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Parents' and informal caregivers' views and experiences of communication about routine childhood vaccination: a synthesis of qualitative evidence (Review)

Ames HMR, Glenton C, Lewin S

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[Qualitative Review]

Parents' and informal caregivers' views and experiences of communication about routine childhood vaccination: a synthesis of qualitative evidence

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ABSTRACT

Background

Childhood vaccination is an effective way to prevent serious childhood illnesses, but many children do not receive all the recommended vaccines. There are various reasons for this; some parents lack access because of poor quality health services, long distances or lack of money. Other parents may not trust vaccines or the healthcare workers who provide them, or they may not see the need for vaccination due to a lack of information or misinformation about how vaccinations work and the diseases they can prevent.

Communication with parents about childhood vaccinations is one way of addressing these issues. Communication can take place at healthcare facilities, at home or in the community. Communication can be two-way, for example face-to-face discussions between parents and healthcare providers, or one-way, for instance via text messages, posters or radio programmes. Some types of communication enable parents to actively discuss vaccines and their benefits and harms, as well as diseases they can prevent. Other communication types simply give information about vaccination issues or when and where vaccines are available. People involved in vaccine programmes need to understand how parents experience different types of communication about vaccination and how this influences their decision to vaccinate.

Objectives

The specific objectives of the review were to identify, appraise and synthesise qualitative studies exploring: parents' and informal caregivers' views and experiences regarding communication about childhood vaccinations and the manner in which it is communicated; and the influence that vaccination communication has on parents' and informal caregivers' decisions regarding childhood vaccination.

Search methods

We searched MEDLINE (OvidSP), MEDLINE In-process and Other Non-Index Citations (Ovid SP), Embase (Ovid), CINAHL (EbscoHOST), and Anthropology Plus (EbscoHost) databases for eligible studies from inception to 30 August 2016. We developed

search strategies for each database, using guidelines developed by the Cochrane Qualitative Research Methods Group for searching for qualitative evidence as well as modified versions of the search developed for three related reviews of effectiveness. There were no date or geographic restrictions for the search.

Selection criteria

We included studies that utilised qualitative methods for data collection and analysis; focused on the views and experiences of parents and informal caregivers regarding information about vaccination for children aged up to six years; and were from any setting globally where information about childhood vaccinations was communicated or distributed.

Data collection and analysis

We used maximum variation purposive sampling for data synthesis, using a three-step sampling frame. We conducted a thematic analysis using a constant comparison strategy for data extraction and synthesis. We assessed our confidence in the findings using the GRADE-CERQual approach. High confidence suggests that it is highly likely that the review finding is a reasonable representation of the phenomenon of interest, while very low confidence indicates that it is not clear whether the review finding is a reasonable representation of it. Using a matrix model, we then integrated our findings with those from other Cochrane reviews that assessed the effects of different communication strategies on parents' knowledge, attitudes and behaviour about childhood vaccination.

Main results

We included 38 studies, mostly from high-income countries, many of which explored mothers' perceptions of vaccine communication. Some focused on the MMR (measles, mumps, rubella) vaccine.

In general, parents wanted more information than they were getting (high confidence in the evidence). Lack of information led to worry and regret about vaccination decisions among some parents (moderate confidence).

Parents wanted balanced information about vaccination benefits and harms (high confidence), presented clearly and simply (moderate confidence) and tailored to their situation (low confidence in the evidence). Parents wanted vaccination information to be available at a wider variety of locations, including outside health services (low confidence) and in good time before each vaccination appointment (moderate confidence).

Parents viewed health workers as an important source of information and had specific expectations of their interactions with them (high confidence). Poor communication and negative relationships with health workers sometimes impacted on vaccination decisions (moderate confidence).

Parents generally found it difficult to know which vaccination information source to trust and challenging to find information they felt was unbiased and balanced (high confidence).

The amount of information parents wanted and the sources they felt could be trusted appeared to be linked to acceptance of vaccination, with parents who were more hesitant wanting more information (low to moderate confidence).

Our synthesis and comparison of the qualitative evidence shows that most of the trial interventions addressed at least one or two key aspects of communication, including the provision of information prior to the vaccination appointment and tailoring information to parents' needs. None of the interventions appeared to respond to negative media stories or address parental perceptions of health worker motives.

Authors' conclusions

We have high or moderate confidence in the evidence contributing to several review findings. Further research, especially in rural and low- to middle-income country settings, could strengthen evidence for the findings where we had low or very low confidence. Planners should consider the timing for making vaccination information available to parents, the settings where information is available, the provision of impartial and clear information tailored to parental needs, and parents' perceptions of health workers and the information provided.

PLAIN LANGUAGE SUMMARY

What are parents' and informal caregivers' views and experiences of communication about routine early childhood vaccination?

The aim of this Cochrane review was to explore how parents experience communication about vaccination for children under six years of age. We searched for and analysed qualitative studies that could answer this question.

Qualitative research explores how people perceive and experience the world around them. This review of qualitative research supplements other Cochrane reviews that assess the effect of different communication strategies on parents' knowledge, attitudes and behaviour about childhood vaccination.

Key messages

We are quite confident in the evidence we found that parents want clear, timely and balanced information, but that they often find this information to be lacking. The amount of information parents want and the sources they trust appear to be linked to their acceptance of vaccination; however, our confidence in this last finding is only low to moderate.

What did we study in the review?

Childhood vaccination is an effective way of preventing serious childhood illnesses. However, many children do not receive all of the recommended immunisations. There may be different reasons for this. Some parents do not have access to the vaccine, for instance because of poor quality health services, distance from their home to a health facility or lack of money. Some parents do not trust the vaccine itself or the healthcare worker who provides it, while others do not see the need to vaccinate their children at all. Parents may not know how vaccinations work or about the diseases that they prevent. They may also have received information that is misleading or incorrect.

To address some of these issues, governments and health agencies often try to communicate with parents about childhood vaccinations. This communication can take place at healthcare facilities, at home or in the community. Communication can be two-way, for instance face-to-face discussions between parents and healthcare providers. It can also involve one-way communication, for instance information provided through text messaging, posters, leaflets, or radio or television programmes. Some types of communication allow parents to actively discuss the vaccine, its benefits and harms, and the disease it aims to prevent. Other types of communication simply give information about these issues or about when and where vaccines are available. People involved in vaccine programmes need to understand how parents experience different types of communication about vaccination and how this influences their decision to vaccinate their child.

What are the main findings of the review?

We included 38 studies in our review. Most of the studies were from high-income countries and explored mothers' perceptions of vaccine communication. Some of the studies also included the views of fathers, grandmothers and other caregivers.

In general, parents wanted more information than they were getting (high confidence). For some parents, a lack of information led to worry and regret about their vaccination decision (moderate confidence).

Parents wanted balanced information about both the benefits and risks of vaccination (high confidence), presented in a clear and simple manner (moderate confidence) and tailored to their situation (low confidence). Parents wanted vaccination information to be available outside of the health services (low confidence). They wanted this information in good time before each vaccination appointment and not while their child was being vaccinated (moderate confidence).

Parents viewed health workers as an important source of information and had specific expectations of their interactions with them (high confidence). Poor communication and negative relationships with health workers sometimes impacted on vaccination decisions (moderate confidence).

Parents generally found it difficult to know which vaccination information source to trust and found it difficult to find information that they felt was unbiased and balanced (high confidence).

The amount of information parents wanted and the sources they felt they could trust seem to be linked to their acceptance of vaccination, with parents who were more hesitant wanting more information (low to moderate confidence).

How up-to-date is this review?

We searched for studies published before 30 August 2016.

BACKGROUND

Vaccination has been described as one of the greatest public health achievements of the twentieth century (CDC 1999), and it is widely seen as a worthwhile and cost-effective public health measure. However, over 22 million infants, mainly in low- and middle-income countries (LMICs), did not receive the full series of basic immunisations in 2012 (WHO 2013b), contributing to many preventable child deaths (GAVI 2010). Efforts to improve vaccination coverage were central to meeting the Millennium Development Goal (MDG) of reducing child mortality (UN 2011) and are likely to be central to the Sustainable Development Goals (SDGs) (United Nations 2015). Vaccine hesitancy is considered one of the reasons for suboptimal vaccination uptake.

The World Health Organization (WHO) defines vaccine hesitancy as "a behaviour, influenced by a number of factors including issues of confidence (do not trust vaccine or provider), complacency (do not perceive a need for or do not value the vaccine), and convenience (access). Vaccine-hesitant individuals are a heterogeneous group who hold varying degrees of indecision about specific vaccines or vaccination in general" (WHO 2013a). Factors that may determine an individual's vaccine hesitancy are seen to fall into three domains: contextual influences, including sociocultural and health systems factors; individual and group influences, including those arising from personal perceptions of a vaccine; and vaccine- or vaccination-specific issues, including individual assessments of risks and benefits and the effects of the mode of administration (WHO 2013a). Communication interventions can address several of these factors, including individuals' perceptions of the vaccine provider and of the risks and benefits of the vaccine. Understanding how these factors unfold in different settings can help us determine which interventions may be most appropriate and can shed light on different levels of effectiveness.

Communication interventions can be used to address aspects or factors contributing to vaccine hesitancy. A range of studies and reviews has explored the reasons for vaccine hesitancy and the non-vaccination of children (Dubé 2013; Larson 2014) (Table 1). Overall, the reviews reveal that vaccination decision-making is a complex process, influenced by many factors. An important barrier for individuals in many settings is a lack of appropriate information, leading to doubts about the trade-offs between the benefits and risks of vaccination and to fears about side effects or other implications (Taylor 2002; Mills 2005; Casiday 2006; Hadjikoumi 2006; Pearce 2008). People may lack knowledge about how vaccinations 'work' and about the diseases they prevent (Woo 2004; Mills 2005; Casiday 2006). People may also receive information that is misleading.

Description of the condition

Communication interventions are often cited as being central to improving vaccination uptake, which is needed to achieve the targets set by the international community. Of course, communication is one of many interacting factors that influence parents' and informal caregivers' decisions to take their children for vaccination, and communication alone cannot address all aspects of vaccine hesitancy or refusal. However, communication interventions are an important component of vaccination and public health programmes, and inadequate communication can have a negative impact on vaccination uptake, completion and parental trust in a vaccination (WHO 2014). In most settings, communication about childhood vaccination is common, but there is uncertainty around how people perceive and understand this communication, and whether and how this influences their decision to vaccinate. In addition, the effectiveness of many communication interventions is still uncertain (Kaufman 2013; Saeterdal 2014).

This review is part of a larger project entitled Communicate to Vaccinate (COMMVAC) (Lewin 2011), exploring communication regarding childhood vaccination (www.commvac.com). Project staff have previously published three Cochrane reviews on the effects of different communication approaches for childhood vaccination and of strategies to improve vaccination coverage in LMICs (Kaufman 2013; Saeterdal 2014; Oyo-Ita 2016). Kaufman 2013 assessed the effect of face-to-face strategies to inform or educate about childhood vaccination, finding low or very low certainty evidence that face-to-face strategies may not have an effect on immunisation rates or parent knowledge and understanding of vaccination. Saeterdal 2014 examined community interventions to promote childhood vaccination and found that these interventions may improve attitudes and probably increase vaccination uptake under some circumstances. Oyo-Ita 2016 looked at interventions to improve the coverage of child immunisation in LMICs and found that home visits and health education may improve immunisation coverage.

This qualitative evidence synthesis aims to supplement these three intervention reviews by exploring how parents experience communication interventions for childhood vaccination and identifying factors that may influence the effectiveness of these types of interventions.

Description of the phenomenon of interest

Communication interventions are seldom clearly defined in the health promotion arena. In this review we have defined communication as "a purposeful, structured, repeatable and adaptable strategy to inform and influence individual and community decisions in relation to personal and public health participation, disease prevention and promotion, policy making, service improvement and research" (Hill 2011; Lewin 2011). Communication can be one-way (e.g. through information provision on a radio spot), two-way (e.g. face-to-face interactions at a vaccination session) or multidirectional (e.g. discussing vaccination in a group setting).

In this review we will look at: parents' and informal caregivers' views and experiences of communication about routine early childhood vaccinations given to children under six years of age; the content of the communication; and its influence on parents' views and decision to vaccinate.

Why it is important to do this review

Currently, there is a large focus on vaccination globally. Part of this focus is a consequence of the Millennium Development Goals (MDGs), which included vaccination as a key outcome. Increasingly substantial resources have been used for vaccination communication to try to reach key targets. The availability of new vaccines has also led to an increased focus on vaccination communication. Other concerns that have heightened interest in vaccination communication include under-vaccination leading to outbreaks; settings with low rates of vaccination, such as conflict zones, where there have been outbreaks of vaccine preventable diseases; more vaccines becoming available; and more diseases becoming the focus of eradication campaigns.

In most settings, parents and informal caregivers now have access to a broad and growing spectrum of information sources of varying quality. At the same time, in other some settings, an absolute lack of information and communication can be a significant barrier to addressing vaccine hesitancy and improving vaccination uptake and coverage. To support decision makers within vaccination programmes, it is important to understand how parents and informal caregivers perceive and experience communication/information about vaccination and if the information or mode of communication influences their intention to vaccinate. It is also important to consider how people's beliefs and values mediate their processing of information and their trust in the source of the information. All of these factors can influence the understanding of information received and inform the decisions that people make.

To date, there have been few attempts to synthesise available qualitative data on what parents think about information they receive about childhood vaccination, how this information is communicated and how this may influence their intention to vaccinate their child. Although a large number of reviews have been published on vaccination communication, hesitancy or uptake (see Table 1 for a summary of these reviews) none of these address this issue directly, and most focus on intervention effectiveness and/or focus on quantitative study designs.

The beneficiaries of the findings of this review will be policy-makers, programme planners and health workers involved in childhood vaccination programmes. In order to structure and implement communication interventions appropriately, it is important for these stakeholders to have understand parents' and informal caregivers' views and experiences about routine early childhood vaccination communication and information, and the extent to which this communication influences their decision to vaccinate.

OBJECTIVES

The specific objectives of the review were to identify, appraise and synthesise qualitative studies exploring:

- Parents' and informal caregivers' views and experiences regarding communication about childhood vaccinations and the manner in which this information is communicated; and
- The influence that vaccination communication has on parents' and informal caregivers' decisions regarding childhood vaccination

METHODS

Criteria for considering studies for this review

Types of studies

This is a systematic review of qualitative primary studies. Qualitative research aims to explore how people perceive and experience the world around them. Researchers typically rely on interviews, documents or observation to explore people's perspectives in connection with their health and use of healthcare services. They then explore the data by means of qualitative analytical methods and present their findings narratively rather than through numbers (Glenton 2014).

We included all studies that used qualitative methods for data collection, (e.g. focus group interviews, individual interviews, observation, document analysis) and that utilised qualitative methods for data analysis (e.g. thematic analysis, framework analysis, grounded theory). We excluded studies that collected data using qualitative methods but did not perform a qualitative analysis (e.g. open-ended survey questions where the responses are analysed using descriptive statistics). We included mixed-methods studies where it was possible to extract findings derived from qualitative research.

Types of participants

We included studies that focused on the views and experiences of parents and informal caregivers regarding communication of information about vaccination for children under six years of age. We defined an informal caregiver as anyone directly involved in caring for the child, making the decision to vaccinate or having the responsibility to take the child to immunisation services. The review focuses on children under six years of age because by this time children in most settings are supposed to have completed the routine vaccination calendar for childhood immunisation.

We included studies from anywhere in the world that provided information about childhood vaccinations in any setting, including health facilities, the media and Internet, communities and homes.

Types of phenomena of interest

The phenomena of interest are parents and informal caregivers' views and experiences of routine early childhood vaccination communication and the influence of this communication on their decision or intention to vaccinate.

We included studies that explored parents' and informal caregivers' views and experiences on all forms of communication about childhood vaccination. For the purposes of this review, we defined a communication intervention as "a purposeful, structured, repeatable and adaptable strategy to inform and influence individual and community decisions in relation to personal and public health participation, disease prevention and promotion, policy making, service improvement and research" (Hill 2011; Lewin 2011). Communication could be one-way (e.g. through information provision on a radio spot), two-way (e.g. face-to-face interactions at a vaccination session) or multidirectional (e.g. discussing vaccination in a group setting). A communication strategy could include more than one intervention and have multiple purposes for communicating about vaccination.

These included:

- communication about any vaccines routinely given to children aged under six years, delivered through any mechanism (i.e. injectable, drops and nasal sprays);
- communication about vaccines delivered in both the private sector and through public health services; and
- communication about vaccines that are delivered in routine or repeated mass campaign interventions for children under six years of age, as part of the WHO Extended Programme of Immunization (EPI) in a particular setting.

We included the following vaccines, or combinations of vaccines,in the search.

- Bacille Calmette Guerin vaccine (BCG).
- Hepatitis B vaccine (Hep B).
- Polio vaccines:
  - Oral polio virus vaccine (OPV);
  - Inactivated polio vaccine (IPV).
- Diptheria, tetanus and acellular pertussis vaccine (tDap).
- Haemophilus influenzae type B vaccine (HiB).
- Pneumococcal vaccine.
- Rotavirus vaccines:
  - Rotarix;
  - Rota Tex.
- Measles vaccine.
- Mumps vaccine.
- Rubella vaccine.
- Measles, mumps and rubella vaccine (MMR).
- Pentavalent vaccine (also known as the 5-in1 this vaccine includes protection against diphtheria, tetanus, pertussis, hepatitis B and Haemophilus influenza type B)
- Japanese Encephalitis vaccine.
- Yellow Fever vaccine.
- Tick-borne Encephalitis vaccine.
- Typhoid vaccine.
- Cholera vaccine.
- Meningococcal vaccine.
- Hepatitis A vaccine (Hep A).
- Seasonal influenza vaccine.

We did not include the following vaccines because children do not routinely receive them as part of the extended programme for immunisation.

- Human papillomavirus vaccine (HPV) (not given to children under the age of six years).
- Rabies (as it is generally given in response to a bite).
- Haemagglutinin type 1 and Neuraminidase type 1 (H1N1), and other epidemic vaccinations.

Search methods for identification of studies

Electronic searches

We searched the following electronic databases for eligible studies from database inception to 30 August 2016.

- MEDLINE (OvidSP).
- MEDLINE In-process and Other Non-Index Citations (Ovid SP).
- Embase (Ovid).
- CINAHL (EbscoHOST).
- Anthropology Plus (EbscoHost).

Using guidelines developed by the Cochrane Qualitative Research Methods Group for searching for qualitative evidence (Noyes 2011), as well as modified versions of the search developed for the three COMMVAC intervention reviews (Kaufman 2013; Saeterdal 2014; Oyo-Ita 2016), we developed search strategies for each database. We chose these databases as we anticipated that they would provide the highest yield of results based on preliminary, exploratory searches. There was no date or geographic restrictions for the search.

Searching other resources

We searched the reference lists of all the included studies and key references (i.e. relevant systematic reviews). We searched for any studies using qualitative methods and analysis linked to the three COMMVAC intervention reviews.

Data collection and analysis

Selection of studies

We collated records identified from different sources into one database and removed duplicates. Two review authors then independently assessed titles and abstracts of the identified records to

identify their potential eligibility. At this stage, we discarded abstracts that were clearly irrelevant to the topic of this review.

Due to the challenges and resources associated with translating papers reporting qualitative research, we only selected articles if they were published in languages spoken by at least two members of the review team (i.e. French, English and the Scandinavian languages).

We retrieved the full text of all the papers that were likely to be relevant. Two review authors independently assessed the articles based on the review's inclusion criteria. At all stages, two authors (HA plus CG for the English, Danish, Swedish and Norwegian articles; and HA plus YC for the French articles) reviewed the articles. We resolved disagreements through discussion or, if required, by seeking a third review author's (SL) view. Where appropriate, we contacted the study authors for further information.

Purposive sampling of included studies

Large numbers of studies can threaten the quality of the analysis in qualitative evidence syntheses. In addition, syntheses of qualitative studies aim for greater variation in concepts as opposed to an exhaustive sample that avoids risk of bias. Therefore, since seventy-nine studies were eligible for inclusion, we decided to sample from the eligible studies.

As in primary qualitative research (Silverman 2013), we utilised purposive sampling to select from the eligible studies. We used a type of purposive sampling approach called maximum variation sampling with the aim of achieving the broadest possible variation within the included studies (Suri 2011). We decided on three key sampling criteria that would enable us to capture rich data from all settings that would best answer our review objectives. These became our three-step sampling frame. First, we sampled all studies from low- and middle-income country (LMIC) settings, as most studies took place in high-income country (HIC) settings. Second, we created a simple 1 to 5 scale for assessing the richness of data, with 1 corresponding to very few or thin qualitative data (for example, from an open-ended survey question); 3 being an average qualitative article in a peer-reviewed health services journal; and 5 being very rich data (for example, from an ethnographic study). We sampled all articles that scored a 3 or higher for data richness. Finally, we examined the remaining studies after applying the first two elements and sampled studies that most closely matched our review objectives. After applying our sampling frame, we selected 38 studies for data extraction. The findings from these studies are the basis for the review findings reported here. For a list of included but not sampled studies see Table 2.

Data extraction and management

We performed data extraction using a specifically designed form that we used to extract key themes and categories relevant to the review objectives; these were derived during the initial phase of data extraction. Categories included: the content of information on the communication interventions; parents' and informal caregivers' views and experiences of the communication; and the extent and manner of its influence on their decisions regarding vaccination. We also used the form to extract information about first author, date of publication, language, income setting of study (LMIC versus HIC), context (urban, rural), participant group (first-time parents, older parents, informal caregivers etc.), the vaccine(s) studied, any theoretical or conceptual frameworks used, and the research methods of the study.

Appraisal of the methodological limitations of included studies

Our inclusion criteria specified that studies had to have used qualitative methods for both data collection and data analysis. This criterion constitutes a basic quality threshold. We discarded studies that did not meet this standard. To assess the methodological limitations (or quality) of included studies, we used an adaptation of the Critical Appraisal Skills Programme (CASP) assessment tool for qualitative studies (Atkins 2008). Other reviews of qualitative evidence have also used this tool (Carlsen 2007; Munro 2007; Glenton 2013). The adapted tool includes the following eight questions.

1. Are the setting(s) and context described adequately?
2. Is the sampling strategy described, and is this appropriate?
3. Is the data collection strategy described and justified?
4. Is the data analysis described, and is this appropriate?
5. Are the claims made/findings supported by sufficient evidence?
6. Is there evidence of reflexivity?
7. Does the study demonstrate sensitivity to ethical concerns?
8. Any other concerns?

We conducted a pilot trial on three included studies to assess the feasibility of using this tool and to ensure the integrity of the assessment. We accept that there is no gold standard approach for assessing the methodological limitations of primary qualitative studies, but believe that this adapted CASP checklist offers a reasonable framework by which to assess such limitations.

One author (HA) applied the appraisal framework to each study. A second author (CG) checked for discrepancies. Disagreements were resolved through discussion or by consulting a third author (SL).

We did not use the assessments of methodological limitations to exclude studies but to judge the relative contribution of each study to the development of explanations and relationships and as part of the assessment of how much confidence we have in each finding (see below).

Assessment of confidence in the review findings

We utilised the GRADE-Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) approach to summarise our confidence in the review findings (Lewin 2015;

Lewin 2016). CERQual assesses confidence in the evidence based on the following four key components.

- Methodological limitations of included studies: the extent to which there are concerns about the design or conduct of the primary studies that contributed evidence to an individual review finding.
- Coherence of the review finding: an assessment of how clear and cogent (i.e. well supported or compelling) the fit is between the data from the primary studies and a review finding that synthesises those data.
- Adequacy of the data contributing to a review finding: an overall determination of the degree of richness and quantity of data supporting a review finding.
- Relevance of the included studies to the review question: the extent to which the body of evidence from the primary studies supporting a review finding is applicable to the context (perspective or population, phenomenon of interest, setting) specified in the review question.

After assessing each of the four components, we (HA, CG and SL) judged the overall confidence in each review finding to be high, moderate, low or very low (Lewin 2016).

- High confidence: it is highly likely that the review finding is a reasonable representation of the phenomenon of interest.
- Moderate confidence: it is likely that the review finding is a reasonable representation of the phenomenon of interest.
- Low confidence: it is possible that the review finding is a reasonable representation of the phenomenon of interest.
- Very low confidence: it is not clear whether the review finding is a reasonable representation of the phenomenon of interest.

We based our judgements on an initial assumption that all findings were 'high confidence' and then downgraded them if there were important rather than minor concerns regarding any of the CERQual components. The starting point of 'high confidence' reflects a view that each review finding should be seen as a reasonable representation of the phenomenon of interest unless there are factors that would weaken this assumption.

As a final step, we prepared an evidence profile for each finding as well as 'Summary of qualitative findings' tables. This is similar to the 'Summary of findings' tables used in Cochrane intervention reviews and summarises the key findings, our confidence in the evidence for each finding, and an explanation of the assessment of confidence.

Data synthesis

We conducted a thematic analysis using a constant comparison strategy for data extraction and synthesis (Miles 2014). The constant comparison strategy was originally developed for the analysis of primary data (Glaser 1965; Boeije 2002), but it has been used more recently as a method for constructing the data extraction forms and guiding analysis during qualitative evidence syntheses (Booth 2012).

We applied a five-step process for data extraction and synthesis. Firstly, one author (HA) chose the article judged to most closely answer the review objectives. Secondly, we coded this article using a thematic analysis approach. Thirdly, we created a data extraction sheet based on the codes that emerged from step two. Fourthly, we coded the next article using the data extraction sheet. If necessary, we made additions to the data extraction sheet if new themes emerged from the subsequent articles. Finally, we continued this process until we had extracted data from all of the sampled articles. Two other authors verified data extraction and added any other data that they felt should have been included.

We synthesised the data from the themes identified during the constant comparison thematic data extraction and identified the review findings. Afterward, we re-read the included studies to double check that we had extracted all data relevant to the findings.

Once data coding and analysis were complete, we looked for differences in views and perceptions within and across settings (including low-, middle- and high-income countries as well as rural and urban areas), groups (for instance minority groups; first-time parents; older and younger parents; informal caregivers) and different vaccines. We also attempted to explore whether the setting or source of communication had an impact on people's perceptions of that communication and its influence on their decision regarding vaccination.

Using the synthesised qualitative findings to supplement the Cochrane intervention reviews

As part of data synthesis, we explored how we could integrate the findings from our review with those of related Cochrane intervention reviews (Kaufman 2013; Saeterdal 2014; Oyo-Ita 2016). Currently, these three effectiveness reviews are characterised by few studies and mostly low certainty evidence. We did not consider the findings from a Cochrane effectiveness review on "Patient reminder and recall systems to improve immunisation rates" (Jacobson-Vann 2005), as these findings are out-of-date, and the review is currently being updated.

Using qualitative evidence synthesis findings to supplement intervention reviews is a relatively new approach, and there are no agreed methods on how to conduct this analysis. We decided to use a matrix model approach similar to one used by Candy 2011. Two authors (HA, CG) used this approach to create a comparative table. This explored whether the interventions studied in the related Cochrane reviews contained the features of vaccination communication that parents and caregivers identified as important in this synthesis (Kaufman 2013; Saeterdal 2014; Oyo-Ita 2016).

To create the matrix we undertook the following steps: first, we went through each of the synthesis findings and identified features of communication interventions that parents and informal caregivers perceived as positive or facilitators, including features tied to information timing, availability, amount, source and content. We

organised these features into simple groups and then created eight questions reflecting the key issues highlighted. These questions, which can be answered as yes, no or unclear, allowed us to assess the alignment between the qualitative issues we identified and the interventions assessed in the effectiveness reviews.

1. Has information been communicated to parents before the vaccination appointment?
2. Has the information been provided in more than one setting, including settings outside of the health centre? Has an opportunity for discussion about the vaccination information been offered?
3. Has an attempt been made to tailor the information to a particular audience?
4. Has an attempt been made to ensure that health workers are helpful, caring and willing to have open, non-judgemental discussions with parents about their questions and concerns regarding vaccination?
5. Are health workers perceived by parents, informal caregivers and other stakeholders as being driven primarily by the best interests of the child or are they perceived as being driven by other motives, such as financial gain?
6. Has an attempt been made to provide parents with information they perceive as impartial, balanced and unbiased?
7. Has an attempt been made to communicate vaccination information in a clear and simple way and present it in a variety of formats?
8. Did the information provided try to address ongoing media stories or rumours about vaccination so as to address parents' current questions and concerns?

