Supporting uptake of routine childhood vaccinations in Peterborough

Phase one report: Insight gathering and intervention recommendations

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Executive Summary

Sheffield Hallam University were commissioned by Cambridgeshire County Council and Peterborough City Council to undertake research to understand the barriers and facilitators for seven health behaviours.

In Cambridgeshire, we explored:

- Physical activity, Diet, Smoking in adults, Alcohol consumption, Uptake of NHS health checks, and Vaping in young people

In Peterborough, we explored:

- Uptake of routine childhood vaccinations

This report presents the findings from the childhood vaccination uptake workstream in Peterborough. The findings for other health behaviours in Cambridgeshire are presented in separate reports.

The aim was to:

- Identify the barriers and facilitators for childhood vaccination uptake in Peterborough.
- Make recommendations for interventions that have the potential to address those identified needs.

Our approach

We used the Capability, Opportunity and Motivation – Behaviour (COM-B) [1,2] model to explore factors influencing childhood vaccination uptake.

We conducted a survey and carried out interviews with parents in Peterborough to explore the barriers and facilitators for childhood vaccination uptake.

We conducted a rapid evidence review using the Behaviour Change Wheel (BCW) [1,2] to understand what types of interventions have been implemented to support uptake of childhood vaccinations amongst underserved communities.

We then produced a heat map [3] to explore whether, and to what extent, existing interventions have the potential to address these identified barriers and facilitators.

Informed by the BCW, we made intervention recommendations to address those identified barriers.

We used the APEASE evaluation criteria [2] and the IN-CASE framework [4] to explore which intervention recommendations are likely to be acceptable, practical, effective, and affordable for parents to receive, and for Peterborough City Council and/or wider stakeholders to deliver, and whether receiving and/or delivering these interventions are likely to result in unintended consequences or impact on inequalities.

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Key findings – local survey

We surveyed 255 parents of children aged 11 years and younger who live in Peterborough.

Most parents were from the most deprived (44.7%) and moderately deprived (53.7%) areas of Peterborough. A significant proportion of parents (27.8%) were of white background, other than English, Welsh, Scottish, Northern Irish, British, and Irish. Over a third of parents (38.4%) spoke a language other than English at home. A significant proportion of parents (41.6%) were born outside of the UK.

In total, 17.8% of parents were classified as having low uptake of routine childhood vaccines.

A significant proportion of parents (28%) reported that they were less likely, or somewhat less likely, to agree for their child to receive the vaccines that are offered to them, following the emergence of COVID-19.

The table presents the identified barriers to childhood vaccination uptake, amongst parents who were classified as having low childhood vaccination uptake.

Barriers to childhood vaccination uptake amongst parents classified as having low childhood vaccination uptake
Weaker perceived confidence in their ability to make decisions regarding the MMR vaccination of their child, and their ability to make plans for their children to receive the recommended vaccines
Weaker belief that measles is a severe disease for their child
Weaker beliefs that the MMR vaccine will reduce their child's risk of measles and that routine childhood vaccines will help protect their child from catching serious infectious diseases
Stronger concerns about the MMR vaccine (short-term side-effects, long-term adverse effects, its content) and concerns about vaccinations in general (adverse effects, its content)
Weaker perceived trust in the people in charge of the UK MMR vaccine and routine childhood vaccines
Greater personal (indirect) experience with measles
Greater personal (direct) experience with measles
Weaker perceived likelihood that they will agree for their child to receive the vaccines that are offered to them, following the emergence of COVID-19
Weaker intentions for their child to receive their vaccines compared with parents who were classified as high uptake
Weaker perceived social support to get their child vaccinated
Weaker perceived physical opportunities to get their child vaccinated (time, ease of access to GP surgery/ appointments)

Key findings – interviews

We interviewed 8 parents of children aged 5 years and younger who live in Peterborough. We identified key barriers (B) and facilitators (F) for childhood vaccination uptake, including:

- Perceiving childhood vaccinations to reduce the risk of their children catching infectious diseases / harmful consequences from infectious diseases (F)
- Perceiving their child to be at increased risk of catching infectious diseases due to mixing with other children in early year settings/ schools (F)
- Perceiving some childhood vaccines to be more important than others (B)
- Having concerns about potential short-term side-effects from childhood vaccinations (e.g., high temperature, feeling unwell (B)
- Having a plan for: making an informed decision about vaccines (F), getting their child vaccinated (F), and managing potential short-term side-effects (F)
- Lack of information about childhood vaccines before the appointment is offered (B)

"...When they're getting older and they're either at baby groups or nurseries and pre-school because kids have no boundaries. They'll touch everything and lick everything. It's easier for them to pass around germs...So, if you can prevent it by giving them the vaccinations, they're less like to get whooping cough or measles or things like this." [P3]

"...it's just a booster I don't know if a booster is a necessity...when they had their ones when they were eight, 12 and 16 is it, do they need a top up?" [P1]

"I mean I have concerns, obviously, what the side effects... be after they've had the vaccination. Because there was quite a few- I can't remember which ones they were, but my daughter did get poorly on a few of them, like, she was throwing up, and she had a high temperature and stuff..."[P4]

"You give them some Calpol if they get a bit of a temperature. You know. You might have a bit of an afternoon in front of the TV if they feel a bit sorry for themselves..." [P7]

Key findings – rapid evidence review

We conducted a rapid evidence review of 18 interventions to explore what types of interventions have been implemented to support uptake of childhood vaccinations (≤5 years) amongst underserved communities.

We identified four types of interventions:

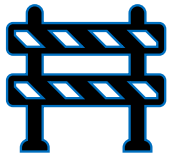
- **Environmental restructuring** (used in 14 interventions) – intervention components that aimed to change the physical or social environment to support parents to take up the offer of childhood vaccines. This included sending reminders to parents or offering vaccinations in alternative locations.
- **Education** (used in 9 interventions) – intervention components that aimed to increase knowledge or understanding about vaccinations to support parents to take up the offer of childhood vaccines.
- **Persuasion** (used in 5 interventions) – intervention components that use methods of communication to persuade parents to take up the offer of childhood vaccines. This included persuasive messages/ communications about the importance of vaccinations for the health of their child.
- **Enablement** (used in 5 interventions) – intervention components that support parents to take up the offer of childhood vaccines, beyond education, training or environmental restructuring. This included providing social support/ practical help for getting their child vaccinated.

The most used strategy within interventions were **reminder/ recall strategies.**

This included sending parents vaccination reminders and/or providing parents with a vaccination recall notification if their children were not up-to-date or had missed an appointment.

Key findings – heatmap

We identified whether 18 published interventions have the potential to address each of the identified barriers and facilitators for supporting uptake of childhood vaccines.



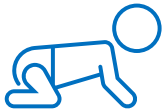
No intervention that we evaluated addressed all the barriers for childhood vaccination uptake.

The most common intervention strategy used in published interventions is recall and reminder strategies. While this strategy is likely important, it does not address other key barriers that we identified in Peterborough, such as motivational barriers and facilitators.

The most common intervention strategy used in published interventions to address motivational barriers was information about health consequences. This included providing parents with information that emphasised the importance of vaccinations for the health of their child. However, this does not address concerns about vaccinations, or the impact of COVID-19 on treatment decision-making.

No intervention that we evaluated had techniques in place to support decision-making and planning. This included supporting parents to: have confidence in their ability to make decisions regarding the vaccination of their child; to make plans for their child to receive the vaccines and; to make plans to manage any potential short-term side-effects.

Our recommendations



Intervention recommendation 1:
Training health visitors in how to have supportive conversations about childhood vaccinations

As part of their role, health visitors promote childhood vaccinations. Health visitors are well placed to have supportive conversations with parents about childhood vaccinations, using evidence-based principles from behavioural science. This would involve health visitors providing advice and support about vaccinations, addressing any concerns, and supporting parents to make a plan for overcoming any challenges that may get in the way of receiving vaccines. Currently health visitors do not receive specific training in how to deliver this kind of support. A targeted behavioural-science informed toolkit for health visitors could maximise the efficacy of this existing initiative.

Intervention recommendation 2:
Messages and communications about childhood vaccinations

Communication content and mode of delivery should be co-produced with target groups, so they are personally relevant and reach the target groups. Communications should educate and persuade parents about the benefits of childhood vaccination and include relevant/ important motivators for parents for vaccination uptake. Communications should include relevant/ important barriers and emphasise (and signpost) to resources/support that is available to manage these issues. Communications should include '*people like me*' and emphasise social norms for vaccination and how people with similar motivations/ barriers have gone on to get their child vaccinated. Caution should be taken to carefully design – and evaluate – messages that include information about short-term side-effects or other vaccination risks to ensure such messages do not unintentionally heighten anxiety or concerns amongst parents.

Intervention recommendation 3:
Childhood vaccination champions in early years settings

We recommend training key members of staff in early years settings to become *childhood vaccination champions*. They would be trained in how to have supportive conversations about childhood vaccines using evidence-based principles from behavioural science, and they would provide advice and support about vaccinations, address any concerns, support parents to make plans for overcoming any capability, opportunity, or motivational barriers that might get in the way of their child receiving vaccines, and signpost parents to NHS resources and support. Delivering childhood vaccines in family hub settings, especially at more flexible times such as weekends or evenings, may help overcome accessibility barriers, such as challenges in accessing a timely appointment at their GP surgery and one that fits with their work schedule or other commitments, however we recognise that there are significant practical and financial barriers for the delivery of vaccines outside of GP practices.

Conclusions

This mixed-method research has identified key capability, opportunity, and motivational barriers and facilitators for childhood vaccination uptake amongst parents in Peterborough. Existing interventions to support uptake amongst underserved communities do not address all the identified needs and therefore may not be as effective as they could be.

We have made a series of recommendations about how to support parents in Peterborough to take up the offer of childhood vaccines, through training health visitors in how to optimise their conversations about childhood vaccines with parents, additional co-produced communications and messages, and recommendations for establishing trained 'childhood vaccination champions' in early year settings.

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Childhood vaccination uptake: Main report

Background

Uptake of childhood vaccinations is lower in Peterborough compared with England and well below the ≥ 95% target [5].

Following the emergence of the COVID-19 pandemic, uptake rates for routine childhood vaccines have fallen even further [6].

Uptake of childhood vaccinations is lower among certain population groups where existing health, social, and economic inequalities exist, including those living in areas of deprivation [7] and some Asian, Black, and other ethnically diverse groups [8].

Several initiatives have been implemented locally (e.g., the Peterborough immunisation suspension list project, drop-in clinics to access vaccinations) and nationally (e.g., MMR catch-up campaigns, increased media coverage).

However, without an in-depth understanding of the barriers and facilitators for childhood vaccination uptake in Peterborough, we don't know what else needs to be put in place to address any unmet needs.

