Barriers to uptake of childhood vaccination: protocol for a review of systematic reviews

Jessica Kaufman\*1,2, Jane Tuckerman1,2, David Durrheim3,4, Carissa Bonner5, Lyndal Trevena5, Daniel Costa5, Susan Thomas3,4, Margie Danchin1,2,6

1. Murdoch Children’s Research Institute, Parkville, VIC, Australia
2. University of Melbourne, Parkville, VIC, Australia
3. University of Newcastle, Newcastle, NSW, Australia
4. Hunter New England Health, Newcastle, NSW, Australia
5. University of Sydney, Sydney, NSW, Australia
6. Royal Children’s Hospital, Parkville, VIC, Australia

\*jess.kaufman@mcri.edu.au

# Background

The achievements of vaccines are threatened by a persistent proportion of parents who decline, delay, or are unable to access vaccines for their children. Globally, outbreaks of vaccine-preventable diseases are increasing. In 2019 alone, there has been a 300% increase in global measles cases.1

Understanding and assessing the factors associated with under- or non-vaccination is critical to develop and target effective interventions to increase uptake. Broadly, these factors can be categorised using the COM-B theoretical framework as relating to capability (e.g. lack of knowledge about schedules), opportunity (e.g. infrequent contact with health services), and motivation (e.g. concern about side effects).2

Much attention is often paid to these motivation factors, particularly as the World Health Organization has named vaccine hesitancy as one the 10 greatest threats to global health.3 However, the breadth and impact of hesitancy varies between countries and populations and is complex and context specific.4 In Australia, for instance, indicators of social disadvantage, like larger family size and lone motherhood, are more strongly related to delayed immunisation than parent objection to vaccines.5 While an estimated 3.3% of Australian children are under- vaccinated as a result of vaccination objection, nearly half of parents (43%) report some vaccine concerns.6 This latter group of parents is vulnerable to shifts in vaccine confidence due to vaccine safety scares, despite most continuing to vaccinate.

Despite many individual studies and systematic reviews identifying different barriers or factors associated with childhood vaccine uptake in different settings,7-9 there have been no systematic high-level attempts to summarise or synthesise this evidence across all studies and populations. Such an overview is necessary in order to inform the design of a comprehensive measurement instrument that can be used to diagnose the causes of under-vaccination, whether these relate to access or acceptance.

This overview of systematic reviews aims to identify all parent-level barriers to uptake of childhood vaccination and summarise the available evidence of the relationship between the barriers and vaccine uptake.

**Objectives:** Our specific objectives are to:

* Identify systematic reviews of barriers to uptake of childhood vaccination in countries of any income level
* Extract data on factors, including whether they are identified in LMICs, HICs or both, and the nature of the evidence of their association with uptake
* Appraise the quality of included reviews using a tool specifically designed to assess risk of bias in systematic reviews
* Inductively group the barriers into meaningful categories
* Narratively synthesise the evidence underpinning the identified barriers

# Methods

**Criteria for considering reviews for this overview**

*Types of reviews*

We will include systematic reviews that discuss or focus on parent-level barriers associated with uptake of vaccination for children under 5 years of age. To allow for differences in vaccination schedules across countries we defined childhood vaccination to include all vaccines that could be given to a child under the age of 5 years.

We will include systematic reviews of quantitative, qualitative, or mixed methods primary studies that explore reasons for non-vaccination, barriers or facilitators to vaccination, or factors associated with vaccine uptake.

We will include reviews published in English. If we identify potentially relevant reviews published in other languages, we will record their citations and consider seeking translation on a case-by-case basis. We will search for all reviews published up to 6 August 2019.

Exclusion criteria:

* Reviews focusing solely on adolescent or adult vaccination (e.g. HPV)
* Reviews focusing solely on non-modifiable determinants (e.g. ethnicity, socioeconomic status, gender) or barriers not relevant to parents (e.g. health system structure)
* Reviews published in languages other than English (see note above regarding translation)
* Non-systematic reviews, i.e. literature reviews that do not describe the search strategy and selection criteria for primary studies, and/or do not report the number and references of included studies
* Reviews focusing solely on intervention studies
* Reviews focusing solely on seasonal or pandemic influenza.

*Population*

We will include reviews that report on barriers to vaccination of children under 5 years of age. We will include reviews with mixed patient populations as long as one or more primary studies focus on childhood vaccination. We will only extract data on factors explicitly related to childhood vaccination.

*Factors*

We will extract data on any barrier shown or perceived by parents to be related to vaccine behaviour/uptake. If possible, we will record the review’s assessment of the barrier’s association with uptake (i.e. direction of association and strength or frequency of its identification in primary studies).

*Search*

We will search for systematic reviews using the Epistemonikos database. Epistemonikos regularly indexes systematic reviews from a range of other databases, including the Cochrane Database of Systematic Reviews (CDSR), Pubmed, Embase, CINAHL (The Cumulative Index to Nursing and Allied Health Literature), Psycinfo, LILACS (Literatura Latinoamericana y del Caribe en Ciencias de la Salud), Database of Abstracts of Reviews of Effects (DARE), The Campbell Collaboration online library, JBI Database of Systematic Reviews and Implementation, and EPPI-Centre Evidence Library.

