| Table I. Effect of meningococcal vaccines on mucosal carriage. As compared to the polysaccharide counterparts, will conjugated MC vaccines more effectively reduce nasopharyngeal carriage of *N. meningitidis* and induce herd protection against meningococcal disease? | | | | |
|---|---|---|---|---|
| | | | Rating | Adjustment to level |
| Quality Assessment | No of Studies/Starting quality starting level | | 4 observational studies | 2 |
| | Factors decreasing confidence | Limitation in study design | None serious | 0 |
| | | Inconsistency | None serious | 0 |
| | | Indirectness | None serious | 0 |
| | | Imprecision | None serious | 0 |
| | | Publication bias | None serious | 0 |
| | Factors increasing confidence | Large effect | Not applicable | 0 |
| | | Dose-response | Not applicable | 0 |
| | | Mitigated bias and confounding | Not applicable | 0 |
| | Final rating of quality of evidence | | | 2 |
| Summary of Findings | Statement on quality of evidence | | | Our confidence in the estimate of the effect on the health outcome is limited |
| | Conclusion | | | Conjugated MC vaccines reduce nasopharyngeal carriage of *N. meningitidis* and induce herd protection against meningococcal disease more effectively than do the corresponding polysaccharide vaccines |

**Review of Observational Studies:**In 1988 *Hassan-King et al* conducted a study on Group A meningococcal carriage rates in a rural area of The Gambia. Carriage rates were determined 6 months before and 6 and 18 months after a mass vaccination campaign with a combined group A and group C meningococcal polysaccharide vaccine. During the first pre-vaccination survey, performed during an outbreak of meningococcal disease, the carriage rate was high (16%). The carriage rate remained high during a second survey made 6 months after the campaign that covered approximately 90% of the study population. A year later very few group A meningococcal carriers were found. It was concluded that vaccination had little influence on the carriage rate of group A meningococci but that this was influenced by changes in herd immunity or by other unidentified factors.

In 1999 *Maiden et al* conducted carriage studies on group C meningococci in 14,000 students aged 15-17 years. The surveys were conducted during and after meningococcal group C conjugate vaccine introduction. Carriage was reduced by 66%. Subsequently, Maiden et al conducted another cross-sectional surveys of meningococcal carriage in over 16000 students of the same age group attending school or college. A reduction in serogroup C carriage (rate ratio, 0.19) was observed that lasted at least 2 years with no evidence of serogroup replacement. Vaccine efficacy against carriage was 75%. The impact of vaccination with MCC vaccine on the prevalence of carriage of group C meningococci was consistent with herd immunity. High vaccine efficacy against disease in young children, who were not protected long-term by the schedule initially used, is attributed to the high vaccine efficacy against carriage in older age groups.

In 2007, *Dellicour S et al.* published a systematic review on the impact of meningococcal vaccination on pharyngeal carriage of meningococci. Of the 29 studies that satisfied the inclusion criteria. 25/29 reported the effect of a polysaccharide vaccine, 1/29 the effect of a serogroup C conjugate vaccine and 3/29 the impact of serogroup B outer-membrane vaccines on overall and/or serogroup-specific meningococcal carriage rates. Ten studies of meningococcal polysaccharide vaccines found reduced serogroup-specific carriage; seven of these focussed on high-risk groups and had a short follow-up period. Only one of five studies of civilian populations in Africa showed a significantly reduced carriage. Many studies had methodological shortcomings. The one study which assessed the effect of a meningococcal conjugate vaccine on carriage showed a significant impact. Three studies of serogroup B outer-membrane protein vaccines showed no effect on carriage.

**References:**


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4.Dellicour S, Greenwood B. Systematic review: Impact of meningococcal vaccination on pharyngeal carriage of meningococci. Trop Med Int Health. 2007 Dec;12(12):1409-21.