul style="list-style-type: none"> - Too busy with work and have not had the time - Not a priority or not thought about it
9	'Anti-vaxxer'	- Call handler specifically states in their notes that the person is anti-vaxx