Population vaccination coverage (2023/24)

Childhood vaccine	England	Peterborough
6-in-1 vaccine (1 year old)	91.2%	86.7%
6-in-1 vaccine (2 years old)	92.4%	87.9%
Pneumococcal (PCV) vaccine	93.2%	90.8%
Pneumococcal (PCV) booster	88.2%	81.1%
Hib/Men C booster (2 years old)	88.6%	82.3%
MMR (1 dose) (2 years old)	88.9%	82.2%
MMR (1 dose) (5 years old)	91.9%	86.3%
MMR (2 doses) (5 years old)	83.9%	76.6%

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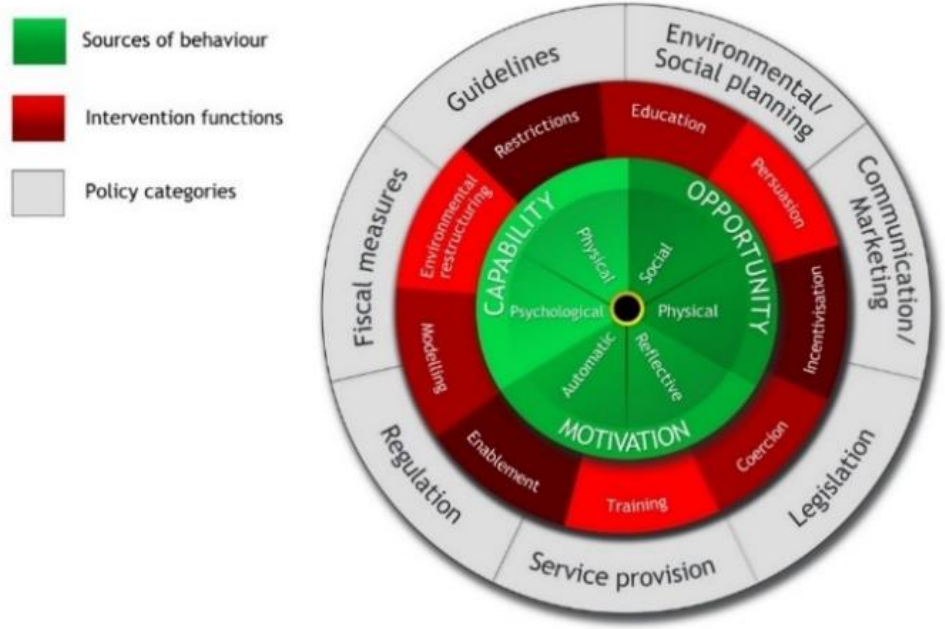
How we used behavioural science in this context

Theoretical approach

We used the Behaviour Change Wheel [2] to make theory-informed intervention recommendations for supporting uptake of routine childhood vaccines. This involved:

- Understanding the barriers and facilitators for childhood vaccination uptake using the capability-opportunity-motivation model of behaviour (COM-B) (green circle) and the Theoretical Domains Framework (TDF) [9]
- Matching the types of intervention functions that are likely to address those identified barriers and facilitators (red circle)
- Matching the types of policy categories that can help to deliver those identified interventions (grey circle).

We described the content of the intervention recommendations in terms of its Behaviour Change Techniques (BCTs), which are the 'active ingredients' of the intervention [10].



We used the APEASE evaluation criteria [2] and the IN-CASE framework [4] to explore which intervention recommendations are likely to be acceptable, practical, effective, and affordable, and whether receiving and/or delivering these interventions are likely to result in unintended consequences or impact on inequalities.

Local survey of parents in Peterborough

We conducted a survey of parents in Peterborough.

The objectives were to:

(1) explore the barriers and facilitators to childhood vaccination uptake amongst parents in Peterborough.

(2) determine whether sociodemographic variables are related to these barriers and facilitators.

(3) examine whether the emergence of COVID-19 has impacted on these barriers and facilitators.

(4) examine whether these barriers and facilitators are associated with childhood vaccination uptake and intentions.

Individuals were recruited via on-street market researchers between July - September 2024.

Eligibility criteria included: participants aged 18 or above; Peterborough resident; has parental or caregiver responsibility for one or more children who are aged 11 years or younger; able to provide consent. A purposive sampling strategy was used to recruit a diverse sample e.g., by vaccination uptake and intentions; deprivation; age of children; and ethnicity.

The survey measured:

- **Vaccination uptake** i.e., whether their child has received vaccinations, informed by previous surveys [11]
- **Capability, Opportunity and Motivation for uptake of childhood vaccines,** informed by the COM-B self-report measure [12] and the Protection Motivation Theory [13-15]
- **Demographic and health data** i.e., age of parent or caregiver; gender; ethnicity; partial postcode; employment status; annual household income; education level; number and age of children aged 16 years and younger who they have parental or caregiver responsibility for; country of birth; whether they speak a language other than English at home; whether they are currently registered with a GP practice; whether their child has received, or would receive, their childhood vaccinations in the UK or a non-UK country.

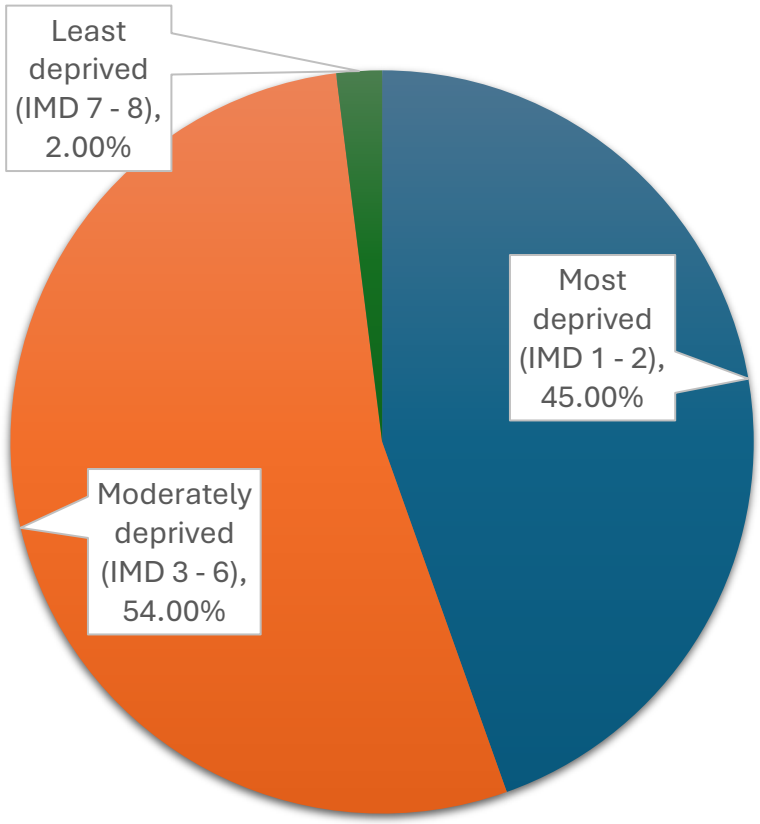
Descriptive statistics and/or statistical tests were conducted to address each research question. The analysis was done using SPSS version 26.0 (IMB Corp).

Ethical approval

Ethical approval was granted by Sheffield Hallam University Research Ethics Committee (ID ER65436549) and Peterborough City Council. All participants provided informed consent before participating.

Survey findings – Participants

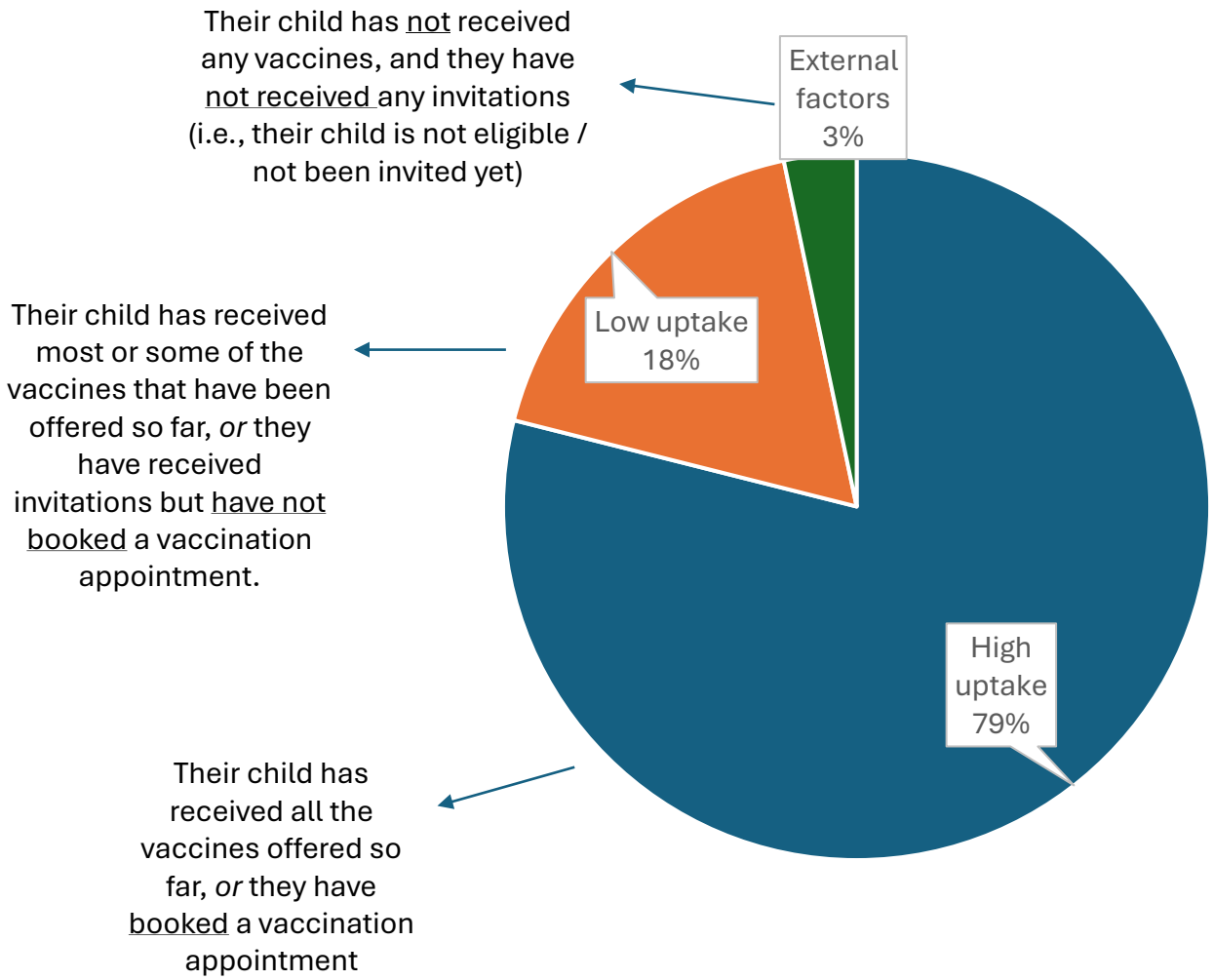
In total, 255 parents in Peterborough who have children aged 11 years and younger took part in the survey



Most parents were from the most deprived and moderately deprived areas of Peterborough.

- The mean age of parents was 32.02 years (7.33), with most being female (75.6%).
- Nearly 3/4 of parents had a child or children aged 5 years and younger (72.9%).
- A significant proportion of parents (27.8%) were of white background, other than English, Welsh, Scottish, Northern Irish, British, and Irish.
- Over a third of parents (38.4%) spoke a language other than English at home.
- A significant proportion of parents (41.6%) were born outside of the UK.
- A third of parents (32.9%) reporting that their primary occupation is looking after their home or family.
- Over a third of parents (35.3%) reported no formal educational qualifications.

