Title

Practice nurses' perceptions of their immunisation role and strategies used to promote measles, mumps and rubella vaccine uptake in 2014 – 2018: A qualitative study

Running Head
Practice nurses perceptions of their role concerning the measles, mumps and rubella vaccine

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Abstract

Aim

The aim of this study was to explore which aspects of their role practice nurses perceive to be most influential and the strategies they employ to promote the MMR vaccine.

Design

Qualitative study employing in depth interviews.

Method

Fifteen London based practice nurses, nine in 2014 and six in 2018, took part in semi-structured interviews that were audio recorded and transcribed verbatim. Qualitative content analysis was used to systematically manage, analyse and identify themes.

Results

Analysis of data identified aspects of their role practice nurses perceived to be most influential (the themes) including: promoting vaccination, assisting parents' to make informed decisions and provided insight into how they used specific strategies to achieve these in practice. These themes were consistent over both phases of the study.

Conclusion

The findings provide an understanding of: (i) the practice nurses perceptions of the most important aspects of their role when promoting the measles, mumps and rubella vaccine; (ii) the strategies they implemented in practice to achieve these. The latter included assisting parents in their immunisation decisions, and was facilitated by practice nurses engaging with parents to provide relevant evidence to address parent queries, dispel misconceptions and tailor strategies to promote the measles, mumps and rubella vaccine.

Impact

This study addresses the paucity of literature available that specifically explores practice nurses' perceptions of their role concerning the measles, mumps and rubella vaccine.

The findings reveal how practice nurses promote the measles, mumps and rubella vaccine by identifying strategies to enable parents to make informed decisions.

At a time of an increasing incidence of measles, practice nurses have an important public health role in achieving herd immunity levels for measles, mumps and rubella.

Key words

Practice nurse, perception, MMR, vaccine, role, immunisation.

INTRODUCTION

It is estimated that every year immunisation prevents between two and three million deaths globally (World Health Organization, 2020). The measles, mumps and rubella vaccine (MMR) is one of a number of combined vaccines in national immunisation programmes, such as in the United Kingdom (UK).

BACKGROUND

The incidence of measles in Europe has been increasing since 2016. Between January 2016 and October 2017, 9,000 cases of measles were reported in the European Union including 44 deaths (Coombes, 2017; Filia et al., 2017; George et al., 2017; Public Health England, 2019). The incidence of measles in Europe continued to increase in 2018. The European region 2018 data found 82,596 people contracted measles (Thornton, 2019).

A number of factors are reported to influence parental immunisation decision making regarding MMR vaccination. More balanced information, a lack of information and negative relationships with healthcare workers were identified in a systematic review as important factors that influenced parents and informal caregivers' immunisation decision making (Ames, Glenton, & Lewin, 2017). Furthermore, fear of vaccination side effects, distrust in the vaccine, lack of perceived risk of vaccine-preventable diseases and the influence of anti-vaccination reports in the media have been factors reported to impact on parental immunisation decision-making (Larson et al., 2015). Additionally, a mixed methods study in the UK revealed that barriers to immunisation uptake included issues with access and convenience of immunisation services, as well as challenges for service providers with limited resources to deliver immunisation services to large numbers of children (Letley et al., 2018).

The ability of parents to have an open discussion and trusting relationship with health professionals is identified as a positive influence in immunisation decision making (Mixer, Jamrozik, & Newsom, 2007). In addition, face to face interventions were found to be effective to inform parents about early childhood vaccination to influence vaccination status (Kaufman et al., 2018). A qualitative systematic review of factors that influence parents' vaccination decision making in the UK revealed parents trusted health professionals (Forster et al., 2016). In contrast, factors that parents cited as unhelpful for decision making were their inability to have an open dialogue with health

professionals and perceived pressure by health professionals to comply with immunisation schedules. A systematic review of factors affecting vaccine uptake revealed a lack of trust in health professionals as one of the reasons parents do not vaccinate their children (Smith, Amlôt, Weinman, Yiend, & Rubin, 2017).

