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Longitudinal Meningococcal Carriage in Adolescents and Young adults in South Australia 2017-2020

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Background

Adolescents and young adults have the highest rates of meningococcal pharyngeal carriage in the population, which serves as a reservoir for bacterial transmission and is a prerequisite for invasive meningococcal disease (IMD).

Aim/Methods

This study aimed to describe longitudinal changes in meningococcal carriage in adolescents in South Australia (SA) over 4 years using data from 1) a state-wide cluster randomised controlled trial (RCT) in SA in secondary-school students (n=34,489), where two oropharyngeal swabs were collected in 2017 and2018, and 2) a cross-sectional study (n=8,132) assessing meningococcal carriage prevalence among school leavers (aged 17–25) who had a single swab collected (2018-2020). Individuals who participated in both studies allowed longitudinal carriage evaluation. Our study included two unique cohorts. The first comprised

individuals enrolled in 2019, with three consecutive annual swabs taken between 2017 and 2019. The second comprised individuals enrolled in 2020, with swabs taken at three time points in 2017, 2018, and 2020. The PorA-PCR assay was used to detect the presence of N. meningitidis in the swab samples, and serogroups were identified using both PCR and whole genome sequencing (WGS).

Results

Between 2017 and 2020, 2,980 individuals provided three oropharyngeal swab samples, with 11.3% (336) testing positive for N. meningitidis by PorA-PCR in ≥1 visit. Subsequently, 78% (262) of samples underwent WGS analysis. In the 2019 cohort (n=2039), 6.2% (n=127) acquired carriage within the previous year, 23 (1.1%) were still carrying N. meningitidis detected more than 1 year earlier, and 3 (0.1%) had carriage detected at all 3 visits. A further 3 had carriage detected in 2017 and 2019 but were negative in 2018. Of those with persistent carriage over 2 years, two participants had the same genogroup detected at all three visits, one group X and the other group Y (clonal complex [cc]23). The third participant had 3 different genogroups over 3 years, cnl (cc198), genogroup W (cc198), and non-groupable carriage (cc41/44).

Conclusions

Whilst carriage is typically transient, this longitudinal cohort demonstrates that a small number of adolescents and young adults have persistent carriage. Longer-term carriage may potentially increase the opportunity for recombination events. Funded by GlaxoSmithKline Biologicals SA