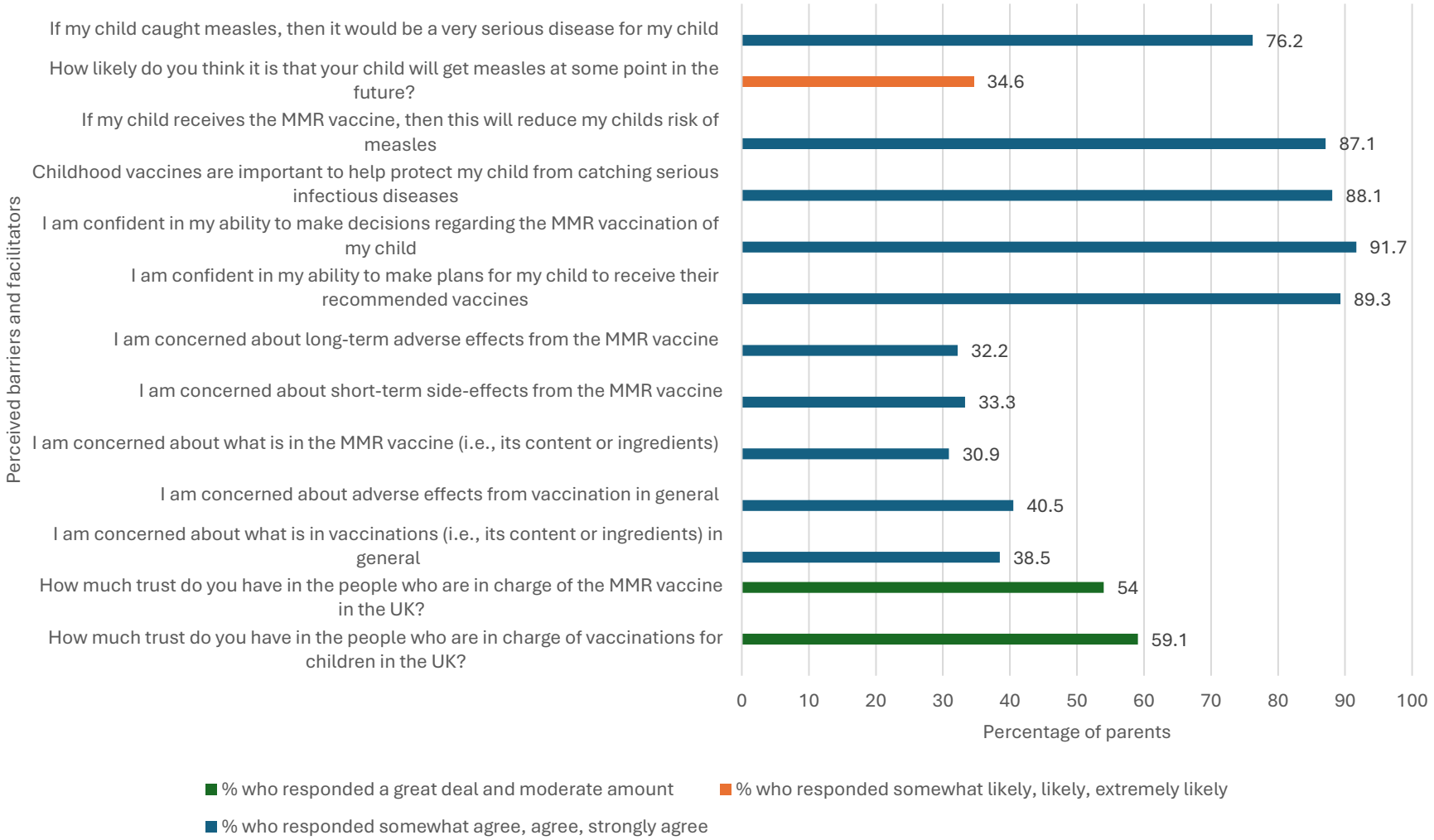
Survey findings – Uptake of routine childhood vaccines (≤ 5 years)



In total, 18% of parents were classified as having low uptake of routine childhood vaccines. Parents who were classified as having low uptake reported that their child has received *most*, or *some*, of the vaccines that have been offered so far, or they have received invitations but have *not booked* a vaccination appointment.

Parents who were classified as having low uptake of childhood vaccines reported **weaker intentions** for their child to receive all of the vaccines at the time that they are offered, compared with parents who were classified as having high uptake of childhood vaccines.

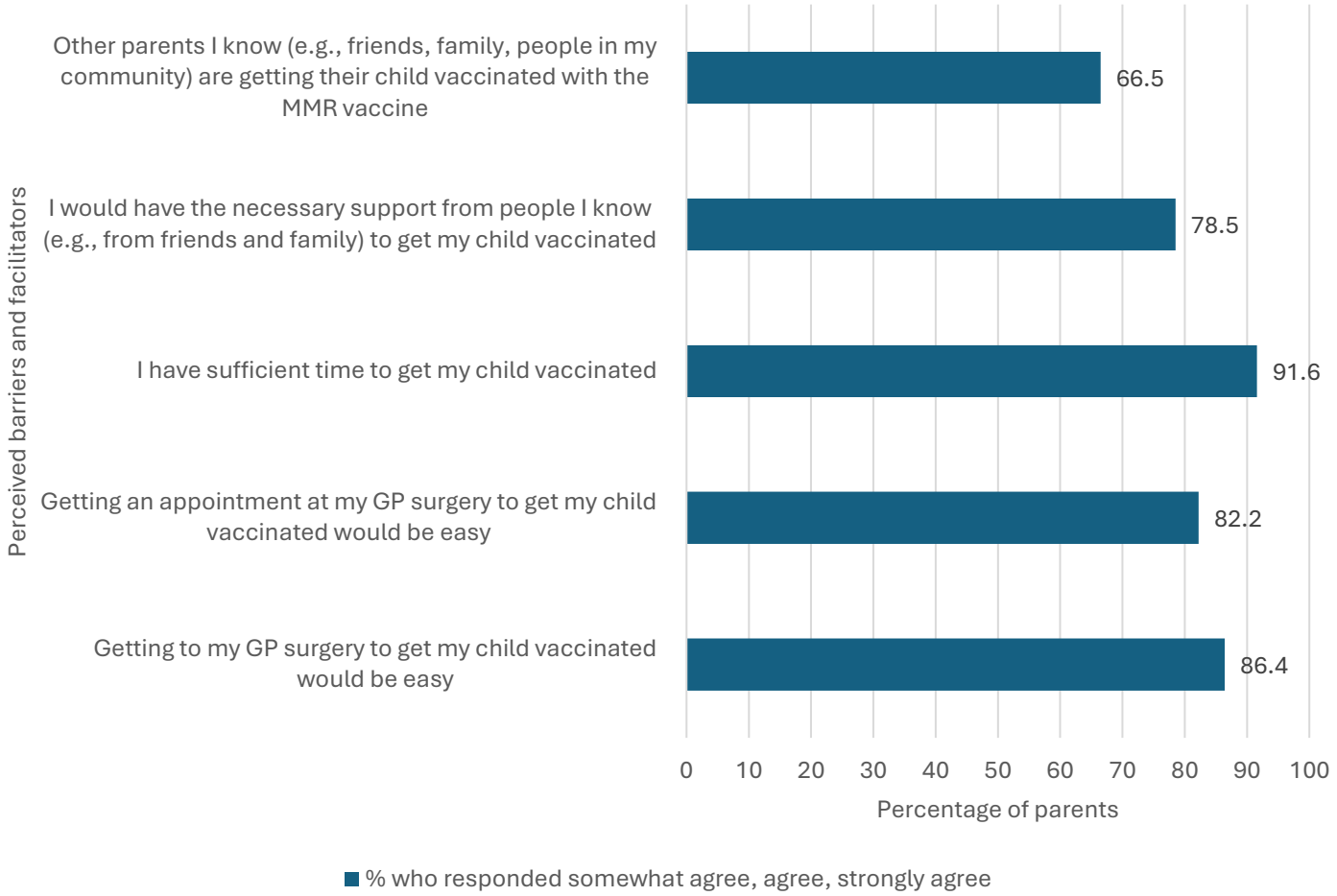
Research Question 1: *What are the barriers and facilitators for childhood vaccination uptake?*



This graph shows what % of parents agreed, or responded positively, to each statement.

Overall although a high proportion of parents viewed childhood vaccines as necessary, a considerable proportion of parents reported having concerns about vaccines and a lack of trust in the people in charge of childhood vaccination programmes in the UK.

Research Question 1: *What are the barriers and facilitators for childhood vaccination uptake?*

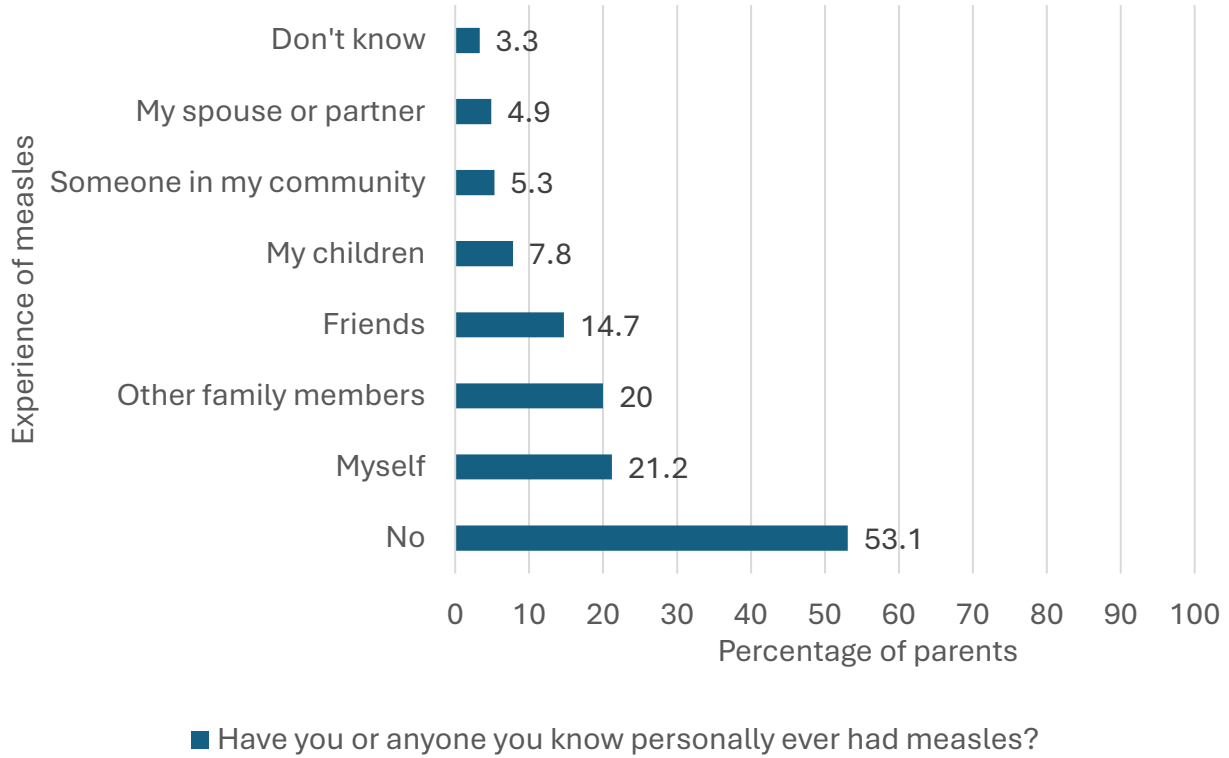


This graph shows what % of parents agreed, or responded positively, to each statement.

Overall, parents reported having the physical opportunity to get their child vaccinated (e.g., they have the time to get their child vaccinated, and getting an appointment, and getting to their GP surgery, would be easy).

Although most parents believed they would have the necessary support for people around them to get their child vaccinated, perceived social norms for vaccination were low. Only 67% agreed that other parents they know are getting their child vaccinated with the MMR vaccine.