In the UK general practitioners, health visitors, school nurses and practice nurses in particular are involved in the delivery of the national immunisation programme (Table S1). There is evidence that general practitioners and health visitors influence parental decision making concerning the MMR vaccine (Mixer et al., 2007; Smailbegovic, Laing, & Bedford, 2003). It is acknowledged that recommendations to vaccinate by doctors, including their ability to communicate the importance of vaccination to parents is associated with an increased likelihood of vaccination uptake (Lee, Duck, & Sibley, 2018). Practice nurses have been increasingly identified as leading the delivery of national immunisation programmes (Joyce & Piterman, 2011; Maconachie & Lewendon, 2004). However, there is minimal information available regarding which aspects of their immunisation role practice nurses perceive to be most influential and the strategies they employ in practice to promote the MMR vaccine (Hill, Salmon, & Aitken, 2019). This is important since this will provide greater insight into approaches that can be used in practice with particular populations or to address myths and misconceptions about the MMR vaccine that may influence uptake. These findings will be useful to inform educational initiatives for future and existing practice nurses and policy makers in terms of targeting specific populations to improve MMR vaccine uptake and therefore prevent future outbreaks.

Aim

The aim of this study was to explore which aspects of their role practice nurses perceive to be most influential and the strategies they employ to promote the MMR vaccine.

Design

An exploratory descriptive qualitative design was used to address the study aim. This was considered appropriate since there was a paucity of research available which had focused on this phenomenon previously thus enabling flexibility without being rooted to a specific theoretical framework (Kim 2017, Polit & Beck, 2018). The Consolidated

Criteria for Reporting Qualitative Research (COREQ) checklist was used in the reporting of this study (Tong, Sainsbury, & Craig, 2007).

Sample/Participants

A purposive sample of fifteen practice nurses were recruited by MH through practice nurse fora across London. All practice nurses approached agreed to participate in the research. Inclusion criteria were registered nurses who were employed in England as practice nurses and were involved in the administration of the Healthy Child Programme: Pregnancy and the First 5 Years of Life and consequently the MMR vaccine (Department of Health, 2009). The exclusion criteria were employment in organisations other than general practice; not currently on the Nursing and Midwifery Council register in the UK or not involved in the administration of the MMR vaccine.

Data collection

There were two phases of data collection with 15 participants participating in depth face-to-face interviews: nine in 2014 and six in 2018. There was no intention to compare individual perceptions over time but instead to describe the perceptions of practice nurses practicing at two different points in time with the second period of data collection being after an increase in the incidence of measles in Europe.

The list of questions consisted of open ended questions that remained the same for both the 2014 and 2018 participants. The development of these questions was informed and influenced by MH own expertise in the field of immunisation, consultations with other practice nurses and the current body of evidence at the time of undertaking the interviews. Questions focused on the practice nurses views about the MMR vaccine, their discussions and consultations with parents and immunisation resources they accessed (Table S2). MH had prior research training as part of her PhD.

Interviews were held in a quiet undisturbed room at a venue of choice identified by each participant and lasted between 40 to 60 minutes. MH conducted all interviews. All interviews were audio recorded by MH and transcribed verbatim by an external transcriber. All practice nurses were assigned a different participant number when extracts of their interviews were used to preserve anonymity.

Ethical considerations

The Proportionate Review Sub-committee of the NRES Committee South Central Berkshire granted ethical approval on (14/11/2012; REC reference number: 12/SC/0653). Written consent was obtained prior to each interview by MH. Data collected were anonymised.

Data analysis

Data were analysed using qualitative content analysis. Qualitative content analysis involves close reading of textual matter, where relevant parts of the text are re organised into analytical categories (Krippendorff, 2019). Qualitative content analysis was used in our study to describe a phenomenon, which was to discern how practice nurses perceive their role in immunisation for measles, mumps and rubella. In this approach, the analysis starts with identifying and quantifying certain words or content in text with the purpose of understanding the contextual use of the words or content (Krippendorff, 2019). This ensured that MH coded the narrative that was relevant to answering the research question.

In order to produce a convincing account when undertaking a qualitative study, researchers are recommended to keep clear and accurate records of the research process in detail (Cooper & Endacott, 2007). This was achieved by MH documenting the definitions of all the initial codes from the 15 interviews in a coding manual. Then MH and JC independently coded three transcripts, then compared codes. The coding manual was refined following discussion and agreement. MH then coded the remaining transcripts that were each critically reviewed by at least one co-author (LA or DS). A process of reflection and discussion resulted in agreement amongst all authors, which led to the identification, refinement and agreement of codes, sub themes and themes. This was an iterative process until there was consensus on the final number of themes.