Secondly, we created a table, listing these eight questions. We then assessed whether the interventions included in the Cochrane effectiveness reviews reflected these features. As the scope of Oyo-Ita 2016 was broader than communication, we only assessed trials from that review which focused on communication interventions. We assessed whether there was a full or partial match between each of the eight questions and the intervention components from each trial. We then added these assessments to the table. We used a tick to indicate a 'yes'; an em dash (-), a 'no'; and a question mark, an 'unclear'. None of the trials presented information regarding questions 5 and 8. We assume that the interventions did not address these questions but cannot be sure due to the limited amount of information available in the trial reports.

Researcher reflexivity

Throughout the data synthesis, the authors were aware of their own positions and reflected on how these could influence the data synthesis and study design. With an aim of identifying assumptions in the data synthesis, we also presented the preliminary findings to the larger COMMVAC project team for feedback.

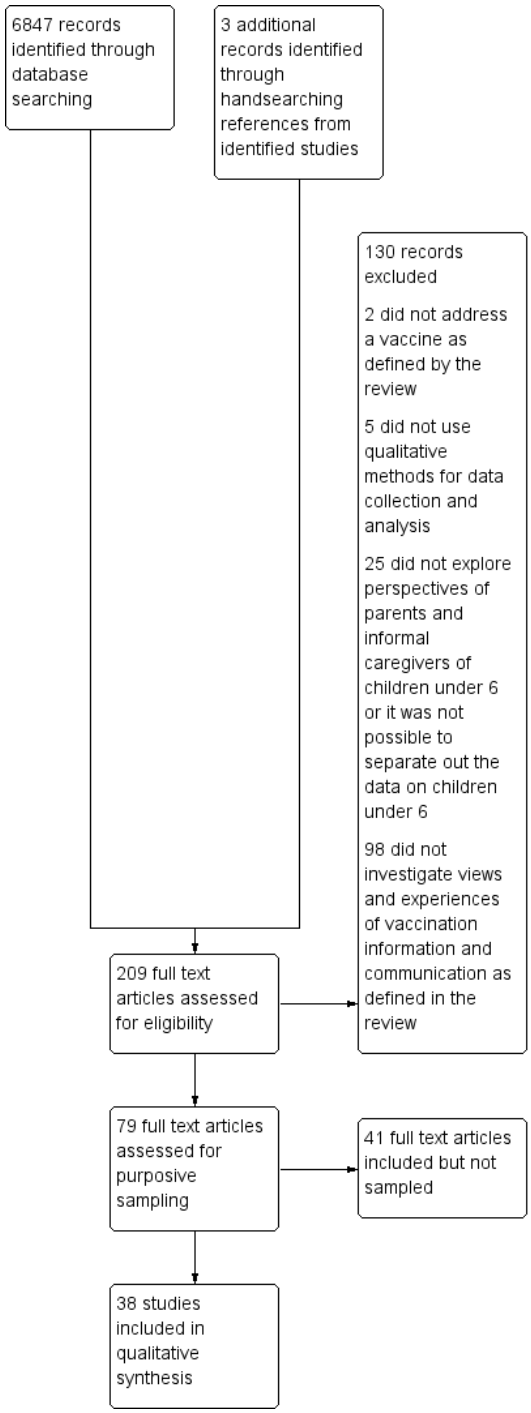
RESULTS

Description of studies

Results of the search

We identified a total of 6850 titles and abstracts published on or before 30 August 2016. We considered 209 full-text papers for inclusion in this synthesis. We found 79 studies that met our inclusion criteria and purposively sampled 38 for inclusion in the synthesis (Figure 1). All of the sampled studies were published between 1998 and 2016.

Figure 1. Study flow diagram



Included studies

Study respondents

In all of the studies, authors sought the perspectives of parents themselves. Although some studies also included informal caregivers such as grandmothers, it was not possible to distinguish between these points of view during analysis. Most of the respondents were mothers with only a few studies also exploring the perspectives of fathers. In addition, some studies elicited health worker perceptions, but we did not extract or include these data in our analysis.

Setting

Nine full-text articles reported research in low- and middle-income countries (LMICs): Ethiopia (N = 2), Uganda (N = 1), India (N = 1), Brazil (N = 2), Kazakhstan and Uzbekistan (N = 1), Iran (N = 1), and Turkey (N = 1); 29 took place in high income countries (HICs): the UK (N = 10), Norway (N = 1), the USA (N = 10), Australia (N = 2), the Netherlands (N = 2), Switzerland (N = 1) and Canada (N = 3). These assignments are based on the World Bank's classification of income level as of August 2016 (World Bank 2016).

Twenty-seven studies focused on vaccines that were part of the WHO Expanded Programme on Immunization (EPI) in that country although these vaccines were not specified by name. Two studies focused on EPI vaccines but focused on one of these vaccines specifically (MMR in one study and hepatitis B in the other). Six studies focused exclusively on the MMR vaccine and one on the oral polio vaccine. Two studies focused on the MMR vaccine in combination with another vaccine (tDap/IPV booster and the 5-in-1). One study focused on the influenza vaccine. All but one of the studies with a focus on the MMR vaccine were undertaken in the UK (the other took place in Switzerland).

Thirty-seven studies focused on routine immunisation programmes. Only one study exclusively focused on a vaccination campaign (specifically, a polio campaign in India) (Hussain 2012).

Quality of the included qualitative studies

All of the included studies were published as papers in health research journals, which can lead to word limits that are not particularly well suited for reporting qualitative research. In general, there was poor reporting of context, sampling, research methods and researcher reflexivity across the studies. All studies gave some description, even if very brief, about the participants, sampling, methods and analysis. Most of the studies used interview or focus group discussions with very few instances of other methods of qualitative data collection such as participant observation. The general lack of rich data and thick description in the studies may also have been due to the limitations set by journals publishing the studies.

Categories and findings identified in the data

In this section, we present the categories identified in the data synthesis and the findings of the review that correspond to each category. At the end of the results section, we bring together the results of this synthesis and the interventions studied in the three COMMVAC effectiveness reviews (Oyo-Ita 2016; Kaufman 2013; Saeterdal 2014) and present them in a comparative table.

From the constant comparison thematic synthesis, we developed six overarching categories related to vaccination information: timing of vaccination information; availability of vaccination information; amount of vaccination information; source of vaccination information; content of vaccination information; and influence of the relationship between vaccination information, the way it is communicated and vaccination decisions.

Findings

In the sections below, we report each finding and provide a link to the CERQual evidence profile table supporting the assessment of confidence in that finding. We start each section with a link to the 'CERQual summary of qualitative findings' table. For each finding, we start with a short, overall summary and then present the detailed results.

Timing of vaccination information

Summary of qualitative findings table (Table 3).

Finding 1: Parents liked to receive information about vaccination before the baby was born for reasons such as fatigue and time limitations for reading about vaccination after delivery (low confidence).

Table 4

A few studies found that parents wanted to receive information about their child's vaccinations during pregnancy and well before the first vaccination appointment (Benin 2006; Tickner 2007; Miller 2008; Barbieri 2015; Saada 2015). Benin 2006 found that unless parents accepted vaccination without question (that is, they did not view it as a decision that needed to be made), they made the decision to vaccinate before the baby was born. Parents in Benin 2006 and Tickner 2007 felt that they had more time to look for information before the baby arrived, while parents in Barbieri 2015 and Miller 2008 also reported having more time to critically

appraise information at this stage. They felt that after the baby was born was not an optimal time for learning and making decisions about vaccination due to stress and fatigue (Tickner 2007; Miller 2008).

" 'I think people should look into it, but when you've got a six-week old baby, you've got a job to even like get enough rest for yourself, let alone going to look on the Internet and your baby's injection is due in two-weeks time. So I don't think . . . maybe this should all be done before the baby's born . . . you know, all the information should be given before the child's born. Erm it's a bit like the vitamin K that they give the baby after they're born, they ask you when you're in labour. Well I'm not being funny but, you know, there's no way on this earth that you're gonna start oh I've got to go on the Internet a minute, you know [Laughter]. You know, you just go along with, you know, what they say' "(Tickner 2007).

Finding 2: Parents liked to receive vaccination information in good time before each appointment, including all follow-up appointments, in order to reflect on the content and prepare questions (moderate confidence).

Table 5

Some studies reported that parents wanted information about vaccination to be communicated well in advance of the vaccination appointment (Evans 2001; McMurray 2004; Shui 2005; Fowler 2007; Saada 2015; Dube 2016), and some wanted to receive information multiple times before the appointment (Shui 2005; Fowler 2007). They felt that if this was the case they would have time to review and reflect on the content and prepare any questions they might want to ask during the vaccination session (Evans 2001; McMurray 2004; Shui 2005). Some parents suggested that an optimal time to communicate the information was with the vaccination appointment card giving the appointment date and time for the next vaccination (Evans 2001). Only one study found that parents wanted to receive more information at the vaccination appointment as well as in advance (McMurray 2004).

In three studies, parents reported not receiving information about vaccination before or during follow-up vaccination appointments (McMurray 2004; Tickner 2010; Brown 2012). Parents noted that when they only received information at the first vaccination visit, they often lost it or forgot it by the time of the follow-up appointment months or years later (McMurray 2004; Brown 2012). For example, parents in Brown 2012 reported receiving a leaflet describing all childhood vaccines a full year before having to make the decision about the MMR vaccine, and by that time, they had lost the leaflet. Parents also wanted information to be communicated in advance about new vaccines that were introduced into the vaccination programme. When they received this information at the time of the appointment they felt overwhelmed and sometimes decided against vaccination (Dube 2016).

"Interviewer (I): And why you did not give the rotavirus vaccine? "Participant (P): Because it is a live vaccine, I thought that the risk of being contaminated by the stools was greater than the danger of catching gastroenteritis. And the fact that it's a new vaccine as well, I know they're doing studies on it, but I was uncomfortable with it anyway. As well, I didn't know that this new vaccine had come out, and they presented it to us right at the moment of vaccination and we had to make a decision immediately [laughs]. So that's why, without much time to think about it and the fact that I was uncomfortable, I decided not to have him vaccinated" (Dube 2016).

Finding 3: Parents found it difficult to remember information communicated during a vaccination appointment as they were distracted and worried about their child (moderate confidence).

Table 6

In a few studies parents felt that receiving information during a vaccination appointment was not ideal, as they were tired, distracted by their child and worried about how the child would react to being vaccinated (Shui 2005; Austvoll-Dahlgren 2010).

" 'When [your child is] called in and getting ready to get the shots you're flustered with worrying about how to comfort the child . . . you're not thinking about trying to read that information at the time. You need it ahead of time' " (Shui 2005).

Availability of vaccination information

Summary of qualitative findings table (Table 7).

Finding 4: Parents want vaccination information resources to be available at a wider range of health services and community and online settings, for instance through schools, pharmacies, clinics and libraries (low confidence).

Table 8

Parents stated that information was currently available to them from a range of sources, including but not limited to:

- public health nurses (Guillaume 2004; Austvoll-Dahlgren 2010), doctors (Guillaume 2004; Benin 2006; Fadda 2015), and other health professionals (Evans 2001);
- group health talks (Berhanel 2000);
- their pharmacy (Tickner 2010);
- medical publications (Guillaume 2004; Brunson 2015);
- leaflets (Guillaume 2004);
- posters (Berhanel 2000);
- the Internet (Evans 2001), including government websites (Brunson 2015);
- the library (Tickner 2010);
- baby care books and articles (Evans 2001; Benin 2006; Brunson 2015);
- their child's play group or preschool (Tickner 2010);

- peers and friends (Berhanel 2000; Evans 2001; Benin 2006; Tickner 2010).

However, a few studies found that parents wanted vaccination information to be available at a wider range of locations (Shui 2005; Fowler 2007; Miller 2008; Fadda 2015). None of the articles addressed why parents wanted broader options for the availability of vaccination information. Only Fadda 2015 explained that they wanted multiple views about vaccination to be available as part of the same communication intervention in order to avoid events or information that were one-sided or only for or against vaccination.

Finding 5: Parents want help from health workers to locate relevant vaccination information resources (low confidence).

Table 9

A few studies found that locating information was difficult for some parents, and they wanted help from health workers (Miller 2008; Fadda 2015), for example recommendations on reliable Internet sites for finding additional information following a consultation (Austvoll-Dahlgren 2010; Fadda 2015).

Finding 6: Parents who had migrated to a new country had difficulty negotiating the new health system and accessing and understanding vaccination information (low confidence).

Table 10

A few studies found that parents who had migrated had difficulty accessing and negotiating their new health system (Tomlinson 2013; Harmsen 2015; Kowal 2015). Some parents who had migrated had insufficient knowledge about how immunisation services and policies worked in their new countries concerning, for example, schedules, appointment structure and the expected amount of information to be given out (Tomlinson 2013; Harmsen 2015; Kowal 2015). They also felt that there was a lack of both oral and written information in their own language (Tomlinson 2013; Harmsen 2015; Kowal 2015).

Parents' understanding of immunisation and how services should be delivered came from their personal experiences in their country of origin (Tomlinson 2013; Harmsen 2015; Kowal 2015). Kowal 2015 found that parents believed it was easier to locate information about vaccination in their home countries, whereas the move to the host country entailed the loss of their social support network for obtaining health promotion information.

Amount of vaccination information

Summary of qualitative findings table (Table 11).

Many articles presented findings around the amount of information parents wanted and how they felt about the amount of vaccination information that was available or that they had received (Bond 1998; Berhanel 2000; Evans 2001; Guillaume 2004; Shui 2005; Benin 2006; Fowler 2007; Tickner 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Tickner 2010; Bond 2011; Figueiredo 2011; Harmsen 2012; Hussain 2012; Tomlinson 2013; Fadda 2015; Harmsen 2015; Blaisdell 2016; Sobo 2016).

Finding 7: Parents generally found the amount of vaccination information they received to be inadequate (high confidence).

Table 12

Many studies found that parents were dissatisfied with the amount of vaccination information that they received (Bond 1998; Evans 2001; Guillaume 2004; Shui 2005; Fowler 2007; Tickner 2007; Gust 2008; Tickner 2010; Bond 2011; Figueiredo 2011; Harmsen 2012; Hussain 2012; Tomlinson 2013; Fadda 2015; Harmsen 2015; Blaisdell 2016; Sobo 2016). Some parents felt that even though there was more information available now than previously, it was still not enough to meet their information needs (Gust 2008; Figueiredo 2011; Fadda 2015; Harmsen 2015; Sobo 2016). This lack of information sometimes served to reinforce their concerns about vaccination (Shui 2005; Fowler 2007; Harmsen 2012; Fadda 2015; Harmsen 2015; Sobo 2016). Lack of information or inadequate answers to parents' questions and concerns led to parents feeling angry about their lack of knowledge and sometimes to have doubts about the vaccination programme (Bond 1998; Bond 2011; Hussain 2012; Fadda 2015; Blaisdell 2016). Many parents said that inadequate information had hampered their decision-making (Evans 2001; Guillaume 2004; Fowler 2007; Tomlinson 2013).

" 'But that's very confusing isn't it, as a parent because you obviously want the best for your child and when you see all these reports . . . and you're trying to look at it and make an educated decision . . . I think just basically there's a complete lack of information . . . I think there needs to be something a bit sort of totally universal that everyone can sort of get their hands on and that's independent 'cause I think people are just either way polarised' " (Evans 2001).

" 'We would like to have information before vaccination. There is not enough information . . . therefore there occur doubts [regarding vaccination]' " (Fowler 2007).

Only one study, undertaken in Ethiopia, found that parents were satisfied with the amount of information they were receiving. This was based on exit interviews after a health talk. However, the same study, when using in-depth interviews, found that parents were actually dissatisfied with the information they received about childhood vaccination and wanted more (Berhanel 2000).

Finding 8: The amount of information parents would like to receive seemed to have an inverse relationship with their acceptance of vaccination (low confidence).

Table 13

Parents who accepted vaccination wanted less information than parents who had concerns or were thinking of not vaccinating (or

had not vaccinated) their child (Guillaume 2004; Benin 2006; Austvoll-Dahlgren 2010; Bond 2011; Kowal 2015).

"On the contrary, searching for information was reported to be more likely if parents were undecided or negative towards vaccination, for example if hearing about serious side effects or if not trusting the information provided by the public health nurse. One parent explained: 'Then you may be wary if somebody you know closely and you have seen it with you own eyes, someone who has had side effects … Then I think you may look up more information on your own' " (Austvoll-Dahlgren 2010).

Different parents had different approaches to the amount of information they wanted. Parents with concerns wanted a large amount of clearly presented information (Guillaume 2004). Some parents kept searching for more information to confirm their decision even after they had decided (Guillaume 2004). Other parents searched for as much information as possible until they felt they could make a decision, even if this meant delaying the vaccination. Finally, some parents made a choice and then attempted to limit the extent to which they were exposed to information that could influence their decision (Guillaume 2004).

" 'I think honestly speaking, this sounds stupid, but I think well, I don't want to hear it [about side effects], because it scares me. I know it might be stupid because you think, well you know they're s'posed to have it but if you start thinking well, what if you know if this happens and that happens well, then you won't immunise your children, so, there's a risk I s'pose' " (Bond 2011).

Source of vaccination information

Summary of qualitative findings table (Table 14).

The source of information (i.e. where it came from) was important to many parents. Most parents talked about a range of official and unofficial sources and their pros and cons (Brown 2012).

Finding 9: Parents generally found it difficult to know which vaccination information sources to trust (high confidence).

Table 15

Judging the trustworthiness of information sources was a challenge for many parents (Evans 2001; Guillaume 2004; McMurray 2004; Shui 2005; Benin 2006; Fowler 2007; Hilton 2007; Tickner 2007; Austin 2008; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Tickner 2010; Brown 2012; Harmsen 2012; Hussain 2012; Blaisdell 2016; Sobo 2016). Parent perspectives on the trustworthiness of a source varied between those who had decided to vaccinate, those questioning vaccination, and those who had decided not to vaccinate (Benin 2006; Austin 2008; Brown 2012; Sobo 2016). Trusting the source of the information was perceived by some to be even more important than the content of the information (Guillaume 2004). Sources mentioned included health professionals, government, politicians, public health institutes, policymakers, researchers, mass media, television, newspapers, the Internet, books, leaflets, peers and friends.

Finding 10: Parents found it difficult to find a vaccination information source that they perceived as impartial or providing balanced information (high confidence).

Table 16

Some parents felt that finding impartial and balanced information sources was problematic for a number of reasons (Bond 1998; Guillaume 2004; McMurray 2004; Hilton 2007; Tickner 2007; Austin 2008; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Brown 2012; Harmsen 2012; Hussain 2012; Dube 2016).

Some parents expressed a belief that the government or healthcare providers were withholding information about vaccination and that they were only being told about the benefits (Guillaume 2004; Hilton 2007; Tickner 2007; Miller 2008; Austvoll-Dahlgren 2010; Brown 2012; Dube 2016).

" 'I don't think it gives you the whole picture. It [the information] gives . . . the profession what the parents need to know, which is have your children immunised . . . and this is what happens if you don't. But it doesn't give you the rest of the picture' " (Tickner 2007).

" 'Both sides of the story. I got only the medical side . . . what the doctors have been taught . . . what the nurses have been taught. I only got the side that they've been taught in medical school . . . It works for some . . . What about the children who have problems? And what they didn't tell me was the other side of the coin . . . so that I could weigh it out for myself' " (Miller 2008).

Parents also questioned how objective healthcare providers were in providing information, feeling that their impartiality was compromised due to incentives (McMurray 2004; Hilton 2007; Austin 2008; Brown 2012; Dube 2016), their medical training (Brown 2012), influences from the government (Guillaume 2004; McMurray 2004), being pro-vaccination (McMurray 2004), and their perceived unwillingness to discuss alternatives (Guillaume 2004), among other things.

" 'I've never had a problem with doctors not being willing to listen to my viewpoint, but I know that doctors and health professionals have to give the government line, so I am not expecting an unbiased discussion' " (McMurray 2004).

Some parents also believed that the media only reported one side of the story (Guillaume 2004).

Finding 11: Parental attitudes towards vaccination influenced which vaccination information sources they trusted (moderate confidence).

Table 17

Some studies found that pre-existing views on vaccination shaped parents' trust in different vaccination information sources (Bond 1998; Benin 2006; Hilton 2007; Austin 2008; Gust 2008; Austvoll-Dahlgren 2010; Brown 2012; Hussain 2012; Brunson 2013; Kowal 2015; Dube 2016; Sobo 2016). Parents who accepted vaccination tended to trust their healthcare provider (Benin 2006; Gust 2008; Austvoll-Dahlgren 2010; Brown 2012; Kowal 2015;

Dube 2016; Sobo 2016), and they gave less credence to information suggesting that vaccines were not safe (Brunson 2013; Hilton 2007).

Parents who were hesitant towards vaccination, had delayed vaccinating or had decided not to vaccinate were less likely to trust their provider (Bond 1998; Benin 2006; Hilton 2007; Austin 2008; Austvoll-Dahlgren 2010; Brown 2012; Brunson 2013; Sobo 2016), and they were more inclined to believe that sources questioning vaccine safety provided missing information (Hilton 2007). These parents often questioned healthcare providers' motives and objectivity (Bond 1998; Hilton 2007; Austin 2008; Brown 2012; Brunson 2013). Previous negative experiences had often damaged their trust in allopathic providers, leading them to seek trusting relationships with an alternative healthcare provider such as a homeopath (Benin 2006; Brown 2012). Other parents turned to resources such as books, the Internet or magazines (Benin 2006; Austvoll-Dahlgren 2010), with some distrusting government and research sources (Brown 2012).

Finding 12: Parents wanted vaccination information to be available outside of the context of vaccination appointments, including from health workers, parents' groups, online forums and other sources. Parents in some studies wanted the opportunity to discuss this information with people who were not involved in their child's vaccination appointment (high confidence).

Table 18

Some parents wanted the option to discuss vaccination outside of the context of vaccination appointments, including with health workers, parents' groups and other people, to receive exposure to different opinions and voices (Evans 2001; McMurray 2004; Fowler 2007; Tickner 2007; Miller 2008; Tickner 2010; Figueiredo 2011; Brown 2014; Kitayama 2014; Fadda 2015; Saada 2015; Sobo 2016). Some of these parents suggested designated discussion times during health education or postnatal support visits (Evans 2001; Fadda 2015). Others wanted to discuss vaccination with their baby support groups but felt this was not possible as the child would have already received their first vaccination by then (Tickner 2007). Other suggested contexts for these discussions included:

- doctors' offices, hospitals and health units (Evans 2001; Fowler 2007; Miller 2008; Fadda 2015; Saada 2015);
- prenatal classes (Miller 2008);
- libraries (Miller 2008; Tickner 2010);
- the Internet (Miller 2008);
- pharmacies (Fowler 2007; Tickner 2010);
- child's play groups or preschool/kindergarten (McMurray 2004; Fowler 2007; Tickner 2010);
- the workplace (Fowler 2007);
- home visits (Fadda 2015; Figueiredo 2011);
- church (Figueiredo 2011);
- public presentations (Figueiredo 2011); and
- mobile health (mHealth) interventions such as text messages and online immunisation cards (Brown 2014; Kitayama 2014).

Some parents felt that having information available through a broader spectrum of sources and sites would give them the chance for discussion without the time constraints of a doctor's office and could facilitate access to a variety of stakeholders with different viewpoints (McMurray 2004; Fadda 2015; Saada 2015).

Finding 13: Health workers are an important source of vaccination information for parents (high confidence).

Table 19

Many studies attested to the important role of health workers in providing vaccination information to parents (Berhanel 2000; Guillaume 2004; McMurray 2004; Benin 2006; Hilton 2007; Tickner 2007; Gust 2008; Miller 2008; Tadesse 2009; Austvoll-Dahlgren 2010; Tickner 2010; Bond 2011; Brunson 2013; Brown 2014; Delkhosh 2014; Fadda 2015; Harmsen 2015; Kowal 2015; Saada 2015; Dube 2016; Sobo 2016). For parents who accepted vaccination, these health workers worked within the allopathic health system and were public health nurses, paediatricians, general practitioners and general health workers (Guillaume 2004; McMurray 2004; Benin 2006; Tickner 2007; Gust 2008; Miller 2008; Tadesse 2009; Austvoll-Dahlgren 2010; Brunson 2013; Delkhosh 2014; Fadda 2015; Harmsen 2015; Kowal 2015; Saada 2015; Dube 2016; Sobo 2016). Parents who were hesitant towards vaccination, had delayed vaccinating or had decided not to vaccinate, often sought the counsel of alternative medicine practitioners such as chiropractors and homeopaths (Benin 2006; Miller 2008; Brunson 2013; Dube 2016; Sobo 2016).

Finding 14: In their interactions and communication with health workers, parents expected longer-than-usual appointments; clear answers to their questions; information tailored to their needs; and open discussions where health workers were helpful, caring, sensitive and receptive to their concerns. Parents complained when these characteristics were missing (high confidence).

Table 20

A number of studies discussed parents' expectations of health workers in relation to communicating information about vaccination (Bond 1998; Berhanel 2000; Evans 2001; Guillaume 2004; McMurray 2004; Shui 2005; Benin 2006; Fowler 2007; Tickner 2007; Austin 2008; Gust 2008; Henderson 2008; Miller 2008; Tadesse 2009; Austvoll-Dahlgren 2010; Tickner 2010; Bond 2011; Brown 2012; Harmsen 2012; Hussain 2012; Brown 2014; Delkhosh 2014; Brunson 2015; Fadda 2015; Harmsen 2015; Kowal 2015; Saada 2015; Dube 2016; Sobo 2016). The studies suggested that many parents expected:

- good, clear answers to their questions (McMurray 2004; Austvoll-Dahlgren 2010; Hussain 2012; Brown 2014; Delkhosh 2014; Brunson 2015; Fadda 2015);
- long, open discussions where they felt listened to (Bond 1998; Evans 2001; Benin 2006; Austin 2008; Gust 2008; Bond 2011; Delkhosh 2014; Brunson 2015; Fadda 2015; Saada 2015; Dube 2016; Sobo 2016);
- a knowledgeable health worker with the correct information (Benin 2006; Delkhosh 2014; Brunson 2015; Fadda 2015; Dube 2016);
- consideration of their individual needs, using a 'whole person' approach (Benin 2006; Brunson 2015; Saada 2015; Dube 2016; Sobo 2016);
- friendly, caring, sensitive and supportive health workers with good interpersonal communication skills (Bond 1998; Berhanel 2000; Shui 2005; Fowler 2007; Henderson 2008; Tadesse 2009; Bond 2011; Delkhosh 2014; Dube 2016; Sobo 2016);
- advice supported by evidence (Brown 2012; Fadda 2015; Dube 2016);
- a good, supportive relationship not based on the vaccination status of their children (Guillaume 2004; Dube 2016; Sobo 2016);
- long appointments (Shui 2005; Tickner 2010; Harmsen 2012; Harmsen 2015; Dube 2016; Sobo 2016);
- empathy with their parental responsibility in making the decision (Harmsen 2012; Dube 2016; Sobo 2016);
- explanations about health workers' actions during a vaccination appointment (Miller 2008; Harmsen 2015; Kowal 2015);
- availability of information from health workers (Shui 2005; Dube 2016);
- treatment as a partner in their child's care (Evans 2001; Shui 2005; Saada 2015; Dube 2016; Sobo 2016).

Many articles also discussed the implications of not realising these expectations (Bond 1998; Berhanel 2000; Shui 2005; Benin 2006; Gust 2008; Henderson 2008; Tickner 2010; Bond 2011; Brown 2012; Delkhosh 2014; Brunson 2015; Fadda 2015). For example, a participant in one study described the challenges faced in trying to find information on vaccination:

" 'I've gotten some information from the baby care books . . . From peers, too, friends . . . Getting information about why the vaccination schedule is the way it is, no one can seem to really answer for me, even my doctor. I've asked my doctors that question . . . I really haven't gotten a really good answer . . . I feel like I can't get really solid information' " (Benin 2006).

