Modelling the multiple anatomical site transmission of *Mycoplasma genitalium* in men who have sex with men: A compartmental mathematical model

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Background:

Mycoplasma genitalium (*M. genitalium*) is a newly recognised and common sexually transmitted infection in men who have sex with men (MSM). The anus and urethra are the most infected sites, but few studies have investigated the routes of transmission between anatomical sites in MSM, and their findings have been contradictory.

Methods:

We developed four models with a susceptible-infected-susceptible structure **to** examine the role of sexual practices in *M. genitalium* transmission. Our models calibrated to the prevalence of single-site infection (oropharynx only, anorectum only, and urethral only) and multisite infections (oropharynx and urethra; oropharynx and anorectum, urethral and anorectum, and all three sites) from three Australia studies included 2040 MSM attending sexual health clinic.

Results:

We could calibrate the model to fit the existing *M. genitalium* prevalence data at the oropharynx, urethra, and rectum (either alone or in combination) if the transmission was only possible through the acts of anal and oral sex. The addition of kissing and rimming to oral and anal sex either worsened or did not improve the calibration. The model of anal sex and oral sex only estimated that anorectal infection accounted for 67.4% of all incident cases, urethral infection accounted for 29.6%, and oropharyngeal infection accounted for only 3.0% of cases. The anal sex and oral sex only model estimated proportion of incident *M. genitalium* by anal sex was 85.3%, and by oral sex was 14.7%.

Conclusion:

Our findings suggest that multiple anatomical site-specific transmission of *M. genitalium* is transmitted between men primarily by oral and anal sex alone without

significant transmission by kissing or rimming. Consistent condom use for penile-anal sex could prevent more than 80% of *M. genitalium* incident cases.

Disclosure of Interest Statement:
The authors declare no conflicts of interest.