Rigour

In order to establish trustworthiness of the study, MH provided all participants with the opportunity to comment about their transcript to ensure that these transcripts matched their perceptions. This process of member checking enabled participants to check the accuracy and credibility of these transcripts to decrease the incidence of incorrect data and the incorrect interpretation of data (Harper & Cole, 2012). Only one participant requested a change to their verbatim transcript, as they had revealed the identity of a client in their general practice. MH anonymised reference to the client and resent the amended transcript to the participant for review. No further changes were requested by this participant.

Reflexivity was an important part of the data analysis process. Reflexivity requires precision about the analytical method and data collection procedures used, and emphasises the researcher's own assumptions and beliefs of how the researcher's presence affects what they are investigating (Dean, 2017). Therefore, it was important that MH needed to ensure the analysis was guided by the data rather than her specialist knowledge about immunisation. This was especially evident when defending how the codes, sub themes and themes emerged from the data. The process of peer debriefing with the co-authors (LA, DS and JC) enabled MH to become more aware of her positionality in relation to the analysis.

FINDINGS

Sample characteristics

Fourteen of the 15 participants were female. There were differences in the academic levels between the groups. All nine participants in 2014 held undergraduate degrees, seven of these were in nursing and two were in other fields not related to nursing, but these latter two participants had then completed a diploma in nursing. None of these nine participants held postgraduate degrees. The six participants in 2018 all held undergraduate degrees in nursing or a related field; four of these participants also held additional postgraduate degrees.

Participants described their self-identified ethnic origin as White British/British (n = 9); Black British (n = 2); Irish (n = 2); White Asian (n = 1) or European (n = 1). Nine participants were employed full time (i.e. 37.5 hours/week) and the remaining six were

employed part time from 4 – 30 hours/week. The 2018 participants had been, on average, slightly longer in clinical practice than the 2014 group (2014: median 6, range 2 – 35 years; 2018: median 10, range 3 – 32 years).

Themes

Practice nurses identified three specific aspects of their role that were most influential in terms of promoting MMR vaccine uptake which constituted the identified themes: promoting vaccination, assisting parents to make informed decisions and strategies and organisational factors that promote MMR uptake. Practice nurses were able to provide unique insights into how they used specific strategies in practice. These three themes were consistent over 2014 and 2018 further supporting the importance of these aspects of their role in promoting MMR uptake. These strategies and approaches are discussed in more detail below.

Promoting vaccination

Practice nurses recognised that a successful vaccination programme would only be achieved by assisting parents to make informed decisions; they used a range of strategies to increase uptake of the MMR vaccine to achieve this goal. During their consultations with parents, practice nurses discussed the MMR vaccine and the importance of achieving herd immunity. This illustrated how these practice nurses perceived the benefits of herd immunity not only to protect children but the wider population.

> *it's a national programme…it's trying to keep society safe, so that* [the] *majority, those who slip through the net will be protected by the greater majority of people, who are vaccinated* (PN 1, 2014)
>
> *I explain about herd immunity. I think parents don't often think about that much (PN 6, 2018)*

Currency of knowledge regarding immunisation schedules was recognised as essential, with all practice nurses attending regular updates. This influenced their consultations with parents, as they were able to address vaccine related queries, particularly about the MMR vaccine. Over the two phases of the study, practice nurses perceived their priorities within this area differently. In 2014, practice nurses were focused on changes to the scheduling of the first MMR vaccine and how they perceived this change impacted on their workload. By 2018, practice nurses reported

concentrating more on lower vaccine uptake and reaching herd immunity levels for MMR.

> *Well, the Childhood Immunisation Programme has changed quite a lot…in recent years they combined the 12 and 13 months immunisations…It takes quite some getting used to when a change happens. So, the whole process is slightly lengthened by the changes* (PN 4, 2014)

> *…and we've still got a lower uptake, we haven't got herd immunity uptake for the one-year-olds but, for some reason, our practice has got 100% on the three-years-and-four-months cohort* (PN 6, 2018)

Practice nurse interviews revealed how they perceived their role in engaging with parents to dispel misconceptions about the MMR vaccine. Many practice nurses reported widespread concerns from parents about the alleged link between autism and MMR. In order to mitigate against these parental concerns, practice nurses endeavoured to provide accurate information about the MMR vaccine.