Research Question 1: *What are the barriers and facilitators for childhood vaccination uptake?*

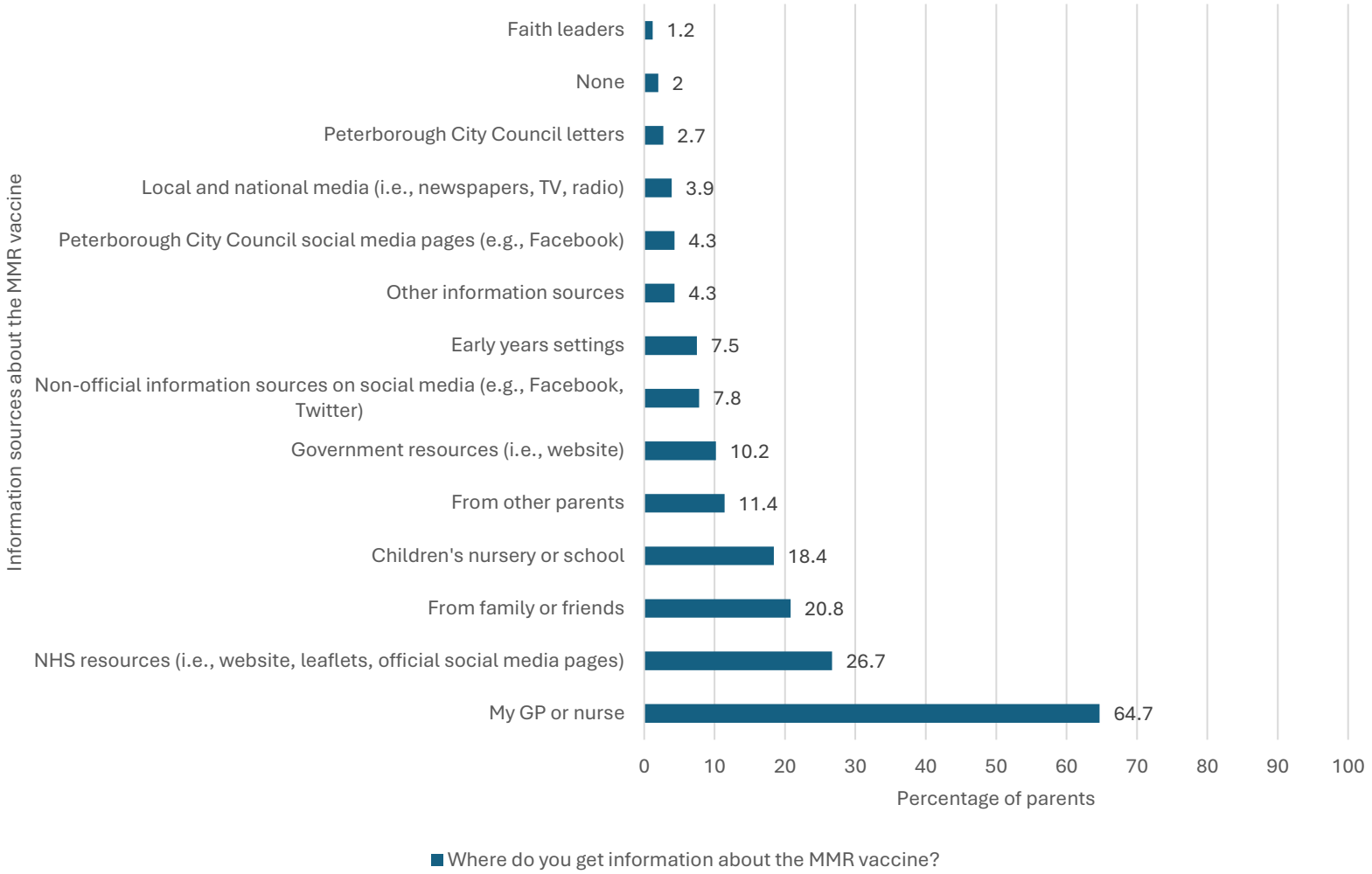


This graph shows what % of parents reported that they, or anyone they know personally, has ever had measles.

Over half of parents reported no personal experience with measles – i.e., they have not had measles, and they did not know anyone personally who has ever had measles (53.1%).

Some parents reported having had measles (21.2%), and knowing other family members (20%), and friends (14.7%) who have had measles.

Research Question 1: *What are the barriers and facilitators for childhood vaccination uptake?*



This graph shows what % of parents reported accessing information about the MMR vaccine from different sources.

Most parents reported that they got information about the MMR vaccine from their GP or nurse (64.7%) and NHS resources (26.7%).

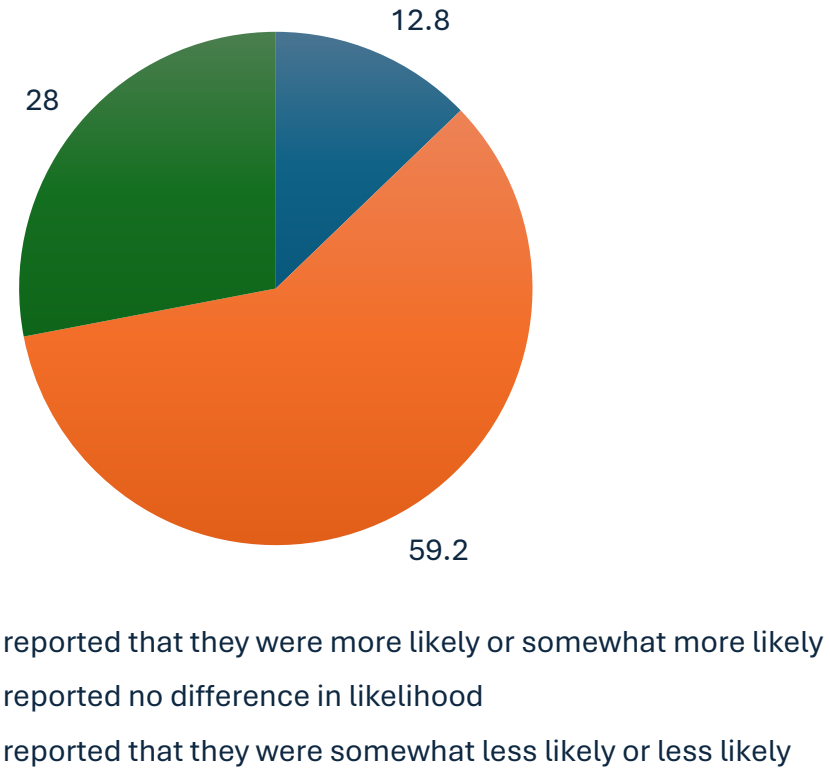
A significant proportion of parents also reported that they got information about the MMR vaccine from family and friends (20.8%), children's nursery or school (18.4%), and from other parents (11.4%).

Research Question 2: *Do the barriers and facilitators for childhood vaccination uptake vary amongst key population groups?*

A significant proportion of parents we surveyed (27.8%) were of white background, other than English, Welsh, Scottish, Northern Irish, British, and Irish. Parents who identified as being *White: Gypsy or Irish Traveller* or *White: Any other white background* reported some key barriers for childhood vaccination uptake:

- 61% of parents (who identified as being White: Gypsy or Irish Traveller or White: Any other white background) believed measles is a serious disease for their child.
- Over half of parents (54%) believed that their child is likely to catch measles at some point in the future.
- Just under half of parents reported that they have trust in the people in charge of the UK MMR vaccine (42.6%) and in the people in charge of the vaccines for children in the UK (47.1%).
- Concerns about the MMR vaccine and vaccines in general (e.g., short-term and long-term adverse effects, content of the vaccine) were high. For example, 61.8% reported that they have concerns about adverse effects from vaccines in general.
- Over 80% of parents reported that: they believe the MMR vaccine will reduce their child's risk of measles; childhood vaccines are important to help protect their child from catching serious infectious diseases; they are confident in their ability to make decisions regarding the MMR vaccination of their child and; they are confident in their ability to make plans to do so.
- Over 70% of parents reported that other people they know are getting their child vaccinated and that they would have support from people they know to get their child vaccinated.
- Over 81% of parents report that they have the physical opportunity to get their child vaccinated (e.g., time, ease to book a GP appointments, ability to get to their GP surgery).

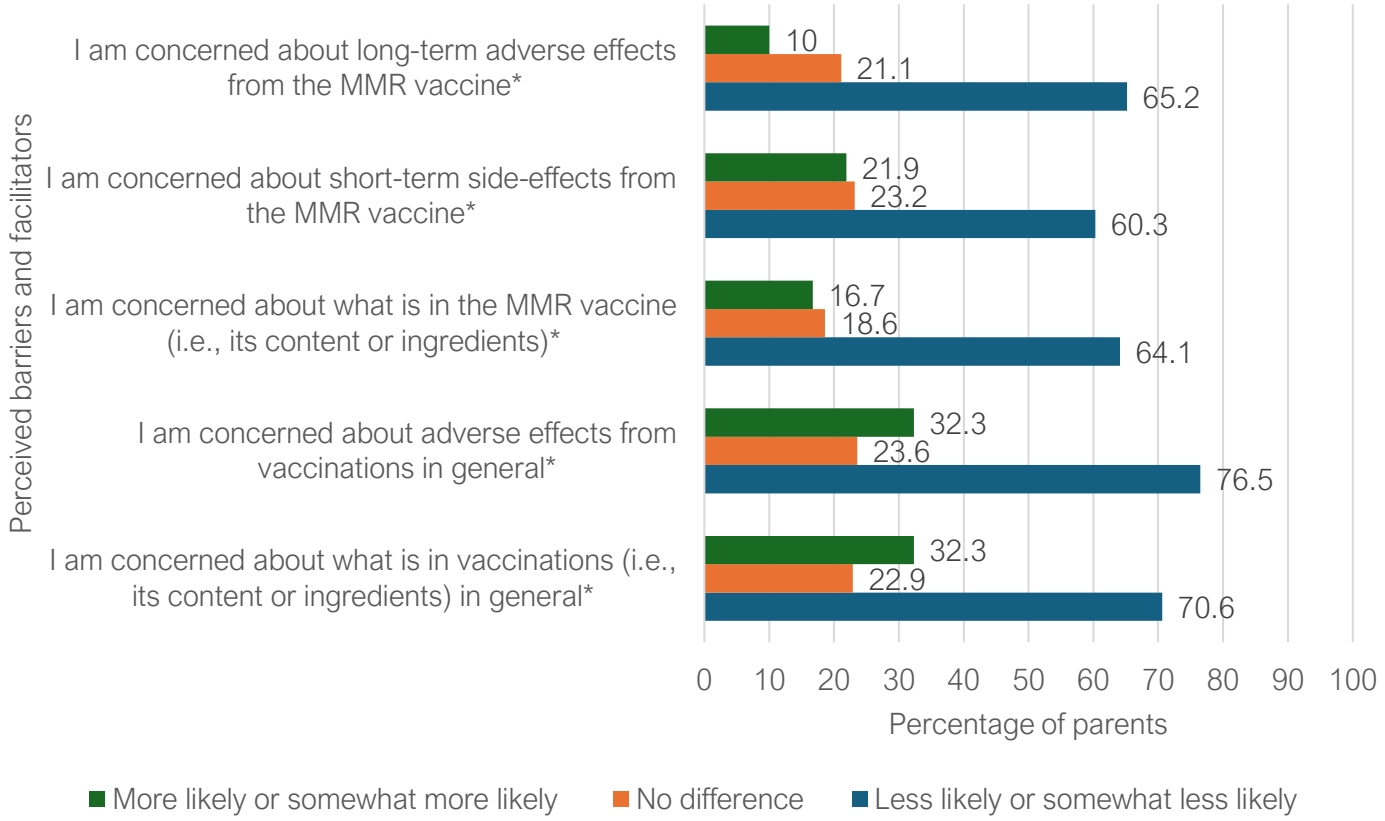
Research Question 3: *Has the emergence of COVID-19 impacted on childhood vaccination uptake?*



This pie chart shows what % of parents reported that they were more likely or less likely for their child to receive the vaccines that are offered to them following the emergence of COVID-19, or reported having no difference in likelihood.

In total, 28% of parents reported that they were **less likely**, or somewhat less likely, to agree for their child to receive the vaccines that are offered to them following the emergence of COVID-19.

Research Question 3: *Has the emergence of COVID-19 impacted on childhood vaccination uptake?*



Parents who were less likely to agree for their child to receive the vaccines that are offered to them following the emergence of COVID-19 reported more concerns about vaccinations.

