4CMENB MULTICOMPONENT MENINGOCOCCAL VACCINE DEVELOPED FOR SEROGROUP B MENINGOCOCCI ELICITS CROSS-REACTIVE IMMUNITY AGAINST SEROGROUPS C, W AND Y

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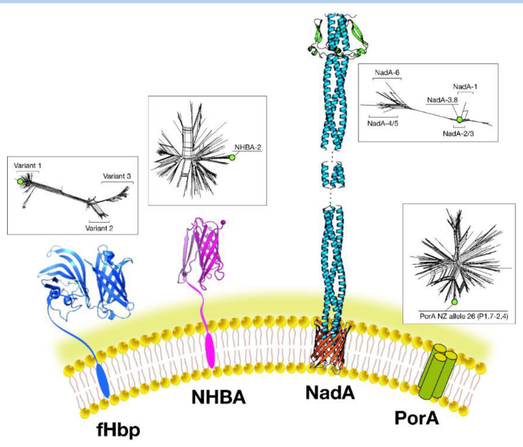
BACKGROUND AND AIM

- Invasive meningococcal disease (IMD) is mostly caused by *Neisseria meningitidis* serogroups: A, B, C, W, Y, and X and has the highest incidence in infants and adolescents.[1]
- The multicomponent meningococcal serogroup B vaccine (4CMenB, *Bexsero*, GSK) is designed for broad coverage against MenB strains and currently indicated for active immunisation against IMD caused by MenB.[2]
- However, genes encoding the 4CMenB vaccine antigens are also expressed and conserved in strains belonging to other meningococcal serogroups.[3]

Are antibodies raised by 4CMenB immunisation able to kill non-MenB strains?



AIM OF THE STUDY: Infant sera taken after 4CMenB immunisation was tested for the ability to induce complement-mediated bactericidal killing of non-MenB strains

fHbp, factor H binding protein; **NHBA**, Neisserial Heparin Binding Antigen; **NadA**, *Neisseria* adhesin A; **PorA**, porin A.

MATERIALS AND METHODS

IMD isolates were collected from different countries to ensure that the tested panels are representative of circulating strains and for accuracy of estimation of vaccination impact on non-MenB strains were classified by serogroup, multilocus sequence typing (MLST) and antigen sequence typing.

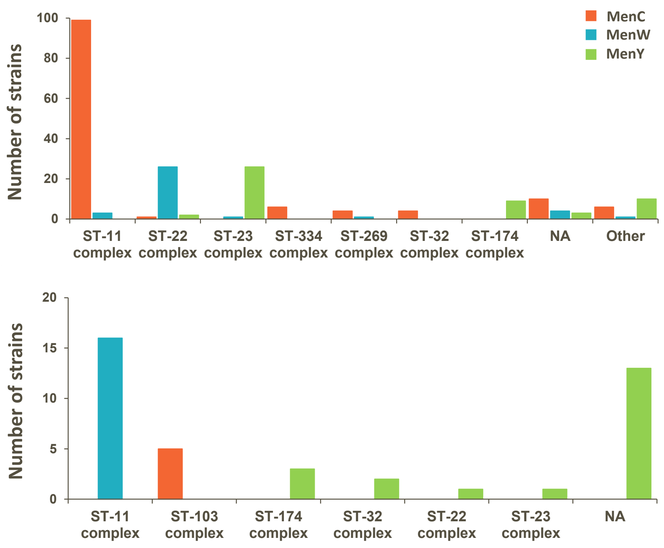
Euro-3 panel

- England and Wales, Germany, France
- 227 non-MenB isolates
- Jul 1st, 2007–Jun 30th, 2008