> *People seem to want to have a little bit more clarification. The whole Wakefield* [study] *and why there has been this huge upsurge and what came of it and you know, just an explanation of what happened in the Wakefield case* (PN 2, 2014)

> *I would give them the internet searches, where they can look up what happened with what they've heard, in terms of the Wakefield* [study] (PN 4, 2018)

Practice nurse consultations with parents involved a complex array of information giving and discussion. It was important for these practice nurses to be able to provide clarification to parents about the MMR vaccine and provide reassurance to parents to assist their immunisation decision making.

Assisting parents to make informed decisions

Practice nurses considered they were able to assist parents to make immunisation decisions about the MMR vaccine. They were aware of factors that influenced parents' immunisation decisions. Some of these factors included the practice nurse and family members. Practice nurses were appraised of the many sources of information that influenced parents, such as the media and social media. Internet sources included both official government and healthcare organisation websites as well as individual, interest group or community websites. Practice nurses guided parents towards specific internet sources of information that they perceived to be more credible than others.

> *… but for those* [parents] *who, maybe are uncertain, I think we have a huge influence, because often people have been influenced by family members* (PN 9, 2014)

> *I think I suggested that she have a look at government NHS websites, if she wanted more information about the MMR vaccine, 'cos there is a lot of rubbish out there* (PN 3, 2018)

Practice nurses encountered parents' who held different views about the MMR vaccine. These consisted of parents either willing to vaccinate their child or vaccine hesitant.

> *And, when they arrive with their books… they've always had the first MMR and they don't have any qualms about the second one* (PN 5, 2014)

> *MMR's the only vaccine that I've experienced that parents, that's the only one that they don't want to have* (PN 6, 2014)

Practice nurses were aware of a number of factors that influenced parental immunisation decision making concerning the MMR vaccine. These ranged from concerns about disease outbreaks, to safety concerns such as overloading a child's immune system with multiple vaccines. Fears about outbreaks of measles in particular was a factor that influenced parents to vaccinate their children with the MMR vaccine. Consequently, this made practice nurses keen to ensure parents were aware of measles outbreaks and the seriousness of this disease.

> *I think recently the outbreak of measles and the fear of the mortality associated with having measles… so, worst case scenario – death, if they don't have the vaccine* [MMR] (PN 6, 2014)

> *…the one thing I do talk about as well is how there have been several outbreaks of measles as a result of poor uptake of the vaccine* [MMR] (PN 2, 2018)

A sub theme identified by practice nurses was the media, which they perceived influenced parents in both phases of our study. However, notably in 2014 this influence focused on the Wakefield publication, while in 2018 the media influence was more general.

> *…and Wakefield being struck off and all the good press that we <u>could</u> do with it, has not been done. It's frustrating that this amount of time has passed and there's still, the association is still there* (PN 5, 2014)

> *…and, you know, the original problem over MMR was from the media…they came out with it first…maybe they* [parents] *read it in magazines* (PN 6, 2018)

Practice nurses displayed awareness of the many factors that influenced parental immunisation decision making, especially the role of the media. They sought to engage with parents to mitigate misinformation concerning the MMR vaccine.

Strategies and organisational factors that promote measles, mumps and rubella uptake

All practice nurses perceived that promoting the uptake of the MMR vaccine was an important part of their role. One particular strategy used included posting birthday cards to remind parents when their child's MMR vaccine was due. The birthday cards coincided when the first and second MMR vaccine were recommended in the national immunisation programme. Practice nurses acknowledged parents sometimes forgot when their child was due to have their vaccines, so letters were an additional strategy that these practice nurses used to remind parents to attend for appointments.

> *…when I joined this practice and I started to use these* [birthday] *cards, we have found it quite helpful and we are on top of our target*…: *Sometimes they forget, and that's when we need to catch them for the MMR* (PN 7, 2014)

> *I think practices should be sending parents a letter to tell them their child is due for immunisations* (PN 4, 2018)

Practice nurses described how time constraints during their consultations with parents hindered their ability to adequately address parental questions about the MMR vaccine and required innovation in practices to ameliorate these time constraints. Strategies such as further appointments and referrals to other information sources helped overcome this constraint.