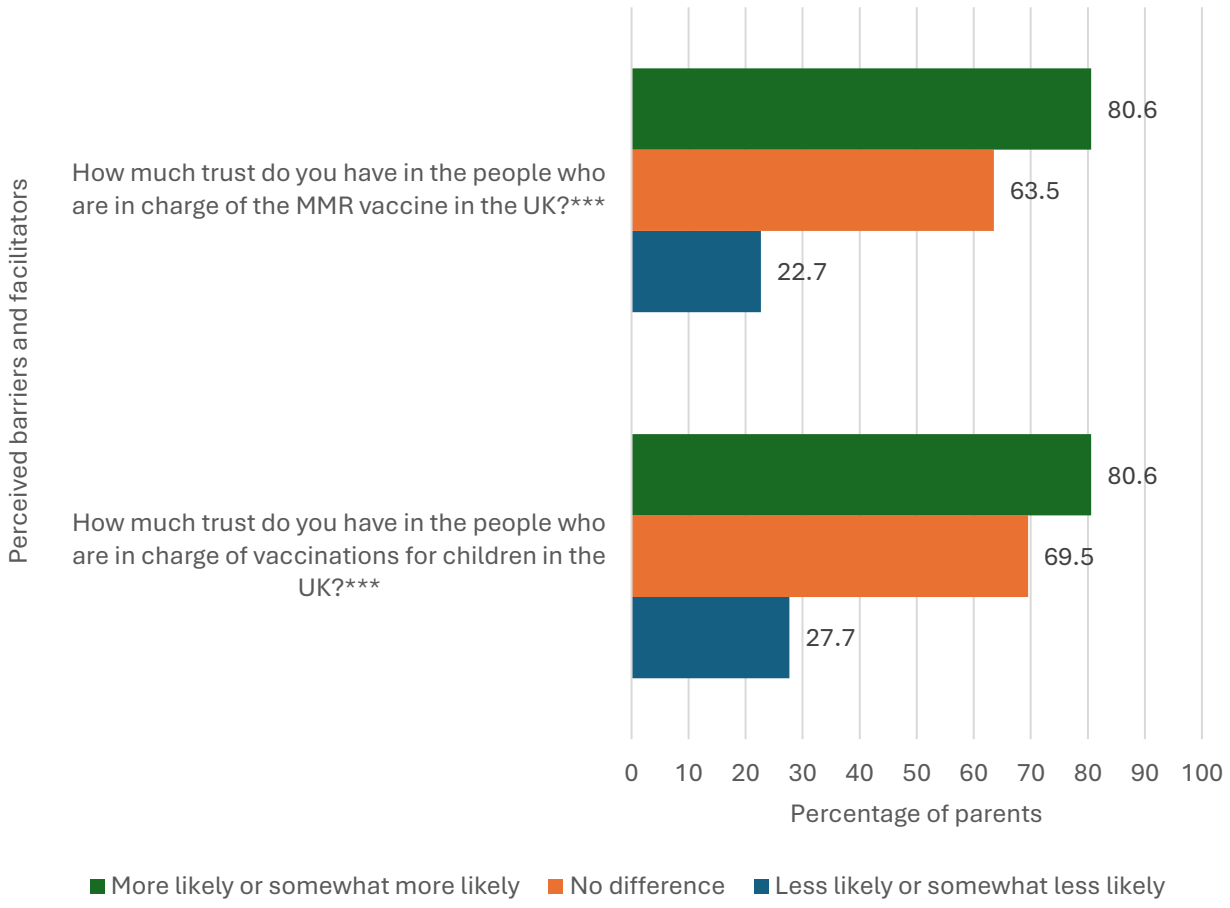
In total, 65.2% of parents who were **less likely** to agree for their child to receive the vaccines following the emergence of COVID-19 reported that they have concerns about the long-term effects of the MMR vaccine.

In comparison, only 21.1% of parents who reported **no difference in likelihood** to agree for their child to receive the vaccines following the emergence of COVID-19 reported that they have concerns about the long-term effects of the MMR vaccine.

Concerns were even lower in those who were more likely or somewhat **more likely** to agree for their child to receive the vaccines following the emergence of COVID-19; only 10% of parents in this group reported having concerns about the long-term effects of the MMR vaccine.

Data for items with one asterisk (*) are the % of parents who responded, 'somewhat agree', 'agree', or 'strongly agree' to the item. Data for items with two asterisks (**) are the % of parents who responded, 'somewhat likely', 'likely', 'extremely likely' to the item. Data for items with three asterisks (***) are the % of parents who responded 'a great deal' or 'a moderate amount' to the item.

Research Question 3: *Has the emergence of COVID-19 impacted on childhood vaccination uptake?*



Parents who were less likely to agree for their child to receive the vaccines that are offered to them following the emergence of COVID-19 reported weaker trust in the people in charge of the UK childhood vaccination programme.

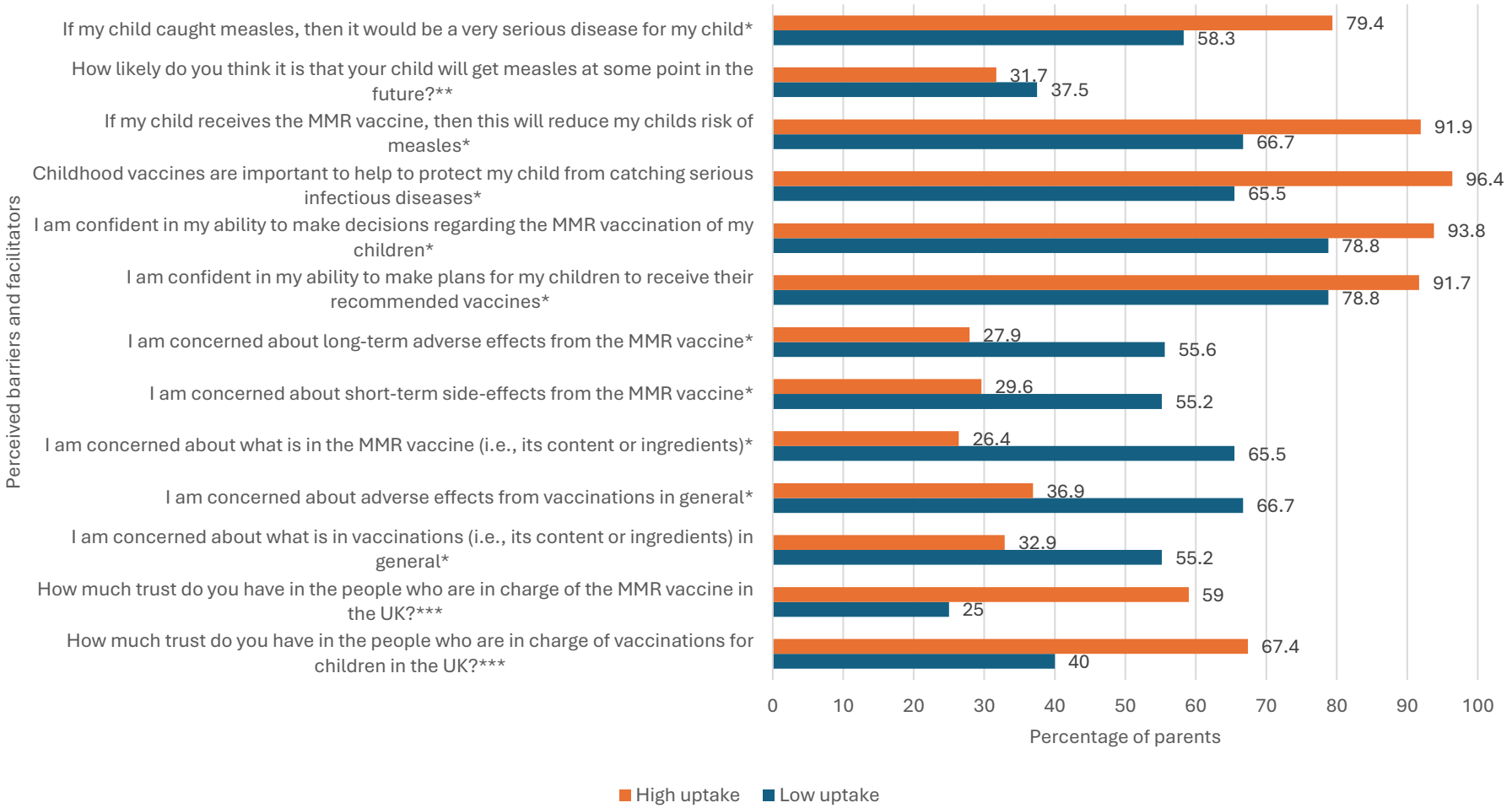
Only 22.7% of parents who were **less likely** to agree for their child to receive the vaccines following the emergence of COVID-19 reported that they trust the people in charge of the MMR vaccine in the UK.

In comparison, 63.5% of parents who reported **no difference in likelihood** to agree for their child to receive the vaccines following the emergence of COVID-19 reported that they trust the people in charge of the MMR vaccine in the UK.

Trust was even higher in those who were more likely or somewhat **more likely to agree** for their child to receive the vaccines following the emergence of COVID-19; 80.6% of parents in this group reported that they trust the people in charge of the MMR vaccine in the UK.

Data for items with one asterisk (*) are the % of parents who responded, 'somewhat agree', 'agree', or 'strongly agree' to the item. Data for items with two asterisks (**) are the % of parents who responded, 'somewhat likely', 'likely', 'extremely likely' to the item. Data for items with three asterisks (***) are the % of parents who responded 'a great deal' or 'a moderate amount' to the item.

Research Question 4: *How do the barriers and facilitators to childhood vaccination uptake vary amongst parents who are classified as having high uptake and low uptake of routine childhood vaccines?*



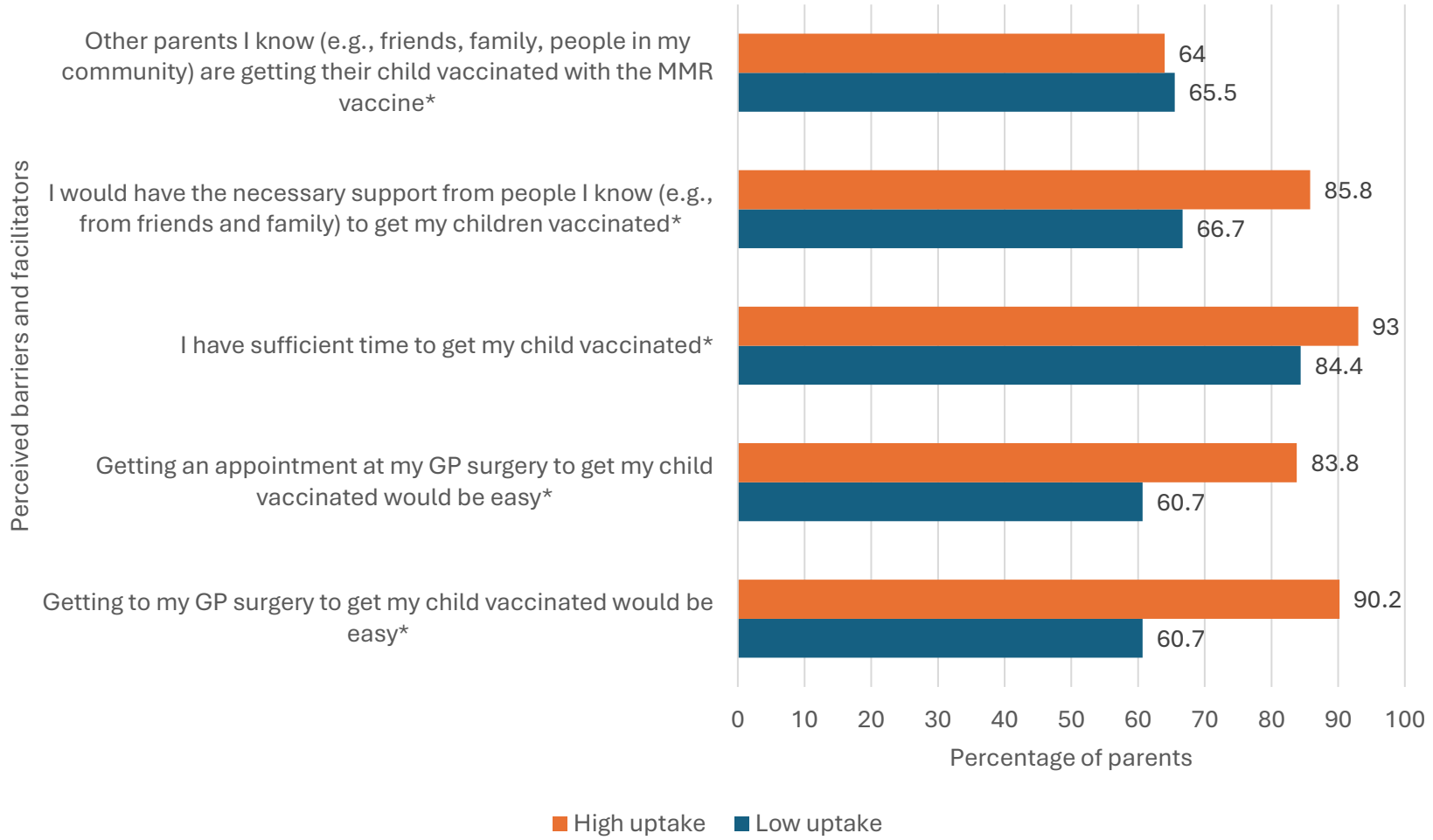
This graph shows what % of parents agreed, or responded positively, to each statement, by those who were classified as having low uptake (blue bars) and those classified as having high uptake (orange bars).