Parents felt that doctors had neither the time or the motivation to find answers for them (Benin 2006). Most parents felt that the contact time they had with health workers was too short and did not leave time for discussion (Berhanel 2000; Shui 2005; Gust 2008; Delkhosh 2014; Brunson 2015; Fadda 2015; Saada 2015; Dube 2016; Sobo 2016). A study in Ethiopia also showed that the information communicated in clinic health talks was not standardised and that the content and quality varied between locations. There was also a lack of health promotion materials in clinics, such as posters and support materials (Berhanel 2000).

In a few articles, parents made recommendations about how they would like to communicate with health workers and the role that health workers could play in providing information (McMurray 2004; Miller 2008; Austvoll-Dahlgren 2010). Parents believed that health workers could be better at recommending and finding literature from trustworthy sources to give to them at consultations (Miller 2008; Austvoll-Dahlgren 2010; Dube 2016), and they expected provider knowledge to be up-to-date and well informed (Miller 2008; Sobo 2016). Another option put forward was to give parents access to information intermediaries at nurseries or school forums. This would allow them to compare the views of local practitioners and third parties and give parents opportunities to discuss these views (McMurray 2004; Fadda 2015). This cooperation between different health sectors and caregivers would help parents feel like their various health providers were on the same page and working together (Miller 2008). Parents also suggested that information on the risks and benefits of vaccination could be made more relevant to their local context (McMurray 2004).

Parents also suggested that health workers provide a receptive environment to questions and open discussion to address their concerns (Miller 2008; Delkhosh 2014). They also wanted health workers to be aware of how their behaviour and demeanour affected parents (Miller 2008; Delkhosh 2014). Parents wanted health workers to communicate in clear, simple terms and respect them as the decision-makers.

" '. . . and to have the answers, you know, or if . . . if they don't know, that maybe they could suggest where I might be able to find that information, you know . . . where I might look . . . you know? I'd like it to be validated that, you know, it is a concern . . . even though, to them, this one child in a million, right? But to me, it's my child' " (Miller 2008).

Finding 15: Some parents accepted and preferred vaccination information and reminders communicated electronically through mobile health (mHealth) applications, for example via text messages or electronic vaccination cards (low confidence).

Table 21

Two studies found that parents appreciated vaccination information provided electronically (Brown 2014; Kitayama 2014). Kitayama 2014 explored the perceived advantages of using an online immunisation tool within an underserved Latino community in New York. Parents felt that the online tool would save them a lot of time and give them easier access to their child's update immunisation card. Parents also highlighted the ability to print out a hard copy.

" 'It's good because, if you need a copy, you just go there, get one

and print it out instead of having to call the doctor's office, wait in line and paying four dollars for a trip there . . . and with a child that you can't leave at home, I think it's good. You can do a lot of things automatically. It saves a lot of time' " (Kitayama 2014).
Brown 2014 looked into the acceptance of weekly text blasts, text messages with information or appointment reminders, for single, adolescent mothers in Nebraska, USA. The mothers felt supported by and became reliant on the text messages. They were seen as reliable and trustworthy sources of important information for their health and that of their child. The messages were a good fit with the participants' learning and lifestyles, and they liked the fact that they could go back and re-read the messages at any time.
" 'It's helpful that I can keep the messages right here (phone in hand) so I can go back and reread them if I forgot something. I have all the messages saved in my phone and will have access to them until I erase them' " (Brown 2014).

Finding 16: Parents felt that the vaccination card was a potentially important source of vaccination information, for instance about the names of the diseases, the names of the vaccines and the date for the next appointment. However, some parents and informal caregivers found it difficult to read and understand this information (moderate confidence).

Table 22
Parents reported that the dates written on the vaccination card were important, and they used the card to plan for attending vaccination sessions (Babirye 2011; Figueiredo 2011; Kitayama 2014; Barbieri 2015; Fadda 2015).
" 'As for me, I make sure that when my wife is pregnant she attends the antenatal clinic as required and is also immunised because she usually tells me when she is immunised. Also after she gives birth I make sure she takes the children for immunisation on the dates written on the immunisation card' " (Babirye 2011).
Parents found that the vaccination card provided them with practical knowledge and was an important source of information (Figueiredo 2011; Kitayama 2014; Barbieri 2015). A few parents in the UK mentioned the vaccination card as a source of information (Tickner 2007).
Parents in Turkey also believed that the vaccination card could be a good source of information but noted that they could not access this information because they could not read or understand what was written (Topuzoğ lu 2007).
"Mothers also did not know which vaccine was administered to their children. This was because they could not read the name of the vaccine from the vaccination card and they could not get satisfactory information from the health personnel administering the vaccine: 'You cannot understand it [which vaccine was administered] from the card; also they [the health personnel] do not say anything. You just take the child and they give the vaccine' " (Topuzoğ lu 2007).

Finding 17: Parents regarded scientific sources as desirable, particularly if the source was objective, complete and independent of the government. Scientific sources were seen to be more reliable than discussion forums or lay opinions, but some saw them as having conflicts of interest (low confidence).

Table 23
In some studies parents mentioned health research or research publications as a source of information (Guillaume 2004; Hilton 2007; Austvoll-Dahlgren 2010; Brown 2012; Harmsen 2012; Brunson 2013; Barbieri 2015; Brunson 2015; Blaisdell 2016; Sobo 2016). In three (Guillaume 2004; Austvoll-Dahlgren 2010; Harmsen 2012), parents expressed a preference for research-based information, which they perceived as more reliable, independent (from government) and more impartial than other sources (Guillaume 2004). However, parents who expressed a preference for research-based information sometimes had difficulty accessing, understanding and assessing it due to the use of jargon and technical terms (Austvoll-Dahlgren 2010). Some parents also believed that research studies could be flawed, and that the independent research that they would like to have seen done to address some of their questions and concerns was neither ethically nor practically feasible (Brown 2012; Sobo 2016). Parents in one study felt that the current evidence on vaccines was incomplete, although they did not describe in what ways (Brown 2012).
Four studies (three from the UK and one from the USA) (Guillaume 2004; Hilton 2007; Brown 2012; Brunson 2013), focusing on the controversy surrounding the MMR vaccine mentioned Andrew Wakefield and his now discredited study, which claimed to have found a link between the vaccine and autism but which was found to be fatally flawed both scientifically and ethically (Godlee 2011). Some parents had disregarded the Wakefield study findings, believing that the methodology and findings were flawed. However, others believed that there must be merit to the findings due to the large amount of attention the study had received. Parents who were hesitant towards vaccination, had delayed vaccinating or had decided not to vaccinate tended to view Wakefield as an impartial doctor and a credible information source. For many, he was providing the necessary balance they saw as missing from other vaccine information.

Finding 18: Parents generally viewed the mass media, for example newspapers, magazines, television and the Internet, as an important source of vaccination information (moderate confidence)

Table 24
For many parents, the mass media was an important source of vaccination information (Evans 2001; Guillaume 2004; McMurray 2004; Benin 2006; Hilton 2007; Tickner 2007; Tickner 2010; Figueiredo 2011; Brown 2012; Brown 2014; Delkhosh 2014). Parents preferences regarding different media information sources

were often linked to their attitudes towards vaccination. Benin 2006 found that for non-vaccinators, the Internet, books and *Mothering Magazine*, along with their homeopath (naturopath), were the preferred sources of information. Evans 2001 also found that parents consulted a wide range of sources, including the Internet and alternative medicine books and articles, but they often perceived the available information to be biased to either one or the other side of the vaccination debate. Guillaume 2004 found that parents accessed a wide range of sources when looking for information about vaccination. These ranged from the television and newspapers to healthcare providers and politicians. The media was often their initial source of information, but parents also used it when making the decision about whether to proceed with vaccinations. In general, parents considered broadsheet newspapers to be more reliable than television or tabloids. There was an understanding that all media sources were sensationalist and could portray information in an unbalanced fashion. To address this, parents developed their own criteria for judging these sources and would follow up initial information received from the media with more traditional sources such as official government leaflets or their health worker (Guillaume 2004). Finally, a study in Iran found that media, especially radio and television, were very valuable sources of general health information but played a limited role in informing about vaccination (Delkhosh 2014).

Finding 19: The extent to which parents searched for information about vaccination, and the manner in which they received and assessed this information, was linked to their trust in the information source (high confidence).

Table 25

Many articles mentioned the trust and credibility of vaccination information sources as influencing how parents search for, receive, understand and judge information about vaccination (Bond 1998; Guillaume 2004; McMurray 2004; Shui 2005; Benin 2006; Hilton 2007; Tickner 2007; Miller 2008; Austvoll-Dahlgren 2010; Tickner 2010; Brown 2012; Hussain 2012; Tomlinson 2013; Brunson 2013; Delkhosh 2014; Barbieri 2015; Brunson 2015; Harmsen 2015; Kowal 2015; Blaisdell 2016; Sobo 2016). If a parent trusted the information source and understood the language that the information was presented in, they were more likely to accept the information and not search further (Bond 1998; Guillaume 2004; McMurray 2004; Benin 2006; Tickner 2007; Topuzoğlu 2007; Miller 2008; Austvoll-Dahlgren 2010; Tickner 2010; Brown 2012; Brunson 2013; Tomlinson 2013; Barbieri 2015; Harmsen 2015; Sobo 2016). If a parent did not trust the information source, they were less likely to accept the information and more likely to keep searching for more information (Guillaume 2004; McMurray 2004; Shui 2005; Benin 2006; Hilton 2007; Tickner 2007; Austvoll-Dahlgren 2010; Brown 2012; Harmsen 2012); they were also more inclined to seek out an alternative information source, such as a homeopath (Benin 2006). Some parents who did not trust an information source, such as the media, felt they were able to judge the information and choose what to accept and reject (Guillaume 2004; Fadda 2015).

Finding 20: Parents who trusted their health workers and accepted vaccination also trusted the information they received from the health services and searched less for other information. In contrast, parents who had less trust in their health worker or in the information they received from them were more likely to search for outside information sources (low confidence).

Table 26

In general, parents who accepted vaccination and had decided to vaccinate trusted the information they received from their health workers and the health system in general (Benin 2006; Tickner 2007; Austin 2008; Tickner 2010; Brown 2012; Brunson 2013; Brown 2014; Kowal 2015; Saada 2015; Dube 2016; Sobo 2016). When parents trusted health workers, they followed their recommendations. Trust in a healthcare provider was a main promoter of vaccination (Benin 2006).

" 'You know I really . . . feel that I've made a decision to trust our paediatrician . . . So that, you know, I'm kind of ceding the responsibility of getting more information over to them, trusting her' " (Benin 2006).

When parents did not fully trust in information from their health worker or the health system, they were more likely to search for vaccination information from other sources (Benin 2006; Tickner 2007; Austvoll-Dahlgren 2010; Saada 2015; Sobo 2016).

"On the contrary, searching for information was reported to be more likely if parents were undecided or negative towards vaccination, for example if hearing about serious side effects or if not trusting the information provided by the public health nurse. One parent explained: 'Then you may be wary if somebody you know closely and you have seen it with you own eyes, someone who has had side effects . . . Then I think you may look up more information on your own' " (Austvoll-Dahlgren 2010).

Some parents who had decided not to vaccinate did not trust their healthcare provider or the information they provided. These parents searched elsewhere for an information source they felt they could trust and who would not judge their decision not to vaccinate. They often ended up having a trusting relationship with an alternative provider such as a naturopath who provided them with information they found credible (Benin 2006; Brown 2012).

Finding 21: Some parents were not comfortable asking questions about vaccination or communicating with health workers, and they felt rushed, intimidated or concerned about the perceived attitudes of the health worker towards vaccination (moderate confidence).

Table 27

In many settings, parents felt uncomfortable asking questions. There was a variety of reasons for this including limited time, the attitudes of health workers, language barriers or not knowing that questions were allowed (Evans 2001; McMurray 2004; Topuzoğ lu 2007; Tomlinson 2013; Delkhosh 2014; Harmsen 2015; Saada 2015; Dube 2016).

In Turkey and Iran, mothers said that they did not receive any information from health workers and thus had no knowledge of the vaccinations their children were receiving. Parents were inhibited by the negative attitudes of the health workers. They felt that they did not have the courage to ask questions (Topuzoğ lu 2007; Delkhosh 2014).

In high-income settings, some parents were also reluctant to ask questions during consultations. They were afraid that if they asked questions they would be labelled a nuisance or receive different treatment (Evans 2001; Saada 2015; Dube 2016), or they did not understand the explanations from the health services and so did not feel comfortable asking questions (Tomlinson 2013; Harmsen 2015). Others did not ask questions due to the rushed nature of the consultation and the knowledge that other parents were waiting outside (McMurray 2004; Harmsen 2015; Saada 2015; Dube 2016). Communication during consultations was further diminished when practitioners were unwilling to engage in discussion or were dismissive, condescending or coercive (McMurray 2004). This was especially the case for parents who had decided to delay or refuse vaccinations (Saada 2015; Dube 2016).

Finding 22: Judgement and pressure from health workers made parents feel uncomfortable or alienated and could negatively influence their relationship with healthcare providers. In some cases this also influenced their intention to vaccinate (moderate confidence).

Table 28

Some studies mentioned judgement and pressure from health workers as an influence on vaccination communication and decision-making (Evans 2001; Benin 2006; Topuzoğ lu 2007; Austin 2008; Babirye 2011; Brown 2012; Delkhosh 2014; Saada 2015; Dube 2016; Sobo 2016). Sometimes this pressure and or judgement on the part of the health worker would influence the parent to vaccinate, and other times it pushed the parents in the opposite direction. In all cases, it made parents feel uncomfortable and influenced their relationships with their health worker and the health system.

A few studies found that pressure from health workers pushed parents towards vaccinating (Evans 2001; Topuzoğ lu 2007; Brown 2012). Some parents in HICs felt that it made it easier for them to comply and vaccinate than to refuse vaccinations (Evans 2001; Brown 2012). A few parents vaccinated because they feared that health workers would negatively judge their parenting if their child was to fall ill (Brown 2012). Those that accepted vaccination due to pressure felt that they were unable to have an open discussion with their health worker and did not feel that they had made an informed decision (Evans 2001; Saada 2015). This constant pressure and reminders often created trepidation among parents who began to fear going back for their next vaccination appointment (Brown 2012).

In Turkey and Uganda, parents vaccinated because they were told to do so by health workers (Topuzoğ lu 2007; Babirye 2011). In Turkey, mothers had little information about why they should vaccinate or why they needed to come on schedule, but the negative attitudes of the health workers showed them that vaccination must be important.

" 'If vaccines were not needed, the health personnel would not become so annoyed when we miss a session' " (Topuzoğ lu 2007).

This was in contrast to some other parents who moved towards not immunising when pressured by health workers (Evans 2001; Topuzoğ lu 2007; Austin 2008; Dube 2016; Sobo 2016). Parents who were hesitant or had decided not to vaccinate felt singled out and treated differently.

" '[The doctor] was so insistent that I should have her immunised. The more insistent he was, the less I wanted to have it done' " (Austin 2008).

These parents felt it was difficult to go against medical advice. However, many of them grew more confident, had changed their views over time with subsequent children and felt more comfortable questioning health workers and declining vaccination (Evans 2001; Sobo 2016).

Judgement, stigmatisation and negative attitudes from health workers made mothers in Uganda, Iran and Turkey feel as if they did not want to return to use vaccination services (Topuzoğ lu 2007; Babirye 2011; Delkhosh 2014,). In Uganda, poor mothers often felt stigmatised and bullied by other mothers and health workers because of the way they dressed and thus feared visiting the immunisation clinic (Babirye 2011). In Turkey, the negative attitudes and reprimands from health workers for delaying an immunisation or asking questions made mothers not want to use the vaccination services (Topuzoğ lu 2007).

Regardless of whether parents ended up vaccinating (or vice versa) because of the pressure and judgement from health workers, the interactions made them feel uncomfortable (Evans 2001; McMurray 2004; Benin 2006; Topuzoğ lu 2007; Austin 2008; Brown 2012; Delkhosh 2014; Saada 2015; Dube 2016). Many parents felt pressured about vaccination at inappropriate times, and the pressure from health workers often led parents to feel guilty about their choice (Austin 2008). Non-vaccinators reported facing constant questioning and reminders every time they came in contact with health services (Brown 2012), and that often left them feeling alienated by the medical establishment, with practices refusing to take them as clients (Benin 2006; Saada 2015).

" 'So I feel that I am not immunising, walking a tightrope . . . it was very hard to deal with the amount of medical pressure I was put under. You can be made to feel you are inadequate parent if you are not providing your full range of vaccinations' " (Austin

2008).

Finding 23: Parents, especially those who were hesitant or refused to vaccinate, believed that health workers were receiving incentives or payments for vaccination targets and questioned if the motives for vaccination were financial gain, instead of the best interest of the child (moderate confidence).

Table 29

Parents, especially those who were unsure or refused to vaccinate, felt that health workers were receiving incentives or payments and were therefore motivated by profit, or the need to meet targets in order to receive incentives, rather than the well being of their child (Evans 2001; McMurray 2004; Shui 2005; Benin 2006; Hilton 2007; Austin 2008; Brown 2012; Blaisdell 2016; Dube 2016; Sobo 2016).

" '[GPs] have targets, if they don't vaccinate everyone in their patient list then I think they lose money. So the, if they're using targets rather than looking at it on a child by child basis and whether or not the child should have it, then I think the motivations are money ultimately' " (Brown 2012).

" 'What do you do as a parent? You don't know who to trust. Because these are the people- you're meant to trust your doctor implicitly and yet people are saying well, you know, they're getting paid for having so many people vaccinated and all this, and you start thinking, well . . . who's got my wee boy's best interests at heart' " (Hilton 2007).

" 'If [the doctor's] being paid by pharmaceutical companies, for doing the work, then I cant really trust his opinion-his or her opinion-on the safety of it' " (Sobo 2016).

Finding 24: High levels of attention to vaccination issues from government agencies or the media influenced parents' perceptions of individual vaccines or vaccination in general (moderate confidence).

Table 30

Some studies found that high levels of attention to a vaccine, or to controversy surrounding a vaccine, from the government or media had both positive and negative impacts on parents' perceptions (Bond 1998; Evans 2001; Guillaume 2004; McMurray 2004; Hilton 2007; Tickner 2007; Tickner 2010; Brown 2012). For some parents, a high level of attention or response led them to believe in the importance of the vaccine (Tickner 2007; Brown 2012). For other parents, media attention led them to have doubts (Evans 2001; Hilton 2007; Tickner 2010), believe that there was a problem with the vaccine (Evans 2001, Brown 2012), or suspect that the government was withholding information from the public (Bond 1998).

Finding 25: Some parents distrusted or lacked confidence in information sources linked to the government. They considered these to be biased, to be withholding information or to be motivated by financial gain (moderate confidence).

Table 31

Some studies found that parents perceived information provided by the government to be incomplete, one-sided or compromised by vested interests (Evans 2001; Guillaume 2004; Shui 2005; Hilton 2007; Tickner 2007; Austin 2008; Harmsen 2012; Kowal 2015; Dube 2016; Sobo 2016). At times, this lack of confidence was rooted in previous responses from governments to public health crises, such as the bovine spongiform encephalopathy (BSE) crisis in the UK and the Tuskagee syphilis experiment in the USA (Evans 2001; Guillaume 2004; Hilton 2007).

"For others, however the pressure to immunise perhaps suggested 'nanny-state' politics: '. . . It's like a metaphor for the way the government treats the public. "I know what's best for you - have a burger", sort of thing' " (Hilton 2007).

Some parents felt that their concerns about vaccination had not been adequately addressed (Evans 2001; Shui 2005).

" 'There is a question mark behind the MMR whether that's proven or not there was a question mark, enough for me to sit down and think about it and I think they misjudged that completely . . . people do want to know these days, that's the era we're living in . . . don't just pat us on the head and say, "Oh you'll be OK" ' " (Evans 2001).

Other parents felt that the government was hiding the truth, was not being transparent or was not providing all of the information (Guillaume 2004; Harmsen 2012).

" 'I haven't seen any government programme saying this is what we have actually done, which to me means that they have got something to hide if they are not willing to tell everybody what they have done' " (Guillaume 2004).

Some parents also felt that information from the government was influenced by political and financial factors (Guillaume 2004; Tickner 2007; Austin 2008). Financial factors included the belief, reported by parents in Guillaume 2004, that the MMR combination vaccine was promoted because it was cheaper than individual vaccines and that the government was profiting from vaccination by working with pharmaceutical companies (Tickner 2007; Dube 2016; Sobo 2016).

" 'I mean, you know, infant mortality is at its lowest ever and we're coming up with this vaccine. You know, I just really think that the Government and the pharmaceutical companies are in bed together' " (Tickner 2007).

Finally, some parents who had migrated to new health systems trusted the government in their new country and spoke to this new trust by comparing it to the distrust of the system they had left behind (Kowal 2015).

" 'If these vaccinations are at the approval of the government and have gone through medical and scientific tests and it's safe, I don't think it's a problem. But if it's in China, I would be worried. Over

here, I feel completely secure' " (Kowal 2015).

Finding 26: Politicians' opinions and actions regarding personal vaccination choices influenced parents' perceptions of vaccination (low confidence).

Table 32

A few UK-based studies mentioned the role that politicians play in parents' perceptions of vaccination (Guillaume 2004; Hilton 2007, Brown 2012). Guillaume 2004 found that parents looked to leaders and politicians not only to set an example but with the expectation that they should share personal and confidential information to support government policy. The best example of this in all three studies was the unwillingness of a former Prime Minister in the UK to share information on whether his son had received the MMR vaccine in 2001. For many parents, this showed a lack of trust in the vaccination programme by their political leader. After the BSE crisis of the early 1990s, parents in the UK were also uncomfortable with the government using terms such as 'no proven risk', which had been misused in the past. This had led to the view that politicians were putting their own and their parties' interests before those of the public (Hilton 2007).

Finding 27: Some parents perceived the mass media as having sensationalised vaccination stories, thereby decreasing parental trust in the media (moderate confidence).

Table 33

Parents often viewed mass media as having hyped up or sensationalised vaccination, which decreased their trust in these sources (Evans 2001; Guillaume 2004; Fowler 2007; Hilton 2007; Tickner 2007; Henderson 2008; Brown 2012). Some parents felt that the media had done this for commercial benefit (Brown 2012). While a number of parents were aware of their exposure to the media and felt able to judge the content accordingly (Guillaume 2004), others recognised various issues with media coverage, such as it being "heavy, unbalanced and irresponsible" (Brown 2012), and they did not fully trust what was reported (Evans 2001; Guillaume 2004; Tickner 2007; Brown 2012).

Finding 28: Negative publicity about vaccination in the mass media contributed to concerns about vaccination among parents (moderate confidence).

Table 34

A general theme from a number of the studies was that the media contributed to concerns about vaccination among parents (Evans 2001; Guillaume 2004; McMurray 2004; Fowler 2007; Hilton 2007; Tickner 2007; Henderson 2008; Austvoll-Dahlgren 2010; Tickner 2010; Bond 2011). Some parents who were hesitant to vaccinate or who had decided not to proceed with vaccination had clearly been influenced by media coverage, for example the negative coverage of the MMR vaccine and its false link to autism (Evans 2001; Guillaume 2004; Tickner 2010).

" 'It was because of the media and the press that I looked into the MMR and decided well whoa, I'm not having that you know, otherwise, before, I didn't just didn't think anything of it' " (Evans 2001).

Even parents who had decided to vaccinate had concerns about vaccination that had been raised by the media (Fowler 2007; Austvoll-Dahlgren 2010).

" 'I had heard a little bit about harms. That some had got (side effects). So I was a little sceptical, but I thought that it's just something you have to do. So then we did it . . . I didn't (mention it), I don't think so . . . I think I saw it on television a long time ago. Someone had got brain damage or something like that' " (Austvoll-Dahlgren 2010).

Others felt that the negative publicity contributed to feelings that important information was being withheld from the public (Bond 2011). These concerns sometimes initiated an information search (McMurray 2004).

In summary, often the key issue was not whether parents were supplied with information but whether they believed the information they received and trusted its source (Guillaume 2004). Some parents wanted information from official sources. Others required an established trusting relationship with the information source, while others still had confidence in information sources they could relate to. All of these factors helped to establish credibility (Miller 2008).

Content of vaccination information

Summary of qualitative findings table (Table 35).

Finding 29: Parents felt that the information that they received was biased towards vaccination and its benefits (moderate confidence).

Table 36

Many studies found that parents thought the information they received was one-sided towards vaccination (Evans 2001; Guillaume 2004; Tickner 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Brown 2012; Saada 2015; Blaisdell 2016; Sobo 2016). Most parents felt that the information they received only addressed the positives of vaccination (Tickner 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Saada 2015), was either completely pro-immunisation or anti-vaccination (Evans 2001; Saada 2015), or that health workers only presented information positive to vaccination that they had learned during their training (Miller 2008). Some parents perceived official information sources to be wilfully misleading (Brown 2012). TV was mentioned as a source where the content was often one-sided, with information being portrayed in a specific way (Guillaume 2004).

Finding 30: Parents wanted balanced information about both the benefits and risks of vaccination (high confidence).

Table 37

Parents wanted to understand both the positive and negative sides to vaccination (Bond 1998; Evans 2001; Guillaume 2004; McMurray 2004; Hilton 2007; Tickner 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Babirye 2011; Brown 2012; Brown 2014; Delkhosh 2014; Fadda 2015; Sobo 2016). Balanced information was believed to be important in order to weigh the risks and benefits of vaccination when making a decision (Tickner 2007).

" 'There doesn't seem to be anything balanced does there, there's either the government sort of, yes, you know it's definitely very safe and every child should have it or there's the other side where, you know, they shouldn't have any etc, and it's very hard to try and work out from those two what to do' " (Evans 2001).

Some parents felt that the existing information was heavily weighted towards vaccination and did not discuss the possible risks or harms (Bond 1998; Guillaume 2004; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Brown 2012; Sobo 2016).

Finding 31: Parents did not find the available information to be reliable, convincing or credible (low confidence).

Table 38

Parents did not feel they could rely on or fully believe the information given to them (Bond 1998; Evans 2001; Hilton 2007; Harmsen 2012; Fadda 2015; Blaisdell 2016).

" 'I've never read anything that's made me want to go off and do it so I never have' " (Bond 1998).

Some parents felt that with the amount of information available, something could always be found to reinforce a vaccination position (Blaisdell 2016). Parents often noted that blanket statements such as 'no proven risk' and 'minimal risk' were not convincing and took these to mean that there was no known risk at present, as past experience had shown that these phrases could be retracted (Hilton 2007).

Finding 32: Parents wanted information presented and communicated in a clear and simple way, in a language they understood. They felt that these factors would increase their understanding of and ability to assess the content (moderate confidence).

Table 39

Parents wanted information that was presented in an understandable way that avoided technical terms and jargon to facilitate their assessment of the content (Shui 2005; Hilton 2007; Topuzoğlu 2007; Miller 2008; Austvoll-Dahlgren 2010; Brown 2014; Delkhosh 2014; Kitayama 2014; Fadda 2015; Harmsen 2015). Parents sometimes found medical terminology used in medical research or by their healthcare provider difficult to understand and evaluate (Shui 2005; Hilton 2007; Topuzoğlu 2007; Miller 2008; Austvoll-Dahlgren 2010; Kitayama 2014; Fadda 2015). Misunderstanding and lack of access were further compounded when written information was presented to illiterate mothers, when the mother's education level was not taken into account when providing information or when health workers did not provide any information at all (Topuzoğlu 2007; Delkhosh 2014). Parents also wanted information communicated in a language that they could understand (Kitayama 2014; Harmsen 2015).

Some parents also found presentations in the media unclear due to the mixing of anecdotal and scientific evidence to create an impression of balance (Hilton 2007). A clear presentation of information was important for parents to feel like they had understood the information they had received (Miller 2008; Brown 2014).