*Proposed search strategy*

advanced\_title\_en:(((barrier\* OR facilitat\* OR factor\* OR understand\* OR reason\*) AND (vacc\* OR immunis\* OR immuniz\*))) OR advanced\_abstract\_en:(((barrier\* OR facilitat\* OR factor\* OR understand\* OR reason\*) AND (vacc\* OR immunis\* OR immuniz\*) AND (parent\* OR child\* OR infant\* OR newborn\*))) [Filters: protocol=no, classification=systematic-review]

**Data collection and analysis**

*Selection of reviews*

Using Covidence software, two study authors will independently screen all titles and abstracts to identify potentially eligible reviews. Full text reviews will be examined independently to determine inclusion. Disagreements will be mediated by a third author. Reasons for exclusion of all reviews examined in full text will be recorded.

*Data extraction*

We will use a pilot-tested data extraction form. One author will extract all data, which will be independently verified by a second author. The following data will be extracted for all included reviews:

* Date of publication
* Stated focus of the review
* Vaccines of interest (eg all routine childhood vaccines; specific vaccines)
* Stated selection criteria for primary studies (including whether quality of primary studies was appraised)
* Number and types of primary studies included
* Country and country income level of primary studies (as defined by the World Bank)
* Summary of primary study geographic settings, if stated (e.g. urban/ rural, international/ national/ subnational/ local)
* Summary of primary study health system setting, if stated (public/private, community health, hospital-based)

For all barriers mentioned or described in each review, the following specific data will be extracted:

* Brief description of barrier
* Number of primary studies identifying this barrier, if provided
* Types of primary studies identifying this barrier (e.g. qualitative, quantitative, mixed methods)
* Specific study designs, if stated (e.g. cohort, cross sectional, comparison)
* Description of evidence of association with vaccination behaviour
* Direction of association with behaviour (associated with lower uptake/refusal, associated with higher uptake/acceptance, cited/raised by decliners, cited/raised by acceptors, no or mixed evidence of association, not reported)

*Quality appraisal*

We will appraise the quality of all included reviews using the ROBIS tool to assess risk of bias in systematic reviews.10 Unlike other existing quality appraisal tools, the applicability of ROBIS is not limited to reviews of intervention effectiveness. Additionally, we will report which quality assessment tool was used by individual systematic review authors and whether a guideline was used to direct reporting. Review quality will be independently assessed by two authors and decisions will be discussed to reach consensus.

*Analysis*

Due to the anticipated high heterogeneity of study designs in the included reviews, we will narratively synthesise the evidence around the identified factors. We will inductively code barrier descriptions and thematically group them into categories for analysis. If possible, we will also explore the relationships between review features – including country income level and review quality – and the types of factors identified, as well as their directions of association with uptake.

We will investigate degree of overlap between reviews (i.e. the number of primary studies included in more than one review) by calculating the corrected covered area (CCA) using the methods developed by Pieper et al.11

We aim to complete analysis by April 2020.

**Conclusion**

The barriers identified from this review will inform the selection and generation of items for the Vaccine Barriers Assessment Tool (VBAT), a measurement instrument for diagnosing the causes of under-vaccination and predicting childhood vaccine uptake in Australia and New Zealand.

# Funding

This project is funded by a 2018 Australian National Health and Medical Research Council project grant (APP1164200).

References

1. Mahase E. Measles cases rise 300% globally in first few months of 2019. BMJ. 2019;365:l1810.

2. Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implement Sci. 2011;6:42.

3. World Health Organization. Ten threats to global health in 2019 2019 [Available from: <https://www.who.int/emergencies/ten-threats-to-global-health-in-2019>.

4. MacDonald NE, Hesitancy SWGoV. Vaccine hesitancy: Definition, scope and determinants. Vaccine. 2015;33(34):4161-4.

5. Homel J, Edwards B. Factors associated with delayed infant immunization in a nationally representative cohort study. Child Care Health Dev. 2018;44(4):583-91.

6. Costa-Pinto JC, Willaby HW, Leask J, et al. Parental Immunisation Needs and Attitudes Survey in paediatric hospital clinics and community maternal and child health centres in Melbourne, Australia. J Paediatr Child Health. 2018;54(5):522-9.

7. Brown KF, Kroll JS, Hudson MJ, et al. Factors underlying parental decisions about combination childhood vaccinations including MMR: a systematic review. Vaccine. 2010;28(26):4235-48.

8. Falagas ME, Zarkadoulia E. Factors associated with suboptimal compliance to vaccinations in children in developed countries: a systematic review. Curr Med Res Opin. 2008;24(6):1719-41.

9. Smith LE, Amlot R, Weinman J, et al. A systematic review of factors affecting vaccine uptake in young children. Vaccine. 2017;35(45):6059-69.

10. Whiting P, Savovic J, Higgins JP, et al. ROBIS: A new tool to assess risk of bias in systematic reviews was developed. J Clin Epidemiol. 2016;69:225-34.

11. Pieper D, Antoine SL, Mathes T, et al. Systematic review finds overlapping reviews were not mentioned in every other overview. J Clin Epidemiol. 2014;67(4):368-75.