> *I think* [I] *could potentially change their minds more often if we spent more time with them* (PN 6, 2014)
> *I give them the information verbally and, if they are absolutely dead set, I say, 'OK, but, you know, you can come back at any time and have it* (PN 1, 2018)

Practice nurses also reported their views on how cultural characteristics impacted parental immunisation decision making. They described how the combination of cultural and demographic factors influenced parents' decision making concerning the MMR vaccine.

> *Our Bangladeshi community, our Indian community… are very keen for their children, their grandchildren to be vaccinated…But it surprises me that the Somali elders are not doing the same, because they must've been exposed to measles and the ravages of measles in Somalia* (PN 3, 2014)

> *And so the patients I've seen have been either Somali and those families will talk about a particular problem with MMR… and the other group are some of the more middle class white patients (*PN 5, 2018)

Practice nurses participating in our study identified strategies and organisational factors to promote the uptake of the MMR vaccine (Tables S3 and S4).

DISCUSSION

This qualitative study explored which aspects of the practice nurse role were perceived to be most influential in promoting MMR vaccine uptake from the emic perspective of practice nurses. The findings revealed three components that were consistent over time and were considered most influential in promoting the MMR vaccine. These included tailoring information to promote vaccination, engaging effectively with parents and using multiple strategies to maximise vaccination rates. Although these components are core elements of the practice nurse role, uncovering the strategies used to ensure client centred practice represents an important new contribution to our understanding.

In promoting vaccination, practice nurses encouraged parents to access a variety of information sources to underpin their decision making. As described in previous studies, parents sought their information from family, the media and the internet (Freed, Clark, Butchart, Singer, & Davis, 2011; Grabiel et al., 2013; Kennedy, Basket, & Sheedy, 2011). Despite accessing a range of resources, practice nurses perceived that parents' information needs were not always met and therefore directed parents towards credible information sources and challenged misconceptions. Various short educational interventions have been shown to improve parental immunisation knowledge to support their decision making (Awadh et al., 2014). An additional potential source of information recently tested with promising results is mobile phone app based information with gamification elements (Fadda et al 2018). Of note, when comparing the value of knowledge delivered via this app in combination with, or in contrast to, empowerment, empowerment alone was not sufficient to satisfy parents, but needed to be accompanied by knowledge (Fadda et al 2018).

Practice nurses emphasised the need to engage effectively with parents. They listened and responded to parents' concerns and addressed queries to promote the MMR vaccine. Practice nurses sought to build rapport with parents by addressing concerns including about the retracted Wakefield study, provide clarification and offer additional opportunities for parents to return for ongoing discussion to inform decision making. The value of exploring parents' concerns, offering credible information and building rapport was described by primary care providers in Australia (Berry et al 2017). These authors proposed that discussions could be grouped into three categories including

concern-based, risk-based and knowledge based. The latter two of these categories mirror the strategies used by practice nurses in the current study where they focused on outlining the risks associated with non-vaccination and providing a range of credible sources of information to improve knowledge. A Canadian framework of best practices to optimize trust and promote vaccination that was developed in response to low childhood immunisation rates also echoes these strategies (Sondagar et al, 2020). These practices included understanding the concerns at both the population and individual level and addressing these concerns through the presentation of science-based information.

The value of multiple different strategies, either alone or in combination, to optimise vaccination uptake is recognised (Sondagar et al 2020; Altinoluk-Davis et al 2020). Strategies to promote the MMR vaccine identified by practice nurses in the current study included sending birthday card reminders, letters**,** texts and emails to parents to make appointments with the practice nurse and maintaining a flexible approach to multiple appointments. In a Cochrane review of 75 studies, single and combination reminders improved vaccination rates across all age groups, including for childhood immunisations, by an average of eight percent (Jacobson Vann, Jacobson, Coyne-Beasley, Asafu-Adjei, & Szilagyi, 2018).