Finding 33: Parents wanted information that was tailored to their situation, including to their attitudes towards vaccination and their mother tongue (moderate confidence).

Table 40

Parents wanted information they could relate to, including with regard to their attitudes towards vaccination (accepting, questioning, hesitant or refusing) (McMurray 2004; Hilton 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Bond 2011; Brown 2012; Brown 2014; Delkhosh 2014; Kitayama 2014; Brunson 2015; Fadda 2015; Harmsen 2015). Parents felt that the information they received about vaccination should be relatable to local circumstances in order to be accepted as valid, meaningful and real (McMurray 2004).

Parents were frustrated when the information that they received from health workers did not reflect their lived experiences (McMurray 2004; Austvoll-Dahlgren 2010; Brunson 2015), or when it was not focused on themselves or their child as individuals (Miller 2008; Bond 2011; Delkhosh 2014; Fadda 2015). For parents to be able to relate to vaccination information, it needed to be communicated in a language the they understood (Kitayama 2014; Harmsen 2015). These experiences could be personal or through media reports or stories from family and friends. They felt that the harms from vaccines were not reflected in the information they received as compared to what they had heard or experienced (Austvoll-Dahlgren 2010). Others felt that official information did not reflect real lives in relation to the impact of immunisation or diseases. Parents felt that because of this, the importance of the issue was not being communicated (McMurray 2004).

" 'I don't think they're [MMR leaflets] hard-hitting enough. I know it's not nice to see children on telly poorly and what have you, but it's like the ones for NSPCC [the National Society for the Prevention of Cruelty to Children, UK], they make you want to cry, but they make you understand what's going on and I think that's what needs to be done about MMR. I think a lot more information of how many children have died in the past is what needs to be published, so that people can see that it is working.

Otherwise there's going to be a lot of poorly children and a lot of dead, blind and deaf children about. You know, when I was at college we was handed some figures of - I think it might have been 1970 or something - of how many had died that year, how many were blind and how many was deaf, compared to 2000. And there was a dramatic difference and it was because of all the immunisation. So I think probably they could do with using that a bit more . . . to prove to them [parents] that it [immunisation] is working' " (McMurray 2004).

Some parents found parental testimony to be the most relatable, impartial and trustworthy source of vaccination information. However, they felt it was also prone to errors. Many believed that this was because other parents were seen to have no hidden agenda (Hilton 2007). This made these anecdotes carry as much or more weight as other information sources including epidemiological studies and health officials (Hilton 2007). Parents who contributed to online blogs and forums were often seen to hold more extreme views (Brown 2012).

Parents who were hesitant towards vaccination, had delayed vaccinating or had decided not to vaccinate recognised that the level of information they wanted was higher and more detailed than what was normally given (Gust 2008; Brown 2012).

Finding 34: A varied presentation of information (written, oral and visual) is necessary to meet parents' vaccination information needs (low confidence).

Table 41

Parents indicated that they wanted vaccination information presented in different formats (written, oral and visual) to meet their needs (Miller 2008). Some parents preferred more oral information, to complement the leaflets they received, as they found it easier to remember (Harmsen 2015). Modalities of mHealth interventions, such as text messages, also fit well with parents' everyday lives (Brown 2014).

" 'It's my source of communication [texting], I don't read handouts or pamphlets' " (Brown 2014).

One study pre-tested a vaccination pamphlet with parents and collected information about the presentation of the information (Gust 2008). They found that some mothers did not like specific information or graphic photos about a vaccine-preventable disease as these were seen as 'scare tactics'. However, other mothers saw the photos as helpful. They liked the use of statistics as they saw this as respecting their intelligence. They wanted the information in the pamphlet to be detailed and include the names of vaccines, how they are tested and what the risks are. They felt that it was important to give information on who had produced the pamphlet, as the source could influence their trust in the information. Finally, they felt that information should be less biased towards immunisations, not condescending to parents, not appearing to judge parents who question immunisations and presenting 'all the facts' to allow parents to make their own informed decision (Gust 2008).

Finding 35: Parents wanted specific information about vaccination and found some of the available information to be too general or incomplete. Parents wanted more information than they received about topics including: combined versus single vaccines, technical information about production and delivery, the vaccination appointment, the vaccination schedule, vaccine ingredients and safety, vaccination in general and vaccine-preventable diseases, vaccine side effects, and the risks and benefits of vaccines (high confidence)

Table 42

Parents thought that available information was too general or incomplete, and they wanted additional details (Bond 1998; Berhanel 2000; Guillaume 2004; McMurray 2004; Shui 2005; Benin 2006; Fowler 2007; Topuzoğlu 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Bond 2011; Brown 2012; Harmsen 2012; Hussain 2012; Tomlinson 2013; Brown 2014; Delkhosh 2014; Kitayama 2014; Barbieri 2015; Brunson 2015; Fadda 2015; Harmsen 2015; Saada 2015; Blaisdell 2016; Dube 2016; Sobo 2016). For example, some parents wanted information to distinguish between vaccines (Austvoll-Dahlgren 2010; Saada 2015).

" 'To me they are all the same and they can't be? Some are perhaps really important, and for me that would have been the next step in knowing what I have to read up on. It might be that you can drop some of them, but then I know that I have to sit down and spend my summer holidays to understand what this is. But if, for example (the evidence is conclusive), then I can just read a little bit one evening and make a quick decision to vaccinate' " (Austvoll-Dahlgren 2010).

Parents felt that the information they were receiving about vaccination was not comprehensive and did not provide the whole story (Bond 1998; Bond 2011). They felt that specific content that they wanted to know more about was missing. Public debate in the media made them feel that information was being withheld from the public (Bond 1998; Bond 2011). Parents were also frustrated by what they saw as an absence of information about vaccination (Brown 2012), or they perceived a lack of a complete explanation from their healthcare provider (Gust 2008; Brunson 2015).

Some parents also wanted very specific information about the MMR vaccine. In the UK this was strongly linked to the MMR vaccine scare (Guillaume 2004; Fadda 2015). They were especially concerned about why it had to be given in a combined form and what the ingredients of the vaccine were (Guillaume 2004).

Parents wanted specific advice supported by evidence and rationale (Brown 2012), and they wanted more information about various aspects of vaccination.

- Combined vs single vaccines (Guillaume 2004; Gust 2008).

- Reasons for combined vaccines (Guillaume 2004; Gust 2008).
- Benefits of combined vaccines (Guillaume 2004).
- Immune overload (Gust 2008; Miller 2008).
- Potential interactions in vaccines given together (Miller 2008).

- Technical information about vaccine production and delivery (Fowler 2007; Gust 2008; Barbieri 2015).
  - Quality control (Fowler 2007).
  - Accountability for quality assurance (Fowler 2007).
  - Vaccine purchasing (Fowler 2007).
  - Country of manufacture (Fowler 2007).
  - Proper storage (Fowler 2007).
  - Methods for testing vaccines (Gust 2008).
  - Difference between a live vs killed vaccine (Miller 2008).

- Specific information about the vaccination appointment (Fowler 2007; Fadda 2015; Harmsen 2015).
  - The injection sites (Fowler 2007; Kitayama 2014).
  - Contraindications and when not to vaccinate (Fowler 2007; Gust 2008; Miller 2008).
  - Reasons for grouping vaccines together in one visit (Gust 2008; Harmsen 2015).
  - Ways to pay for all of the vaccinations (Gust 2008).
  - What to expect at a well-baby clinic when coming in for vaccination (Miller 2008).

- The vaccination schedule (Shui 2005; Fowler 2007; Brown 2012; Brown 2014; Barbieri 2015; Saada 2015; Sobo 2016).
  - Reasons for the vaccine schedule (Shui 2005; Barbieri 2015).
  - Ages when vaccines are given (Brown 2012).
  - Possibility for alternative schedules (Brown 2012).
  - Names of the vaccines (Fowler 2007; Gust 2008; Kitayama 2014).
  - Reasons why children need so many shots (Shui 2005; Gust 2008; Kitayama 2014).
  - Reasons for multiple doses of the same vaccine (Gust 2008).
  - Mandatory vaccinations (Kitayama 2014).
  - Schedule for booster shots (Kitayama 2014).
- Vaccine ingredients and vaccine safety (Guillaume 2004; Fowler 2007; Brown 2012; Harmsen 2012; Brunson 2015; Sobo 2016).
  - Vaccine ingredients (Guillaume 2004; Shui 2005; Gust 2008; Barbieri 2015; Blaisdell 2016).
  - Mercury in vaccines (Gust 2008; Brunson 2015).
  - Roles of different vaccine ingredients (Miller 2008).
  - Vaccine safety (Miller 2008; Brunson 2015).

- General information about vaccination and vaccine preventable diseases (Brown 2012; Kitayama 2014; Brunson 2015; Harmsen 2015; Saada 2015; Dube 2016).
  - Extent and duration of vaccine efficacy (Fowler 2007; Miller 2008; Brown 2012; Tomlinson 2013; Barbieri 2015).
  - Potential alternatives to vaccination (Brown 2012).
  - Description of vaccine preventable diseases and their symptoms (McMurray 2004; Fowler 2007; Harmsen 2012; Harmsen 2015; Dube 2016).
  - Advice from specialists (Fowler 2007).
  - Consequences of not vaccinating (Shui 2005; Gust 2008).
  - Natural immunity (Gust 2008).
  - Odds of catching one of the diseases (Gust 2008; Barbieri 2015; Fadda 2015; Harmsen 2015).
  - Guaranteed efficacy of vaccines (Gust 2008; Miller 2008).
  - Whether children still get the diseases (Gust 2008).
  - Severity of diseases (Gust 2008; Barbieri 2015).
  - Different strains of polio (Hussain 2012).
  - Importance of immunisation (Shui 2005; Miller 2008; Tomlinson 2013).
  - Up-to-date information on current scientific information, research and statistics (Miller 2008; Fadda 2015; Blaisdell 2016).
  - State of childhood immunisation in other countries (Miller 2008; Barbieri 2015).
  - The number of vaccines given at each appointment in the vaccination schedule (Brunson 2015; Barbieri 2015).

- Vaccine side effects (Bond 1998; Fowler 2007; Gust 2008; Austvoll-Dahlgren 2010; Bond 2011; Brown 2012; Harmsen 2012; Barbieri 2015; Harmsen 2015).
  - Susceptibility to vaccine side effects(Bond 1998; Bond 2011).
  - Reactions to vaccines/adverse events and what to expect (Bond 1998; Shui 2005; Miller 2008; Bond 2011; Brown 2012; Delkhosh 2014).
  - Caring for children after vaccination (Shui 2005; Fowler 2007; Delkhosh 2014; Fadda 2015).
  - Adverse events specific to each vaccine (Fowler 2007; Fadda 2015).
  - Risk of autism (Gust 2008).
  - Long-term effects of vaccination (Gust 2008; Barbieri 2015; Blaisdell 2016).
  - Concerns about vaccine-linked illnesses (Miller 2008).

- Risks and benefits (Fowler 2007; Gust 2008; Austvoll-Dahlgren 2010; Harmsen 2012; Harmsen 2015; Saada 2015).
  - Risks and benefits of individual vaccines (Austvoll-Dahlgren 2010).
  - General risks of vaccines (Gust 2008; Harmsen 2012).

Finding 36: Parental misconceptions about vaccination were sometimes based on information that they had received from health workers (moderate confidence).

Table 43

Some studies found that parental misconceptions about vaccination were sometimes rooted in information they had received from health workers (Bond 1998; Berhanel 2000; Hussain 2012; Fadda 2015; Blaisdell 2016; Dube 2016).

In two cases (Berhanel 2000; Hussain 2012), both in LMIC settings, parents reported receiving misinformation from health workers, and their misconceptions about vaccination had developed due to this misinformation. This is important in a context where health workers are the main source of information for parents, and access to other information sources is difficult.

"Though the presence of medical interns helped, members of the vaccination team were observed sometimes providing dubious etiological explanations to the families: telling them that polio was 'special' and needed a constant boost which other vaccines did not" (Hussain 2012).

In high-income settings, four studies found that some mothers appeared to be unaware of the importance of vaccination or of following the vaccination calendar, and their healthcare provider had reinforced this belief (Bond 1998; Fadda 2015; Blaisdell 2016; Dube 2016).

"These mothers appeared to be unaware of the need for age appropriate vaccines and this was reinforced by their doctors who were: 'Not really fussed . . . as long as she gets them, he doesn't care when, as long as she gets immunised' " (Bond 1998).

Some allopathic providers were advising against vaccination (Fadda 2015).

" 'The paediatrician has advised me against MMR. He told me he is not really in favor of vaccinations. But I decided I will do it. I have decided to go against the tide!' " (Fadda 2015).

In other cases, parents had clearly received misinformation from alternative healthcare providers (Fadda 2015; Dube 2016).

" 'One way or the other, when my homeopath tells me that my daughter is going to have cancer, because it looks like we are going to get cancer from being vaccinated or my family doctor, well my family doctor doesn't do that, or other people or the government tell me that people are still dying because there weren't vaccinated . . . all that, for me, one side or the other, I really have a problem with that and that's why I haven't made a decision yet, I have a hard time accepting that information' " (Dube 2016).

The relationship between vaccination information and vaccination decisions

Summary of qualitative findings table (Table 44).

Finding 37: Some parents vaccinated their child because they felt that it was a cultural and social norm and not necessarily a decision that they had to make (high confidence).

Table 45

Many studies found that parents saw vaccination as an obvious choice, a cultural and social norm and not necessarily a decision that they had to make (Bond 1998; Berhanel 2000; Benin 2006; Tickner 2007; Austvoll-Dahlgren 2010; Brunson 2013; Barbieri 2015; Brunson 2015; Fadda 2015; Harmsen 2015; Sobo 2016). These parents assumed that the benefits of vaccinating their child outweighed any possible risk, and they seldom asked questions during vaccination appointments (Austvoll-Dahlgren 2010; Barbieri 2015). They accepted immunisation as part of a programme to be followed (Berhanel 2000; Tickner 2007). Not all parents realised that they had a choice to vaccinate (Miller 2008).

Finding 38: Many parents, regardless of their vaccination decision, believed that their decision had not been adequately informed (moderate confidence).

Table 46

Many parents did not feel that they had been able to make an informed decision about vaccination (Bond 1998; Evans 2001; Guillaume 2004; McMurray 2004; Shui 2005; Fowler 2007; Austvoll-Dahlgren 2010; Delkhosh 2014; Harmsen 2015; Dube 2016). Parents often felt that their decision to vaccinate did not reflect an informed choice (Bond 1998; McMurray 2004; Fowler 2007; Dube 2016). Some had a low level of confidence in their decision as they felt they were missing crucial information about, for example, the diseases being vaccinated against and the risks and benefits of the vaccines (Evans 2001; Austvoll-Dahlgren 2010; Delkhosh 2014; Harmsen 2015).

"Although parents were generally well informed about immunisation, they reported that inadequate information had hampered their decision-making process: 'But that's very confusing isn't it, as a parent because you obviously want the best for your child and when you see all these reports . . . and you're trying to look at it and make an educated decision . . . I think just basically there's a complete lack of information . . . I think there needs to be something a bit sort of totally universal that everyone can sort of get their hands on and that's independent 'cause I think people are just either way polarised' " (Evans 2001).

This low level of confidence was due to reliance on everyday knowledge paired with limited time to interact with the health services (McMurray 2004; Delkhosh 2014). In addition, parents reported that the information available was neither convincing nor comprehensive (Bond 1998), that they did not receive enough information (Shui 2005; Fowler 2007), or that they did not have enough time (or any time at all) to look at the information before the appointment (McMurray 2004; Fowler 2007).

"Focus groups in Kazakhstan expressed that there was not enough information to help parents make a good decision about vaccinating a child, and that this lack of information reinforced their

concerns: 'We would like to have information before vaccination. There is not enough information . . . therefore there occur doubts [regarding vaccination]' "(Fowler 2007).

Finding 39: Some parents who had vaccinated their children were unsure, regretted or worried about their decision due to a perceived lack of information (high confidence).

Table 47

Some studies found that even parents who had vaccinated worried about their decision because they felt they lacked information (Bond 1998; Guillaume 2004; Shui 2005; Fowler 2007; Austin 2008, Austvoll-Dahlgren 2010; Tomlinson 2013; Delkhosh 2014; Fadda 2015; Dube 2016). Parents who felt unknowledgeable about vaccination were less confident in their decision and expressed uncertainty over their choice (Guillaume 2004; Shui 2005; Fowler 2007; Austvoll-Dahlgren 2010; Delkhosh 2014; Fadda 2015). Some parents said these worries were triggered by media debates where they felt information was being withheld from the public (Bond 1998). Some studies found that even if parents had made the decision to vaccinate they worried about the decision they had made (Evans 2001; Guillaume 2004; Tickner 2007; Austin 2008; Austvoll-Dahlgren 2010; Tickner 2010; Dube 2016). Other parents worried about or second guessed their decision because they did not trust the information from the government (Austin 2008; Dube 2016), they lacked information about the diseases that were being vaccinated against and how vaccination worked (Austvoll-Dahlgren 2010; Tomlinson 2013; Delkhosh 2014), they worried that their choice not to vaccinate would affect follow-up care at health services (Austvoll-Dahlgren 2010), or they were not provided with information about why they had to take a combined vaccine instead of singles (Evans 2001).

Finding 40: Health workers were used to supporting and minimising the complexity of vaccination decisions and ameliorating or sharing any regret parents felt about deciding to vaccinate (low confidence).

Table 48

Health workers had various roles, many of which were complex, when interacting with parents about vaccination. Some parents used them as a support when they were in doubt about their decision (Austvoll-Dahlgren 2010; Blaisdell 2016). Others used them to ameliorate any regret they felt in their decision to vaccinate, as this had been shared with a health worker (Brown 2012; Fadda 2015).

Trusting a health worker minimised the complexity of influences on the decision to vaccinate, allowed parents to limit their information searching and made them feel that they were sharing the decision to vaccinate with an expert (Brown 2012; Fadda 2015).

"MMR1-accepting parents used trust in their health professionals both to minimise the complexity of influences on their decision by reducing the need to seek and evaluate alternative sources of advice, and to minimise anticipated regret by 'sharing' the decision (therefore the blame for any negative outcomes) with an expert: 'If something went wrong with the vaccine at least I listened to, I read all the information, listened to someone that knows a lot more than I do and if that was meant to be then I feel that was meant to be but I wouldn't want to take all the responsibility on myself by choosing not to vaccinate my children' " (Brown 2012).

Finding 41: Some parents vaccinated their children because they trusted their health worker or because the health worker was helpful, asked, or recommended for them to do so (moderate confidence).

Table 49

Health workers are one of a variety of sources for parents of information about vaccination (see previous findings). Because of their important role, health workers held some influence over a parent's decision to vaccinate. In some instances parents accepted vaccines because the health worker was helpful, asked them to or recommended them (Berhanel 2000; McMurray 2004; Benin 2006; Tickner 2007; Henderson 2008; Tadesse 2009; Austvoll-Dahlgren 2010; Tickner 2010; Brunson 2013; Tomlinson 2013; Delkhosh 2014; Barbieri 2015; Fadda 2015; Harmsen 2015; Kowal 2015; Blaisdell 2016; Sobo 2016).

" 'Me myself I the three kids I give them the immunisation, I give them the MMR . . . but I think it's good to . . . in all in altogether it's very important to give them the immunisation whatever it is . . . I have done some researches on the Internet and I read about it but still nothing convince me that it is er one of the side-effects of the MMR that is going to lead to an autism . . . I talk with the health visitor that I told her like that I don't want to give her now, maybe year later or six months later or so. She say me it's up to you but I'm advising you to give her you don't know what's gonna to happen during this month, maybe she's going to catch any diseases . . . I speak with my husband, we agree together . . . let us do it' " (Tomlinson 2013).

Finding 42: Some parents vaccinated their children because of perceived pressure from the health services (low confidence).

Table 50

Some studies found that parents vaccinated their children because of perceived pressure from the health services (Berhanel 2000; Evans 2001; Topuzoğlu 2007; Austin 2008; Figueiredo 2011; Tomlinson 2013; Saada 2015).

" 'She thought like something that she must do . . . and because she has received few letters from the GPs she thought well I don't have a choice I have to take my child now' " (Tomlinson 2013).

This pressure sometimes lead to parents feeling alienated and patronised. It also made parents who had decided not to vaccinate feel guilty about their decision (Austin 2008; Saada 2015).

" 'I thought please, I don't really want this done, and I knew for some reason it just wasn't right for him, but I went ahead because the government said that this is what we should do and that makes you feel so guilty' " (Austin 2008).

Others felt that the government was making decisions based on what was best for society rather than what was best for an individual. Parents felt that their focus was to make a decision for their individual child, independent of what was in line with government policy or pressure from the health services to make decisions based on what was best for society (Evans 2001).

" 'Sometimes the doctors and nurses at the surgery can be too much you know, you must have it, you know? And that's what puts a lot of people's backs up doesn't it really, your choice is gone a bit isn't it?' " (Evans 2001).

Finding 43: Some parents who decided not to vaccinate often felt that they had made a more informed decision than parents who had vaccinated (very low confidence).

Table 51

One study found that non-vaccinators thought they had made a more informed decision than parents who had vaccinated (Brown 2012).

"Parents who rejected MMR1 questioned the extent to which most parents taking their course of action really understand the issues around their decision (and felt that they were unusual in having 'good' knowledge about or justification for rejection), whilst parents who accepted MMR1 doubted not the knowledge of MMR rejectors, but their motivation" (Brown 2012).

Integrating the findings from this synthesis with the findings of relevant Cochrane effectiveness reviews

The matrix (see Table 52) shows that most of the interventions in the trials communicated information before the vaccination appointment. Some trials also provided information in more than one setting; attempted to tailor information to different parents (i.e. based on level of literacy); engaged health workers to help parents make appointments; and attempted to provide clear, simple and unbiased information. None of the interventions appeared to address parental perceptions of health worker motives or clearly stated that the vaccination information that was given had been developed to respond to a rumour or negative stories in the media. This matrix provides a useful overview of the how the findings of this synthesis of qualitative evidence are reflected in the content of the interventions in the trials included in the related Cochrane effectiveness reviews.

DISCUSSION

Summary of main results

In summary, parents perceived information and communication about vaccination to be important. They wanted to receive information in good time before each vaccination appointment and not while their child was being vaccinated. They wanted information about vaccination to be available at a wide variety of locations and help from health workers in locating relevant information. Parents wanted health workers to have open, respectful discussions with them in a caring, sensitive and non-judgemental way, give clear answers to their questions, and provide a supportive environment for decision-making. They expected them to have the best interests of their child at heart and not be driven by financial incentives.

In general, parents found the amount of information they received to be inadequate. The amount of information parents would like to receive appears to be linked to their acceptance of vaccination. Parents generally found it difficult to know which vaccination information source to trust. Their perceptions of trustworthy sources depended on their perceptions of vaccination. They also found it difficult to find information that they felt was impartial and balanced. Parents wanted to receive specific, balanced information, communicated in a clear and simple manner, and in a language they understood about both the benefits and harms of vaccination. Parents wanted information that was relatable and tailored to their situation, including their attitudes towards vaccination. They wanted information to be presented in a variety of ways including through mHealth interventions such as text messaging.

Many parents, regardless of their attitudes towards vaccination, believed that their decision to vaccinate had been inadequately informed. This could cause worry and regret about their vaccination decision.

Summary of integrating the findings from this synthesis with the findings of relevant Cochrane effectiveness reviews

Our comparison of the findings of the qualitative evidence synthesis and effectiveness reviews shows that most of the trial interventions addressed at least one to two key aspects of communication identified as important in the qualitative evidence synthesis, including offering information before the vaccination appointment and tailoring information to parents' needs. None of the interventions appeared to respond to negative media stories or address parental perceptions of health worker motives.

The matrix table presented in Table 52 could inform the development of future trial interventions and trial subgroup analyses. This qualitative review could help suggest ways of grouping future trials for planned subgroup analyses in the reviews of effectiveness, for instance according to differences in the setting or the population, or because of nuances in the interventions. In addition, this qualitative review could help explain why certain interventions appear to be more effective than others by providing insight into parental

perceptions and preferences surrounding vaccination information.

Overall completeness and applicability of evidence

The sampling approach we used in this review (see above) was geared towards achieving a maximum variation of setting, vaccines and populations, but it is still possible that we omitted findings relevant to particular populations, communication strategies, settings and experiences.

All of the studies we included explored parental perceptions of vaccination information. A few included informal caregivers such as grandmothers in their sample but did not distinguish between participant groups when reporting findings. Furthermore, most studies only identified participants as parents. Some studies included a description of the parents such as young, old, vaccine-hesitant, acceptor, refuser, minority group, etc. Some studies included fathers but none focused on fathers only. It is therefore uncertain whether informal caregivers or fathers have the same perspectives on and perceived need for vaccination information.

Most studies in this review are from high-income urban settings. It is unclear what impact this has had on the overall completeness of the evidence, as experiences and perceptions of vaccination are context- and programme-specific. However, poorly resourced healthcare systems may have similar financial and organisational challenges that could influence the delivery, expectations and experiences around communication strategies.

Some of the included articles, from the UK and Switzerland, focused on the MMR vaccine and parental concerns about this particular vaccine and its safety. The MMR vaccine was particularly controversial in many settings, with widespread concern about the potential for adverse effects following the publication of a now discredited paper on this topic (Godlee 2011). Several of our findings rely heavily on findings from these MMR studies, which are from a specific context and time and are specific to parental thoughts about the MMR vaccine. It is possible that parents' experiences of communication strategies were different in settings where this controversy was well known to the public, compared to settings where it was not.

We have attempted to address concerns about the applicability and completeness of the primary study data contributing to each finding in our CERQual assessment of relevance and data adequacy for each finding. We have reported these assessments in the CERQual evidence profiles (Tables 4-6, 8-10, 12, 13, 15-34, 36-43, 45-51).

The methods used in the included studies may in some cases limit the applicability and completeness of the data reported. All of the included studies made use of individual or group interviews and focus group discussions as their main method of data collection. None used long-term ethnographic methods, and only a few employed any form of observation. While interviews and focus groups allow researchers to collect data on what people say, observational methods also allow researchers to collect data on what people do. This would have been appropriate for understanding how information is communicated to parents in various settings and how parents themselves search for information about vaccination. Interviews and focus group discussions seem to be the most commonly used research methods amongst qualitative researchers exploring issues related to health. This could be because they are less time-consuming than longer term ethnographic methods. We also assessed most of the included studies to have poorly reported one or more methodological domains, related to context, sampling and/or data collection methods. In addition, very few discussed researcher reflexivity. We have attempted to assess any concerns about the methodological limitations of the primary studies that contributed evidence to an individual review finding in our CERQual assessment of each finding.

Within the CERQual approach, we defined confidence in the evidence as an assessment of the extent to which a synthesis finding is a reasonable representation of the phenomenon of interest. As this assessment communicates the extent to which the research finding is likely to be substantially different from the phenomenon of interest, the assessments provide a broad indication of the applicability of the evidence (Lewin 2015). Additional factors that users of these findings might consider in assessing whether our findings are likely to be applicable to their setting include the following (Lavis 2009; Burford 2013).

- Whether the studies contributing evidence took place in similar settings to those where the findings will be applied.
- Whether there are important differences in political, social, or cultural factors, in populations or in other social factors that might have substantial impacts on information needs, on how information is delivered or received, or might substantially alter the feasibility and acceptability of different communication interventions, compared to the sites in which the studies were done. For example, if communication is being designed for settings in which there are high levels of distrust of mass media or where health service users do not feel comfortable posing questions to health workers.
- Whether there are important differences in health system arrangements that may mean that certain forms of communication about childhood vaccinations, or particular kinds of content, could not be delivered in the same way as in the sites in which the studies were conducted. For example, if there are not sufficient resources available to share information about vaccination in advance of vaccination appointments.

Confidence in the findings

Based on our CERQual assessments, the findings range from very low to high confidence. The main reasons for downgrading for methodological limitations were poor reporting of context, sampling or methods as well as lack of researcher reflexivity.

