A systematic review of interventions for reducing parental vaccine refusal and vaccine hesitancy
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CRD summary
The authors concluded there was no high-quality evidence on the effective strategies to reduce parental vaccine refusal, and high-quality trials were needed. This accurately reflects the evidence presented, and can be considered to be reliable.

Authors' objectives
To review interventions to reduce parental refusal of vaccine and vaccine hesitancy.

Searching
PubMed, Cochrane Central Register of Controlled Trials (CENTRAL), EMBASE and PsycINFO were searched to September 2012, for papers published after 1st January, 1990. Search terms were reported and English-language filters were used.

Study selection
Intervention studies, of any design, that reported parental vaccine refusal behaviour, parental attitudes towards immunisation, parental intention to vaccinate, or a combination of these, were included.

Most of the included studies were based in the USA. Interventions were grouped by: state laws that permitted personal belief or philosophical exemptions to vaccination; state- and school-level implementation of these laws; and parent-centred immunisation information or education. Parent-centred interventions included written educational materials, group meetings, presentations, online decision aids, and combinations of these. Data were collected via the Internet or on paper questionnaires and surveys, in most cases. Where reported, parents were making decisions for children aged zero to 17 years, across the studies.

Two reviewers independently assessed studies for inclusion and discussion was held to reach a consensus.

Assessment of study quality
Randomised controlled trials were evaluated for potential bias, based on sequence generation, allocation concealment, blinding, completeness of outcome data, selective reporting, and baseline imbalances. Other study designs were assessed using the World Health Organization's Strategic Advisory Group of Experts on immunisation (SAGE) guidelines; no further details were provided.

GRADE criteria were used to downgrade or upgrade the level of confidence in the findings across the studies. Studies were downgraded for vulnerability to bias, indirectness of evidence, imprecision, or inconsistency. They were upgraded for strength of association or size of effect, dose-response relationship, or antagonistic bias and confounding.

It appears that two reviewers assessed study quality.

Data extraction
Two reviewers independently extracted the data, using EPPI-Reviewer, and any disagreements were discussed to reach a consensus.

Methods of synthesis
Studies were grouped according to the three categories: passage of state laws; state- or school-level implementation of laws; and parent-centred information or education. Heterogeneity was not formally assessed and funnel plots were not drawn.

Results of the review
Thirty studies were included in the review; 13 were before-and-after studies, four were randomised controlled trials (RCTs), seven were non-randomised controlled studies, and six were evaluation studies. Some studies were based on states, districts or schools, such that the exact participant numbers were not reported. Where reported, participant numbers ranged from 38 parents to 1,178 parents.

**Passage of state laws:** Four observational studies reported on the impact of introducing state-level personal belief or philosophical exemptions to school immunisation requirements. Two studies reported statistically significant increases in non-medical exemptions, after the introduction of the law, compared with states that allowed religious only exemptions. The two other studies reported an increase in the overall exemption rates and a decrease in medical exemptions, after the introduction of the law. Based on the overall quality and indirectness of the evidence, the impact of state laws on parental vaccine refusal was considered to be unclear.

**State- and school-level implementation:** Five studies were found. Three studies reported on the impact of state-level procedural complexity for obtaining exemption from immunisation, and one reported on school-level procedural complexity. All four studies showed an inverse relationship between the difficulty of the process and exemption rates. Two studies reported the impact of early and frequent parental notification of immunisation requirements, and reported significantly decreased rates of exemption. Based on the quality assessment, these results were considered to be of limited reliability and the impact of increasing procedural difficulty on parental vaccine refusal was unclear.

**Parent-centred information or education:** Seventeen studies were found. Fifteen (including two RCTs) reported the impact of information provision (most often via brochures) on parental attitudes towards vaccination. Eight of these reported statistically significant improvements in attitudes towards immunisation, one study reported a negative impact, and the others found no differences. Ten studies (including two RCTs) evaluated the impact of educational information on parental intention to vaccinate their child (most used leaflets). Five studies reported a significant positive impact on vaccination intentions, and five reported no difference. For both these subgroups, only the randomised controlled trials were included in the quality assessment and GRADE process. This evidence was judged to be compromised by shortcomings in study design and imprecision of the results, so confidence in the estimate of effect was limited and the impact of patient-centred education on immunisation intentions or attitudes was judged to be unclear.

**Authors’ conclusions**
There was no high-quality evidence on the effective strategies to reduce parental vaccine refusal.

**CRD commentary**
This review addressed a clear question, with appropriate inclusion criteria. The literature search was reasonably comprehensive, but no attempts were made to identify publications not in English and grey literature, as acknowledged by the authors. The review processes were mostly well described, reducing the potential for reviewer error and bias.

The included studies were assessed for quality and reliability, but the exact details were only partly described and the judgements for individual studies were not presented. The evidence was considered too varied for statistical synthesis and a narrative synthesis, which incorporated weighting of the evidence according to reliability, was reported.

The authors’ cautious conclusions reflect the evidence presented and should be considered to be reliable.

**Implications of the review for practice and research**
**Practice:** There were no recommendations for practice.

**Research:** There was a need for good quality, randomised controlled trials to evaluate interventions to address parental vaccine refusal and hesitancy. These should assess the impact on vaccination rates among refusing parents.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.