Brazilian panel

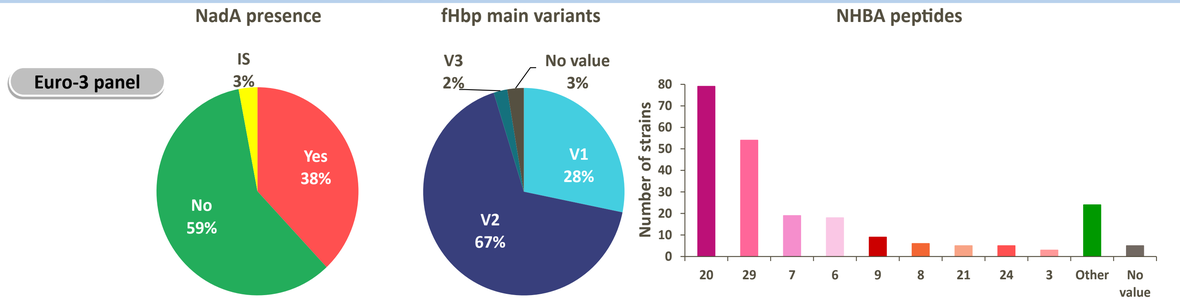
- Brazil
- 41 non-MenB isolates
- 2012

Strain characterisation



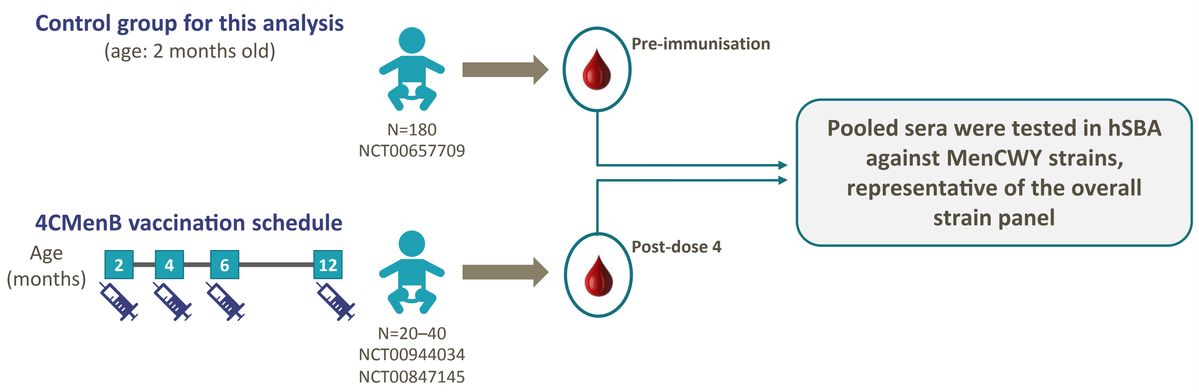
ST, sequence type; **NA**, a ST which was not assigned to any clonal complex or not defined; **Other**, a ST for which less than 1% of isolates were identified.

4CMenB antigens are conserved across serogroups.



Note: 4CMenB contains fHbp variant 1, NHBA peptide 2, and NadA. **IS**, insertion sequence-disrupted gene; **V**, fHbp variants; **No value**, new fHbp and NHBA variants and subvariants; **Other**, peptides other than those listed and present in less than 1% of isolates.

Strains representative of different clonal complexes and antigen STs were randomly selected and tested using serum bactericidal activity assay using human complement (hSBA).



N, number of infants; 💉, 4CMenB vaccine ; 🩸, blood sample.

CONCLUSIONS

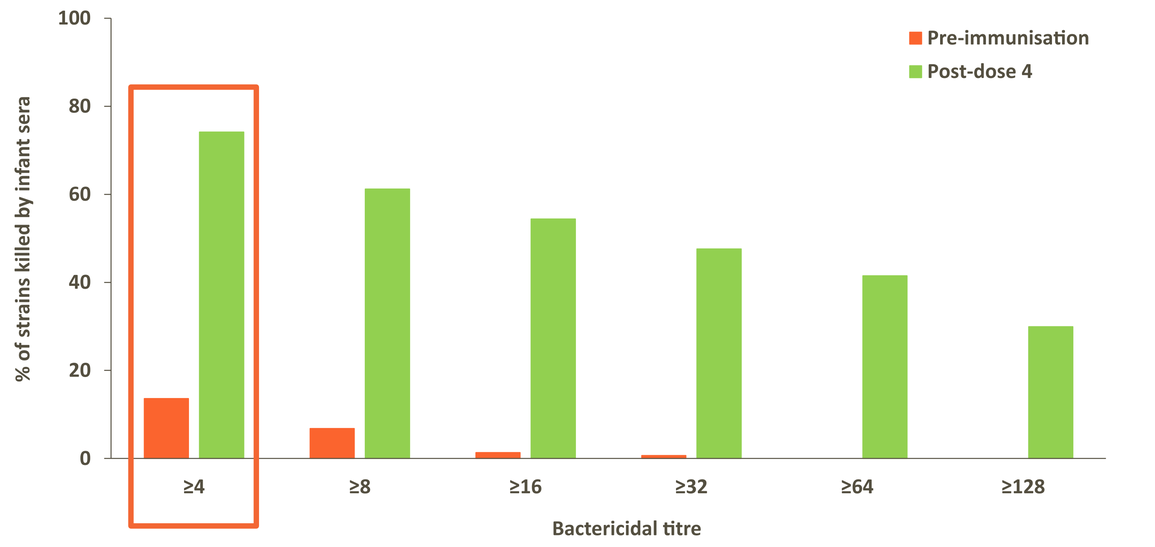
- 4CMenB antigens are present in non-MenB meningococcal strains, with varying sequence relatedness and expression level.
- This is the first example in which an epidemiologically representative large panel of 147 non-MenB strains have been tested against sera raised by 4CMenB vaccination in infants, the population most impacted by IMD.
- 109 out of the 147 representative non-MenB strains were killed in hSBA by infant sera, resulting in an overall coverage of 74% for non-B strains.