Parents who were classified as having low uptake reported more barriers.

There were no significant differences in perceived susceptibility of their child catching measles, between those classified as having low uptake and high uptake.

Data for items with one asterisk (*) are the % of parents who responded, 'somewhat agree', 'agree', or 'strongly agree' to the item. Data for items with two asterisks (**) are the % of parents who responded, 'somewhat likely', 'likely', 'extremely likely' to the item. Data for items with three asterisks (***) are the % of parents who responded 'a great deal' or 'a moderate amount' to the item.

Research Question 4: *How do the barriers and facilitators to childhood vaccination uptake vary amongst parents who are classified as having high uptake and low uptake of routine childhood vaccines?*



This graph shows what % of parents agreed, or responded positively, to each statement, by those who were classified as having low uptake (blue bars) and those classified as having high uptake (orange bars).

Parents who were classified as having low uptake reported more barriers.

There was no significant difference in perceived social norms for childhood vaccination uptake, between those classified as having low uptake and high uptake.

Data for items with one asterisk (*) are the % of parents who responded, 'somewhat agree', 'agree', or 'strongly agree' to the item. Data for items with two asterisks (**) are the % of parents who responded, 'somewhat likely', 'likely', 'extremely likely' to the item. Data for items with three asterisks (***) are the % of parents who responded 'a great deal' or 'a moderate amount' to the item.

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Summary – local survey

We surveyed 255 parents of children aged 11 years and younger who live in Peterborough.

Most parents were from the most deprived (44.7%) and moderately deprived (53.7%) areas of Peterborough. A significant proportion of parents (27.8%) were of white background, other than English, Welsh, Scottish, Northern Irish, British, and Irish. Over a third of parents (38.4%) spoke a language other than English at home. A significant proportion of parents (41.6%) were born outside of the UK.

In total, 17.8% of parents were classified as having low uptake of routine childhood vaccines.

A significant proportion of parents (28%) reported that they were less likely, or somewhat less likely, to agree for their child to receive the vaccines that are offered to them, following the emergence of COVID-19.

The table presents the identified barriers to childhood vaccination uptake, amongst parents who were classified as having low childhood vaccination uptake.

Barriers to childhood vaccination uptake amongst parents classified as having low childhood vaccination uptake
Weaker perceived confidence in their ability to make decisions regarding the MMR vaccination of their child, and their ability to make plans for their children to receive the recommended vaccines
Weaker belief that measles is a severe disease for their child
Weaker beliefs that the MMR vaccine will reduce their child's risk of measles and that routine childhood vaccines will help protect their child from catching serious infectious diseases
Stronger concerns about the MMR vaccine (short-term side-effects, long-term adverse effects, its content) and concerns about vaccinations in general (adverse effects, its content)
Weaker perceived trust in the people in charge of the UK MMR vaccine and routine childhood vaccines
Greater personal (indirect) experience with measles
Greater personal (direct) experience with measles
Weaker perceived likelihood that they will agree for their child to receive the vaccines that are offered to them, following the emergence of COVID-19
Weaker intentions for their child to receive their vaccines compared with parents who were classified as high uptake
Weaker perceived social support to get their child vaccinated
Weaker perceived physical opportunities to get their child vaccinated (time, ease of access to GP surgery/ appointments)

Interviews with parents in Peterborough

We conducted interviews to explore the barriers and facilitators for childhood vaccination uptake in more depth. The objectives were to:

(1) explore the barriers and facilitators to childhood vaccination uptake in general, and MMR vaccination and 6-in-1/ 4-in-1 vaccination uptake specifically

(2) explore what would help parents to take up the offer of routine childhood vaccinations.

Sampling and recruitment

Individuals were recruited between January – February 2025. Eligibility criteria were participants aged 18 years or older; a Peterborough resident; has parental or caregiver responsibility for one or more children who are aged 5 years or younger; able to provide consent. Individuals were recruited via expressions of interest from the earlier childhood vaccination survey. All participants were offered a £20 gift voucher as a thank you for their participation.

Ethical approval

Ethical approval was granted by Sheffield Hallam University Research Ethics Committee (ID ER68324734) and Peterborough City Council. All participants provided informed consent before participating in the interview.

Data collection

Interviews were conducted via telephone. A semi-structured topic guide was developed which consisted of questions about their views, opinions, and experiences about routine childhood vaccines, about vaccines that provide protection against measles (the MMR vaccine) and whooping cough (the 6-in-1 vaccine/ 4-in-1 pre-school booster), and what they think affects parent's decisions to take up the offer of routine childhood vaccines.

Analysis

Data were audio-recorded, transcribed, and anonymised. Framework analysis was used to code the data [16] using NVivo. The transcripts were coded into domains, using the 14 TDF domains as a framework. Text was coded under the domain (theme) that best matched the content. Text relating strongly to more than one TDF domain was coded in both. The types of statements under each TDF domain were than analysed using inductive content analysis. Sub-themes arising from the data (under each TDF domain) were identified to create sub-categories.

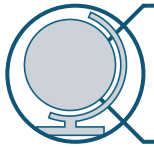
Qualitative interview findings – Participants

In total, 8 parents in Peterborough who have children aged 5 years and younger took part in an interview

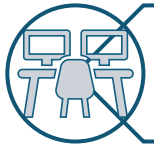
Parents ranged in age from 20 – 42 years old, with 5 parents being 30 years old or younger

Seven parents were female

Six parents identified as being White British, and two parents identified as being Eastern European



Six parents were born in the UK, and two parents were born in an Eastern European country



Three parents were unemployed, two parents worked full-time, two parents worked part-time, and one parent was in education or training

Five parents had one child, three parents had two or more children.

*Are there **capability** barriers (B) and facilitators (F) for childhood vaccination uptake?*

Parents reported the following **capability** barriers (b) and facilitators (f):

Knowledge

- Having knowledge about infectious diseases (F)
- Having a lack of knowledge, or misunderstanding, about infectious diseases (B)
- Having knowledge about the importance of vaccinations and how to access them (F)
- Having a lack of knowledge about the benefits and risks vaccinations (B)

"To me whooping cough just sounds like it's a cough or some kind of cough so honestly wouldn't know." [P6]

Behavioural regulation

- Having a plan for making an informed decision about vaccination (F)
- Having a plan for getting their child vaccinated (F)
- Having a plan for managing potential side-effects or adverse reactions from vaccination (F)

"You give them some Calpol if they get a bit of a temperature. You know. You might have a bit of an afternoon in front of the TV if they feel a bit sorry for themselves..." [P7]

"I work a 9 to 5, and most doctors' surgeries open 9 to 5 and not on weekends. But we made it work with our work schedules because my partner works a sort of a half a night shift, so he is able to take him. *We sort of try and book for the afternoons, so if I'm not off work he can take him.*" [P8]

NB: Whether or not something was determined to be a likely barrier or facilitator was based on researcher interpretation, rather than parent behaviour, as all parents had taken up the offer of routine childhood vaccines offered so far.

*Are there **opportunity** barriers (B) and facilitators (F) for childhood vaccination uptake?*

Parents reported the following **opportunity** barriers (b) and facilitators (f):

Social influences

- Perceiving peer pressure to decline vaccinations (B)
- Other people around them don't vaccinate (B)
- Having social norms for vaccination (F)
- Having supportive conversations with people around them (e.g., friends, family) about vaccination (F)
- Perceive a lack of support from healthcare professionals (B)
- Having support from healthcare professionals (F)
- Having support from people around them to get their child vaccinated (F)

"…I was struggling to get him in for his year one. They [family nurse and midwife] sent a referral through and within a couple of days I'd received a letter saying I've got an appointment at this time for his vaccination." [P3]

"…Some people that I know that doesn't have them, that chose not to vaccinate their children, but they also live like different lifestyle and everything else and they really believe that their own immunity is able to fight off anything if they live healthy." [P5]

Environmental context and resources

- Receiving an invitation from their GP surgery (F)
- Lack of information about childhood vaccines before the appointment (B)
- Lack of accessible of appointments (B)
- Having access to a local GP surgery (F)
- Receiving information about childhood vaccines during the appointment (F)

"…I would like more information, and I prefer to get my information more like face to face than over letters or calls because I have trouble understanding specific things so being able to get sat down and spoken about the injections, I would feel more comfortable with that than anything else due to the fact is I'll understand more and better that way". [P6]

NB: Whether or not something was determined to be a likely barrier or facilitator was based on researcher interpretation, rather than parent behaviour, as all parents had taken up the offer of routine childhood vaccines offered so far.

*Are there **motivation** barriers (B) and facilitators (F) for childhood vaccination uptake?*

Parents reported the following **motivation** barriers (b) and facilitators (f):

Social/ professional role and identity

- Having a 'pro-vaccination' identity (F)
- Vaccination is part of their role as a parent (F)

Beliefs about capabilities

- Having confidence in their ability to make an informed decision about vaccination (F)

Intentions

- Having positive intentions to get their child vaccinated (F)
- Experiencing some uncertainty about vaccinations (B)

"I think I've always known growing up my mum, us...kids we all had our vaccinations, my cousin had all hers. It was sort of, it's part of life, yeah vaccinations here we go, off we go, you know this is what we're doing." [P8]

"As long as I knew what any side effects were for my- that could have presented in my children, what the risks of getting the disease would be if they didn't have the vaccinations and so forth. So as long as I knew that the information that I needed was to make an informed decision then that's okay." [P7]

"I mean I'd, I'd likely to think maybe I would go and get them done but I mean, a question would be it's just a booster I don't know if a booster is a necessity or whether I don't know, they, when they had their ones when they were eight, 12 and 16 is it, do they need a top up?" [P1]

NB: Whether or not something was determined to be a likely barrier or facilitator was based on researcher interpretation, rather than parent behaviour, as all parents had taken up the offer of routine childhood vaccines offered so far.