We typically downgraded a finding for concerns about coherence when some of the data from the included studies contradicted the review finding or when it was not clear if some of the underlying data supported the review finding. Downgrading due to data adequacy occurred when we had concerns about the richness or quantity of the data supporting a review finding. We downgraded findings because of concerns about relevance in cases where the setting or vaccine was only partially relevant. For example, if there was a focus on the MMR vaccine specifically in the contributing studies or if all of the studies contributing to a finding came from northern European settings.

Agreements and disagreements with other studies or reviews

The findings from this qualitative evidence synthesis have commonalities with findings from other qualitative and mixed-methods reviews of vaccination and parental decision support needs (Jackson 2008; Brown 2010; Carlsen 2016), but none had the same focus as this review. These reviews focused on the swine flu vaccine specifically (Carlsen 2016), the MMR vaccine in high-income contexts specifically (Brown 2010), and child health decisions in general (Jackson 2008).

Similarly to our findings, two of these reviews mention that parents were unhappy with the timing of information and wanted information ahead of their appointment in order to formulate questions and have an informed discussion with their health worker (Jackson 2008; Brown 2010). As in our review, parents in these reviews also wanted health workers to help them locate good sources of information, have open and long discussions about vaccination, allow parents to have viewpoints different from theirs without becoming judgemental, and reiterate that a refusal or delay of vaccination would not affect their relationship with the health worker or the health care system (Jackson 2008; Brown 2010). One of the reviews also reported that parents did not like feeling pressured by the health system into making a decision that they felt was not informed and that they might regret later on (Jackson 2008).

As with our findings, these reviews also reported that, overall, health workers were a trusted source of information for most parents, but there was also a perception from some that the health workers had conflicts of interest due to financial incentives or were unable to discuss vaccinations openly with parents as they had to stick to the official message (Jackson 2008; Brown 2010; Carlsen 2016). Some parents felt this lack of credibility extended to official government information and information from pharmaceutical companies (Jackson 2008; Brown 2010).

Similarly to parents in our findings, parents in these reviews found health information to be complex, sometimes difficult to understand and difficult to access. They wanted information to be tailored to their situation, presented in a clear and simple manner, and balanced (considering both the risks and benefits of vaccination). They also wanted the opportunity to discuss this information both with health workers and outside of the healthcare setting, for example in parents' groups (Jackson 2008; Brown 2010). Presentation of the information in a variety of formats was also seen as helping to increase people's understanding of content (Jackson 2008). In contrast, inconsistent or contradictory information from different sources, such as the media and health workers, led to confusion and concern and to parents having doubts about the information provided (Brown 2010; Carlsen 2016).

Reflexivity

Reflexivity discussions in the included articles

Childhood immunisation is often a contentious topic, and the included papers point to issues of distrust between health authorities and members of the public, as well as people's perceptions of vaccination as a social or moral obligation. When carrying out future research on vaccination beliefs and behaviour, it is therefore relevant to consider how parents perceive these studies, as this may influence their willingness to participate as well as their responses. For instance, studies that use health professionals to recruit participants or to carry out interviews are unlikely to be perceived as 'neutral' on the topic of childhood vaccination. For many of the included studies, however, it was not possible to determine the backgrounds of the people recruiting participants or collecting data. Where this information was offered, a number of studies used health professionals or government employees to carry out the tasks. The researchers' own perspectives of vaccination can also influence the manner in which they collect and analyse data on this topic. However, very few of the studies discussed these issues; an issue that was also highlighted in the swine flu review referred to above (Carlsen 2016).

Reflexivity within the review author team

In keeping with quality standards for reflexivity within qualitative research, as review authors we reflected on our own backgrounds and positions, and how these may have affected our choice of review topic; the manner in which we collected, analysed and interpreted the data; and, in turn, how the emerging findings from the synthesis influenced those views and opinions. All of the authors are social scientists: HA and CG are social anthropologists by training and SL is a physician with training in qualitative research methods. All of us are employed by the Norwegian Public Health Institute, and while we support informed, individual decisions, we also have a public health perspective. We regard adherence to the currently recommended vaccines as a vital public health measure. We are also of the view that it is important for parents and informal caregivers to receive information about childhood vaccination. Had we, for instance, had a more vaccine-hesitant perspective or placed greater emphasis on individual choice, this may

have influenced the manner in which we interpreted the data or the implications for practice we drew.

AUTHORS' CONCLUSIONS

Implications for practice

The following questions, derived from our findings, may help programme managers and other stakeholders to assess whether the vaccination communication interventions they are planning adequately address the issues that are important to parents and informal caregivers.

1. Is vaccination information communicated to parents in good time before vaccine delivery and decision-making about vaccination, in a context where parents have time to consider the information and come to a decision?
2. Is information about vaccination available at a wide range of health service and community settings? Is it possible for parents to have discussions in these settings about vaccination?
3. Is information about vaccination adapted to the needs of each family? For instance, vaccine-hesitant parents may need different types and amounts of information than vaccine acceptors.
4. Do health workers provide parents with and help them find neutral vaccination information tailored to their needs? Do they have open, respectful discussions with parents in a caring, sensitive and non-judgemental way? Give clear answers to parents' questions? Provide a supportive environment for decision-making?
5. Are health workers perceived by parents, informal caregivers and other stakeholders as being driven primarily by the best interests of the child or are they perceived as being driven by other motives, such as financial gain?
6. Do parents perceive the vaccination information they receive as impartial, balanced, independent and transparent?
7. Is vaccination information communicated to parents in a clear and simple manner and in a variety of formats?
8. Are vaccination communication strategies adjusted to respond to media stories, rumours, and negative publicity about vaccination in order to respond to parental questions and concerns that these stories may have raised?

Implications for research

These implications have been derived from the CERQual assessment and the overview of the studies included in this review.

There is a need for better reporting of context, sampling, methods and researcher reflexivity in qualitative studies. Future qualitative studies should report their methods clearly and include reflection on the researchers' roles in the study and how this may have impacted on the process and findings of the study. More detail concerning setting and participants is also needed to identify underlying cultural or social phenomena (shared values or beliefs) that mediate the influence of communications and should therefore be addressed when designing vaccination communication interventions.

Research about parental perceptions of vaccination information needs to include a broader spectrum of contexts. In particular, more studies are needed in LMIC settings and in rural settings in HICs.

More research is needed on parental preferences around the details of timing, amount and content of vaccination information in order to help tailor vaccination information to individuals and groups in communities.

Future qualitative studies on vaccination information should consider the perceptions of informal caregivers and fathers in order to understand the viewpoints of all of the people involved in making decisions about a child's health.They should also explore why some communication strategies do or do not influence parents' and informal caregivers' decisions about routine childhood vaccination.

Future trials of vaccination communication should offer better descriptions of the communication interventions used in the study, including the training received by those delivering the vaccination information and how the information was developed and pretested. More detailed descriptions of home visits and discussions between health workers and parents/informal caregivers are also needed.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Austin 2008

Context	Parents of children in a primary group area in the South West UK born between certain dates Mostly urban, but with some representation of deprived rural areas All vaccines in the UK vaccination calendar until school entry
Participants	Parents of completely and incompletely immunised children; 24 mothers and 1 father. Almost all families were of UK origin with English as a first language
Methods	4 focus group discussions: 2 with complete (n = 15) and 2 with incomplete (n = 10) participation, analysed with Cresswell's spiral analysis
Notes	-

Austvoll-Dahlgren 2010

Context	3 maternal and child health centres in a major Norwegian city; unspecified vaccine
Participants	10 parents of preschool-aged children
Methods	Focus group discussions and individual, in-depth interviews, analysed using grounded theory
Notes	-

Babirye 2011

Context	2 health districts in need of improvement in Kampala, Uganda; unspecified vaccines
Participants	3 different categories of respondents: mothers aged 18-25 years, mothers older than 25 years, and fathers
Methods	Focus group discussions analysed using content analysis
Notes	-

Barbieri 2015

Context	Southeast Sao Paulo, Brazil in an urban, highly educated neighbourhood; EPI vaccines
Participants	15 couples who were highly educated and had children for at least 5 years. Had to be married and living together. 5 each from vaccinators, late or selective vaccinators and non vaccinators
Methods	Snowball sampling for in depth interviews. Analysed using a thematic framework approach

Notes	-

Benin 2006

Context	Connecticut, USA; unspecified vaccines with a focus on hepatitis B
Participants	Postpartum mothers
Methods	Purposive sampling with a random component for qualitative, open-ended interviews at 2 time points: right after birth and at 3-6 months, with 10 survey questions at the first time point and 6 at the second about knowledge to end the encounter; analysed using a version of grounded theory
Notes	-

Berhanel 2000

Context	Macro and micro levels of the EPI programme in Ethiopia for all EPI vaccines
Participants	Mothers
Methods	Snowball sampling was used to find participants for the interviews. No description of sampling was provided for observations. Analysis was ongoing and guided by the review objectives
Notes	-

Blaisdell 2016

Context	Urban Portland ME, USA; EPI vaccines
Participants	Vaccine-hesitant parents identified through a screening tool
Methods	Convenience sample recruited by a professional market research firm for focus group discussions, Constant comparative and inductive grounded theory analysis
Notes	-

Bond 1998

Context	Melbourne, Australia; unspecified vaccine
Participants	First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised
Methods	Stratified purposive sampling strategy for semi-structured interviews, analysed using 6 themes

Bond 1998 (*Continued*)

Notes	-

Bond 2011

Context	Melbourne, Australia; unspecified vaccine
Participants	First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised
Methods	Stratified purposive sampling strategy for semi-structured interviews analysed thematically
Notes	-

Brown 2012

Context	London, UK; MMR vaccine
Participants	Mothers planning to accept, decline or postpone the first MMR dose
Methods	A purposive sampling frame was used to select parents with a range of intended MMR1 decisions: accepting MMR1 on time, accepting MMR1 late, obtaining 1 or more singles, or obtaining no MMR1 or singles. Semi-structured interviews were analysed using modified grounded theory
Notes	-

Brown 2014

Context	Midwest Nebraska, USA; EPI vaccines
Participants	Postpartum adolescent mothers, single and living alone and owning a cell phone
Methods	Purposive convenience sampling for semi-structured interviews that took place once a month for 6 months
Notes	-

Brunson 2013

Context	A large, diverse county in western Washington (state) known for lower than average vaccination rates; EPI vaccines
Participants	US-born parents with children aged 18 months or younger
Methods	Purposive sampling to involve parents with all types of vaccination decisions, followed by theoretical sampling to fill in blanks for in-depth and semi-structured interviews. Analysis was based in grounded theory
Notes	-

Brunson 2015

Context	A large diverse county in western Washington state known for lower than average vaccination rates; EPI vaccines
Participants	US-born parents with children aged 18 months or younger
Methods	Purposive sampling to involve parents with all types of vaccination decisions, followed by theoretical sampling to fill in blanks for in-depth and semi-structured interviews. Interviews were analysed using thematic analysis
Notes	-

Delkhosh 2014

Context	Southern Tehran, Iran in an urban area; EPI vaccines
Participants	Mothers with children aged 0-24 months
Methods	Maximum variety sampling was used to recruit mothers for semi-structured interviews. Content analysis
Notes	-

Dube 2016

Context	Quebec, Canada; EPI vaccines
Participants	Mothers during pregnancy and postpartum with children aged 3-11 months
Methods	Purposive sampling using diversification criteria for semi-structured interviews before and after birth. Grounded theory analysis
Notes	-

Evans 2001

Context	Avon and Gloucester England; MMR vaccine
Participants	Parents who had and had not vaccinated
Methods	Purposive sampling for focus group discussions analysed using a modified grounded theory approach
Notes	-

Fadda 2015

Context	Italian-speaking canton of Ticino, Switzerland; MMR vaccine
Participants	Parents with a child under 12 months old
Methods	Sampling for variation for semi-structured interviews. Inductive thematic analysis
Notes	-

Figueiredo 2011

Context	Families belonging to 2 health areas in Brazil; unspecified vaccine
Participants	Mothers, fathers and a maternal grandmother with a child under 2 years of age
Methods	Non-structured interviews analysed using thematic content analysis
Notes	-

Fowler 2007

Context	Countries in economic transition, Kazakhstan and Uzbekistan; unspecified vaccine
Participants	Mothers and grandmothers
Methods	Purposive sampling from paediatric clinics, neighbourhood playgrounds and shops for children for FGDs. Inclusion criteria were: mother or grandmother who makes healthcare decisions for 1 or more children aged 0-6 years, knowledge of what a vaccine is, and somewhat or very concerned about vaccines. FGDs were analysed by 2 researchers looking for themes
Notes	-

Guillaume 2004

Context	An urban area of Sheffield. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of suspected measles outbreak in London and Newcastle; MMR vaccine
Participants	Parents of young children
Methods	A purposive sampling strategy was used to recruit parents of children under the age of 5 via community-based childcare organisations (nursery schools and toddler groups) that provide childcare for children in this age group for semi-structured interviews. Interviews were analysed using a grounded theory approach
Notes	-

Gust 2008

Context	3 US cities in Georgia, Wisconsin and California; unspecified vaccine
Participants	Mothers who screened as worried or undecided, non-Hispanic white, non-Hispanic black, Hispanic
Methods	Purposive sampling (choosing people who will illuminate the study questions) was used to recruit mothers from daycare centres, churches, mothers' groups, Montessori schools, referrals from other mothers and telephone calling in Atlanta, Georgia, La Crosse, Wisconsin and Los Angeles, California, from November 2003 to July 2004 FGDs in 2 phases: phase 1 - obtain detailed information about mothers' attitudes and beliefs about vaccines and toward their child's main healthcare provider's provision of immunisation information and obtain their comments on draft educational materials developed for these parent segments (including suggestions on topics to address concerns); phase 2 - review and provide comments on revised educational materials tailored to address concerns expressed in phase 1 of the study. Data were analysed using coding for themes
Notes	-

Harmsen 2012

Context	Netherlands; unspecified vaccine
Participants	Parents with anthroposophical beliefs
Methods	Doctors and nurses from 3 different anthroposophical child welfare centres in the Netherlands invited parents to participate. Parents received an information letter regarding the study objectives and procedures and could inform the researchers whether they wished to participate by sending an email to an email address. Parents who did so then received more details about the date and location of the focus group discussions. FGDs were analysed using thematic analysis
Notes	-

Harmsen 2015

Context	Immigrant parents in Utrecht, Netherlands; EPI vaccines
Participants	Turkish and Moroccan mothers in the Netherlands with a child 0-4 years old living in the Netherlands for at least 1 year
Methods	Focus group discussions analysed with thematic analysis
Notes	-

Henderson 2008

Context	NE London; unspecified vaccines
Participants	Orthodox Jewish mothers
Methods	Snowball sampling for semi-structured interviews. Interviews were analysed according to analytical themes

Notes	-

Hilton 2007

Context	Central Scotland with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Participants	Mothers and fathers
Methods	Purposive sampling was used to obtain a diverse sample of parents in terms of age, socioeconomic circumstances, likely views about vaccination, and family circumstances, including first-time mothers, more experienced mothers, single fathers, and parents with multiple social problems. The sample also included parents with a range of vaccine decision-making outcomes, including parents who had fully immunised, opted for single vaccines, rejected MMR, and rejected all vaccinations. 2 additional groups were conducted with parents who had autistic children and with parents who had an immune-compromised child following chemotherapy for FGDs. FGDs were analysed using thematic coding with constant comparison
Notes	-

Hussain 2012

Context	Aligarh high risk district, Uttar Pradesh, India, during a polio campaign; oral polio vaccine
Participants	Families
Methods	Rapid ethnography: participant observation and interviews. Analysis coding based on literature and observations
Notes	-

Kitayama 2014

Context	Underserved Latino community in northern Manhattan, New York, USA; EPI vaccines
Participants	Latino low-income parents
Methods	Focus group discussions to pretest an online tool; thematic analysis
Notes	-

Kowal 2015

Context	Urban environment with refugee participants born in 1 of 4 selected Asian countries and living in Edmonton, Alberta Canada; EPI vaccines
Participants	Born in India, Pakistan, China or Bhutan, currently living in Edmonton, moved to Canada in the last 8 years and have a child under 8 years old. Lower income and education than Edmonton average
Methods	Semi-structured interviews analysed with content analysis
Notes	-

McMurray 2004

Context	Leeds, England; MMR and 5-in-1 vaccines
Participants	Parents of children 4-5 years old
Methods	Medical practices were purposively sampled and parents were invited to participate in semi-structured interviews. Interviews were analysed using a form of framework analysis
Notes	-

Miller 2008

Context	Rural Alberta Canada; unspecified vaccines
Participants	Mothers with varying vaccination choices
Methods	Semi-structured interviews with legal-aged mothers responsible for decisions about immunising their infant in the past year. Parents were invited to participate through their public health nurse. A purposive sampling strategy was used. Interviews were analysed using content analysis
Notes	-

Saada 2015

Context	Northern California
Participants	Parents of children aged 12-36 months who were members of Kaiser Permanente in northern California, who were on time, late or missing vaccinations
Methods	Stratified purposive sampling for semi-structured telephone interviews analysed using an inductive approach using a priori themes
Notes	-

Shui 2005

Context	Atlanta, Georgia, USA; unspecified vaccine
Participants	African American mothers who are concerned about vaccine safety but whose children are fully immunised
Methods	Convenience sampling for FGDs. Analysis using iterative coding with thematic analysis
Notes	-

Sobo 2016

Context	Campus day centre and community locations known to attract vaccine cautious individuals in California, USA; unspecified vaccines
Participants	Parents with at least 1 child kindergarten age or younger
Methods	Quick 5 minute interview involving 1 very focused question; content analysis
Notes	-

Tadesse 2009

Context	Wonago District, Gede Zone, southern Ethiopia; unspecified vaccines
Participants	Mothers whose children did and did not complete their vaccinations
Methods	Purposive sampling for FGDs; thematic analysis used
Notes	-

Tickner 2007

Context	Southern England; a focus on MMR and the 5-in-1 vaccine
Participants	Parents with babies aged 4-13 weeks
Methods	Invited to participate by their public health nurse. Purposive sampling was used to include parents from a range of socioeconomic backgrounds and those with different views towards immunisation. Semi-structured interviews were conducted and analysed using a modified grounded theory approach
Notes	-

Tickner 2010

Context	Southern England; MMR and tDap/IPV booster
Participants	Parents in preschool groups
Methods	Invited to participate in interviews through letters in preschool. Interviews were analysed using a modified grounded theory approach
Notes	-

Tomlinson 2013

Context	Somali community in Birmingham UK; unspecified vaccines with a focus on MMR
Participants	Mothers from the Somali community
Methods	Purposive and snowball sampling through gatekeepers for semi-structured interviews. Analysed using an inductive, thematic approach
Notes	-

Topuzoğlu 2007

Context	Umraniya, Istanbul, Turkey; unspecified vaccines
Participants	Socioeconomically disadvantaged suburban mothers who had children younger than 5 years old
Methods	Researchers visited a low-income area and asked mothers to participate. 8 FGDs with mothers living in low-income areas and 2 in-depth interviews with a non-vaccinator and a woman in a violent relationship. Key themes were identified and a coding frame was developed
Notes	-

EPI: Expanded Programme on Immunization; **FGD**: focus group discussions; **tDap/IPV**: tetanus, diptheria and acellular pertussis/ inactivated polio vaccine.

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Ahlers-Schmidt 2013	Did not use qualitative methods for data collection and analysis
Alderson 1997	Did not explore perspectives of parents and informal caregivers of children under 6

(*Continued*)

Ali 2009	Did not explore perspectives of parents and informal caregivers of children under 6
Ali 2010	Did not explore perspectives of parents and informal caregivers of children under 6
Attwell 2015	Did not use qualitative methods for data collection and analysis
Babalola 2011	Did not investigate views and experiences of vaccination information and communication as defined in the review
Bazylevych 2011	Did not explore perspectives of parents and informal caregivers of children under 6
Bean 2013	Did not explore perspectives of parents and informal caregivers of children under 6
Bhat-Schelbert 2012	Not able to separate out the data on children under 6
Birmingham 2011	Did not explore perspectives of parents and informal caregivers of children under 6
Braka 2012	Did not investigate views and experiences of vaccination information and communication as defined in the review
Brown 1983	Did not investigate views and experiences of vaccination information and communication as defined in the review
Brownlie 2006	Did not explore perspectives of parents and informal caregivers of children under 6
Brownlie 2011	Did not investigate views and experiences of vaccination information and communication as defined in the review
Butterfoss 1997	Did not investigate views and experiences of vaccination information and communication as defined in the review
Canavati 2011	Did not investigate views and experiences of vaccination information and communication as defined in the review
Chantler 2006	Did not address a vaccine as defined by the review
Chaturvedi 2009	Did not investigate views and experiences of vaccination information and communication as defined in the review
Cockcroft 2014	Did not use qualitative methods for data collection and analysis
Coreil 1994	Did not investigate views and experiences of vaccination information and communication as defined in the review
Cutts 1990	Did not investigate views and experiences of vaccination information and communication as defined in the review
Dasgupta 2008	Did not investigate views and experiences of vaccination information and communication as defined in the review

(*Continued*)

Downs 2008	Did not investigate views and experiences of vaccination information and communication as defined in the review
Ekunwe 1993	Did not use qualitative methods for data collection and analysis
Elverdam 2011	Did not investigate views and experiences of vaccination information and communication as defined in the review
Eng 1990	Did not use qualitative methods for data collection and analysis
Evers 2000	Did not investigate views and experiences of vaccination information and communication as defined in the review
Feldman-Savelsberg 2000	Did not address a vaccine as defined by the review
Fourn 2009	Did not investigate views and experiences of vaccination information and communication as defined in the review
Fägerskiöld 2003	Did not investigate views and experiences of vaccination information and communication as defined in the review
Groom 2010	Did not explore perspectives of parents and informal caregivers of children under 6
Guidry 2015	Did not investigate views and experiences of vaccination information and communication as defined in the review
Gust 2009	Did not explore perspectives of parents and informal caregivers of children under 6
Harrington 1999	Did not investigate views and experiences of vaccination information and communication as defined in the review
Helman 2004	Did not investigate views and experiences of vaccination information and communication as defined in the review
Hill 2013	Did not investigate views and experiences of vaccination information and communication as defined in the review
Hilton 2006	Did not investigate views and experiences of vaccination information and communication as defined in the review
Hilton 2007a	Did not investigate views and experiences of vaccination information and communication as defined in the review
Hilton 2007b	Did not investigate views and experiences of vaccination information and communication as defined in the review
Hobson-West 2007	Did not investigate views and experiences of vaccination information and communication as defined in the review

(*Continued*)

Ideland 2007	Did not investigate views and experiences of vaccination information and communication as defined in the review
Jackson 2010	Did not investigate views and experiences of vaccination information and communication as defined in the review
Kata 2010	Did not investigate views and experiences of vaccination information and communication as defined in the review
Kaufman 2010	Did not use qualitative methods for data collection and analysis
Keane 1993	Did not investigate views and experiences of vaccination information and communication as defined in the review
Kennedy 2008a	Did not investigate views and experiences of vaccination information and communication as defined in the review
Kennedy 2008b	Did not investigate views and experiences of vaccination information and communication as defined in the review
Kenny 2003	Did not investigate views and experiences of vaccination information and communication as defined in the review
Kharbanda 2009	Did not explore perspectives of parents and informal caregivers of children under 6
Khowaja 2012	Did not investigate views and experiences of vaccination information and communication as defined in the review
Kulig 2002	Did not investigate views and experiences of vaccination information and communication as defined in the review
Lal 2003	Did not investigate views and experiences of vaccination information and communication as defined in the review
Lannon 1995	Did not investigate views and experiences of vaccination information and communication as defined in the review
Leask 2002	Did not investigate views and experiences of vaccination information and communication as defined in the review
Leask 2006a	Did not investigate views and experiences of vaccination information and communication as defined in the review
Leask 2006b	Did not investigate views and experiences of vaccination information and communication as defined in the review
Lupton 2011	Did not investigate views and experiences of vaccination information and communication as defined in the review

(*Continued*)

Marshall 1999	Did not investigate views and experiences of vaccination information and communication as defined in the review
McKnight 2014	Did not investigate views and experiences of vaccination information and communication as defined in the review
Mollema 2012	Did not explore perspectives of parents and informal caregivers of children under 6
Moran 2008	Did not investigate views and experiences of vaccination information and communication as defined in the review
Munthali 2012	Did not investigate views and experiences of vaccination information and communication as defined in the review
Murakami 2014	Did not investigate views and experiences of vaccination information and communication as defined in the review
Niederhauser 2007	Did not investigate views and experiences of vaccination information and communication as defined in the review
Nikula 2009a	Did not investigate views and experiences of vaccination information and communication as defined in the review
Nikula 2009b	Not able to separate out the data on children under 6
Nuwaha 2000	Did not investigate views and experiences of vaccination information and communication as defined in the review
Obute 2007	Did not use qualitative methods for data collection and analysis of data concerning parents and informal caregivers
Odebiyi 1993	Did not investigate views and experiences of vaccination information and communication as defined in the review
Opel 2012	Did not investigate views and experiences of vaccination information and communication as defined in the review
Oude Engberink 2015	Not able to separate out the data on children under 6
Page 2006	Did not explore perspectives of parents and informal caregivers of children under 6
Parvez 2008	Did not investigate views and experiences of vaccination information and communication as defined in the review
Patel 2007	Did not use qualitative methods for data collection and analysis
Pearce 2008	Did not explore perspectives of parents and informal caregivers of children under 6

(*Continued*)

Petousis-Harris 2005	Did not investigate views and experiences of vaccination information and communication as defined in the review
Phimmasane 2010	Did not explore perspectives of parents and informal caregivers of children under 6
Plumridge 2008	Did not investigate views and experiences of vaccination information and communication as defined in the review
Plumridge 2009	Did not investigate views and experiences of vaccination information and communication as defined in the review
Quaiyum 2011	Did not investigate views and experiences of vaccination information and communication as defined in the review
Raffaeta 2012	Did not investigate views and experiences of vaccination information and communication as defined in the review
Raithatha 2003	Did not investigate views and experiences of vaccination information and communication as defined in the review
Renne 2006	Did not investigate views and experiences of vaccination information and communication as defined in the review
Rousseau-Gouesnou 2013	Did not use qualitative methods for data collection and analysis
Ruedin 2002	Did not investigate views and experiences of vaccination information and communication as defined in the review
Ruijs 2012a	Did not explore perspectives of parents and informal caregivers of children under 6
Ruijs 2012b	Did not investigate views and experiences of vaccination information and communication as defined in the review
Ruijs 2013	Did not explore perspectives of parents and informal caregivers of children under 6
Ryman 2010	Did not explore perspectives of parents and informal caregivers of children under 6
Sampson 2011	Not able to separate out the data on children under 6
Sanou 2011	Did not explore perspectives of parents and informal caregivers of children under 6
Schwarz 2009	Did not investigate views and experiences of vaccination information and communication as defined in the review
Sensarma 2015	Did not investigate views and experiences of vaccination information and communication as defined in the review
Shah 2014	Did not use qualitative methods for data collection and analysis

(*Continued*)

Shefer 1998	Did not investigate views and experiences of vaccination information and communication as defined in the review
Skea 2008	Did not investigate views and experiences of vaccination information and communication as defined in the review
Sobo 2015	Did not investigate views and experiences of vaccination information and communication as defined in the review
Tarrant 2001	Did not investigate views and experiences of vaccination information and communication as defined in the review
Tarrant 2003	Did not investigate views and experiences of vaccination information and communication as defined in the review
Uddin 2009	Did not explore perspectives of parents and informal caregivers of children under 6
Uddin 2016	Did not investigate views and experiences of vaccination information and communication as defined in the review
Varghese 2013	Did not investigate views and experiences of vaccination information and communication as defined in the review
Varma 2008	Did not explore perspectives of parents and informal caregivers of children under 6
Watson 2006	Not able to separate out the data on children under 6
White 1995	Did not investigate views and experiences of vaccination information and communication as defined in the review
Whyte 2011	Did not investigate views and experiences of vaccination information and communication as defined in the review
Wilson 2000	Did not investigate views and experiences of vaccination information and communication as defined in the review
Witteman 2015	Did not use qualitative methods for data collection and analysis
Yahya 2007	Did not explore perspectives of parents and informal caregivers of children under 6

DATA AND ANALYSES

This review has no analyses.