Practice nurses in our study described recognising the importance of achieving herd immunity, although they did not describe any examples of expanding on this as part of their parental consultation. There are direct and indirect benefits of herd immunity, the former includes protection of the vaccinated individual, resulting in a reduced chance of infection, whilst the latter relates to the protective effects observed in unvaccinated populations (Kim, Johnstone, & Loeb, 2011). In a systematic review to explore interventions used to assist populations to understand herd immunity, in two of three interventions about community immunity increases in intention to vaccinate were found suggesting potential benefits of such communication (Hakim et al., 2019). Given this, development of strategies to clearly convey the principles and benefits of herd immunity are warranted.

Practice nurses also described the importance of factors that could affect vaccination decisions such as how different cultural characteristics influenced parental immunisation decision making. This in turn influenced the multi-dimensional strategies

practice nurses employed to promote MMR vaccination. There is evidence supporting the relationship between vaccine decision making and ethnicity. In an English study there was significantly higher coverage of the first MMR vaccine in the Asian group, which comprised mothers from Bangladesh and India compared to the other groups (Mixer et al., 2007). In a group of Somali mothers living in Sweden issues surrounding fear related to the effects of the vaccine and previous unpleasant encounters with nurses were considered a barrier to vaccinate, while having trust in nurses and in God were considered facilitators (Jama et al 2018). Although the issues of fear and trust are potentially universal, religious beliefs are an important sociocultural consideration. A systematic review exploring interventions to reduce inequalities in vaccine uptake in children and adolescents in high income countries concluded that locally designed, multicomponent interventions have evidence of effectiveness in urban, ethnically diverse and deprived populations (Crocker-Buque, Edelstein, & Mounier-Jack, 2017).

Limitations

Our study did not engage with patient and public involvement. It is unclear whether participants' who had received immunisation training from MH were influenced. The study consisted of a sample size of 15 practice nurses across different boroughs in London, England; it is unknown whether the results are transferable beyond London. While our study did not use a theoretical approach, it provides a strong base to build on for future research as it lays the foundation for exploring the key contribution of practice nurses and the strategies they employ for the delivery and promotion of the MMR vaccine to prevent future outbreaks.

CONCLUSION

This qualitative study addresses the paucity of literature that explores the practice nurses' role and highlights those strategies that they consider to be most influential in promoting MMR vaccine uptake. The findings inform future approaches for addressing myths and misconceptions about the MMR vaccine and when targeting particular populations. A factor that enabled practice nurses to engage with parents was their ability to integrate a robust evidence base to dispel myths and misconceptions about the MMR vaccine. Having recourse to the most contemporary immunisation evidence is therefore crucial for practice nurses to assist parents to make informed immunisation decisions.

In addition, the findings provide evidence for policy makers regarding strategies for targeting specific populations and planning how to best engage with these to improve MMR vaccine uptake and therefore prevent future outbreaks. A key recommendation for policy makers and employers is to therefore ensure practice nurses have adequate time to fulfil their multi-dimensional role when fulfilling the multifaceted approach to supporting the uptake of the MMR vaccine. Development and testing of strategies to effectively build rapport and meet parental information needs is urgently needed.

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Table S1 - Schedule for the United Kingdom's routine immunization programme (excluding catch up campaigns)

Age due	Vaccine Given	How it is given
Eight weeks old	Diphtheria, tetanus, pertussis, polio, Haemophilus influence type b (Hib) Meningococcal B (Men B) Rotavirus	One injection One injection One oral application
Twelve weeks old	Diphtheria, tetanus, pertussis, polio, Haemophilus influence type b (Hib) Pneumococcal conjugate vaccine (PCV13) Rotavirus	One injection One injection One oral application
Sixteen weeks old	Diphtheria, tetanus, pertussis, polio, Haemophilus influence type b (Hib) Meningococcal B (Men B)	One injection One injection
One year old (on or after the child's first birthday)	Hib/MenC Pneumococcal conjugate vaccine (PCV13) Meningococcal B (Men B) Measles, mumps and rubella (MMR)	One injection One injection One injection One injection
Two to ten years	Live attenuated influenza vaccine (LAIV)	Nasal spray, single application in each nostril. (If LAIV is contraindicated and child is in a clinical risk group, give inactivated influenza vaccine)

Three years four months old or soon after	Diphtheria, tetanus, pertussis and polio (dTaP/IPV)	One injection
Twelve to thirteen years old	Human papillomavirus (HPV)	One injection
Fourteen years old	Tetanus, diphtheria and polio (Td/IPV) Meningococcal ACWY conjugate (MenACWY)	One injection One injection
Sixty five years old	Pneumococcal polysaccharide vaccine (PPV)	One injection
Sixty five years of age and older	Inactivated influenza vaccine	One injection
Seventy years old	Herpes Zoster vaccine	One injection

Reference: (Department of Health, 2020).