*Are there **motivation** barriers (B) and facilitators (F) for childhood vaccination uptake?*

Beliefs about consequences

- Perceiving infectious diseases to have serious health consequences (F) and their child to be at increased risk of serious health consequences from infectious diseases (F)
- Perceiving their child to be at increased risk of catching an infectious disease due to mixing with other children in early year settings/ schools (F)
- Perceives that the risk of their child catching an infectious disease depends on uptake in the wider community (B)

- Perceiving childhood vaccinations to reduce the risk of catching infectious diseases (F), the risk of serious health consequences from infectious diseases (F), and the risk of transmission of infectious diseases in the community (F)
- Perceiving some vaccines to be more important than others (B)

- Having no concerns about childhood vaccines (F)
- Having concerns about potential short-term side-effects from vaccinations (B)
- Perceive the benefits of vaccination to outweigh potential risks (F)
- Perceive informed decision-making to be important for childhood vaccination uptake (F)

- Perceive COVID-19 to have had no impact on childhood vaccination decision-making (F) or to have had a positive impact on childhood vaccination decision-making (F)
- Perceive COVID-19 to have had a negative impact on childhood vaccination uptake (B)

- Having trust in healthcare professionals (F)

"... Children are being put in kind of social settings and...in a busy environment at a younger age...so I do think, it [vaccinations] is important." [P1]

"...When it comes to the measles thing, I'm more determined for them to get the vaccination for that, yeah." [P6]

"I mean I have concerns, obviously, what the side effects... I can't remember which ones they were, but my daughter did get poorly on a few of them, like, she was throwing up, and she had a high temperature and stuff..."[P4]

"Yes [COVID-19 has influenced childhood vaccinations], 100% with anti-vaccinators 100%" [P5]

NB: Whether or not something was determined to be a likely barrier or facilitator was based on researcher interpretation, rather than parent behaviour, as all parents had taken up the offer of routine childhood vaccines offered so far.

*Are there **motivation** barriers (B) and facilitators (F) for childhood vaccination uptake?*

Emotion

- Anticipating regret if their child caught an infectious disease and they were unvaccinated (F)
- Experiencing negative emotions after getting their child vaccinated (B)
- Experiencing negative emotions about infectious diseases (F)

Reinforcement

- Having negative experiences of infectious diseases (F)
- Having negative experiences during pregnancy (F)
- Having negative experiences of childhood vaccinations (B)
- Having positive experiences of childhood vaccinations (F)

"But obviously if children don't have them, like, any child, then obviously they're going to get- They might get really poorly, I'm not saying they will, but they could get really poorly, which obviously then their parents should've- Like, they'll probably regret, and say they should've taken them to get their vaccinations, but obviously then it's too late." [P4]

"It was pretty straight forward, we got [a] letter, we rung up the surgery, we booked him in and when we got there as well, literally turned up, near enough straight in...people in that room making sure that he had all the right vaccines and everything, somebody jabbing him, and they were great. Made him smile afterwards" [P8]

"And especially when they're babies too, they have an injection and then they cry their eyes out and then you feel terrible about it because they're crying it's hard." [P6]

NB: Whether or not something was determined to be a likely barrier or facilitator was based on researcher interpretation, rather than parent behaviour, as all parents had taken up the offer of routine childhood vaccines offered so far.

What do parents think would help parents like themselves to take up the offer of routine childhood vaccinations?

- Having flexible appointments (i.e., weekend and evening appointments, walk-in centres)
- Receiving vaccination reminders
- Having information and support about childhood vaccinations from health visitors and midwifes
- Having information and support about childhood vaccinations in parent support groups (i.e., in community centres)
- Having information about infectious diseases
- Having information about vaccinations, including information about potential short-term side-effects
- Having accessible communications and messages about vaccinations (i.e., different languages, lay-person friendly)
- Having messages and communications about vaccinations in different formats (i.e., social media posts, TikTok videos)
- Having information about childhood vaccinations in advance of receiving an invitation to make a vaccination appointment at the GP surgery

Having weekend appointments or weekend clinics and bits and pieces like that are important because then you're going to have people who maybe might take longer to get their children to be vaccinated, or might forget about it because, "Oh, I can't go. I'm at work," [P7]

"I mean leaflets with letters in our house don't really get read...you don't always get time to sit down and read it or things like that. So if you have got someone where you can just drop in to a clinic or you know a community centre that a health visitor's at or something like that, that would be ideal. Maybe even like somebody that you just text and be like I'm not really sure what's all this about, you know." [P8]

"...Obviously after you have your baby, they always tell you about [how] we recommend they have this, this and this and all the information you get, you get the booklets about breastfeeding and things like his... but you don't really get a lot of what future vaccinations are until you get an appointment from the doctor saying they're due this." [P3]

NB: Whether or not something was determined to be a likely barrier or facilitator was based on researcher interpretation, rather than parent behaviour, as all parents had taken up the offer of routine childhood vaccines offered so far.

Summary – interviews

We interviewed 8 parents of children aged 5 years and younger who live in Peterborough and identified key capability, opportunity, and motivation barriers and facilitators for childhood vaccination uptake.

Capability

Overall, parents reported having a general understanding about the importance of childhood vaccinations. Parents had limited understanding about what each vaccine provides protection against; however, for most parents, this was not a barrier as they understood that childhood vaccines are important for protecting the health of their child. For some parents, a lack of knowledge about the benefit-risk profile of vaccinations resulted in some uncertainty as to whether their child would receive them. They were unsure whether some vaccines are necessary and coupled with concerns about potential short-term side-effects (i.e., their child feeling unwell), they expressed some hesitancy about vaccination uptake.

Some parents described having a plan for making an informed decision about vaccines (i.e., if they were uncertain about something in relation to childhood vaccines, or they had forgotten what they had previously been told, then they would seek our further information from reputable and trustworthy sources). Some discussed having a plan for getting their child vaccinated, which included booking vaccination appointments that suited their work schedules. Some discussed having a plan for managing potential short-term side-effects from vaccinations (i.e., they had a plan to give their child Calpol to manage high temperatures) and had a plan for managing any potential adverse reactions (i.e., they had a plan to take their child to A&E if they suspected any adverse reaction following a vaccination).

Motivation

Overall, parents believed that childhood vaccinations are important for their children, to reduce the risk of their child catching infectious diseases and to reduce the risk of their child suffering serious health consequences from infection. Parents perceived their children to be at increased risk of catching infectious diseases due to mixing with other children in early year settings (e.g., attending nursery, baby groups, preschool) and for older children, being around other children at school. Some reported having concerns about potential short-term side-effects and for some, this was based on their previous experience of getting their child vaccinated. For most, these concerns did not prevent them from taking up the offer of further vaccines, as they viewed the benefits to outweigh any potential risks. However, there was some hesitancy about uptake when the perceived need for vaccinations was unclear (i.e., whether the disease is life-threatening, or whether a 'booster' is necessary) and there were concerns about short-term side-effects.

Opportunity

Parents discussed challenges relating to the accessibility of appointments to get their child vaccinated. This included a lack of available, and flexible, appointments. Although these challenges did not impact on vaccination uptake, some discussed how these challenges did negatively impact on the *timing* of vaccinations, that is, some children were delayed in receiving their vaccination. Parents valued receiving support from people around them. This included taking their child to their appointment (e.g., if one of the parents could not attend due to work commitments) or providing practical and emotional support when their child is receiving their vaccine. Parents valued having supportive conversations with healthcare professionals, including in early year settings, and would value more information about childhood vaccines in advance of receiving an invitation to make a vaccination appointment at the GP surgery.

Rapid evidence review of interventions

We conducted a rapid evidence review to identify what types of interventions have been implemented to support uptake of childhood vaccinations (≤ 5 years) amongst underserved communities.

The aim was to:

(1) identify what types of interventions (i.e., its content) have been implemented to support vaccination uptake.

Searches

We conducted systematic searches in electronic bibliographic databases, using relevant search terms for population (i.e., parent), terms for underserved communities (i.e., disadvantaged); terms for intervention (i.e., approach) and terms for childhood vaccines (i.e., immunisations). Studies were included in the review if they reported an intervention/ initiative to increase intentions and/or uptake of childhood vaccinations for children aged 0 – 5 years amongst underserved communities.

Data extraction

Data relating to the content of the intervention was extracted and classified using the Behaviour Change Wheel [2] and the BCT taxonomy [10]. Data were managed in Covidence and Excel.

Analysis

Using the Theory and Techniques Tool (a heat map identifying links between BCTs and Mechanisms of Action: MoAs) [3], we then identified whether these previously tested interventions have the potential to address the barriers and facilitators for uptake of childhood vaccinations in Peterborough, as identified in our survey and qualitative insight gathering activities. That is, we explored the extent to which there was a *match* between the content of the interventions (i.e., how they seek to change behaviour) and the barriers and facilitators to vaccination uptake, and whether there were any gaps.

Rapid evidence review of interventions:

Description of included studies

In total, 18 interventions were included in the review.

- 12 interventions were conducted in the USA, two interventions were conducted in Australia, two interventions were conducted in Canada, and two interventions were conducted in the UK.
- 12 interventions focused on childhood vaccination schedules more broadly, with four studies specifically looking at the MMR vaccine, one study looking at the seven-valent pneumococcal conjugate vaccine (PCV-7), and one study looking at the Haemophilus influenzae type b (Hib) vaccine.
- All reported on underserved communities (e.g., ethnically diverse, deprived, urban).

Types of interventions

We identified four types of interventions:

Environmental restructuring (used in 14 interventions) – intervention components that aimed to change the physical or social environment to support parents to take up the offer of childhood vaccines. This included sending reminders to parents or offering vaccinations in alternative locations.

Education (used in 9 interventions) – intervention components that aimed to increase knowledge or understanding about vaccinations to support parents to take up the offer of childhood vaccines.

Persuasion (used in 5 interventions) – intervention components that use methods of communication to persuade parents to take up the offer of childhood vaccines. This included persuasive messages/ communications about the importance of vaccinations for the health of their child.

Enablement (used in 5 interventions) – intervention components that support parents to take up the offer of childhood vaccines, beyond education, training or environmental restructuring. This included providing social support/ practical help for getting their child vaccinated.

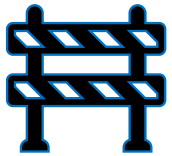
Description of the strategies used in existing interventions

Intervention functions	BCTs	Description of the intervention component
Environmental restructuring (14 studies)	BCT 7.1 Prompts/ cues	• 14 interventions used reminder or recall strategies (study IDs 1 – 4, 6, 8 – 16). This included: vaccination reminders (e.g., letters, text messages, phone calls, postcards); personalised immunisation calendars and; vaccination recall for parents whose children were not up-to-date or had missed an appointment.
	BCT 12.1 Restructuring the physical environment	• 1 intervention co-located a family programme in a health centre in order to assess child vaccination status and book vaccination appointments (study ID 2) • 2 interventions expanded access to vaccinations in clinical settings, including offering immunisation-only clinics (study ID 2) and provided evening and weekend clinics at nearby locations (study ID 14) • 1 intervention delivered MMR vaccines as part of home visits by a public health nurse (study ID 12)
Education (9 studies)	No BCTs identified	• 4 interventions delivered educational materials and educational sessions to learn about immunisations and the immunisation schedule (study IDs 1, 5, 6, 10)
	BCT 5.1 Information about health consequences	• 4 interventions educated parents about the importance of vaccination for the health of their child via messages on a personalised calendar ('Immunising your child on time protects them from: tetanus, diphtheria, whooping cough, measles, rubella, hepatitis, mumps, polio, meningitis, chicken pox, pneumonia, ear disease') (study ID 16), text messages (e.g., why immunisations are important) (study ID 15, 17), and via outreach home visits delivered by community health workers (study ID 18).
	BCT 2.2 Feedback on behaviour	• 1 intervention provided reminders to parents to inform them that their children were behind in all routine immunisations (study ID 12)
Persuasion (5 studies)	BCT 5.2 Salience of consequences	• 1 intervention provided posters in waiting areas and examination rooms with pictorial examples of vaccine-preventable diseases (study ID 2)
	BCT 5.1 Information about health consequences	• 4 interventions educated parents about the importance of vaccination for the health of their child via personalised calendar ('Immunising your child on time protects them from: tetanus, diphtheria, whooping cough, measles, rubella, hepatitis, mumps, polio, meningitis, chicken pox, pneumonia, ear disease') (study ID 16), text messages (e.g., why immunisations are important) (study ID 15, 17), and via outreach home visits delivered by community health workers (study ID 18).
Enablement (5 studies)	BCT 3.2 Social support (practical)	• 3 interventions provided parents with assistance, including transportation and insurance problems (especially Medicaid reenrolment) (study ID 3, 18), or assistance in scheduling and rescheduling appointments (study ID 6, 18).
	BCT 3.1 Social support (unspecified)	• 1 intervention described how vaccination coordinators identified children who were behind on their vaccination schedules and conducted outreach to get them back on schedule (study ID 7)
	BCT 2.2 Feedback on behaviour	• 1 intervention sent a letter to parents to notify them that their children were not up-to-date and suggested that they have their child vaccinated at their primary care site or, if they had no usual source of care, at the county health department (study ID 8)

(Key: 1 = Findley 2008; 2 = Fu 2012; 3 = Hambridge 2009;4 = Cockman 2011; 5 = Thomas 2008; 6 = Vora 2009; 7 = Kattan 2014; 8 = Kempe 2013; 9 = Kempe 2015; 10 = Atchison 2013; 11 = Dombkowski 2014; 12 = Lemstra 2011; 13 = Cushon 2012; 14 = Stockwell 2012; 15 = Hofstetter et al, 2015; 16 = Abbott et al, 2013; 17 = Brown 2014; 18 = Pati 2015).