ADDITIONAL TABLES

Table 1. Summary of related published reviews on vaccination communication, hesitancy or uptake

Review	Title	Review focus	Methodology
Carlsen 2016	The swine flu vaccine, public attitudes, and researcher interpretations: a systematic review of qualitative research	Looks at a vaccine given in response to a pandemic and also considers all age groups	Qualitative
Groom 2015	Immunisation information systems to increase vaccination rates: a Community Guide systematic review	Focuses only on the effectiveness of such information systems in high-income countries	Quantitative
Harvey 2015	Parental reminder, recall and educational interventions to improve early childhood immunisation uptake: a systematic review and meta-analysis	Focuses only on the effectiveness of remind, recall and educational interventions for childhood vaccination uptake	Quantitative
Odone 2015	Effectiveness of interventions that apply new media to improve vaccine uptake and vaccine coverage	Focuses only on the effectiveness of interventions that apply new media to promote vaccination uptake and increase vaccination coverage	Quantitative
Larson 2014	Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: a systematic review of published literature, 2007-2012	Focuses on the factors affecting vaccine hesitancy and its determinants	Quantitative
Saeterdal 2014	Interventions aimed at communities to inform and/or educate about early childhood vaccination	Focuses on the effectiveness of interventions aimed at communities to inform and/or educate people about vaccination in children 6 years and younger	Quantitative
Williams 2014	What are the factors that contribute to parental vaccine-hesitancy and what can we do about it?	Focuses on all aspects of vaccine hesitancy, and not vaccination communication specifically, and also on vaccines for both children and adolescents	Quantitative
Dubé 2013	Vaccine hesitancy: an overview	This review provides an overview of the phenomenon of vaccine hesitancy. First, it characterises vaccine	Unclear as it included multiple reviews and does not specifically men-

Table 1. Summary of related published reviews on vaccination communication, hesitancy or uptake (*Continued*)

		hesitancy and suggests the possible causes of the apparent increase in vaccine hesitancy in the developed world. Then it looks at determinants of individual decision making about vaccination	tion the methodology for each
Kaufman 2013	Face to face interventions for informing or educating parents about early childhood vaccination	Focuses on the effectiveness of face to face interventions for informing or educating parents about early childhood vaccination to increase immunisation uptake and parental knowledge	Quantitative
MacDonald 2013	Promotional communications for influenza vaccination: a systematic review	Focuses on effective practice in promotional communications for seasonal influenza vaccination in Europe, for all age groups	Quantitative
Sadaf 2013	A systematic review of interventions for reducing parental vaccine refusal and vaccine hesitancy	Focuses on the effectiveness of interventions to decrease parental vaccine refusal and hesitancy toward recommended childhood and adolescent vaccines	Quantitative
Cairns 2012	Systematic literature review of the evidence for effective national immunisation schedule promotional communications	Focuses on the effectiveness of immunisation promotional communication interventions and on the European context only	Quantitative
Oyo-Ita 2016	Interventions for improving coverage of child immunisation in low- and middle-income countries	Focuses on the effectiveness of intervention strategies to boost and sustain high childhood immunisation coverage in LMIC countries	Quantitative
Brown 2010	Factors underlying parental decisions about combination childhood vaccinations including MMR: a systematic review	Focuses on MMR in a high-income context	Mixed methods including both quantitative and qualitative studies
Jackson 2008	A systematic review of decision support needs of parents making child health decisions	Focus on all child health decisions, not just vaccination	Mixed methods including both quantitative and qualitative studies

LMIC: low- and middle-income countries; **MMR**: measles, mumps and rubella vaccine.

Table 2. Included but not sampled studies

Study	Title	Reason for exclusion
Austin 2000	Parents' perceptions of information on immunisations	The relevant data was not as close to the review question as the sampled studies
Bender 1988	Immunization drop-outs and maternal behavior: evaluation of reasons given and strategies for maintaining gains made in the national vaccination campaign in Liberia	While mixed methods were used only the quantitative results were reported
Brooke 1999	Beliefs about childhood immunisation among Lebanese Muslim immigrants in Australia	Did not meet the sampling criteria for data richness
Casiday 2007	Children's health and the social theory of risk: insights from the British measles, mumps and rubella (MMR) controversy	The relevant data was not as close to the review question as the sampled studies
Condon 2002	Maternal attitudes to preschool immunisations among ethnic minority groups	Did not meet the sampling criteria for data richness
Cotter 2003	Immunisation: the views of parents and health professionals in Ireland	Did not meet the sampling criteria for data richness
Cullen 2005	Why parents choose not to vaccinate their children against childhood diseases	Did not meet the sampling criteria for data richness
Eng 1991	The acceptability of childhood immunization to Togolese mothers: a sociobehavioral perspective	Did not meet the sampling criteria for data richness
Fadda 2016	What are parents' perspectives on psychological empowerment in the MMR vaccination decision? A focus group study	Did not meet the sampling criteria for data richness
Fredrickson 2004	Childhood immunization refusal: provider and parent perceptions	Did not meet the sampling criteria for data richness
Gerdes 2006	So dangerous are not measles, mumps and rubella . . . A qualitative survey of causes of MMR vaccination refusal in the county of Vejle	The relevant data was not as close to the review question as the sampled studies
Glanz 2013	A mixed methods study of parental vaccine decision making and parent-provider trust	Did not meet the sampling criteria for data richness
Gullion 2008	Deciding to opt out of childhood vaccination mandates	Did not meet the sampling criteria for data richness
Harmsen 2013	Why parents refuse childhood vaccination: a qualitative study using online focus groups	Did not meet the sampling criteria for data richness

Table 2. Included but not sampled studies (*Continued*)

Harrington 2000	Low immunisation uptake: is the process the problem?	The relevant data was not as close to the review question as the sampled studies
Houseman 1997	Focus groups among public, military, and private sector mothers: insights to improve the immunization process	Did not meet the sampling criteria for data richness
Johnson 2014	'That's just what's expected of you . . . so you do it': mothers discussions around choice and the MMR vaccination	Did not meet the sampling criteria for data richness
Keller 2012	Mexican American parent's perceptions of culturally congruent interpersonal processes of care during childhood immunization episodes: A pilot study	Did not meet the sampling criteria for data richness
Lewendon 2002	Why are children not being immunised? Barriers to immunisation uptake in South Devon	Did not meet the sampling criteria for data richness
Luthy 2013	Vaccinating parents experience vaccine anxiety too	Did not meet the sampling criteria for data richness
Luthy 2012	Reasons parents exempt children from receiving immunizations	Did not meet the sampling criteria for data richness
Luthy 2010	Reasons parents exempt children from receiving immunizations	Did not meet the sampling criteria for data richness
Lwembe 2016	A qualitative evaluation to explore the suitability, feasibility and acceptability of using a 'celebration card' intervention in primary care to improve the uptake of childhood vaccinations	Did not meet the sampling criteria for data richness
Mack 1999	Children's immunizations: the gap between parents and providers	Did not meet the sampling criteria for data richness
Masaryk 2016	Qualitative inquiry into reasons why vaccination messages fail	Did not meet the sampling criteria for data richness
McCormick 1997	Parental perceptions of barriers to childhood immunization: results of focus groups conducted in an urban population	The relevant data was not as close to the review question as the sampled studies
Mixer 2007	Ethnicity as a correlate of the uptake of the first dose of mumps, measles and rubella vaccine	Did not meet the sampling criteria for data richness
New 1991	"I don't believe in needles": qualitative aspects of a study into the uptake of infant immunisation in two English health authorities	Did not meet the sampling criteria for data richness

Table 2. Included but not sampled studies (*Continued*)

Nicholson 2012	Lessons from an online debate about measles-mumps-rubella (MMR) immunization	The relevant data was not as close to the review question as the sampled studies
Opel 2011	Development of a survey to identify vaccine-hesitant parents: the parent attitudes about childhood vaccines survey	Did not meet the sampling criteria for data richness
Payne 2011	A Multi-Center, Qualitative Assessment of Pediatrician and Maternal Perspectives on Rotavirus Vaccines and the Detection of Porcine circovirus	Did not meet the sampling criteria for data richness
Poltorak 2005	'MMR talk' and vaccination choices: an ethnographic study in Brighton	The relevant data was not as close to the review question as the sampled studies
Samuelsson 2003	Parents rely on child vaccinations. But at the same time they distrust the medical establishment as shown in a qualitative study of attitudes	The relevant data was not as close to the review question as the sampled studies
Shoup 2015	Development of an interactive social media tool for parents with concerns about vaccines	Did not meet the sampling criteria for data richness
Sporton 2001	Choosing not to immunize: are parents making informed decisions?	The relevant data was not as close to the review question as the sampled studies
Tarrant 2008	Secrets to success: a qualitative study of perceptions of childhood immunisations in a highly immunised population	Did not meet the sampling criteria for data richness
Wang 2015	"Everybody just wants to do what's best for their child": understanding how pro-vaccine parents can support a culture of vaccine hesitancy	Did not meet the sampling criteria for data richness
Wang 2014	Chinese immigrant parents' vaccination decision making for children: a qualitative analysis	Did not meet the sampling criteria for data richness
Wilson 2008	Parental views on paediatric vaccination: the impact of competing advocacy coalitions	The relevant data was not as close to the review question as the sampled studies

MMR: measles, mumps and rubella vaccine.

Table 3. Summary of qualitative findings table: timing of vaccination information

Finding		Overall CERQual Assessment	Explanation for assessment	Contributing studies
Findings related to timing of vaccination information				
1	Parents liked to receive information about vaccination before the baby was born for reasons such as fatigue and time limitations for reading about vaccination after delivery	**Low confidence**	Minor concerns about methodological limitations and moderate concerns about adequacy and relevance	Benin 2006; Tickner 2007; Miller 2008; Barbieri 2015; Saada 2015
2	Parents liked to receive vaccination information in good time before each appointment, including all follow-up appointments, in order to reflect on the content and prepare questions	**Moderate confidence**	Moderate concerns about methodological limitations and minor concerns regarding relevance and adequacy	Evans 2001; McMurray 2004; Shui 2005; Fowler 2007; Tickner 2010; Brown 2012; Saada 2015; Dube 2016
3	Parents found it difficult to remember information given during a vaccination appointment as they were distracted and worried about their child	**Moderate confidence**	Minor concerns about methodological limitations and coherence and moderate concerns regarding adequacy	Shui 2005; Austvoll-Dahlgren 2010

Table 4. CERQual evidence profile: finding 1

Finding 1: parents liked to receive information about vaccination before the baby was born for reasons such as fatigue and time limitations for reading about vaccination after delivery	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting from 1 study on sampling and data collection methods
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance as studies were from limited settings
Adequacy	Moderate concerns regarding adequacy due to 3 contributing studies with thin data
Overall CERQual assessment	

Table 4. CERQual evidence profile: finding 1 (*Continued*)

Low confidence	Due to minor concerns about methodological limitations and moderate concerns about adequacy and relevance
Contributing studies	
Study	**Context**
Benin 2006	Connecticut USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Barbieri 2015	Southeast Sao Paulo, Brazil; highly educated parents in urban areas; EPI vaccines
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 5. CERQual evidence profile: finding 2

Finding 2: parents liked to receive vaccination information in good time before each appointment, including all follow-up appointments, in order to reflect on the content and prepare questions	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting from some studies on context, sampling and data collection
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to partial due to a limited geographic spread and focus on MMR
Adequacy	Minor concerns regarding adequacy due to the thinness of the data
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns about methodological limitations and minor concerns regarding relevance and adequacy
Contributing studies	

Table 5. CERQual evidence profile: finding 2 (*Continued*)

Study	Context
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine;**tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 6. CERQual evidence profile: finding 3

Finding 3: parents found it difficult to remember information given during a vaccination appointment as they were distracted and worried about their child	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of in relation to context, reflexivity and ethics
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to partial relevance due to a narrow range of settings
Adequacy	Moderate concerns regarding adequacy due to 2 contributing studies with thin data
Overall CERQual assessment	

Table 6. CERQual evidence profile: finding 3 (*Continued*)

Moderate confidence	Due to minor concerns about methodological limitations and coherence and moderate concerns regarding adequacy

Contributing studies

Study	Context
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine

Table 7. Summary of qualitative findings table: availability of vaccination information

Finding		Overall CERQual assessment	Explanation for assessment	Contributing studies
Findings related to availability of vaccination information				
4	Parents want vaccination information resources to be available at a wider range of health services and community and online settings, for instance through schools, pharmacies, clinics and libraries	**Low confidence**	Due to moderate concerns regarding methodological limitations, relevance and adequacy	Shui 2005; Fowler 2007; Miller 2008; Fadda 2015
5	Parents want help from health workers to locate relevant vaccination information resources	**Low confidence**	Due to minor concerns about methodological limitations and moderate concerns about relevance and adequacy	Miller 2008; Austvoll-Dahlgren 2010; Fadda 2015
6	Parents who had migrated to a new country had difficulty negotiating the new health system and accessing and understanding vaccination information	**Low confidence**	Due to moderate concerns about methodological limitations and relevance and minor concerns about adequacy	Tomlinson 2013; Harmsen 2015; Kowal 2015

Table 8. CERQual evidence profile: finding 4

Finding 4: parents want vaccination information resources to be available at a wider range of health services and community and online settings, for instance through schools, pharmacies, clinics and libraries	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to a lack of reporting on context
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance as studies were from limited settings
Adequacy	Moderate concerns regarding adequacy due to quantity and thinness of the data
Overall CERQual assessment	
Low confidence	Due to moderate concerns regarding methodological limitations, relevance and adequacy

Contributing studies	
Study	**Context**
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine

MMR: measles, mumps and rubella vaccine.

Table 9. CERQual evidence profile: finding 5

Finding 5: parents want help from health workers to locate relevant vaccination information resources	
Assessment for each CERQual component	
Methodological limitations	Minor concerns due to poor reporting of researcher reflexivity
Coherence	No or very minor concerns regarding coherence

Table 9. CERQual evidence profile: finding 5 (*Continued*)

Relevance	Moderate concerns regarding partial relevance, as studies were from limited settings
Adequacy	Moderate concerns regarding adequacy due to 2 contributing studies with thin data
Overall CERQual assessment	
Low confidence	Due to minor concerns about methodological limitations and moderate concerns about relevance and adequacy
Contributing studies	
Study	**Context**
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine

MMR: measles, mumps and rubella vaccine.

Table 10. CERQual evidence profile: finding 6

Finding 6: parents who had migrated to a new country had difficulty negotiating the new health system and accessing and understanding vaccination information	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting of sampling and researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding partial relevance, as studies were from limited settings
Adequacy	Minor concerns regarding adequacy due to small number of studies
Overall CERQual assessment	
Low confidence	Due to moderated concerns about methodological limitations and relevance and minor concerns about adequacy

Table 10. CERQual evidence profile: finding 6 (*Continued*)

Contributing studies	
Study	**Context**
Tomlinson 2013	Somali community in Birmingham UK; unspecified vaccines with a focus on MMR
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines
Kowal 2015	Urban Edmonton, Alberta Canada; refugee participants born in India, Pakistan, China or Bhutan and currently living in Edmonton; moved to Canada in the last 8 years and have a child under 8 years old. Lower income and education than the Edmonton average; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 11. Summary of qualitative findings table: amount of vaccination information

Finding		**Overall CERQual assessment**	**Explanation for assessment**	**Contributing studies**
Findings related to the amount of vaccination information				
7	Parents generally found the amount of vaccination information they received to be inadequate	**High confidence**	-	Bond 1998; Berhanel 2000; Evans 2001; Guillaume 2004; Shui 2005; Fowler 2007; Tickner 2007; Gust 2008; Tickner 2010; Bond 2011; Figueiredo 2011; Harmsen 2012; Hussain 2012; Tomlinson 2013; Fadda 2015; Harmsen 2015; Blaisdell 2016
8	The amount of information parents would like to receive seemed to have an inverse relationship with their acceptance of vaccination	**Low confidence**	Due to minor concerns regarding methodological limitations and moderate concerns about relevance and adequacy	Guillaume 2004; Benin 2006; Austvoll-Dahlgren 2010; Bond 2011; Kowal 2015

Table 12. CERQual evidence profile: finding 7

Finding 7: parents generally found the amount of vaccination information they received to be inadequate	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of context, sampling and reflexivity, but these were assessed as not having a large influence on this finding
Coherence	No or very minor concerns regarding coherence
Relevance	No or very minor concerns regarding relevance
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
High confidence	-
Contributing studies	

Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised ; unspecified vaccine
Berhanel 2000	Macro- and micro-levels of the EPI programme in Ethiopia; mothers; unspecified vaccine
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
Bond 2011	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised ; hypothetical influenza outbreak for a flu vaccine
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine

Table 12. CERQual evidence profile: finding 7 (*Continued*)

Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Figueiredo 2011	Families belonging to 2 health areas in Brazil; mothers, fathers and a maternal grandmother; unspecified vaccine
Harmsen 2012	Parents with anthroposophical beliefs in the Netherlands; unspecified vaccine
Hussain 2012	Aligarh high risk district, Uttar Pradesh, India; families during a polio campaign; OPV
Tomlinson 2013	Somali community in Birmingham UK; unspecified vaccines with a focus on MMR
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **OPV**: oral polio virus vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 13. CERQual evidence profile: finding 8

Finding 8: the amount of information parents would like to receive seemed to have an inverse relationship with their acceptance of vaccination	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of context, sampling and methods
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance as studies were from limited settings
Adequacy	Moderate concerns regarding adequacy due to thinness and quantity of data
Overall CERQual assessment	

Table 13. CERQual evidence profile: finding 8 (*Continued*)

Low confidence	Due to minor concerns regarding methodological limitations and moderate concerns about relevance and adequacy

Contributing studies

Study	Context
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Bond 2011	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; hypothetical influenza outbreak for a flu vaccine
Kowal 2015	Urban Edmonton, Alberta Canada; refugee participants born in India, Pakistan, China or Bhutan and currently living in Edmonton; moved to Canada in the last 8 years and have a child under 8 years old. Lower income and education than the Edmonton average; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 14. Summary of qualitative findings table: source of vaccination information

Finding		Overall CERQual assessment	Explanation for assessment	Contributing studies
Findings related to the source of vaccination information				
9	Parents generally found it difficult to know which vaccination information sources to trust	**High confidence**	-	Evans 2001; Guillaume 2004; McMurray 2004; Shui 2005; Benin 2006; Fowler 2007; Tickner 2007; Austin 2008; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Tickner 2010; Brown 2012; Harmsen 2012; Hussain 2012; Blaisdell 2016; Sobo 2016

Table 14. Summary of qualitative findings table: source of vaccination information (*Continued*)

10	Parents found it difficult to find a vaccination information source that they perceived as impartial or providing balanced information	**High confidence**	-	Bond 1998; Guillaume 2004; McMurray 2004; Hilton 2007; Tickner 2007; Austin 2008; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Brown 2012; Harmsen 2012; Hussain 2012; Dube 2016
11	Parental attitudes towards vaccination influenced which vaccination information sources they trusted	**Moderate confidence**	Due to moderate concerns regarding methodological limitations and minor concerns due to relevance and coherence	Bond 1998; Benin 2006; Hilton 2007; Austin 2008; Gust 2008; Austvoll-Dahlgren 2010; Brown 2012; Hussain 2012; Brunson 2013; Kowal 2015; Dube 2016; Sobo 2016
12	Parents wanted vaccination information to be available outside of the context of vaccination appointments, including from health workers, parents' groups, online forums and other sources. Parents in some studies wanted the opportunity to discuss this information with people who were not involved in their child's vaccination appointment	**High confidence**	-	Evans 2001; McMurray 2004; Fowler 2007; Tickner 2007; Miller 2008; Tickner 2010; Figueiredo 2011; Brown 2014; Kitayama 2014; Fadda 2015; Saada 2015; Sobo 2016
13	Health workers are an important source of vaccination information for parents	**High confidence**	-	Berhanel 2000; Guillaume 2004; McMurray 2004; Benin 2006; Hilton 2007; Tickner 2007; Gust 2008; Miller 2008; Tadesse 2009; Austvoll-Dahlgren 2010; Tickner 2010; Bond 2011; Brunson 2013; Brown 2014; Delkhosh 2014; Fadda 2015; Harmsen 2015; Kowal 2015; Saada 2015; Dube 2016; Sobo 2016
14	In their interactions and communication with health workers, parents expected longer-than-usual	**High confidence**	-	Bond 1998; Berhanel 2000; Evans 2001; Guillaume 2004; McMurray 2004; Shui 2005; Benin

Table 14. Summary of qualitative findings table: source of vaccination information (*Continued*)

	appointments; clear answers to their questions; information tailored to their needs; and open discussions where health workers were helpful, caring, sensitive and receptive to their concerns. Parents complained when these characteristics were missing			2006; Fowler 2007; Tickner 2007; Austin 2008; Gust 2008; Henderson 2008; Miller 2008, Tadesse 2009; Austvoll-Dahlgren 2010; Tickner 2010; Bond 2011; Harmsen 2012; Hussain 2012; Brown 2014; Delkhosh 2014; Brunson 2015; Fadda 2015; Harmsen 2015; Kowal 2015; Saada 2015; Dube 2016; Sobo 2016
15	Some parents accepted and preferred vaccination information and reminders communicated electronically through mobile health (mHealth) applications, for example via text messages or electronic vaccination cards	**Low confidence**	Due to moderate concerns regarding methodological limitations and relevance and minor concerns regarding coherence and adequacy	Brown 2014; Kitayama 2014
16	Parents felt that the vaccination card was a potentially important source of vaccination information, for instance about the names of the diseases, the names of the vaccines and the date for the next appointment. However, some parents and informal caregivers found it difficult to read and understand this information	**Moderate confidence**	Due to minor concerns regarding methodological limitations, relevance and adequacy	Tickner 2007; Topuzoğlu 2007; Babirye 2011; Figueiredo 2011; Kitayama 2014; Barbieri 2015; Fadda 2015
17	Parents regarded scientific sources as desirable, particularly if the source was objective, complete and independent of the government. Scientific sources were seen to be more reliable than discussion forums or lay opinions, but some saw them as having conflicts of interest	**Low confidence**	Due to minor concerns regarding to methodological limitations and moderate concerns regarding adequacy and relevance	Guillaume 2004; Austvoll-Dahlgren 2010; Harmsen 2012; Brunson 2013; Barbieri 2015; Brunson 2015; Blaisdell 2016; Sobo 2016
18	Parents generally viewed the mass media, for example newspapers, magazines, tele-	**Moderate confidence**	Due to minor concerns regarding methodological limitations and moderate con-	Evans 2001; Guillaume 2004; Benin 2006; Hilton 2007; Tickner 2007;

Table 14. Summary of qualitative findings table: source of vaccination information (*Continued*)

	vision and the Internet, as an important source of vaccination information		cerns regarding relevance	Tickner 2010; Figueiredo 2011; Brown 2012; Brown 2014; Delkhosh 2014
19	The extent to which parents searched for information about vaccination, and the manner in which they received and assessed this information, was linked to their trust in the information source	**High confidence**	-	Bond 1998; Guillaume 2004; McMurray 2004; Shui 2005; Benin 2006; Hilton 2007; Tickner 2007; Topuzoğlu 2007; Miller 2008; Austvoll-Dahlgren 2010; Tickner 2010; Brown 2012; Harmsen 2012; Hussain 2012; Brunson 2013; Tomlinson 2013; Delkhosh 2014; Barbieri 2015; Brunson 2015; Harmsen 2015; Kowal 2015; Blaisdell 2016; Sobo 2016
20	Parents who trusted their health workers and accepted vaccination also trusted the information they received from the health services and searched less for other information. In contrast, parents who had less trust in their health worker or in the information they received from them were more likely to search for outside information sources	**Low confidence**	Due to moderate concerns about relevance and methodological limitations and minor concerns regarding adequacy	Benin 2006; Tickner 2007; Austin 2008; Austvoll-Dahlgren 2010; Tickner 2010; Brown 2012; Brunson 2013; Brown 2014; Kowal 2015; Saada 2015; Dube 2016; Sobo 2016
21	Some parents were not comfort- able asking questions about vaccination or communicating with health workers, and they felt rushed, intimidated or concerned about the perceived attitudes of the health worker towards vaccination	**Moderate confidence**	Due to moderate concerns regarding methodological limitations	Evans 2001; McMurray 2004; Topuzoğlu 2007; Tomlinson 2013; Delkhosh 2014; Harmsen 2015; Saada 2015; Dube 2016
22	Judgement and pressure from health workers made parents feel uncomfortable or alienated and could negatively influence their relationship with healthcare	**Moderate confidence**	Due to moderate concerns regarding methodological limitations and relevance and minor concerns regarding coherence and adequacy	Evans 2001; Benin 2006: Hilton 2007; Topuzoğlu 2007; Austin 2008; Babirye 2011; Brown 2012; Delkhosh 2014; Saada 2015;

Table 14. Summary of qualitative findings table: source of vaccination information (*Continued*)

	providers. In some cases this also influenced their intention to vaccinate			Dube 2016; Sobo 2016
23	Some parents, especially those who were hesitant or refused to vaccinate, believed that health workers were receiving incentives or payments for vaccination targets and questioned if the motives for vaccination were financial gain, instead of the best interest of the child	**Moderate confidence**	Due to moderate concerns regarding relevance and minor concerns regarding methodological limitations	Evans 2001; Guillaume 2004; McMurray 2004; Shui 2005; Benin 2006; Hilton 2007; Austin 2008; Brown 2012; Blaisdell 2016; Dube 2016; Sobo 2016
24	High levels of attention to vaccination issues from government agencies or the media influenced parents' perceptions of individual vaccines or vaccination in general	**Moderate confidence**	Due to minor concerns regarding methodological limitations, coherence and moderate concerns regarding relevance	Bond 1998; Evans 2001; Guillaume 2004; McMurray 2004; Hilton 2007; Tickner 2007; Tickner 2010; Brown 2012
25	Some parents distrusted or lacked confidence in information sources linked to the government. They considered these to be biased, to be withholding information or to be motivated by financial gain	**Moderate confidence**	Due to moderate concerns regarding methodological limitations and relevance	Evans 2001; Guillaume 2004; Shui 2005; Hilton 2007; Tickner 2007; Austin 2008; Harmsen 2012; Kowal 2015; Dube 2016; Sobo 2016
26	Politicians' opinions and actions regarding personal vaccination choices influenced parents' perceptions of vaccination	**Low confidence**	Due to serious concerns regarding relevance, moderate concerns regarding adequacy and minor concerns regarding methodological limitations	Guillaume 2004; Hilton 2007; Brown 2012
27	Some parents perceived the mass media as having sensationalised vaccination stories, thereby decreasing parental trust in the media	**Moderate confidence**	Due to moderate concerns regarding methodological limitations and relevance	Evans 2001; Guillaume 2004; Fowler 2007; Hilton 2007; Tickner 2007; Brown 2012
28	Negative publicity about vaccination in the mass media contributed to concerns about	**Moderate confidence**	Due to moderate concerns regarding relevance and minor concerns regarding methodological limitations	Evans 2001; Guillaume 2004; McMurray 2004; Fowler 2007; Hilton 2007; Tickner 2007; Henderson

Table 14. Summary of qualitative findings table: source of vaccination information (*Continued*)

	vaccination among parents			2008; Austvoll-Dahlgren 2010; Tickner 2010; Bond 2011

Table 15. CERQual evidence profile: finding 9

Finding 9: parents generally found it difficult to know which vaccination information sources to trust	
Assessment for each CERQual component	
Methodological limitations	No or very minor concerns regarding methodological limitations
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to partial relevance due to a narrow range of settings
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
High confidence	-
Contributing studies	
Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children

Table 15. CERQual evidence profile: finding 9 (*Continued*)

Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Harmsen 2012	The Netherlands; parents with anthroposophical beliefs; unspecified vaccine
Hussain 2012	Aligarh high risk district, Uttar Pradesh, India; families during a polio campaign; OPV
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **OPV**: oral polio virus vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 16. CERQual evidence profile: finding 10

Finding 10: parents found it difficult to find a vaccination information source that they perceived as impartial or providing balanced information	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to a lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to partial relevance due to a narrow range of settings

Table 16. CERQual evidence profile: finding 10 (*Continued*)

Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
High confidence	-
Contributing studies	

Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Harmsen 2012	The Netherlands; parents with anthroposophical beliefs; unspecified vaccine
Hussain 2012	Aligarh high risk district, Uttar Pradesh, India; families during a polio campaign; OPV
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **OPV**: oral polio virus vaccine.

