Interlaboratory comparison of a multiplex immunoassay for the assignment of antibody concentrations against select Group B Streptococcus polysaccharides in human sera

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Background:

A barrier to standardized evaluation of Group B Streptococcus (GBS) serocorrelates of protection is the wide variety of assay formats currently in use. A literature review identified 37 different assays with a variety of reagents and plate-coating methods, and the lack of standardised reagents and assay methods has been highlighted as a major weakness in moving the GBS vaccine pipeline forward.[1]

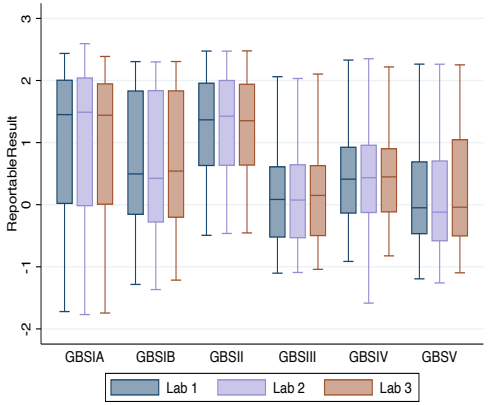
Objective:

To develop and validate a multiplex immunoassay for the assignment of antibody concentrations in sero-epidemiological studies, using standard reagents

Methods:

The 6-plex direct Luminex immunoassay used in this study was developed for the quantitation of IgG antibodies to Group B Streptococcus capsular polysaccharide serotypes Ia, Ib, II, III, IV and V in human sera. CDC, SGUL and Pfizer participated in the study using a panel of 44 human sera that were chosen to span the dynamic range of the assay. The study was conducted over 16 testing days, by 2 analysts, with 2 lots of qualified beads to generate up to 16 replicate values for each sample. Data was analysed for intra- and inter-laboratory variance, coefficient of variance between samples, laboratories and serotypes, precision and accuracy.

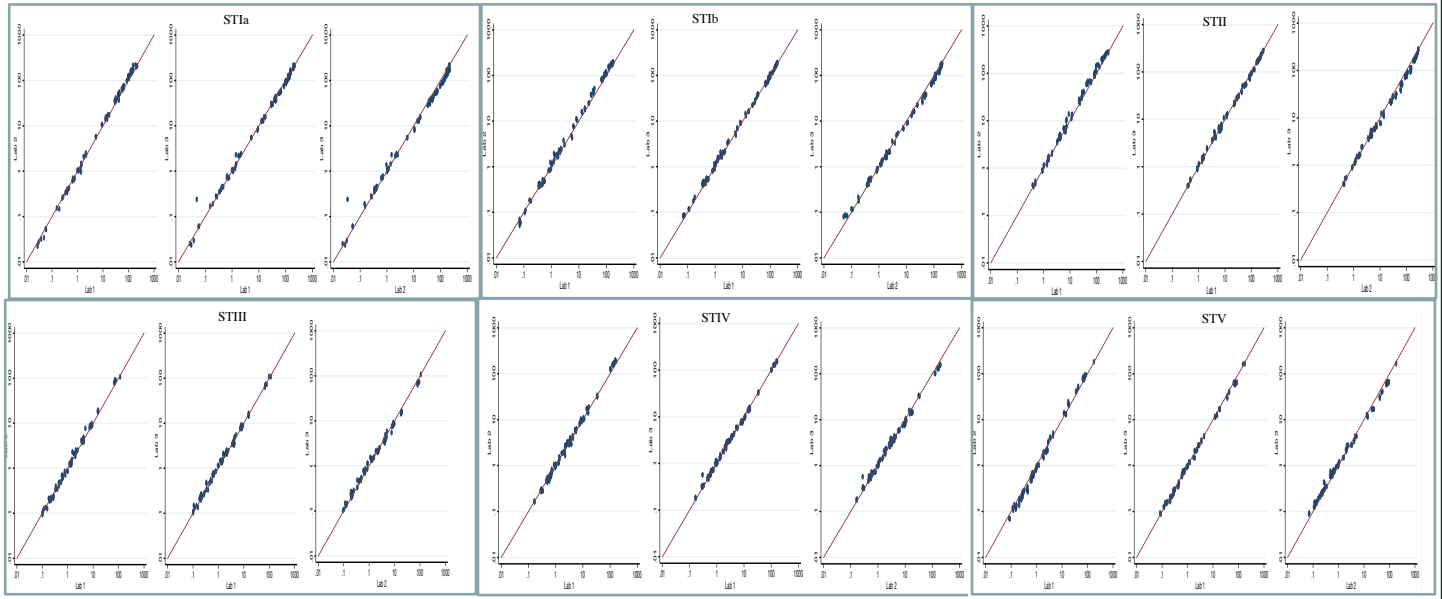
Results - 1



Boxplot of median and IQR log10 antibody concentrations by laboratory and serotype for the 44 sera panel

Results - 2

Correlation between antibody concentrations by laboratory and serotype.



Relative standard deviation (%) and number of samples tested by laboratory and serotype.

Lab	ST1a (n)	ST1b (n)	STII (n)	STIII (n)	STIV (n)	STV (n)
Lab1	15.6 (751)	14.0 (738)	14.2 (715)	15.8 (713)	13.9 (774)	14.5 (745)
Lab 2	16.2 (686)	15.3 (666)	13.1 (686)	19.3 (668)	19.8 (724)	15.9 (679)
Lab 3	21.3 (681)	12.0 (682)	10.4 (674)	13.2 (669)	13.3 (701)	10.3 (678)

Lower limit of quantification (LLOQ) and lower limit of detection (LLOD) in ug/mL by serotype*.

	STIa	STIb	STII	STIII	STIV	STV
LLOQ	0.004	0.01	0.015	0.012	0.006	0.043
LLOD	<.0001	.00002	.000011	.000024	.000012	.000086

* Values generated from Pfizer internal validation study and not derived from this interlaboratory study.

Conclusions:

The multiplex Immunoassay shows good concordance between laboratories across the assay range and by serotype and excellent correlation between laboratories and serotypes. The assay will be used in future to determine serocorrelates of protection against invasive infant GBS disease in natural immune sera.

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