



# Kissing but not sex is the strongest risk factor for oropharyngeal gonorrhoea in men who have sex with men: a cross-sectional survey

Eric P.F. Chow<sup>1,2</sup>, David Priest<sup>1</sup>, Jane S Hocking<sup>3</sup>, Deborah A Williamson<sup>4, 5</sup>, Vincent J Cornelisse<sup>1,2</sup>, Tim R.H. Read<sup>1,2</sup>, Catriona S Bradshaw<sup>1,2</sup>, Marcus Y Chen<sup>1,2</sup>, Christopher K Fairley<sup>1,2</sup>

- 1. Melbourne Sexual Health Centre, Alfred Health, Carlton, VIC, Australia
- 2. Central Clinical School, Monash University, Melbourne, VIC, Australia
- 3. Centre for Epidemiology and Biostatistics, Melbourne School of Population and Global Health, The University of Melbourne, Melbourne, Victoria, Australia
- 4. Microbiological Diagnostic Unit Public Health Laboratory, Department of Microbiology & Immunology, The University of Melbourne at The Doherty Institute for Infection and Immunity, Melbourne, VIC, Australia
- 5. Doherty Applied Microbial Genomics, Department of Microbiology & Immunology, The University of Melbourne at The Doherty Institute for Infection and Immunity, Melbourne, VIC, Australia



## BACKGROUND

- The oropharynx is a common site of gonorrhoea among men who have sex with men (MSM).
- A mathematical model has supported the hypothesis that transmission from oropharynx to oropharynx (i.e. kissing) is sustaining the gonorrhoea epidemic among men who have sex with men (MSM)<sup>1</sup>. However, no empirical data have confirmed this.
- Previous studies examining the association between kissing and oropharyngeal gonorrhoea did not examine kissing outside sexual practice.

## AIM

- To determine whether kissing-only is a risk factor for oropharyngeal gonorrhoea in MSM.



**Table 2.** Risk factors associated with oropharyngeal gonorrhoea positivity among men who have sex with men.

Risk factors	Number of individuals	Crude OR (95% CI)	Adjusted OR (95% CI)
Number of kissing-only partners			
0-1	1,724	1	1
2-3	747	1.32 (0.91-1.93)	1.36 (0.89-2.10)
≥4	1,298	1.99 (1.48-2.68)	1.59 (1.10-2.31)
Number of sex-only partners			
0-1	2,867	1	1
2-3	506	1.33 (0.92-1.92)	1.25 (0.83-1.88)
≥4	396	1.44 (0.97-2.14)	1.04 (0.66-1.64)
Number of kissing-and-sex partners			
0-1	937	1	1
2-3	1,246	1.29 (0.85-1.96)	1.06 (0.67-1.70)
≥4	1,586	2.24 (1.54-3.25)	1.52 (0.97-2.39)
Age			
16-25	1,037	2.09 (1.20-3.62)	1.78 (0.96-3.27)
26-35	1,640	2.04 (1.20-3.48)	1.97 (1.10-3.52)
36-45	624	1.79 (0.99-3.25)	1.49 (0.78-2.86)
≥46	468	1	1
HIV status			
Negative	3,670	1	1
Positive	99	2.14 (1.15-3.96)	1.56 (0.75-3.25)
Known gonorrhoea contact			
No	3,627	1	1
Yes	142	5.39 (3.57-8.13)	3.82 (2.37-6.16)
Urethral gonorrhoea			
Negative	2,900	1	1
Positive	59	11.52 (7.47-17.76)	2.47 (1.42-4.29)
Not tested	576	0.84 (0.56-1.27)	1.09 (0.71-1.67)
Anorectal gonorrhoea			
Negative	3,142	1	1
Positive	114	19.38 (13.93-26.96)	12.58 (8.51-18.58)
Not tested	279	1.90 (1.18-3.06)	2.08 (1.27-3.40)

## METHODS

- A cross-sectional study was conducted at the Melbourne Sexual Health Centre (MSHC), Australia, between March 2016 and February 2017.
- MSM attended MSHC were invited to complete a short questionnaire using computer-assisted self-interview (CASI).
- This short questionnaire collected data on the number of partners of the following activities in the last 3 months
  - a) Kissing-only (i.e. kissing without oral and/or anal sex);
  - b) Sex-only (i.e. oral and/or anal sex without kissing);
  - c) Kissing-and-sex (i.e. kissing with oral and/or anal sex) partners in the last 3 months.
- Responses to the questionnaire were linked to the test result of oropharyngeal gonorrhoea by nucleic acid amplification test.
- Potential confounders such as demographic characteristics, HIV status, known gonorrhoea contact and gonorrhoea infection at the urethra and anorectum were adjusted in the model.

**Table 1.** Mean and median number of partners for kissing-only, sex-only and kissing-and-sex partners among men who have sex with men.

Type of activities	Mean number of partner (standard deviation)	Median number of partner (interquartile range)
Kissing-only	4.2 (8.6)	2 (0-5)
Sex-only	1.4 (4.2)	0 (0-1)
Kissing-and-sex	4.9 (8.8)	3 (2-5)

## RESULTS

- 3,769 men completed the survey and were tested for oropharyngeal gonorrhoea. The median age was 30 (IQR 25-37).
- The oropharyngeal gonorrhoea positivity was 6.2% (234/3769).
- Table 1 shows the number of partners for kissing-only; sex-only; and kissing-and-sex. Kissing is common during sex and the majority (62.5%) of MSM did not have sex-only partners.
- Table 2 shows that reporting ≥4 kissing-only partners (aOR=1.6; 95% CI: 1.1-2.3) was significantly associated with oropharyngeal gonorrhoea compared to men who had one or less kissing-only partners after adjusting for potential confounding factors.
- Number of sex-only partners (p=0.567) was not associated with oropharyngeal gonorrhoea.
- Reporting ≥4 kissing-and-sex partners was associated with oropharyngeal gonorrhoea in the univariable analysis (aOR=2.3; 95% CI: 1.54-3.25) but was not significant in the adjusted analysis (aOR=1.52; 95% CI: 0.97-2.39).

## CONCLUSIONS

- MSM have a similar number of kissing-only partners and kissing-and-sex partners. Very few MSM had sex-only partners.
- Kissing-only is the strongest risk factor for oropharyngeal gonorrhoea in MSM.
- Our data suggest that sex is not the principle acts responsible for oropharyngeal gonorrhoea and that and that the borderline significance of kissing and sex is a risk primarily associated with kissing.
- Majority of MSM do not use condom for oral sex. A non-condom based intervention that targeting the oropharynx is required to prevent and control the spread of oropharyngeal gonorrhoea.

## REFERENCE

- Zhang L, *et al.* *Neisseria gonorrhoeae* Transmission Among Men Who Have Sex With Men: An Anatomical Site-Specific Mathematical Model Evaluating the Potential Preventive Impact of Mouthwash. Sexually Transmitted Diseases. 2017; 44(10): 586-592.

## CONTACT

Dr Eric Chow, Senior Research Fellow  
E: [echow@mshc.org.au](mailto:echow@mshc.org.au) | T: +61 (3) 9341 6233