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SEX-DEPENDENT IMMUNE RESPONSES TO INFANT VACCINATION: AN INDIVIDUAL PARTICIPANT DATA META-ANALYSIS OF ANTIBODY AND MEMORY B CELLS

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Background

Biological sex has previously been identified as an important source of variation in infection and immunity. We aimed to investigate sex-dependent differences in immune response to childhood vaccination.

Methods

We undertook an individual participant data meta-analysis of vaccine trials from one centre, in which children under three years of age were randomised and immunological parameters measured. Log-transformed antigen-specific antibody and memory B cell data were combined in a meta-analysis. Differences between girls and boys were reported as geometric mean ratios.

Results

Vaccine immunogenicity data were available from nine trials and 2378 children. Six trials investigated meningococcal vaccines, two studied pneumococcal vaccines, and one studied the effect of different needle sizes. Blood samples were taken at one month post-priming, pre-boost, post-boost and at 24 months of age. Not all time points were available in all studies. Significant differences between girls and boys were observed for anti-diphtheria antibody and capsular group A, W, and Y meningococcal serum bactericidal activity. Serotype-specific anti-pneumococcal antibody concentrations were significantly different for at least one time point in 12 of 13 serotypes. No sex-differences were observed for responses to *Haemophilus influenzae* type b, capsular group C meningococcal or tetanus toxoid vaccines.

Conclusions

In young children, immune responses to vaccines were consistently higher or equivalent in girls compared with boys. In no instance were male responses significantly higher. While these data show some significant differences in immune responses which appear to be determined by biological sex, the clinical significance of such differences remains unclear. Investigation of the biology of these differences may inform improved design of vaccines to direct optimal immune responses and potentially to improve population protection.

Systematic Review Registration (Please input N/A if not registered)

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