Table 17. CERQual evidence profile: finding 11

Finding 11: parental attitudes towards vaccination influenced which vaccination information sources they trusted	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to a lack of reporting on context, sampling and methods and lack of discussion of researcher reflexivity
Coherence	Minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to partial relevance due to a narrow range of settings
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding methodological limitations and minor concerns due to relevance and coherence
Contributing studies	
Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Hussain 2012	Aligarh high risk district, Uttar Pradesh, India; families during a polio campaign; OPV

Table 17. CERQual evidence profile: finding 11 (*Continued*)

Brunson 2013	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Kowal 2015	Urban Edmonton, Alberta Canada; refugee participants born in India, Pakistan, China or Bhutan and currently living in Edmonton; moved to Canada in the last 8 years and have a child under 8 years old. Lower income and education than the Edmonton average; EPI vaccines
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine;**OPV**: oral polio virus vaccine.

Table 18. CERQual evidence profile: finding 12

Finding 12: parents wanted vaccination information to be available outside of the context of vaccination appointments, including from health workers, parents' groups, online forums and other sources. Parents in some studies wanted the opportunity to discuss this information with people who were not involved in their child's vaccination appointment	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of methods in some studies
Coherence	No or very minor concerns regarding coherence
Relevance	No or very minor concerns regarding relevance
Adequacy	Minor concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
High confidence	-
Contributing studies	
Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines

Table 18. CERQual evidence profile: finding 12 (*Continued*)

Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Figueiredo 2011	Families belonging to 2 health areas in Brazil; mothers, fathers and a maternal grandmother; unspecified vaccine
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Kitayama 2014	Northern Manhattan NY, USA; underserved Latino community with low-income parents; EPI vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **OPV**: oral polio virus vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 19. CERQual evidence profile: finding 13

Finding 13: health workers are an important source of vaccination information for parents	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to a lack of reporting on sampling and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to partial relevance due to a focus on the MMR vaccine
Adequacy	No or very minor concerns regarding adequacy

Table 19. CERQual evidence profile: finding 13 (*Continued*)

Overall CERQual assessment	
High confidence	-
Contributing studies	
Study	**Context**
Berhanel 2000	Macro- and micro-levels of the EPI programme in Ethiopia; mothers; unspecified vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Benin 2006	Connecticut USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Tadesse 2009	Wonago District, Gede Zone, southern Ethiopia; mothers whose children did and did not complete their vaccinations; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Bond 2011	Melbourne, Australia; first-time and experienced mothers of infants who were completely immunised, incompletely immunised, partially immunised or not immunised with children aged 3-30 months; hypothetical influenza outbreak for a flu vaccine
Brunson 2013	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines

Table 19. CERQual evidence profile: finding 13 (*Continued*)

Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **OPV**: oral polio virus vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 20. CERQual evidence profile: finding 14

Finding 14: in their interactions and communication with health workers, parents expected longer-than-usual appointments; clear answers to their questions; information tailored to their needs; and open discussions where health workers were helpful, caring, sensitive and receptive to their concerns. Parents complained when these characteristics were missing	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological due to a lack of reporting on sampling and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	No or very minor concerns regarding relevance
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
High confidence	-
Contributing studies	
Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Berhanel 2000	Macro- and micro-levels of the EPI programme in Ethiopia; mothers; unspecified vaccine
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine

Table 20. CERQual evidence profile: finding 14 (*Continued*)

Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Benin 2006	Connecticut USA, postpartum mothers, unspecified vaccines with a focus on Hepatitis B
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Henderson 2008	NE London; Orthodox Jewish mothers; unspecified vaccines
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Tadesse 2009	Wonago District, Gede Zone, southern Ethiopia; mothers whose children did and did not complete their vaccinations; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Bond 2011	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; hypothetical influenza outbreak for a flu vaccine
Harmsen 2012	The Netherlands; parents with anthroposophical beliefs; unspecified vaccine
Hussain 2012	Aligarh high risk district, Uttar Pradesh, India; families during a polio campaign; OPV
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines

Table 20. CERQual evidence profile: finding 14 (*Continued*)

Brunson 2015	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines
Kowal 2015	Urban Edmonton, Alberta Canada; refugee participants born in India, Pakistan, China or Bhutan and currently living in Edmonton; moved to Canada in the last 8 years and have a child under 8 years old. Lower income and education than the Edmonton average; EPI vaccines
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **OPV**: oral polio virus vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 21. CERQual evidence profile: finding 15

Finding 15: some parents accepted and preferred vaccination information and reminders communicated electronically through mobile health (mHealth) applications, for example via text messages or electronic vaccination cards	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting of context, sampling, researcher reflexivity and ethics
Coherence	Minor concerns regarding coherence due to partial relevance as each article addresses a different MHealth strategy
Relevance	Moderate concerns regarding relevance due to partial relevance of setting
Adequacy	Minor concerns regarding adequacy due to thinness of data
Overall CERQual assessment	

Table 21. CERQual evidence profile: finding 15 (*Continued*)

Low confidence	Due to moderate concerns regarding methodological limitations and relevance and minor concerns regarding coherence and adequacy
Contributing studies	
Study	**Context**
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Kitayama 2014	Northern Manhattan NY, USA; underserved Latino community with low-income parents; EPI vaccines

EPI: Extended Programme on Immunization.

Table 22. CERQual evidence profile: finding 16

Finding 16: parents felt that the vaccination card was a potentially important source of vaccination information, for instance about the names of the diseases, the names of the vaccines and the date for the next appointment. However, some parents and informal caregivers found it difficult to read and understand this information	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of methods in some studies
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to partial relevance due limited geographic contexts
Adequacy	Minor concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
Moderate confidence	Due to minor concerns regarding methodological limitations, relevance and adequacy
Contributing studies	
Study	**Context**
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine

Table 22. CERQual evidence profile: finding 16 (*Continued*)

Topuzoğlu 2007	Umraniya, Istanbul, Turkey; socioeconomically disadvantaged suburban mothers who had children younger than 5 years old; unspecified vaccines
Babirye 2011	2 health districts in need of improvement in Kampala, Uganda; interviews and focus groups with both women and men; unspecified vaccines
Figueiredo 2011	Families belonging to 2 health areas in Brazil; mothers, fathers and a maternal grandmother; unspecified vaccine
Kitayama 2014	Northern Manhattan NY, USA; underserved Latino community with low-income parents; EPI vaccines
Barbieri 2015	Southeast Sao Paulo, Brazil; highly educated parents in urban areas; EPI vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 23. CERQual evidence profile: finding 17

Finding 17: parents regarded scientific sources as desirable, particularly if the source was objective, complete and independent of the government. Scientific sources were seen to be more reliable than discussion forums or lay opinions, but some saw them as having conflicts of interest	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to lack of researcher reflexivity and only partial descriptions of context and sampling strategies
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance geographic spread and participants were drawn from a restricted range of population groups
Adequacy	Moderate concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
Low confidence	Due to minor concerns regarding to methodological limitations and moderate concerns regarding adequacy and relevance
Contributing studies	

Table 23. CERQual evidence profile: finding 17 (*Continued*)

Study	Context
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Harmsen 2012	The Netherlands; parents with anthroposophical beliefs; unspecified vaccine
Brunson 2013	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Barbieri 2015	Southeast Sao Paulo, Brazil; highly educated parents in urban areas; EPI vaccines
Brunson 2015	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization.

Table 24. CERQual evidence profile: finding 18

Finding 18: parents generally viewed the mass media, for example newspapers, magazines, television and the Internet, as an important source of vaccination information	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of methods in some studies
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance geographic spread and a focus on the MMR vaccine
Adequacy	No or very minor concerns regarding adequacy

Table 24. CERQual evidence profile: finding 18 (*Continued*)

Overall CERQual assessment	
Moderate confidence	Due to minor concerns regarding methodological limitations and moderate concerns regarding relevance

Contributing studies	
Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Figueiredo 2011	Families belonging to 2 health areas in Brazil; mothers, fathers and a maternal grandmother; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 25. CERQual evidence profile: finding 19

Finding 19: the extent to which parents searched for information about vaccination, and the manner in which they received and assessed this information, was linked to their trust in the information source
Assessment for each CERQual component

Table 25. CERQual evidence profile: finding 19 (*Continued*)

Methodological limitations	Minor concerns regarding methodological limitations due to lack of reporting on methods and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	No or very minor concerns regarding
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
High confidence	-
Contributing studies	

Study	Context
Bond 1998	Melbourne, Australia; fFirst-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised ; unspecified vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Topuzoğlu 2007	Umraniya, Istanbul, Turkey; socioeconomically disadvantaged suburban mothers who had children younger than 5 years old; unspecified vaccines
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster

Table 25. CERQual evidence profile: finding 19 (*Continued*)

Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Harmsen 2012	The Netherlands; parents with anthroposophical beliefs; unspecified vaccine
Hussain 2012	Aligarh high risk district, Uttar Pradesh, India; families during a polio campaign; OPV
Tomlinson 2013	Somali community in Birmingham UK; unspecified vaccines with a focus on MMR
Brunson 2013	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Barbieri 2015	Southeast Sao Paulo, Brazil; highly educated parents in urban areas; EPI vaccines
Brunson 2015	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines
Kowal 2015	Urban Edmonton, Alberta Canada; refugee participants born in India, Pakistan, China or Bhutan and currently living in Edmonton; moved to Canada in the last 8 years and have a child under 8 years old. Lower income and education than the Edmonton average; EPI vaccines
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **OPV**: oral polio virus vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 26. CERQual evidence profile: finding 20

Finding 20: parents who trusted their health workers and accepted vaccination also trusted the information they received from the health services and searched less for other information. In contrast, parents who had less trust in their health worker or in the information they received from them were more likely to search for outside information sources
Assessment for each CERQual component

Table 26. CERQual evidence profile: finding 20 (*Continued*)

Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting on sampling and data collection and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting and some focus on the MMR vaccine
Adequacy	Minor concerns regarding adequacy due to thinness of data for those with decreased trust
Overall CERQual assessment	
Low confidence	Due to moderate concerns about relevance and methodological limitations and minor concerns regarding adequacy

Contributing studies

Study	Context
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Brunson 2013	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Kowal 2015	Urban Edmonton, Alberta Canada; refugee participants born in India, Pakistan, China or Bhutan and currently living in Edmonton; moved to Canada in the last 8 years and have a child under 8 years old. Lower income and education than the Edmonton average;

Table 26. CERQual evidence profile: finding 20 (*Continued*)

	EPI vaccines
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 27. CERQual evidence profile: finding 21

Finding 21: some parents were not comfortable asking questions about vaccination or communicating with health workers, and they felt rushed, intimidated or concerned about the perceived attitudes of the health worker towards vaccination	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting on context, sampling and data collection and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	No or very minor concerns regarding coherence
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding methodological limitations
Contributing studies	
Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Topuzoğlu 2007	Umraniya, Istanbul, Turkey; socioeconomically disadvantaged suburban mothers who had children younger than 5 years old; unspecified vaccines

Table 27. CERQual evidence profile: finding 21 (*Continued*)

Tomlinson 2013	Somali community in Birmingham UK; unspecified vaccines with a focus on MMR
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 28. CERQual evidence profile: finding 22

Finding 22: judgement and pressure from health workers made parents feel uncomfortable or alienated and could negatively influence their relationship with healthcare providers. In some cases this also influenced their intention to vaccinate	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting on context, sampling and data collection and lack of discussion of researcher reflexivity
Coherence	Minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting
Adequacy	Minor concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding methodological limitations and relevance and minor concerns regarding coherence and adequacy
Contributing studies	
Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B

Table 28. CERQual evidence profile: finding 22 (*Continued*)

Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Topuzoğlu 2007	Umraniya, Istanbul, Turkey; socioeconomically disadvantaged suburban mothers who had children younger than 5 years old; unspecified vaccines
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Babirye 2011	2 health districts in need of improvement in Kampala, Uganda; interviews and focus groups with both women and men; unspecified vaccines
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 29. CERQual evidence profile: finding 23

Finding 23: some parents, especially those who were hesitant or refused to vaccinate, believed that health workers were receiving incentives or payments for vaccination targets and questioned if the motives for vaccination were financial gain, instead of the best interest of the child	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of sampling and methods and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting and some focus on the MMR vaccine
Adequacy	No or very minor concerns regarding adequacy

Table 29. CERQual evidence profile: finding 23 (*Continued*)

Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding relevance and minor concerns regarding methodological limitations

Contributing studies	
Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 30. CERQual evidence profile: finding 24

Finding 24: high levels of attention to vaccination issues from government agencies or the media influenced parents' perceptions of individual vaccines or vaccination in general	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of methods and lack of discussion of researcher reflexivity
Coherence	Minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting and a focus on the MMR vaccine
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
Moderate confidence	Due to minor concerns regarding methodological limitations, coherence and moderate concerns regarding relevance
Contributing studies	
Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine

MMR: measles, mumps and rubella vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 31. CERQual evidence profile: finding 25

Finding 25: some parents distrusted or lacked confidence in information sources linked to the government. They considered these to be biased, to be withholding information or to be motivated by financial gain	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting on context, and methods and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting and some focused on the MMR vaccine
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding methodological limitations and relevance
Contributing studies	
Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Harmsen 2012	The Netherlands; parents with anthroposophical beliefs; unspecified vaccine
Kowal 2015	Urban Edmonton, Alberta Canada; refugee participants born in India, Pakistan, China or Bhutan and currently living in Edmonton; moved to Canada in the last 8 years and have a child under 8 years old. Lower income and education than the Edmonton average; EPI vaccines

Table 31. CERQual evidence profile: finding 25 (*Continued*)

Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 32. CERQual evidence profile: finding 26

Finding 26: politicians' opinions and actions regarding personal vaccination choices influenced parents' perceptions of vaccination	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of methods and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Serious concerns regarding relevance due to studies from only 1 setting, only focusing on the MMR vaccine and only discussing specific politicians
Adequacy	Moderate concerns regarding adequacy due to thinness of data and number of studies
Overall CERQual assessment	
Low confidence	Due to serious concerns regarding relevance, moderate concerns regarding adequacy and minor concerns regarding methodological limitations
Contributing studies	
Study	**Context**
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine

MMR: measles, mumps and rubella vaccine.

Table 33. CERQual evidence profile: finding 27

Finding 27: some parents perceived the mass media as having sensationalised vaccination stories, thereby decreasing parental trust in the media	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting on context, and methods and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting and a focus on the MMR vaccine
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding methodological limitations and relevance
Contributing studies	

Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine

MMR: measles, mumps and rubella vaccine.

Table 34. CERQual evidence profile: finding 28

Finding 28: negative publicity about vaccination in the mass media contributed to concerns about vaccination among parents	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of methods and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting and a focus on the MMR vaccine
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding relevance and minor concerns regarding methodological limitations
Contributing studies	
Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Henderson 2008	NE London; Orthodox Jewish mothers; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster

Table 34. CERQual evidence profile: finding 28 (*Continued*)

Bond 2011	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; hypothetical influenza outbreak for a flu vaccine

MMR: measles, mumps and rubella vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 35. Summary of qualitative findings table: content of vaccination information

Finding		Overall CERQual assessment	Explanation for assessment	Contributing studies
Findings related to the content of vaccination information				
29	Parents felt that the information that they received was biased towards vaccination and its benefits	**Moderate confidence**	Due to moderate concerns regarding relevance and minor concerns regarding methodological limitations and adequacy	Evans 2001; Guillaume 2004; Tickner 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Brown 2012; Saada 2015; Blaisdell 2016; Sobo 2016
30	Parents wanted balanced information about both the benefits and risks of vaccination	**High confidence**	-	Bond 1998; Evans 2001; Guillaume 2004; McMurray 2004; Hilton 2007; Tickner 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Babirye 2011; Brown 2012; Brown 2014; Delkhosh 2014; Fadda 2015; Sobo 2016
31	Parents did not find the available information to be reliable, convincing or credible	**Low confidence**	Due to moderate concerns regarding coherence and relevance and minor concerns regarding methodological limitations and adequacy	Bond 1998; Evans 2001; Hilton 2007; Gust 2008; Harmsen 2012; Fadda 2015; Blaisdell 2016
32	Parents wanted information presented and communicated in a clear and simple way, in a language they understood. They felt that these factors would increase their understanding of and ability to assess the content	**Moderate confidence**	Due to moderate concerns about relevance and minor concerns regarding methodological limitations, adequacy and coherence	Shui 2005; Hilton 2007; Topuzoğlu 2007; Miller 2008; Austvoll-Dahlgren 2010; Brown 2014; Delkhosh 2014; Kitayama 2014; Fadda 2015; Harmsen 2015

Table 35. Summary of qualitative findings table: content of vaccination information (*Continued*)

33	Parents wanted information that was tailored to their situation, including to their attitudes towards vaccination and their mother tongue	**Moderate confidence**	Due to moderate concerns regarding relevance and minor concerns regarding methodological limitations, adequacy and coherence	McMurray 2004; Hilton 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Bond 2011; Brown 2012; Brown 2014; Delkhosh 2014; Kitayama 2014; Brunson 2015; Fadda 2015; Harmsen 2015
34	A varied presentation of information (written, oral and visual) is necessary to meet parents' vaccination information needs	**Low confidence**	Due to moderate concerns regarding adequacy and relevance	Gust 2008; Miller 2008; Brown 2014; Harmsen 2015
35	Parents wanted specific information about vaccination and found some of the available information to be too general or incomplete. Parents wanted more information than they received about topics including: combined versus single vaccines, technical information about production and delivery, the vaccination appointment, the vaccination schedule, vaccine ingredients and safety, vaccination in general and vaccine-preventable diseases, vaccine side effects, and the risks and benefits of vaccines	**High confidence**	-	Bond 1998; Berhanel 2000; Guillaume 2004; McMurray 2004; Shui 2005; Benin 2006; Fowler 2007; Topuzoğlu 2007; Gust 2008; Miller 2008; Austvoll-Dahlgren 2010; Bond 2011; Brown 2012; Harmsen 2012, Hussain 2012; Tomlinson 2013; Brown 2014; Delkhosh 2014; Kitayama 2014; Barbieri 2015; Brunson 2015; Fadda 2015; Harmsen 2015; Saada 2015; Blaisdell 2016; Dube 2016; Sobo 2016
36	Parental misconceptions about vaccination were sometimes based on information that they had received from health workers	**Moderate confidence**	Due to minor concerns regarding methodological limitations, coherence, relevance and adequacy	Bond 1998; Berhanel 2000; Hussain 2012; Fadda 2015; Blaisdell 2016; Dube 2016

Table 36. CERQual evidence profile: finding 29

Finding 29: parents felt that the information that they received was biased towards vaccination and its benefits
Assessment for each CERQual component

Table 36. CERQual evidence profile: finding 29 (*Continued*)

Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of context, sampling and methods
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting and a focus on the MMR vaccine
Adequacy	Minor concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding relevance and minor concerns regarding methodological limitations and adequacy
Contributing studies	
Study	**Context**
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 37. CERQual evidence profile: finding 30

Finding 30: parents wanted balanced information about both the benefits and risks of vaccination	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to a limited variety of settings
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
High confidence	-
Contributing studies	
Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines

Table 37. CERQual evidence profile: finding 30 (*Continued*)

Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Babirye 2011	2 health districts in need of improvement in Kampala, Uganda; interviews and focus groups with both women and men; unspecified vaccines
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 38. CERQual evidence profile: finding 31

Finding 31: parents did not find the available information to be reliable, convincing or credible	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting on methods and lack of discussion of researcher reflexivity
Coherence	Moderate concerns regarding coherence due to not all data directly supporting the review finding
Relevance	Moderate concerns regarding relevance due to partial relevance of setting and a focus on the MMR vaccine
Adequacy	Minor concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
Low confidence	Due to moderate concerns regarding coherence and relevance and minor concerns regarding methodological limitations and adequacy
Contributing studies	

Table 38. CERQual evidence profile: finding 31 (*Continued*)

Study	Context
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Harmsen 2012	The Netherlands; parents with anthroposophical beliefs; unspecified vaccine
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 39. CERQual evidence profile: finding 32

Finding 32: parents wanted information presented and communicated in a clear and simple way, in a language they understood. They felt that these factors would increase their understanding of and ability to assess the content	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting and lack of discussion of researcher reflexivity
Coherence	Minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting
Adequacy	Minor concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns about relevance and minor concerns regarding methodological limitations, adequacy and coherence
Contributing studies	

Table 39. CERQual evidence profile: finding 32 (*Continued*)

Study	Context
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Topuzoğlu 2007	Umraniya, Istanbul, Turkey; socioeconomically disadvantaged suburban mothers who had children younger than 5 years old; unspecified vaccines
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Kitayama 2014	Northern Manhattan NY, USA; underserved Latino community with low-income parents; EPI vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 40. CERQual evidence profile: finding 33

Finding 33: parents wanted information that was tailored to their situation, including to their attitudes towards vaccination and their mother tongue	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of methods and lack of discussion of researcher reflexivity
Coherence	Minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting

Table 40. CERQual evidence profile: finding 33 (*Continued*)

Adequacy	Minor concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding relevance and minor concerns regarding methodological limitations, adequacy and coherence
Contributing studies	

Study	**Context**
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Hilton 2007	Central Scotland; 64 mothers and 8 fathers with all types of MMR vaccine acceptance or refusal along with social problems, autism and immunocompromised children
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Bond 2011	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; hypothetical influenza outbreak for a flu vaccine
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Kitayama 2014	Northern Manhattan NY, USA; underserved Latino community with low-income parents; EPI vaccines
Brunson 2015	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine

Table 40. CERQual evidence profile: finding 33 (*Continued*)

Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 41. CERQual evidence profile: finding 34

Finding 34: a varied presentation of information (written, oral and visual) is necessary to meet parents' vaccination information needs	
Assessment for each CERQual component	
Methodological limitations	No or very minor concerns regarding methodological limitations
Coherence	No or very minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of study setting
Adequacy	Moderate concerns regarding adequacy due to relatively thin data from 4 studies
Overall CERQual assessment	
Low confidence	Due to moderate concerns regarding adequacy and relevance
Contributing studies	
Study	**Context**
Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines

EPI: Extended Programme on Immunization.

Table 42. CERQual evidence profile: finding 35

Finding 35: parents wanted specific information about vaccination and found some of the available information to be too general or incomplete. Parents wanted more information than they received about topics including: combined versus single vaccines, technical information about production and delivery, the vaccination appointment, the vaccination schedule, vaccine ingredients and safety, vaccination in general and vaccine-preventable diseases, vaccine side effects, and the risks and benefits of vaccines	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of sampling and methods and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	No or very minor concerns regarding relevance
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
High confidence	-
Contributing studies	

Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Berhanel 2000	Macro- and micro-levels of the EPI programme in Ethiopia; mothers; unspecified vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Topuzoğlu 2007	Umraniya, Istanbul, Turkey; socioeconomically disadvantaged suburban mothers who had children younger than 5 years old; unspecified vaccines

Table 42. CERQual evidence profile: finding 35 (*Continued*)

Gust 2008	3 US cities in Georgia, Wisconsin or California; mothers who screened as worried or undecided; non-Hispanic white, non-Hispanic black, or Hispanic; unspecified vaccine
Miller 2008	Rural Alberta Canada; mothers with varying vaccination choices; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Bond 2011	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; hypothetical influenza outbreak for a flu vaccine
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Harmsen 2012	The Netherlands; parents with anthroposophical beliefs; unspecified vaccine
Hussain 2012	Aligarh high risk district, Uttar Pradesh, India; families during a polio campaign; OPV
Tomlinson 2013	Somali community in Birmingham UK; unspecified vaccines with a focus on MMR
Brown 2014	Midwest Nebraska, USA; postpartum adolescent mothers who were single and living alone and owning a cell phone; unspecified vaccines
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Kitayama 2014	Northern Manhattan NY, USA; underserved Latino community with low-income parents; EPI vaccines
Barbieri 2015	Southeast Sao Paulo, Brazil; highly educated parents in urban areas; EPI vaccines
Brunson 2015	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines

Table 42. CERQual evidence profile: finding 35 (*Continued*)

Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **OPV**: oral polio virus vaccine; **tDap/IPV**: tetanus, diptheria and acellular pertussis/inactivated polio vaccine.

Table 43. CERQual evidence profile: finding 36

Finding 36: parental misconceptions about vaccination were sometimes based on information that they had received from health workers	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due lack of discussion of researcher reflexivity
Coherence	Minor concerns regarding coherence due to not all data directly supporting the review finding
Relevance	Minor concerns regarding relevance
Adequacy	Minor concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
Moderate confidence	Due to minor concerns regarding methodological limitations, coherence, relevance and adequacy
Contributing studies	
Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Berhanel 2000	Macro- and micro-levels of the EPI programme in Ethiopia; mothers; unspecified vaccine
Hussain 2012	Aligarh high risk district, Uttar Pradesh, India; families during a polio campaign; OPV
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine

Table 43. CERQual evidence profile: finding 36 (*Continued*)

Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine; **OPV**: oral polio virus vaccine.

