doi: 10.1111/1753-6405.13180

Spatial mapping of gonorrhoea notifications by sexual practice in Victoria, Australia, 2017-2019

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Gonorrhoea infections have been increasing in Australia over the past decade.[1,2] Gay, bisexual and other men who have sex with men (MSM) have been disproportionately affected by gonorrhoea.[3] However, there has been an increase in gonorrhoea infections among heterosexuals in Victoria since the mid-2010s.[4,5] Between 2010 and 2019, the number of females with gonorrhoea in Victoria who were notified each year to the Victorian Government Department of Health increased by 475%, from 291 to 1,673.[6] A study combining notification and whole genome sequencing data for gonorrhoea showed bridging of distinct lineages of *Neisseria gonorrhoeae* between MSM and heterosexuals in Victoria.[7] Mapping of notified infectious syphilis cases in Victoria shows syphilis in MSM is concentrated in inner Melbourne suburbs while syphilis in women and heterosexual men is mainly in outer Melbourne suburbs.[8] However, there have been no studies mapping notified gonorrhoea cases in Victoria. This study aimed to describe the geographical distribution of gonorrhoea infection, stratified by gender and population group, in Victoria between 2017 and 2019 using enhanced surveillance data.

De-identified and aggregated data on notified gonorrhoea cases between 2017 and 2019, stratified by 79 Victorian local government area of residence of infected individuals, were provided by the Victorian Government Department of Health. The data were further categorised into five populations based on gender of the individual and gender of sex partner: (1) women; (2) heterosexual men; (3) bisexual men; (4) men who have sex with men (MSM); and (5) other/unknown. The last category included individuals with other or missing gender, or with missing information on the gender of sex partners. Multi-site infections from the same individuals were counted as one case. Spatial mapping of the number of cases in each local government area by populations was conducted using QGIS software (version 3.6). This study was approved by the Alfred Hospital Ethics Committee (Project 782/20).

Between 2017 and 2019, there were 24,825 notified gonorrhoea cases in Victoria: 4,882 (20%) were women, 3,276 (13%) were heterosexual men, 10,386 (42%) were MSM, 279 (1%) were bisexual men and 6,002 (24%) were other or unknown. Overall, the female-to-male ratio was 1:4.

We excluded 9,263 cases for the mapping because 6,002 individuals were categorised in the other/unknown group and a further 3,261 individuals with missing local government area data. Figure 1 illustrates 15,562 notified gonorrhoea cases by population group and local government area. Cases in MSM were concentrated in inner Melbourne local government areas, especially Melbourne (n=1,254), Yarra (n=912) and Stonnington (n=826). Cases in women were also concentrated in inner Melbourne (n=320), but there were also higher numbers of cases in outer Melbourne local government areas such as Melton (n=229) in the outer North West and Casey (n=220) in the outer South East. The pattern was similar for heterosexual men with cases concentrated in inner Melbourne (n=231), Casey (n=172) and Brimbank (n=157) in the outer West. We were unable to map cases among bisexual men due to the small number of cases in each local government area.

This is the first study to map the distribution of reported gonorrhoea infections by local government area and population by sexual practices as the publically available Australian surveillance data only report cases by gender (males vs females) but not by sexual orientation. Our results showed notified gonorrhoea cases in MSM were concentrated in inner metropolitan Melbourne suburbs; however, cases in women and heterosexual men were also concentrated in outer Melbourne suburbs. It is notable that the geographical pattern for these three population groups is similar to the geographical distribution of notified syphilis cases by group during the same period.[8]

The reasons of the rises in gonorrhoea and syphilis in heterosexuals in these areas of Melbourne are not well understood. In Melbourne, there is only one public sexual health clinic providing free HIV/STI testing and treatment, and it is located centrally, near the central business district of Melbourne. Apart from inner Melbourne, most cases of gonorrhoea in heterosexual men and women are focused in and around Melton (about 40-50 km west from Melbourne central business district) and Casey (about 50-60 km south-east from Melbourne central business district). The outer West and North West and the outer South East areas of Melbourne include some of the most socioeconomically disadvantaged areas of Melbourne.

There are several limitations to this study. First, the local government areas were based on the residence of the notified cases and it is not known where individuals acquired their infection. Second, the population group was categorised based on whether they acquired the infection from opposite- and/or same-sex partners. Misclassification of the population group may have occurred due to inaccurate reporting of sexual practices. Third, there have been no official estimates on the number of heterosexual men and gay men in each LGA and thus we were unable to present the data as notification rate per 100,000 population.

