

Modelling the contribution that different sexual practices involving the oropharynx and saliva have on *Neisseria gonorrhoeae* infections at multiple anatomical sites in men who have sex with men

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Background:

There is controversy about what sexual practices transmit *Neisseria gonorrhoeae* in men who have sex with men (MSM). To date, no studies have modelled potential transmission when one sexual practice follows another in the same sexual encounter in transmission. We tested if these sequential practices were necessary to replicate the high proportion of MSM who have more than one anatomical site infected with gonorrhoea ('multi-site infection').

Methods:

We developed eight compartmental models to test our hypothesis. We examined three possible transmission routes: (1) oral sex followed by anal sex (or vice versa); (2) using saliva as a lubricant for penile-anal sex, and (3) oral sex followed by oral-anal sex (rimming) or vice versa. For comparison, we used a baseline model that did not include any of these three transmission routes. The seven other models added one of the possible transmission routes or combinations of the three of them to the baseline model.

Results:

The baseline model could replicate infection at the single anatomical site but underestimated the multi-site infection. When we added the three transmission routes to the baseline model, oral sex followed by anal sex or vice versa could replicate the prevalence of multi-site infection. The other two transmission routes alone or together could not replicate multi-site infection without the inclusion of oral sex followed by anal sex or vice versa.

Conclusions:

Our model suggests sexual practices that involve oral followed by anal sex (or vice versa) may be important for explaining the high proportion of multi-site infection.

Disclosure of Interest Statement:

The authors declare no conflicts of interest.