Varicella vaccination: a critical review of the evidence

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Authors' objectives
To assess the various options for the use of vaccine to prevent varicella in healthy individuals.

Searching
MEDLINE (from 1966 to 2000) and EMBASE (no time frame given) were searched using the following search terms: 'random allocation', 'placebo', 'double-blind method', 'comparative study', 'epidemiologic methods', 'research design', 'clinical trials', controlled clinical trials', 'meta analysis', 'drug evaluation', 'prospective studies' and 'evaluation studies'. Additional studies were identified by searching the reference lists of located studies, the Internet for position papers and summaries from health organisations (e.g. World Health Organization and the Centers for Disease Control and Prevention), vaccine product information, and the Cochrane Library.

Study selection
Study designs of evaluations included in the review
Controlled trials were included. Prospective cohort studies were considered only for longer term outcomes and if they contained more than 50 patients.

Specific interventions included in the review
The intervention was immunisation by varicella vaccination.

Participants included in the review
Healthy infants, older children, susceptible adolescents and adults were included.

Outcomes assessed in the review
Studies reporting adverse reactions to vaccination and vaccine effectiveness were included in the review.

How were decisions on the relevance of primary studies made?
The authors only state that they adhered to the methodology of the Canadian Task Force on Preventive Health Care. They do not state how many of the reviewers performed the selection.

Assessment of study quality
The authors report that the papers were systematically reviewed using the methodology of the Canadian Task Force on Preventive Health Care (see Other Publications of Related Interest). The authors state how the studies were assessed for validity, but not how many of the reviewers performed the validity assessment.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction.

Data were extracted under the following headings: study design, study population, varicella cases, effect size, and cases with known exposure.

Methods of synthesis
How were the studies combined?
A narrative synthesis was undertaken in the following categories: vaccine effectiveness; adverse reactions to vaccination; transmission of varicella from vaccinated individuals to others; risk of herpes zoster following vaccination;
shift in age of varicella; and cost-effectiveness data for varicella vaccine.

How were differences between studies investigated?
The authors described the best available level of evidence, along with key supporting studies, for each of the criteria evaluated.

Results of the review
Twenty-four controlled trials, of which 10 were randomised controlled trials (RCTs), and 18 cohort studies were included in the review.

Vaccine effectiveness: in children aged 10 months to 14 years there was level I evidence that a single dose was effective in preventing varicella. A direct comparison of vaccine effectiveness for one versus two injection regimens has not been performed in adolescents nor adults.

Adverse reactions: RCTs in children showed no increase in the rate of fever or varicella-like rash. Injection site reactions occurred in 7 to 30% of the participants, and less than 5% of the vaccine and placebo recipients experienced a mild varicella-like rash.

Transmission of varicella from vaccinated to others: no clinical trials have shown transmission.

Risk of herpes zoster following vaccination: only one RCT commented on the risk; no cases were noted in either placebo or vaccine recipients after 9 months.

Cost information
All cost-effectiveness studies were based on simulations. No clinical trials have examined the cost-effectiveness of varicella vaccination in healthy populations. Simulation studies, examining both societal and health care costs associated with varicella, have found net cost-savings with programmes for routine varicella vaccination directed at children aged 15 months. Sero-testing of adult health care workers with a negative or uncertain history of varicella was the most cost-effective approach to vaccination. For children aged 9 to 12 years with uncertain history, sero-testing followed by vaccination was the most cost-effective approach.

Authors' conclusions
There was strong evidence for the effectiveness of varicella vaccination in children. Furthermore, vaccination appeared to be cost-effective when judged from a societal perspective. The quality of evidence was weaker in support of vaccination of adults, but in sum, was supportive of two injection regimens in susceptible individuals. Effectiveness data are required in adolescents and adults to clarify the optimal number of doses. The study results do not support any theoretical concern that immunisation my lead to increased incidence of herpes zoster or an unacceptable rate of transmission of infection from vaccinees. The authors concluded that the quality of evidence in the included studies was generally good. However, several methodological issues affected the quality of the studies, such as the loss to follow-up, the use of self reporting and short periods of follow-up.

CRD commentary
This review addressed an appropriate question using stated inclusion criteria. The literature search covered several databases as well as handsearching. However, the possibility that some studies were missed cannot be excluded. There were no details of the validity assessment nor of any other processes relating to the conduct of the review, apart from stating that the process adhered to published guidelines. Limited and selective study details were provided (only details of the RCTs were tabulated), and there was no discussion of how the material was synthesised.

The conclusion should be treated with caution given the lack of details relating to the review process and the lack of study details.
Implications of the review for practice and research

Practice: The authors state that the findings of their review support current recommendations from the USA, Canada and the World Health Organization on varicella vaccination.

Research: The authors state that effectiveness data in adolescents and adults are required to clarify the optimal number of doses.

Reviewer's comment: It should be noted that varicella vaccination is not currently part of the childhood immunisation schedule in the United Kingdom, although vaccination of susceptible health workers is currently under review by the Department of Health.

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Record Status
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.