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Title: Molecular Epidemiology of Superficial Streptococcus pyogenes Infections in the SToP Trial, Western Australia

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Background & Aims: To date, there is relatively limited literature regarding the molecular epidemiology of superficial Streptococcus pyogenes (GAS) infections, namely impetigo and pharyngitis, in remote Western Australia (WA). Aboriginal children living in remote WA experience the highest rates of impetigo in the world, and this is linked with health complications such as acute rheumatic fever and rheumatic heart disease (RHD). Using molecular epidemiological surveillance techniques (e.g. whole genome sequencing) to determine GAS strain prevalence, antimicrobial resistance profiles and transmission routes in settings with a high burden of infections has the potential to inform control and mitigation programs and advance vaccine development and

Methods: The SToP Trial baseline collection of clinical samples in 2019 yielded 195 GAS isolates (115 from skin swabs of impetiginous lesions and 80 from pharyngeal swabs). The isolates will undergo DNA extraction for whole genome sequencing. A bespoke bioinformatic pipeline will be used to generate emm and MLST type, and antimicrobial resistance profiles. This information will be compared with SToP Trial meta- and clinical data to provide the most up-to-date, relevant, and detailed epidemiological data regarding superficial GAS skin and throat infections in remote WA.

Results: Currently, DNA extractions for the 195 GAS isolates have been completed and they are in the process of being whole genome sequenced. Analysis of genetic data alongside SToP Trial clinical and meta data will provide up-to-date molecular epidemiological information for GAS in remote northern Australia and provide contemporary epidemiological data in a high burden setting.

Conclusions: This project will provide the necessary data to define the clinical epidemiology of GAS infections in the remote WA setting and serve as a baseline set of results for the impact of SToP Trial interventions to be evaluated. Our objective is for this information to be utilised in the development of novel strategies to drive down the burden of GAS infections and resulting complications.