Heatmap

We identified whether 18 published interventions have the potential to address each of the identified barriers and facilitators for supporting uptake of childhood vaccines.



No intervention that we evaluated addressed all the barriers for childhood vaccination uptake.

The most common intervention strategy used in published interventions is **recall and reminder strategies**. While this strategy is likely important, it does not address other key barriers that we identified in Peterborough, such as motivational barriers and facilitators.

The most common intervention strategy used in published interventions to address motivational barriers was **information about health consequences**. This included providing parents with information that emphasised the importance of vaccinations for the health of their child. However, this does not address concerns about vaccinations, or the impact of COVID-19 on treatment decision-making.

No intervention that we evaluated had techniques in place to **support decision-making and planning.** This included supporting parents to: have confidence in their ability to make decisions regarding the vaccination of their child; to make plans for their child to receive the vaccines and; to make plans to manage any potential short-term side-effects

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Intervention recommendations

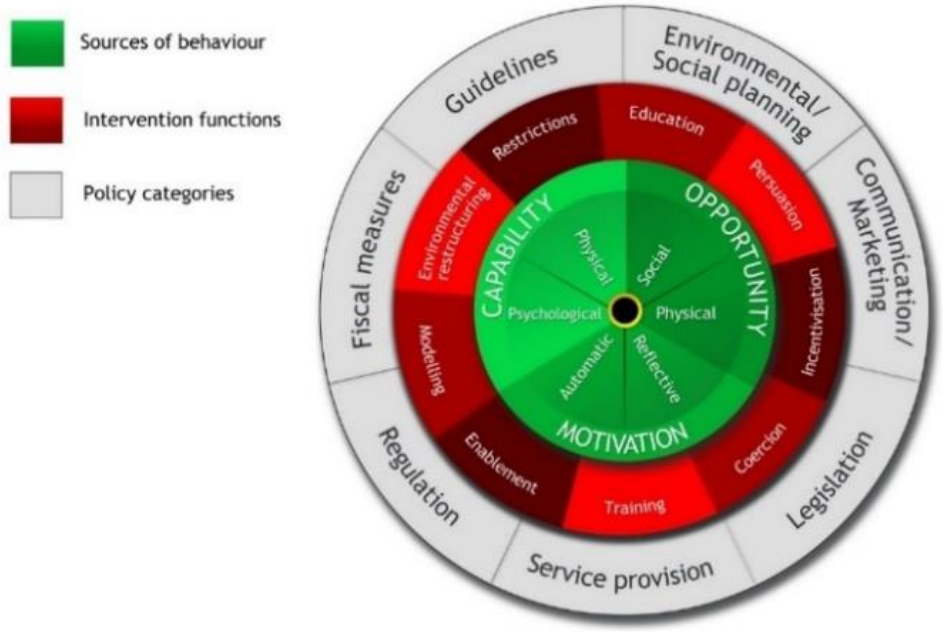
We used the Behaviour Change Wheel [2] to make theory-informed intervention recommendations for supporting uptake of routine childhood vaccines.

We have matched the types of intervention functions (red circle) that are likely to address the identified barriers and facilitators for childhood vaccination uptake (green circle).

We have also matched the types of policy categories that can help to deliver those identified interventions (grey circle).

We describe the content of the intervention recommendations in terms of its Behaviour Change Techniques (BCTs), which are the 'active ingredients' of the intervention [10].

Using the APEASE evaluation criteria [2] and the IN-CASE framework [4], we have explored the likely acceptability, practicality, effectiveness, and affordability of the interventions (both from the perspective of the parent, and those who would deliver the intervention), and explored whether receiving and/or delivering these interventions are likely to result in unintended consequences or impact on inequalities.



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Intervention recommendation 1:

Training health visitors in how to have supportive conversations about childhood vaccinations

The Healthy Child Programme is a universal programme which aims to ensure that every child gets the best start they can. All families with babies are offered 5 mandated health visitor reviews before their child reaches 2 and a half years old. As part of their role, health visitors promote childhood vaccinations. Therefore, health visitors are well placed to have supportive conversations with parents about childhood vaccinations, using evidence-based principles from behavioural science. This would involve providing advice and support about vaccinations, addressing any concerns, and supporting parents to make a plan for overcoming any challenges that may get in the way of receiving vaccines. Currently health visitors do not receive specific training in how to deliver this kind of support.

A targeted behavioural-science informed toolkit for health visitors could maximise the efficacy of this existing initiative.

APEASE and IN-CASE evaluation criteria:
Parents discussed how they would value conversations about vaccinations with a trusted healthcare professional, such as a health visitor, in advance of receiving an invitation to make a vaccination appointment at the GP surgery (**acceptability**) and health visitors already discuss vaccinations as part of their existing role (**practicality**). There is evidence to suggest that healthcare professionals can be trained in behavioural science principles [17-19] (**effectiveness**). This intervention could be expensive, as it requires health visitor staff time to engage with the toolkit and training materials (**affordability**). Although there is evidence to suggest that trained healthcare professionals can deliver this kind of support with fidelity [17-19], there would need to be initial monitoring to ensure that health visitors deliver this kind of support as intended (**side-effects**). As all families are offered 5 mandated health visitor reviews, this intervention is likely to be equitable, however interpreters may need to be considered alongside the provision of translated materials (**equitable**).

Behaviour Change Wheel

Policy categories:

Guidelines

Intervention functions:

Education

Persuasion

Enablement

Key BCTs:

Information about health consequences

Information about social and environmental consequences

Credible source

Social support (practical)

Social support (unspecified)

Problem solving

Action planning

Identified need

Having knowledge about infectious diseases and vaccines

Having a plan for getting their child vaccinated

Having a plan for managing any potential short-term side-effects

Believing that vaccines are necessary for their child and the benefits outweigh any potential risks

Impact of COVID-19 on decision-making

Having support from people around them

Having information and support from trustworthy sources (i.e., healthcare professionals)

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Intervention recommendation 2:

Messages and communications about childhood vaccinations

Communications should educate and persuade people about the benefits of childhood vaccinations. Communications should include relevant or important motivators for parents to take up the offer of vaccinations. For example, key motivators for uptake were: believing that vaccinations protect their child from catching, and suffering serious health consequences from, infectious diseases and that their children are at increased risk of catching infectious disease due to mixing with other babies/ children in early year settings/ schools. Communications should signpost to trustworthy sources of support and resources that can help parents to overcome any barriers that may get in the way of them accessing vaccinations. Communications should include relevant or important barriers and emphasise that support is available to manage these things. For example, key barriers for uptake were: concerns about potential short-term side-effects, whether some vaccines are necessary, lack of information/ resources about vaccinations and, lack of accessible appointments.

Communications should emphasise social norms for accessing vaccinations amongst different target groups in the wording and imagery used, e.g., 'people like me' who have similar motivations and barriers and who have gone onto access vaccinations. Messages should have trustworthy branding (e.g., NHS, PCC).

APEASE and IN-CASE evaluation criteria:
Communications that are co-produced with relevant target groups are likely to be **acceptable** to parents and **practical and affordable** to deliver. Co-producing *where* and *how* the messages will be delivered will optimise their *reach* and maximise potential **effectiveness**. It is important to evaluate how to create messages that include information about short-term side-effects *without* unintentionally heightening anxiety in parents (**side-effects**). Messages should be provided in different formats/ languages (**equity**).

Behaviour change Wheel

Policy categories:

Communications and marketing

Intervention functions:

Education

Persuasion

Key BCTs:

Information about health consequences

Information about social and environmental consequences

Vicarious consequences

Credible source

Problem solving

Action planning

Identified need

Having knowledge about infectious diseases and vaccines

Having a plan for getting their child vaccinated

Having a plan for managing any potential short-term side-effects

Believing that vaccines are necessary for their child and the benefits outweigh any potential risks

Social norms

Having information and support from trustworthy sources (i.e., NHS branding)

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Intervention recommendation 3:

Childhood vaccination champions in early years settings

Parents may benefit from having access to advice and support about childhood vaccinations in early year settings, such as family hubs. We recommend training staff in early year settings to become *childhood vaccination champions*. Similar to intervention recommendation 1, we recommend training key staff in early year settings in how to have supportive conversations about childhood vaccines using evidence-based principles from behavioural science. Childhood vaccination champions would provide advice and support about vaccinations, address any concerns, support parents to make a plan for overcoming any challenges that may get in the way of receiving vaccine, and signpost parents to NHS resources and support.

Delivering childhood vaccines in family hub settings, especially at more flexible times such as weekends or evenings, may help overcome accessibility barriers, such as challenges in accessing an appointment at their GP surgery that fits with parents work schedules.

APEASE and IN-CASE evaluation criteria:
Parents discussed how they would value conversations about vaccinations with trusted staff in early year settings, as well as having more flexible opportunities for getting their child vaccinated (**acceptability**). There are likely **practical** barriers and **cost** implications for the delivery of vaccinations outside of GP practices. Training staff to become 'childhood vaccination champions' could be expensive, as it requires staff time to engage with the toolkit and training materials (**affordability**) and there would need to be initial monitoring to ensure that staff deliver this kind of support as intended (**side-effects**). Like intervention 1, interpreters may need to be considered alongside the provision of translated materials (**equitable**).

Behaviour change Wheel

Policy categories:

Service provision

Intervention functions:

Education

Persuasion

Environmental restructuring

Key BCTs:

Information about health consequences

Information about social and environmental consequences

Credible source

Social support (practical)

Social support (unspecified)

Problem solving

Action planning

Restructuring the physical environment

Identified need

Having knowledge about infectious diseases and vaccines

Having a plan for getting their child vaccinated

Having a plan for managing any potential short-term side-effects

Believing that vaccines are necessary for their child and the benefits outweigh any potential risks

Impact of COVID-19 on decision-making

Having support from people around them

Having information and support from trustworthy sources (i.e., healthcare professionals)

Having accessible appointments to get their child vaccinated

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Conclusions

This mixed-method research has identified key capability, opportunity, and motivational barriers and facilitators for childhood vaccination uptake amongst parents in Peterborough. Existing interventions to support uptake amongst underserved communities do not address all the identified needs and therefore may not be as effective as they could be.

We have made a series of recommendations about how to support parents in Peterborough to take up the offer of childhood vaccines, through training health visitors in how to optimise their conversations about childhood vaccines with parents, additional co-produced communications and messages, and recommendations for establishing trained 'childhood vaccination champions' in early year settings.

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