

Syphilis in the sunshine state: two *Treponema pallidum* strains account for the majority of infections in Queensland.

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Background:

An ongoing outbreak of syphilis in Australia, first reported in Queensland in 2011, has led to increasing cases of congenital syphilis, including several deaths.

Methods:

Here, we applied a multi-locus sequence typing (MLST) approach on available *Treponema pallidum* PCR-positive samples from Queensland, from January 2011 to July 2020. Patient data, including Aboriginal and Torres Strait Islander peoples (ATSI) status and sexual orientation was used to investigate circulation of strain among key networks.

Results:

A total of 393 samples from 337 males and 56 females were genotyped. Thirty-six *Treponema pallidum* sequence types (STs) were identified, and two common STs, ST1 and ST100 comprised 69% (271/393) of all samples, including the majority of samples in females (44/56; 79%). ST1 was prevalent throughout the entire study period, and was the most common genotype found among the ATSI population (46/52; 88%). Of interest, both ST1 and ST100 had high male-to-female ratios, including MSM, suggesting that syphilis infections are primarily among MSM but that bridging from MSM into heterosexual networks may potentially contribute to infectious syphilis among females. Interestingly, we observed remarkable differences in the number of syphilis genotypes circulating among different sexual networks, with 27 unique genotypes found among gay and bisexual men while only 9 genotypes were identified among individuals self-identifying as heterosexual. Sexual orientation data were missing from 175/393 (45%) of samples in our dataset limiting detailed investigation into these trends.

Conclusion:

Overall, we saw considerable diversity among syphilis STs throughout the study period. The fact that two key STs accounted for the majority of infections locally (including among ATSI and gay and bisexual men) stresses the need for further exploration of strain-specific transmission pathways to inform targeted public health interventions for better control of syphilis, particularly congenital syphilis, in Queensland.

Disclosure of Interest Statement:

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