

# **Chlamydia trachomatis transmission between the oropharynx, urethra and anorectum in men who have sex with men: A mathematical model**

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## **Background:**

It has been presumed that Chlamydia trachomatis is transmitted between men only through anal or oral sex, but no mathematical models have tested this presumption.

## **Methods:**

To test this presumption, we created 20 compartmental mathematical models of different sexual practices that included both oral and anal sex and calibrated these models to the observed rates of chlamydia trachomatis infection at three anatomical sites from 4888 men who have sex with men (MSM) in Melbourne Sexual Health Centre during 2018-2019.

## **Results:**

A model that included only oral and anal sex could replicate the observed rates of single-site infection at the oropharynx, urethra, and rectum alone, but could not replicate infection at more than one of these sites (multisite). However, if we included transmission from sexual practices that followed one another in the same sexual episode (e.g. saliva contamination of the penis from oral sex transmitting chlamydia to the rectum by anal sex), we significantly improved the calibration of multisite infection rates substantially.

**Conclusions:**

Our modelling study suggests that transmission routes other than just oral and anal sex are necessary to explain the high rate of chlamydia trachomatis infection at more than one site.

**Disclosure of Interest Statement:**

The authors declare no conflicts of interest.