TITLE: Quadrivalent Meningococcal Vaccination Programs for Children and Adolescents: Clinical Evidence, Risks, and Cost-Effectiveness

DATE: 12 April 2012

RESEARCH QUESTIONS

1. What is the clinical benefit of quadrivalent meningococcal vaccination programs for children and adolescents for the prevention of meningitis?

2. What is the clinical evidence regarding the potential harm of not implementing a quadrivalent meningococcal vaccination program for children and adolescents?

3. What is the clinical evidence regarding the ideal age for the delivery of the quadrivalent meningococcal vaccination for children and adolescents?

4. What is the cost-effectiveness of a quadrivalent meningococcal vaccination program for children and adolescents?

5. What are the evidence-based guidelines regarding meningococcal vaccination programs for children and adolescents?

KEY MESSAGE

Two economic studies and six evidence-based guidelines were identified regarding meningococcal vaccination programs for children and adolescents.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2012, Issue 4), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, economic

Disclaimer: The Rapid Response Service is an information service for those involved in planning and providing health care in Canada. Rapid responses are based on a limited literature search and are not comprehensive, systematic reviews. The intent is to provide a list of sources of the best evidence on the topic that CADTH could identify using all reasonable efforts within the time allowed. Rapid responses should be considered along with other types of information and health care considerations. The information included in this response is not intended to replace professional medical advice, nor should it be construed as a recommendation for or against the use of a particular health technology. Readers are also cautioned that a lack of good quality evidence does not necessarily mean a lack of effectiveness particularly in the case of new and emerging health technologies, for which little information can be found, but which may in future prove to be effective. While CADTH has taken care in the preparation of the report to ensure that its contents are accurate, complete and up to date, CADTH does not make any guarantee to that effect. CADTH is not liable for any loss or damages resulting from use of the information in the report.

Copyright: This report contains CADTH copyright material and may contain material in which a third party owns copyright. This report may be used for the purposes of research or private study only. It may not be copied, posted on a web site, redistributed by email or stored on an electronic system without the prior written permission of CADTH or applicable copyright owner.

Links: This report may contain links to other information available on the websites of third parties on the Internet. CADTH does not have control over the content of such sites. Use of third party sites is governed by the owners' own terms and conditions.
studies, and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2007 and March 29, 2012. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, economic evaluations, and evidence-based guidelines.

Two economic studies and six evidence-based guidelines were identified regarding meningococcal vaccination programs for children and adolescents. No relevant health technology assessment reports, systematic reviews, meta-analyses, or randomized controlled trials were identified. Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

The included American economic study evaluated the cost-effectiveness of a catch-up vaccination campaign for children 11 to 17 years of age added to routine quadrivalent meningococcal vaccine (MCV-4) for 11 year olds.\(^1\) They estimated that a catch-up and routine vaccination program could result in a 48% reduction in cases of meningococcal disease over a ten year period, compared with routine vaccination alone. The catch-up program would cost society US$88,000 per quality adjusted life year (QALY) saved. The authors concluded that although the catch-up and routine vaccination program would be costly, there would be a substantial impact on disease burden.

The Canadian economic study evaluated the cost-effectiveness of a booster dose of MCV-4 or the meningococcal-C vaccine (MCV-C) at 12 years of age, when added to routine MVC-C vaccination at 1 year of age.\(^2\) The authors estimated that a booster dose of MCV-C at 12 years of age could reduce the burden of disease by 55% with no marginal cost. With respect to the MCV-4 vaccine, a booster at 12 years of age could reduce disease burden by 78% at a cost of $31,000 per quality-adjusted life year. The authors concluded that booster doses of meningococcal vaccines would be beneficial with MCV-C being the most cost-effective and MCV-4 being the most effective in preventing disease.

The two included Canadian guidelines make the following recommendations regarding quadrivalent meningococcal vaccination:

- MENACTRA (Men4-DT) is preferred over the quadrivalent polysaccharide vaccine when a serogroup A, Y, or W135 meningococcal vaccine is indicated for those ≥2 years of age.\(^3\)
- Routine administration of meningococcal vaccine in adolescents is recommended, including those who received the serogroup C vaccine at a younger age, however, the
choice of Men4-DT or MCV-C depends on considerations such as burden of illness and resource allocation priorities.\textsuperscript{3,4} 

- The ideal age for routine adolescent vaccination is 12 years,\textsuperscript{3,4} and could be incorporated into existing school-based programs.\textsuperscript{3} 
- For people two years of age or older in specific high risk groups (e.g. asplenia, primary antibody deficiencies, HIV), the quadrivalent conjugate vaccine is recommended.\textsuperscript{4} 

Three of the included American guidelines made similar recommendations:

- The MCV-4 vaccine is recommended for children older than two years who are at high risk for meningococcal disease (e.g. antibody deficiencies, HIV).\textsuperscript{5-7} 
- All children between 11 and 12 years of age should receive MCV-4 vaccination,\textsuperscript{5-7} with a booster dose around age 16.\textsuperscript{5,7} 
- Catch-up MCV-4 vaccination should occur between 13 and 18 years of age for those who missed primary immunization at an earlier age.\textsuperscript{5-7} 

The fourth American guideline contained recommendations from the Infectious Diseases Society of America, but no specific guidance was included in the abstract.\textsuperscript{8} 

No relevant information regarding the clinical effectiveness of vaccination programs or the potential harm of not implementing a meningococcal vaccination program was identified.
REFERENCES SUMMARIZED

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses
No literature identified.

Randomized Controlled Trials
No literature identified.

Economic Evaluations


Guidelines and Recommendations

Canadian Guidelines


American Guidelines


29];60(3):72-6. Available from:
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6003a3.htm
PubMed: PM21270745

http://pediatrics.aappublications.org/content/128/6/1213.full.pdf+html
PubMed: PM22123893

http://cid.oxfordjournals.org/content/49/6/817.full.pdf+html
PubMed: PM19659433

PREPARED BY:
Canadian Agency for Drugs and Technologies in Health
Tel: 1-866-898-8439
www.cadth.ca
APPENDIX – FURTHER INFORMATION:

Randomized Controlled Trials – vaccine administration in infants


Guidelines and Recommendations – rigour unknown or not systematic


Review Articles


Additional References