Given access to health care is critical to the successful control of gonorrhoea, our data suggest targeting of interventions such as access to testing and treatment is needed to improve gonorrhoea control. Data from this and our previous study indicate this should include awareness among health providers, particularly general practitioners, of the need to test for gonorrhoea and syphilis in affected areas. Furthermore, injectable treatments for gonorrhoea and syphilis – ceftriaxone and benzathine penicillin – need to be available to practitioners in these areas together with correct treatment and effective partner management.[9]

Figure 1: Spatial mapping of notified gonorrhoea cases in Victoria by population group stratified by the local government area of residence of individuals, 2017-2018.

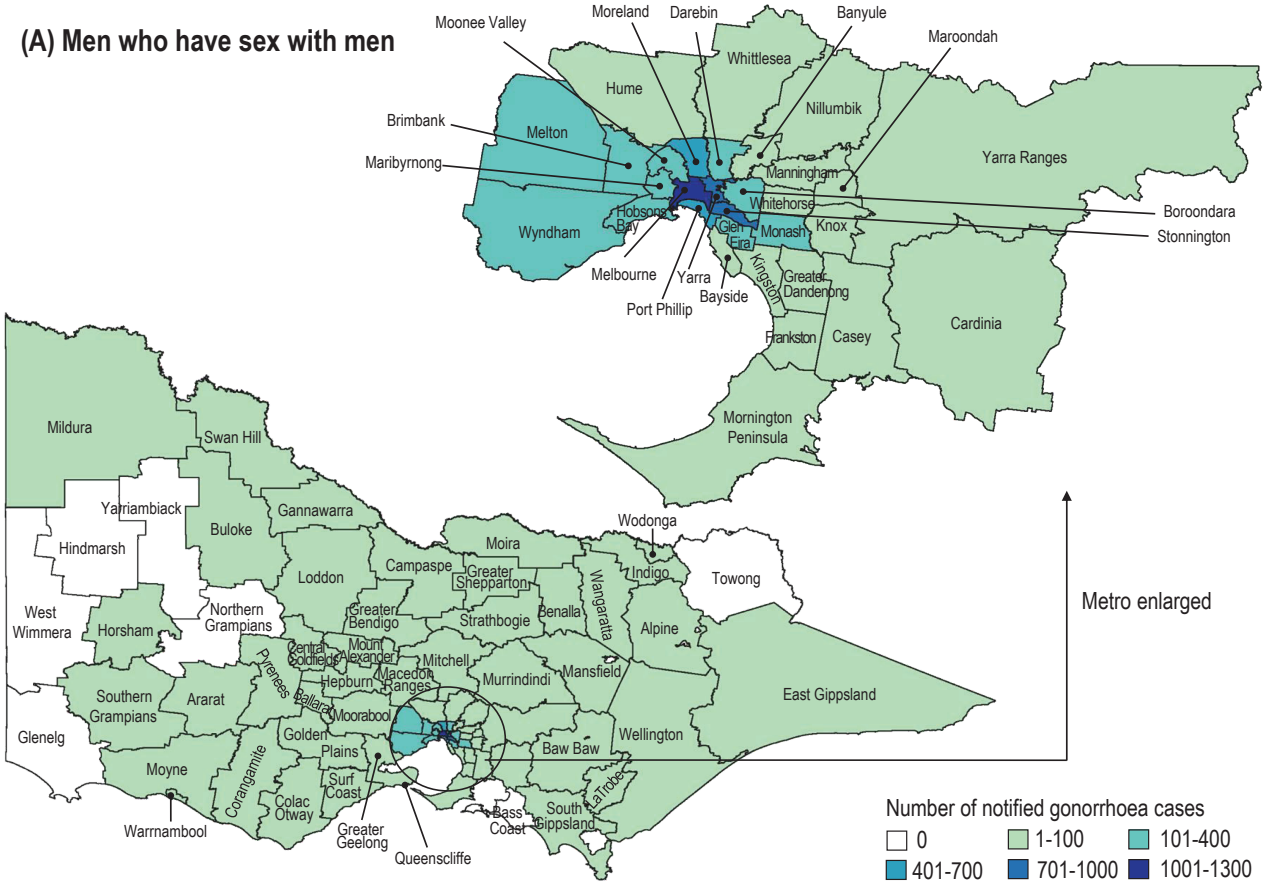
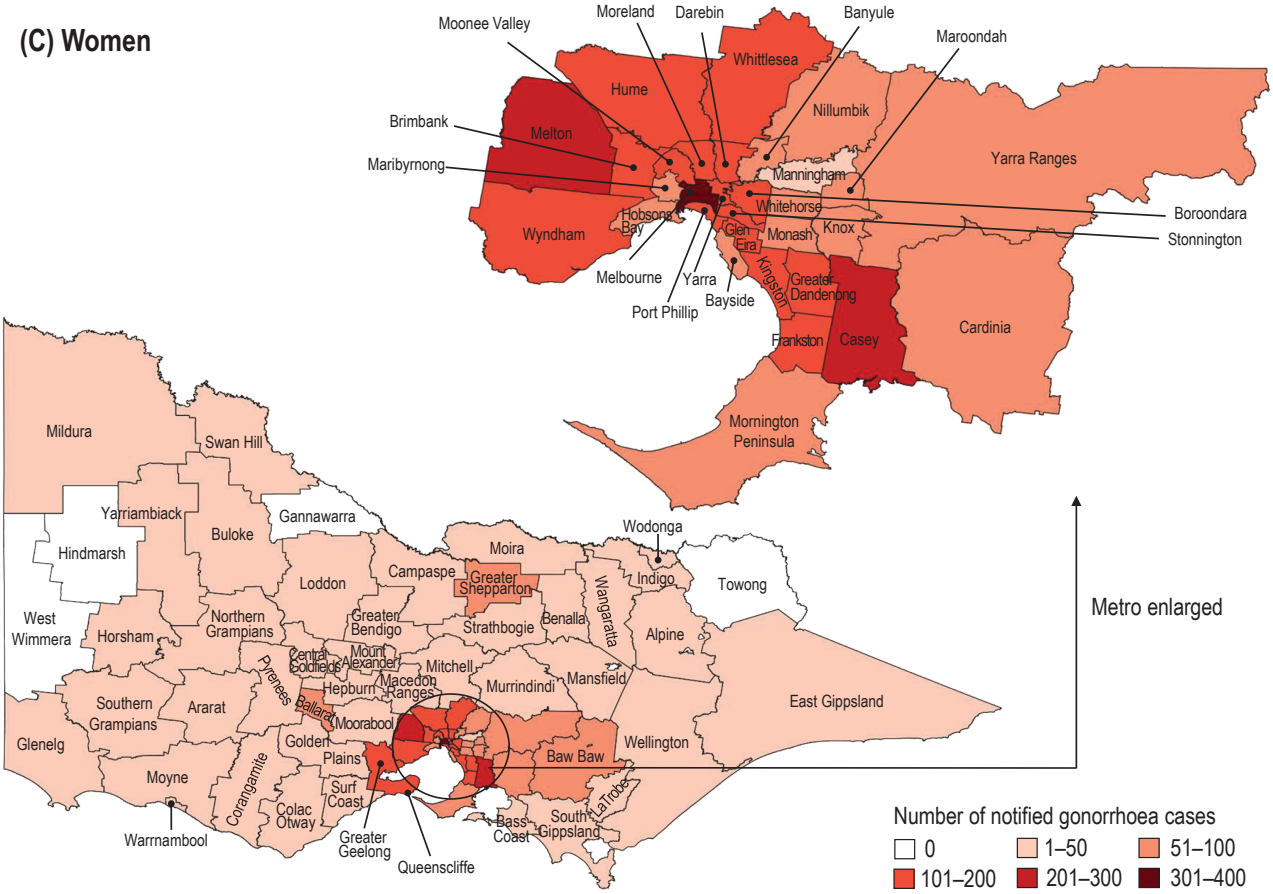


Figure 1 cont.: Spatial mapping of notified gonorrhoea cases in Victoria by population group stratified by the local government area of residence of individuals, 2017-2018.



Acknowledgement

The authors would like to thank Shaun Coutts from the Victorian Government Department of Health for his assistance with data extraction. EPFC and DAW are supported by an Australian National Health and Medical Research Council (NHMRC) Emerging Leadership Investigator Grants (GNT1172873 and GNT1174555, respectively). CKF is supported by an NHMRC Leadership Investigator Grant (GNT1172900).

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