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Detection of Group B streptococcus in western Australian pregnant women by culture and a novel multiplex real-time PCR assay

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Background: As a leading cause of sepsis in neonates, Group B Streptococcus (GBS) is a significant perinatal pathogen. Women in Australia are currently screened by culture for this organism in an effort to eradicate colonisation prior to delivery. GBS are separated into ten different capsular polysaccharide serotypes and previous studies have suggested associations between specific serotypes and disease. For example, serotypes Ia, Ib and III are commonly associated with neonatal disease. At present, however, minimal data exists on serotype distribution within Western Australian women, information that may play an important role in future prophylactic treatment regimes.

Materials/methods: We recruited 297 pregnant women (recruitment ongoing) and collected vaginal and rectal swabs and questionnaire data at 16 – 22 weeks and again at 33 – 39 weeks gestation. A multiplex real-time PCR assay was developed that universally detected GBS using the dltS gene, while concurrently screening for the presence of serotypes Ia, Ib and III. Culture was also performed on all samples.

Results: We found a 23.6% GBS positivity rate in this cohort, consisting of 17.5% vaginal and rectal, 3.4% vaginal only and 2.7% rectal only colonisation. 120 women provided samples at both time points. Serotypes Ia and III were detected at rates of 15.8% and 10.5% of the GBS positive results, respectively. The remaining 73.7% were detected by multiplex PCR as GBS of serotypes other than Ia, Ib or III and are currently being serotyped. GBS colonisation was relatively stable throughout the two gestational time points, with 17.5% of the participants consistently colonised. The multiplex assay had a limit of sensitivity of 2.8 x 10-4 ng of DNA, although, greater sensitivity (2.8 x 10-5 ng of DNA) was observed for the dltS target. Specificity testing reported no cross-reaction with closely-related organisms.

Conclusions: This study provides new insights into circulating GBS serotypes and colonisation in Western Australian pregnant women, in addition to providing a new diagnostic assay for one-step

detection of GBS and concurrent determination of high-risk neonatal serotypes; Information potentially vital to vaccine development. The observed frequency of consistent colonisers over pregnancy may support earlier testing for those at risk of delivering preterm, a neonatal population at increased risk of GBS disease.