Table 44. Summary of qualitative findings table: influence of vaccination information on the intention or decision to vaccinate

Finding		Overall CERQual assessment	Explanation for assessment	Contributing studies
				Study
Findings related to the influence of vaccination information on the intention or decision to vaccinate				
37	Some parents vaccinated their child because they felt that it was a cultural and social norm and not necessarily a decision that they had to make	**High confidence**	-	Bond 1998; Berhanel 2000; Benin 2006; Tickner 2007; Austvoll-Dahlgren 2010; Brunson 2013; Barbieri 2015; Brunson 2015; Fadda 2015; Harmsen 2015; Sobo 2016
38	Many parents, regardless of their vaccination decision, believed that their decision had not been adequately informed	**Moderate confidence**	Due to minor concerns about methodological limitations, coherence and relevance	Bond 1998; Evans 2001; Guillaume 2004; McMurray 2004; Shui 2005; Fowler 2007; Austvoll-Dahlgren 2010; Fadda 2015; Harmsen 2015; Dube 2016
39	Some parents who had vaccinated their children were unsure, regretted or worried about their decision due to a perceived lack of information	**High confidence**	-	Bond 1998; Guillaume 2004; Shui 2005; Fowler 2007; Austin 2008; Austvoll-Dahlgren 2010; Tomlinson 2013; Delkhosh 2014; Fadda 2015; Dube 2016
40	Health workers were used to supporting and minimising the complexity of vaccination decisions and ameliorating or sharing any regret parents felt about deciding to vaccinate	**Low confidence**	Due to moderate concerns regarding adequacy and relevance and minor concerns regarding methodological limitations and coherence	Austvoll-Dahlgren 2010; Brown 2012; Fadda 2015; Blaisdell 2016

Table 44. Summary of qualitative findings table: influence of vaccination information on the intention or decision to vaccinate (*Continued*)

41	Some parents vaccinated their children because they trusted their health worker or because the health worker was helpful, asked, or recommended for them to do so	**Moderate confidence**	Due to moderate concerns regarding methodological limitations and minor concerns regarding relevance	Berhanel 2000; McMurray 2004; Benin 2006; Tickner 2007; Henderson 2008; Austvoll-Dahlgren 2010; Tickner 2010; Brunson 2013; Tomlinson 2013; Delkhosh 2014; Barbieri 2015; Fadda 2015; Harmsen 2015; Kowal 2015; Blaisdell 2016; Sobo 2016
42	Some parents vaccinated their children because of perceived pressure from the health services	**Low confidence**	Due to moderate concerns regarding methodological limitations, relevance and adequacy and minor concerns regarding coherence	Berhanel 2000; Evans 2001; Topuzoğlu 2007; Austin 2008; Figueiredo 2011; Tomlinson 2013; Saada 2015
43	Some parents who decided not to vaccinate often felt that they had made a more informed decision than parents who had vaccinated	**Very low confidence**	Due to moderate concerns regarding methodological limitations and serious concerns regarding relevance and adequacy	Brown 2012

Table 45. CERQual evidence profile: finding 37

Finding 37: some parents vaccinated their child because they felt that it was a cultural and social norm and not necessarily a decision that they had to make	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting on sampling and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
High confidence	-
Contributing studies	

Table 45. CERQual evidence profile: finding 37 (*Continued*)

Study	Context
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Berhanel 2000	Macro- and micro-levels of the EPI programme in Ethiopia; mothers; unspecified vaccine
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Brunson 2013	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Barbieri 2015	Southeast Sao Paulo, Brazil; highly educated parents in urban areas; EPI vaccines
Brunson 2015	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 46. CERQual evidence profile: finding 38

Finding 38: many parents, regardless of their vaccination decision, believed that their decision had not been adequately informed	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting of context and methods and lack of discussion of researcher reflexivity

Table 46. CERQual evidence profile: finding 38 (*Continued*)

Coherence	Minor concerns regarding coherence due to 1 contradictory study
Relevance	Minor concerns regarding relevance due to partial relevance of setting
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
Moderate confidence	Due to minor concerns about methodological limitations, coherence and relevance
Contributing studies	

Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines
Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 47. CERQual evidence profile: finding 39

Finding 39: some parents who had vaccinated their children were unsure, regretted or worried about their decision due to a perceived lack of information	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to limited settings
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
High confidence	-
Contributing studies	
Study	**Context**
Bond 1998	Melbourne, Australia; First-time and experienced mothers of children aged 3-30 months who were completely immunised, incompletely immunised, partially immunised or not immunised; unspecified vaccine
Guillaume 2004	Parents of young children in urban area of Sheffield, UK. Study started in February 2002 during the MMR vaccination scare that had arisen again as a result of a suspected measles outbreak in London and Newcastle; MMR vaccine
Shui 2005	Atlanta, Georgia, USA; African American mothers who are concerned about vaccine safety but whose children are fully immunised; unspecified vaccine
Fowler 2007	Kazakhstan and Uzbekistan; mothers and grandmothers; unspecified vaccine
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Tomlinson 2013	Somali community in Birmingham UK; unspecified vaccines with a focus on MMR
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine

Table 47. CERQual evidence profile: finding 39 (*Continued*)

Dube 2016	Quebec, Canada; mothers during pregnancy and postpartum with children aged 3-11 months; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 48. CERQual evidence profile: finding 40

Finding 40: health workers were used to supporting and minimising the complexity of vaccination decisions and ameliorating or sharing any regret parents felt about deciding to vaccinate	
Assessment for each CERQual component	
Methodological limitations	Minor concerns regarding methodological limitations due to poor reporting on sampling and lack of discussion of researcher reflexivity
Coherence	Minor concerns regarding coherence due to each study addressing 1 part of the finding
Relevance	Moderate concerns regarding relevance due to partial relevance of setting
Adequacy	Moderate concerns regarding adequacy due to thinness of data
Overall CERQual assessment	
Low confidence	Due to moderate concerns regarding adequacy and relevance and minor concerns regarding methodological limitations and coherence
Contributing studies	
Study	**Context**
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 49. CERQual evidence profile: finding 41

Finding 41: some parents vaccinated their children because they trusted their health worker or because the health worker was helpful, asked, or recommended for them to do so	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting on sampling and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Minor concerns regarding relevance due to partial relevance of study setting
Adequacy	No or very minor concerns regarding adequacy
Overall CERQual assessment	
Moderate confidence	Due to moderate concerns regarding methodological limitations and minor concerns regarding relevance
Contributing studies	
Study	**Context**
Berhanel 2000	Macro- and micro-levels of the EPI programme in Ethiopia; mothers; unspecified vaccine
McMurray 2004	Leeds, England; parents of children 4-5 years old; MMR and 5-in-1 vaccines
Benin 2006	Connecticut, USA; postpartum mothers; unspecified vaccines with a focus on hepatitis B
Tickner 2007	Southern England; parents with babies aged 4-13 weeks; a focus on MMR and the 5-in-1 vaccine
Henderson 2008	NE London; Orthodox Jewish mothers; unspecified vaccines
Austvoll-Dahlgren 2010	3 maternal and child health centres in a major Norwegian city; parents; unspecified vaccine
Tickner 2010	Southern England; parents in preschool groups; MMR and tDap/IPV booster
Brunson 2013	King County, Washington, USA; a large, diverse county in western Washington known for lower than average vaccination rates; US-born parents with children 18 months or younger; unspecified vaccines
Tomlinson 2013	Somali community in Birmingham UK; unspecified vaccines with a focus on MMR
Delkhosh 2014	Urban southern Tehran, Iran; mothers with children 0-24 months; EPI vaccines

Table 49. CERQual evidence profile: finding 41 (*Continued*)

Barbieri 2015	Southeast Sao Paulo, Brazil; highly educated parents in urban areas; EPI vaccines
Fadda 2015	Italian speaking Canton of Ticino, Switzerland; parents with children under 12 months; MMR vaccine
Harmsen 2015	Utrecht, Netherlands; Turkish and Moroccan mothers with a child 0-4 years old living in the Netherlands for at least 1 year; EPI vaccines
Kowal 2015	Urban Edmonton, Alberta Canada; refugee participants born in India, Pakistan, China or Bhutan and currently living in Edmonton; moved to Canada in the last 8 years and have a child under 8 years old. Lower income and education than the Edmonton average; EPI vaccines
Blaisdell 2016	Urban Portland, Maine, USA; vaccine-hesitant parents identified through a screening tool; EPI vaccines
Sobo 2016	California, USA; campus day centre and community locations known to attract vaccine-cautious individuals with at least 1 child kindergarten aged or younger; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 50. CERQual evidence profile: finding 42

Finding 42: some parents vaccinated their children because of perceived pressure from the health services	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting on context, sampling and methods and lack of discussion of researcher reflexivity
Coherence	Minor concerns regarding coherence
Relevance	Moderate concerns regarding relevance due to partial relevance of setting and a focus on the MMR vaccine
Adequacy	Moderate concerns regarding adequacy due to thinness of data from few studies
Overall CERQual assessment	
Low confidence	Due to moderate concerns regarding methodological limitations, relevance and adequacy and minor concerns regarding coherence
Contributing studies	

Table 50. CERQual evidence profile: finding 42 (*Continued*)

Study	Context
Berhanel 2000	Macro- and micro-levels of the EPI programme in Ethiopia; mothers; unspecified vaccine
Evans 2001	Avon and Gloucester, England; parents who had and had not vaccinated; MMR vaccine
Topuzoğlu 2007	Umraniya, Istanbul, Turkey; socioeconomically disadvantaged suburban mothers who had children younger than 5 years old; unspecified vaccines
Austin 2008	Primary group area in the South West UK; parents of children born between certain dates; all vaccines in the UK vaccination calendar until school entry
Figueiredo 2011	Families belonging to 2 health areas in Brazil; mothers, fathers and a maternal grandmother; unspecified vaccine
Tomlinson 2013	Somali community in Birmingham UK; unspecified vaccines with a focus on MMR
Saada 2015	Northern California, USA; parents who were on time, late or missing vaccinations of children aged 12-36 months; members of Kaiser Permanente; unspecified vaccines

EPI: Extended Programme on Immunization; **MMR**: measles, mumps and rubella vaccine.

Table 51. CERQual evidence profile: finding 43

Finding 43: some parents who decided not to vaccinate often felt that they had made a more informed decision than parents who had vaccinated	
Assessment for each CERQual component	
Methodological limitations	Moderate concerns regarding methodological limitations due to poor reporting on methods and lack of discussion of researcher reflexivity
Coherence	No or very minor concerns regarding coherence
Relevance	Serious concerns regarding relevance as the finding is from 1 urban setting in the UK
Adequacy	Serious concerns regarding adequacy as the finding is from 1 study with thin data
Overall CERQual assessment	
Very Low confidence	Due to moderate concerns regarding methodological limitations and serious concerns regarding relevance and adequacy
Contributing studies	

Table 51. CERQual evidence profile: finding 43 (*Continued*)

Study	Context
Brown 2012	London, UK; mothers planning to accept, decline or postpone the first MMR dose; MMR vaccine

MMR: measles, mumps and rubella vaccine.

Table 52. Integrating findings from this synthesis with the findings of relevant Cochrane effectiveness reviews

Studies included in relevant Cochrane effectiveness reviews	Was the intervention/communication designed to address the following factors?							
	1	2	3	4	5	6	7	8
Andersson 2009	√	-	√	-	-	√	√	-
Banerjee 2010	√	-	-	-	-	-	-	-
Bartu 2006	√	-	√	-	-	-	-	-
Bjornson 1996	√	-	-	-	-	-	√	-
Bolam 1998	√	√	√	?	-	-	-	-
Brugha 1996	√	-	-	-	-	-	-	-
Owais 2011	√	-	√	-	-	-	√	-
Pandey 2007	√	√	-	-	-	?	√	-
Quinlivan 2003	√	√	-	?	-	-	-	-
Usman 2009	-	-	-	-	-	-	-	-
Usman 2011	-	-	-	-	-	-	√	-

Table 52. Integrating findings from this synthesis with the findings of relevant Cochrane effectiveness reviews (*Continued*)

Wood 1998	√	-	√	√	-	-	?	-

1. Has information been communicated to parents before the vaccination appointment?
2. Has the information been provided in more than one setting, including settings outside of the health centre? Has an opportunity for discussion about the vaccination information been offered?
3. Has an attempt been made to tailor the information to a particular audience?
4. Has an attempt been made to ensure that health workers are helpful, caring and willing to have open, non-judgemental discussions with parents about their questions and concerns regarding vaccination?
5. Are health workers perceived by parents, informal caregivers and other stakeholders as being driven primarily by the best interests of the child or are they perceived as being driven by other motives, such as financial gain?
6. Has an attempt been made to provide parents with information they perceive as impartial, balanced and unbiased?
7. Has an attempt been made to communicate vaccination information in a clear and simple way and present it in a variety of formats?
8. Did the information provided try to address ongoing media stories or rumours about vaccination so as to address parents' current questions and concerns?

APPENDICES

Appendix 1. Search strategy: MEDLINE In-Process & Other Non-Indexed Citations and MEDLINE 1946 to Present, Ovid

#	Searches
1	Immunization/
2	Immunization Programs/
3	Immunization, Schedule/
4	Vaccination/
5	Mass Vaccination/
6	Vaccines/
7	or/1-6
8	Child/
9	Child, Preschool/
10	Infant/

(*Continued*)

11	exp Infant, Newborn/
12	Child Care/
13	Infant Care/
14	Child Welfare/
15	Mothers/
16	Pregnant Women/
17	Fathers/
18	Parents/
19	(child* or infant* or newborn* or new born* or neonat* or baby or babies or toddler*).ti,ab
20	(mother* or pregnant women or father* or parent*).ti,ab.
21	Parenting/
22	Maternal Behavior/
23	Paternal Behavior/
24	or/8-23
25	Correspondence as Topic/
26	Communication/
27	Communication Barriers/
28	Health Communication/
29	Persuasive Communication/
30	Propaganda/
31	Communications Media/
32	Mass Media/
33	Internet/
34	Blogging/
35	Social Media/

(*Continued*)

36	Social Networking/
37	Radio/
38	Television/
39	Telephone/
40	Cellular Phone/
41	Text Messaging/
42	Electronic Mail/
43	Answering Services/
44	Reminder Systems/
45	Hotlines/
46	Health Promotion/
47	Social Marketing/
48	"Marketing of Health Services"/
49	Health Education/
50	Counseling/
51	Motivation/
52	Information Dissemination/
53	Consumer Health Information/
54	Patient Education as Topic/
55	Pamphlets/
56	Information Literacy/
57	Health Literacy/
58	Information Seeking Behavior/
59	Knowledge/

(*Continued*)

60	Comprehension/
61	Health Knowledge, Attitudes, Practice/
62	Attitude to Health/
63	Patient Acceptance of Health Care/
64	"Power (Psychology)"/
65	Decision Making/
66	Decision Support Techniques/
67	Uncertainty/
68	Perception/
69	or/25-68
70	7 and 24 and 69
71	((communicat* or inform* or rumor* or promot* or discuss* or persua* or motivat* or empower* or counsel* or educat*) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
72	((communicat* or inform* or rumor* or promot* or discuss* or persua* or motivat* or empower* or counsel* or educat*) adj6 (vaccinat* or revaccinat* or immuniz* or immunis*)).ab
73	((mass media or media campaign* or social media? or network* or net work* or telephon* or phone* or hotline* or hot line* or answering service* or reminder? or radio or television or online or on line web or internet or e mail* or sms or text message* or messaging or blog? or blogging or face book or facebook or twitter or e health or m health or pamphlet? or brochure? or booklet?) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
74	((mass media or media campaign* or social media? or network* or net work* or telephon* or phone* or hotline* or hot line* or answering service* or reminder? or radio or television or online or on line web or internet or e mail* or sms or text message* or messaging or blog? or blogging or face book or facebook or twitter or e health or m health or pamphlet? or brochure? or booklet?) adj6 (vaccin* or revaccinat* or immuniz* or immunis*)).ab
75	((decide or deciding or decision* or consent*) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
76	((decide or deciding or decision* or consent*) adj6 (vaccinat* or revaccinat* or immuniz* or immunis*)).ab
77	((understand* or comprehen* or knowledge or skill or skills or literacy) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
78	((understand* or comprehen* or knowledge or skill or skills or literacy) adj6 (vaccinat* or revaccinat* or immuniz* or immunis*)).ab

(*Continued*)

79	((attitud* or perception* or perceiv* or aware* or uncertain* or hesitan*) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
80	((attitud* or perception* or perceiv* or aware* or uncertain* or hesitan*) adj6 (vaccin* or revaccinat* or immuniz* or immunis*)).ab
81	((accept* or willing* or concern or concerns or concerned or objection? or against or reject or refus* or resist* or anxiety or anxious or feeling? or emotion*) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
82	((accept* or willing* or concern or concerns or concerned or objection? or against or reject or refus* or resist* or anxiety or anxious or feeling? or emotion*) adj6 (vaccin* or revaccinat* or immuniz* or immunis*)).ab
83	or/71-82
84	83 and 24
85	70 or 84
86	limit 85 to "qualitative (maximizes sensitivity)"
87	Qualitative Research/ or Interviews as Topic/ or (qualitative or group discussion? or focus group? or themes).ti,ab
88	85 and 87
89	86 or 88
90	exp Animals/
91	Humans/
92	90 not (90 and 91)
93	review.pt.
94	meta analysis.pt.
95	news.pt.
96	comment.pt.
97	editorial.pt.
98	cochrane database of systematic reviews.jn.
99	comment on.cm.
100	(systematic review or literature review).ti.

(*Continued*)

101	or/92-100
102	89 not 101
103	limit 102 to (danish or english or french or norwegian or swedish)

Appendix 2. Search strategy: Embase, Ovid

#	Searches
1	immunization/
2	mass immunization/
3	vaccination/
4	bcg vaccination/
5	measles vaccination/
6	revaccination/
7	vaccine/
8	or/1-7
9	child/
10	preschool child/
11	infant/
12	newborn/
13	child health care/
14	child care/
15	newborn care/
16	child welfare/
17	parent/
18	expectant parent/

(*Continued*)

19	expectant father/
20	expectant mother/
21	mother/
22	father/
23	parental behavior/
24	maternal behavior/
25	child parent relation/
26	(child* or infant* or newborn* or new born* or neonat* or baby or babies or toddler*).ti,ab
27	(mother* or pregnant women or father* or parent*).ti,ab.
28	or/9-27
29	parental attitude/
30	parental consent/
31	parenting education/
32	parent counseling/
33	or/29-32
34	interpersonal communication/
35	mass communication/
36	persuasive communication/
37	e-mail/
38	internet/
39	mass medium/
40	mobile phone/
41	postal mail/
42	propaganda/

(*Continued*)

43	social media/
44	telephone/
45	television/
46	text messaging/
47	social network/
48	telecommunication/
49	reminder system/
50	health promotion/
51	health education/
52	social marketing/
53	counseling/
54	peer counseling/
55	motivation/
56	information dissemination/
57	patient education/
58	consumer health information/
59	information literacy/
60	health literacy/
61	information seeking/
62	knowledge/
63	comprehension/
64	attitude to health/
65	health behavior/
66	health belief/

(*Continued*)

67	perception/
68	medical decision making/
69	decision making/
70	decision support system/
71	uncertainty/
72	medical information/
73	empowerment/
74	awareness/
75	or/34-74
76	((communicat* or inform* or rumor* or promot* or discuss* or persua* or motivat* or empower* or counsel* or educat*) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
77	((communicat* or inform* or rumor* or promot* or discuss* or persua* or motivat* or empower* or counsel* or educat*) adj6 (vaccinat* or revaccinat* or immuniz* or immunis*)).ab
78	((mass media or media campaign* or social media? or network* or net work* or telephon* or phone* or hotline* or hot line* or answering service* or reminder? or radio or television or online or on line web or internet or e mail* or sms or text message* or messaging or blog? or blogging or face book or facebook or twitter or e health or m health or pamphlet? or brochure? or booklet?) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
79	((mass media or media campaign* or social media? or network* or net work* or telephon* or phone* or hotline* or hot line* or answering service* or reminder? or radio or television or online or on line web or internet or e mail* or sms or text message* or messaging or blog? or blogging or face book or facebook or twitter or e health or m health or pamphlet? or brochure? or booklet?) adj6 (vaccin* or revaccinat* or immuniz* or immunis*)).ab
80	((decide or deciding or decision* or consent*) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
81	((decide or deciding or decision* or consent*) adj6 (vaccinat* or revaccinat* or immuniz* or immunis*)).ab
82	((understand* or comprehen* or knowledge or skill or skills or literacy) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
83	((understand* or comprehen* or knowledge or skill or skills or literacy) adj6 (vaccinat* or revaccinat* or immuniz* or immunis*)).ab
84	((attitud* or perception* or perceiv* or aware* or uncertain* or hesitan*) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti

(*Continued*)

85	((attitud* or perception* or perceiv* or aware* or uncertain* or hesitan*) adj6 (vaccin* or revaccinat* or immuniz* or immunis*)).ab
86	((accept* or willing* or concern or concerns or concerned or objection? or against or reject or refus* or resist* or anxiety or anxious or feeling? or emotion*) and (vaccin* or revaccinat* or immuniz* or immunis*)).ti
87	((accept* or willing* or concern or concerns or concerned or objection? or against or reject or refus* or resist* or anxiety or anxious or feeling? or emotion*) adj6 (vaccin* or revaccinat* or immuniz* or immunis*)).ab
88	or/76-87
89	8 and 28 and 75
90	8 and 33
91	88 and 28
92	89 or 90 or 91
93	limit 92 to "qualitative (maximizes sensitivity)"
94	qualitative research/ or interview/ or (group discussion? or focus group? or themes).ti,ab
95	92 and 94
96	93 or 95
97	review.pt.
98	editorial.pt.
99	cochrane database of systematic reviews.jn.
100	(systematic review or literature review).ti.
101	or/97-100
102	96 not 101
103	exp animals/ or exp invertebrate/ or animal experiment/ or animal model/ or animal tissue/ or animal cell/ or nonhuman/
104	human/ or normal human/ or human cell/
105	103 and 104
106	103 not 105
107	102 not 106

(*Continued*)

108	limit 107 to (danish or english or french or norwegian or swedish)
109	limit 108 to embase

Appendix 3. Search strategy: CINAHL, EbscoHost

#	Query
S66	S52 OR S64 [Limiters - Exclude MEDLINE records]
S65	S52 OR S64
S64	S57 AND S63
S63	S58 OR S59 OR S60 OR S61 OR S62
S62	TI ((vaccin* or revaccin* or imminis* or imminiz*)) OR AB ((vaccin* or revaccin* or imminis* or imminiz*))
S61	(MH "Vaccines")
S60	(MH "Immunization Schedule")
S59	(MH "Immunization Programs")
S58	(MH "Immunization")
S57	S53 OR S54 OR S55 OR S56
S56	TI ((maternal or mother* or paternal or father* or parent*) W3 attitud*) OR AB ((maternal or mother* or paternal or father* or parent*) W3 attitud*)
S55	(MH "Parental Attitudes")
S54	(MH "Paternal Attitudes")
S53	(MH "Maternal Attitudes")
S52	S48 AND S51
S51	S49 OR S50
S50	TI ((qualitative or group W0 discussion* or focus W0 group* or themes)) OR AB ((qualitative or group W0 discussion* or focus W0 group* or themes))
S49	(MH "Qualitative Studies+")

(*Continued*)

S48	S33 OR S47
S47	S31 AND S46
S46	S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45
S45	AB (accept* or willing* or concern or concerns or concerned or objection* or against or reject or refus* or resist* or anxiety or anxious or feeling* or emotion*) N6 (vaccin* or revaccinat* or immuniz* or immunis*)
S44	TI (accept* or willing* or concern or concerns or concerned or objection* or against or reject or refus* or resist* or anxiety or anxious or feeling* or emotion*) N6 (vaccin* or revaccinat* or immuniz* or immunis*)
S43	AB (attitud* or perception* or perceiv* or aware* or uncertain* or hesitan*) N6 (vaccin* or revaccinat* or immuniz* or immunis*)
S42	TI (attitud* or perception* or perceiv* or aware* or uncertain* or hesitan*) N6 (vaccin* or revaccinat* or immuniz* or immunis*)
S41	AB (understand* or comprehen* or knowledge or skill or skills or literacy) N6 (vaccin* or revaccinat* or immuniz* or immunis*)
S40	TI (understand* or comprehen* or knowledge or skill or skills or literacy) and (vaccin* or revaccinat* or immuniz* or immunis*)
S39	AB (decide or deciding or decision* or consent*) N6 (vaccin* or revaccinat* or immuniz* or immunis*)
S38	TI (decide or deciding or decision* or consent*) and (vaccin* or revaccinat* or immuniz* or immunis*)
S37	AB ("mass media" or media W0 campaign* or social W0 media* or network* or net W0 work* or telephon* or phone* or hotline* or hot W0 line* or answering W0 service* or reminder* or radio or television or online or "on line" or web or internet or e W0 mail* or sms or text W0 messag* or messaging or blog or blogs or blogging or "face book" or facebook or twitter or "e health" or "m health" or pamphlet* or brochure* or booklet*) N6 (vaccin* or revaccinat* or immuniz* or immunis*)
S36	TI ("mass media" or media W0 campaign* or social W0 media* or network* or net W0 work* or telephon* or phone* or hotline* or hot W0 line* or answering W0 service* or reminder* or radio or television or online or "on line" or web or internet or e W0 mail* or sms or text W0 messag* or messaging or blog or blogs or blogging or "face book" or facebook or twitter or "e health" or "m health" or pamphlet* or brochure* or booklet*) and (vaccin* or revaccinat* or immuniz* or immunis*)
S35	AB (communicat* or inform* or rumor* or promot* or discuss* or persua* or motivat* or empower* or counsel* or educat*) N6 (vaccinat* or revaccinat* or immuniz* or immunis*)
S34	TI (communicat* or inform* or rumor* or promot* or discuss* or persua* or motivat* or empower* or counsel* or educat*) and (vaccin* or revaccinat* or immuniz* or immunis*)
S33	S5 AND S31 AND S32
S32	(MH "Perception") OR (MH "Cognition") OR (MH "Decision Making+") OR (MH "Decision Support Techniques") OR (MH "Decision Trees") OR (MH "Empowerment") OR (MH "Uncertainty") OR (MH "Attitude to Illness") OR (MH "Attitude to Health") OR (MH "Health Beliefs") OR (MH "Health Knowledge") OR (MH "Consumer Health Information") OR (MH "Health Information") OR (MH "Information Management") OR (MH "Motivation") OR (MH "Emotions") OR

(*Continued*)

	(MH "Fear") OR (MH "Anxiety") OR (MH "Counseling") OR (MH "Peer Counseling") OR (MH "Health Education") OR (MH "Patient Education") OR (MH "Parenting Education") OR (MH "Social Marketing") OR (MH "Health Promotion") OR (MH "Telephone Information Services") OR (MH "Reminder Systems") OR (MH "Telephone") OR (MH "Wireless Communications") OR (MH "Television") OR (MH "Radio") OR (MH "Pamphlets") OR (MH "Blogs") OR (MH "Internet") OR (MH "World Wide Web") OR (MH "Social Media") OR (MH "Instant Messaging") OR (MH "Text Messaging") OR (MH "Electronic Bulletin Boards") OR (MH "Communications Media") OR (MH "Mail") OR (MH "Voice Mail") OR (MH "Electronic Mail") OR (MH "Parental Notification") OR (MH "Communication") OR (MH "Communication Barriers") OR (MH "Communication Skills") OR (MH "Conversation") OR (MH "Truth Disclosure") OR (MH "Social Networking") OR (MH "Information Seeking Behavior") OR (MH "Information Literacy") OR (MH "Information Needs") OR (MH "Information Retrieval") OR (MH "Access to Information") OR (MH "Affection") OR (MH "Attitude") OR (MH "Uncertainty")
S31	S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30
S30	TI ((mother* or pregnant W0 women or father* or parent*)) OR AB ((mother* or pregnant W0 women or father* or parent*))
S29	TI ((child* or infant* or newborn* or new W0 born* or neonat* or baby or babies or toddler*)) OR AB ((child* or infant* or newborn* or new W0 born* or neonat* or baby or babies or toddler*))
S28	(MH "Paternal Behavior")
S27	(MH "Parental Behavior")
S26	(MH "Maternal Behavior")
S25	(MH "Parenting")
S24	(MH "Expectant Parents")
S23	(MH "Parents")
S22	(MH "Expectant Fathers")
S21	(MH "Fathers")
S20	(MH "Expectant Mothers")
S19	(MH "Mothers")
S18	(MH "Maternal Welfare")
S17	(MH "Maternal-Child Welfare")
S16	(MH "Maternal-Child Health")
S15	(MH "Maternal-Child Care")

(*Continued*)

S14	(MH "Child Welfare")
S13	(MH "Child Health")
S12	(MH "Child Health Services")
S11	(MH "Infant Care")
S10	(MH "Child Care")
S9	(MH "Infant, Newborn")
S8	(MH "Infant")
S7	(MH "Child, Preschool")
S6	(MH "Child")
S5	S1 OR S2 OR S3 OR S4
S4	(MH "Vaccines")
S3	(MH "Immunization Schedule")
S2	(MH "Immunization Programs")
S1	(MH "Immunization")

Appendix 4. Search strategy: Anthropology Plus, EbscoHost

S1	TX (vaccin* or revaccin* or immunis* or immuniz*)

WHAT'S NEW

Date	Event	Description
7 March 2017	Amended	Minor edit made to question 5 contributing to the matrix analysis and the implications for practice to improve clarity

CONTRIBUTIONS OF AUTHORS

HA, CG and SL devised this study. HA led the review process with input and revisions from CG and SL.

DECLARATIONS OF INTEREST

Heather MR Ames: none known

Simon Lewin is Co-ordinating Editor with the Effective Practice and Organisation of Care Group.

Claire Glenton is editor with the Effective Practice and Organisation of Care Group and the Cochrane Consumers and Communication Review Group.

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Claire Glenton and Simon Lewin are both employed by the Centre.

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DIFFERENCES BETWEEN PROTOCOL AND REVIEW

None to report.

INDEX TERMS

Medical Subject Headings (MeSH)

*Caregivers; *Communication; *Decision Making; *Health Knowledge, Attitudes, Practice; *Parents; *Vaccination; Qualitative Research; Trust

MeSH check words

Child; Humans