CAN *TREPONEMA PALLIDUM* GENOTYPING ENHANCE SYPHILIS PUBLIC HEALTH RESPONSES? A QUEENSLAND, AUSTRALIA CASE STUDY

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Background:
To control syphilis transmission and associated negative sequelae including congenital syphilis, targeted public health interventions are required. We assessed the utility of linking *Treponema pallidum* sequence types (STs) to enhanced surveillance records to strengthen public health responses in Queensland.

Methods:
A total of 570 polymerase chain reaction *T. pallidum*-positive samples collected in Queensland from January 2011 to July 2020 were genotyped by multi-locus sequence type (MLST). After removal of samples with incomplete sequence typing (n=139), other *T. pallidum* subspecies (n=7), and multiple unique case samples (n=31), data from 393 samples were linked with cases demographic, behavioural, and geospatial enhanced surveillance data. 219 linked case records, 56% (219/393) of genotyped samples were analysed and mapped.

Results:
Most cases were male (82%,179/219), three-quarters (135/179) had male sex partners. Twenty-three unique STs were identified. Nearly all STs (22/23) were recorded in major cities; ST diversity declined with increasing remoteness (9/23 regional Queensland; 2/23 remote Queensland), despite the ratio of samples to unique ST being similar in each area (7:1 urban; 6:1 regional, 7:1 remote). Two STs accounted for 69% of samples. ST1 (44%, 96/219) accounted for 28%, 73%, and 83% of all STs in urban, regional, and remote Queensland, respectively ($p<0.001$). Conversely, ST100 (25%, 55/219) was more prevalent in urban (33%), than regional (10%) or remote (17%) Queensland ($p<0.001$). Where sexual orientation was reported (205/219), heterosexual acquisition was attributed to 56% (50/90) of ST1, including all (16/16) First Nations women, at least three-quarters (12/16) of reproductive age (19-45 years). ST100 was almost exclusively among non-Indigenous people (96%, 49/51) and men with male sex partners (80%, 40/51; $p<0.001$).

Conclusion:
Geospatial, sexual orientation and First Nations status distinctions between prevalent *T. pallidum* STs in Queensland suggest genotyping could enhance public health surveillance and responses for at-risk populations. Superior data linkage processes will strengthen results.

Disclosure of Interest Statement:

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