Reference

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Table S2 - The interview schedule
Practice nurses perceptions of their immunization role and strategies used to promote measles, mumps and rubella vaccine uptake in 2014 – 2018: A qualitative study.

i). Can you describe your role in the childhood immunization programme?

ii). How often do you have training on immunization, particularly in relation to the childhood immunization programme?

iii). Can you explain what you consider to be the barriers to the uptake of the MMR vaccine?

iv). What do you consider would promote the uptake of the MMR vaccine?

v). When you are with a parent discussing immunization issues and/or concerns, what decision making models do you use to assist you in these consultations?

vi). How many times a week would parents consult you for immunization advice? Can you give me an example of one of your last consultations?

vii). Who would you consider is the health professional that can best advise parents on immunization issues?

viii). How can you influence the uptake of the MMR vaccine?

Table S3 - Practice nurse strategies to achieve individualised care

Practice nurse strategies	Practice nurse quotes 2014 - 2018
Consistency of information provision to parents from the practice nurse and health visitor	…*it would mean whatever we discussed in that [immunization] consultation would be much more exploratory. But the health visitor would also be the second person who would actually reinforce that. So, it would be two people reinforcing, not just the one…* (PN 1, 2014)
Providing immunization information to parents during practice nurse consultations	*In which case we get the leaflets out, we have the chat, we give them the information* (PN 4, 2014)
Exploring parental health beliefs	*I think exploring their health beliefs and looking into greater detail about what they believe about the association of autism and the MMR vaccination* (PN 6, 2018)
Trying to understand the parent/s perspective	*What else could I do? I guess just trying to explore… their health beliefs and try to understand their perspective* (PN 6, 2018)
Advising parents on recommended sources of immunization information (e.g. NHS websites)	*I suggested that she have a look at government NHS websites, if she wanted more information about the MMR vaccine* (PN 3, 2018)
Alerting parents of local outbreaks of infectious diseases	*I think maybe a more local, specific one* [handout] *as well that's up-to-date with recent* [disease] *outbreaks and things could be really convincing*, PN 2, 2018
Exploring the literature and the evidence concerning Wakefield with parents	*I tell them that the research was, debunked completely; that the doctor who wrote it was struck off. There is no demonstrated connection with autism. It was all, false* PN 3, 2018

Table S4 - Organisational factors related to the practice environment

Organisational factors	Practice nurse quotes 2014 - 2018
Constraints of immunization consultation times in practice	*Lengthen* [the] *consultation time* (PN 6, 2014)
Flexible appointments	*After discussing the risks of <u>not</u> having the vaccination, just to say to them that it's always available, free, and they can come back any time with their child* (PN 6, 2014)
Reminding parents (e.g. phoning parents, sending letters)	…*to encourage and speak about it* [vaccines] *and answer their questions…'cos I think letters are good. Most people do respond to letters, but maybe a phone call would be more beneficial* (PN 8, 2014)
Posters in general practice to inform parents about vaccines	*Because we could do with more posters up everywhere and more of a Public Health initiative to inform and to encourage parents to get their children vaccinated* (PN 6, 2018)
Working and meeting with minority groups to promote vaccines	*We could be doing more work with minority groups, group leaders,… having more discussions with them about the vaccines and, potentially, encouraging them or getting their buy in where possible* (PN 6, 2014)
Language specific leaflets	*It would be maybe worth getting some literature in* [the] *Somalian language so they could read it* (PN 8, 2014)
Designated information stand at the general practice concerning vaccines	*I think maybe baby clinic would be quite a good opportunity to have an information stand and actually be there and very much promoting the MMR and talking the people through it and having information leaflets and the evidence* (PN 9, 2014)