This data set has important implications for vaccine choice and clinical practice, as it supports and expands on earlier findings of 4CMenB vaccination cross-immunity against prevalent IMD-causing non-MenB serogroups C, W and Y.

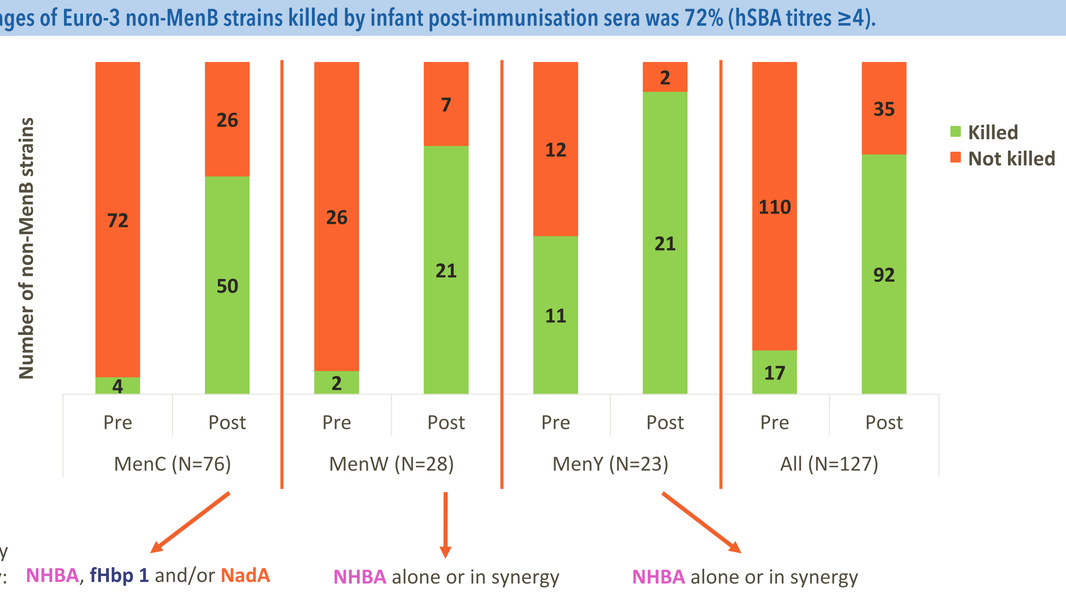
RESULTS

- The majority of 147 non-MenB strains were killed by bactericidal activity of sera from 4CMenB vaccinated infants in Euro-3 and Brazilian panels.

Bactericidal activity of the infant sera against non-MenB strains showed that 74.1% of tested strains were killed by infant sera post-dose 4.



The percentages of Euro-3 non-MenB strains killed by infant post-immunisation sera was 72% (hSBA titres ≥4).



Pre, before vaccination; **Post**, after vaccination with 4 doses of 4CMenB; **N**, number of strains killed in hSBA by the 4CMenB-elicited immune sera.

The percentages of Brazilian non-MenB strains killed by infant post-immunisation sera was 85% (hSBA titres ≥4).

References

1. Jafri et al. Popul Health Metr. 2013;11:17; **2.** EMA. Bexsero Assessment Report. 2012. Product Information; **3.** Bianchi et al. J PrevMed Hyg. 2015;56:E140–3.

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