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Wilkinson AL, Lim MS, Stoové M, Fairley CK, Chen M, El-Hayek C, Denham I, Hellard M
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Sexual Health 2013 10(2):188-9

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http://www.publish.csiro.au/paper/SH12145.htm

http://dx.doi.org/10.1071/SH12145

Submitted: 27 August 2012 Accepted: 31 August 2012 Published: 21 December 2012

Is rectal gonorrhoea a lead indicator of HIV transmission among men who have sex with men in Victoria, Australia?

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Abstract

Objectives: To examine whether rectal gonorrhoea (RG; Neisseria gonorrhoeae) can be used as a lead indicator of trends in HIV diagnosis in men who have sex with men (MSM). Methods: Data from a metropolitan sexual health centre in Victoria, Australia, on RG and HIV tests in HIV-negative MSM from January 2006 to December 2011 were examined. Results: Allowing RG a 12-month lead over HIV showed no concordance in proportion positive (r = 0.27; P-value = 0.28). Conclusions: The data do not support use of RG trends as a lead indicator of trends in HIV among MSM.

Additional keywords: gay men, surveillance, trends.

Background

Gonorrhoea, a sexually transmissible bacterial infection caused by Neisseria gonorhoeae,[1] is prevalent among males in Australia.[2] There are increasing diagnoses of rectal gonorrhoea (RG) and,

like HIV diagnoses, the great majority of infections occur among men who have sex with men (MSM).[3] Of interest, in Victoria, increases in HIV notifications have been observed following increases in gonorrhoea notifications. In 1998, 2003 and 2009, gonorrhoea notifications increased by 47%, 44% and 60% respectively on the previous year,[4] followed by increases in HIV notifications in the periods 1999–2000 (41%), 2004–05 (22%) and 2010–11 (21%).[5,6]

Monitoring RG diagnosis trends may act as a tool for anticipating trends in HIV among MSM. Several factors support this hypothesis including, firstly, that RG infection enhances HIV transmission risk.[7] Second, gonorrhoea is highly infectious[8] and may therefore provide a biological proxy indicator for risk behaviours.[9] Third, the majority of urogenital gonorrhoea infections are symptomatic.[8] Finally, there is limited natural immunity from repeated gonorrhoea exposure.[1,8] These factors, alongside the trends in passive notifications described above, suggest a potential role for gonorrhoea surveillance as a plausible marker of sexual risk behaviours among MSM and a lead indicator of HIV incidence trends. We examined the surveillance potential of RG as a lead indicator of HIV transmission among MSM.

Methods

Data from a metropolitan sexual health centre in Victoria were analysed, including HIV and RG tests and results from January 2006–December 2011 among HIV-negative MSM.

The proportions positive for HIV and RG were plotted with concurrent time periods, and with RG lead times of 6, 12 and 24 months ahead of HIV. Pearson's correlations between RG and HIV proportion positive were calculated.

The study was approved by The Alfred Hospital Human Research Ethics Committee.

Results

During the study period, 12 378 RG tests and 17 908 HIV tests were conducted. The highest annual proportion positive was in 2009 for HIV (1.9%; 95% confidence interval (CI): 1.4–2.5%) and 2006 for RG (4.0%; 95% CI: 3.1–5.0%). The quarterly RG proportion positive peaked in April–June 2006 (6.4%; 95% CI: 4.3–9.2%) and the HIV proportion positive peaked in April–June 2007 (2.4%; 95% CI: 1.2–4.2%).

There was no correlation between RG and HIV, with the RG- to-HIV lead time of 12 months ($r = 0.27$; $P = 0.28$) (Fig. 1), nor at concurrent ($r = 0.04$; $P = 0.84$), 6-month ($r = –0.14$; $P = 0.55$) and 24-month lead times ($r = –0.09$; $P = 0.83$).

Discussion

This study describes a preliminary examination of the surveillance potential of RG as a lead indicator for trends in HIV positivity. There was no correlation found between RG and HIV, despite previous authors suggesting the monitoring of gonorrhoea to predict trends in HIV transmission.[8] Possible explanations for this are that the limited scope of this study meant that an association could not be detected or that the association hypothesised may not exist. However, the hypothesis remains plausible and offers a potentially more reliable and sensitive lead indicator for HIV transmission in MSM than self-reported risk factors, such as unprotected anal intercourse. The plausibility of a 12-month lead time for RG ahead of HIV is supported by high rates of annual sexually transmissible infection testing self-reported by MSM in Victoria.[2]

We acknowledge the limitations of inferring individual-level outcomes from aggregated ecological data. Second, use of proportions positive for HIV and RG, although necessary for comparisons

between infections in this study, is influenced by testing frequency and is not a true reflection of incidence. Furthermore, MSM may have been tested for RG and HIV at other locations during the period analysed.

We propose that further research at an individual patient level is needed to test the surveillance hypothesis presented here. Establishing a temporal relationship between RG and HIV diagnoses could inform clinical and public health practice, for example by encouraging HIV testing and protective behaviours in those diagnosed with RG. Increases in RG at a population level could also ready public health systems for increases in HIV and inform the timing of investment in social marketing and other HIV prevention initiatives.

Conflicts of interest

None declared.

Acknowledgements

The authors acknowledge Mr Afrizal, who collated and extracted the data for this study. The authors gratefully acknowledge the contribution to this work of the Victorian Operational Infrastructure Support Program. ML is supported by an National Health and Medical Research Council (NHMRC) post-doctoral fellowship and MH is supported by an NHMRC Senior Research Fellowship.

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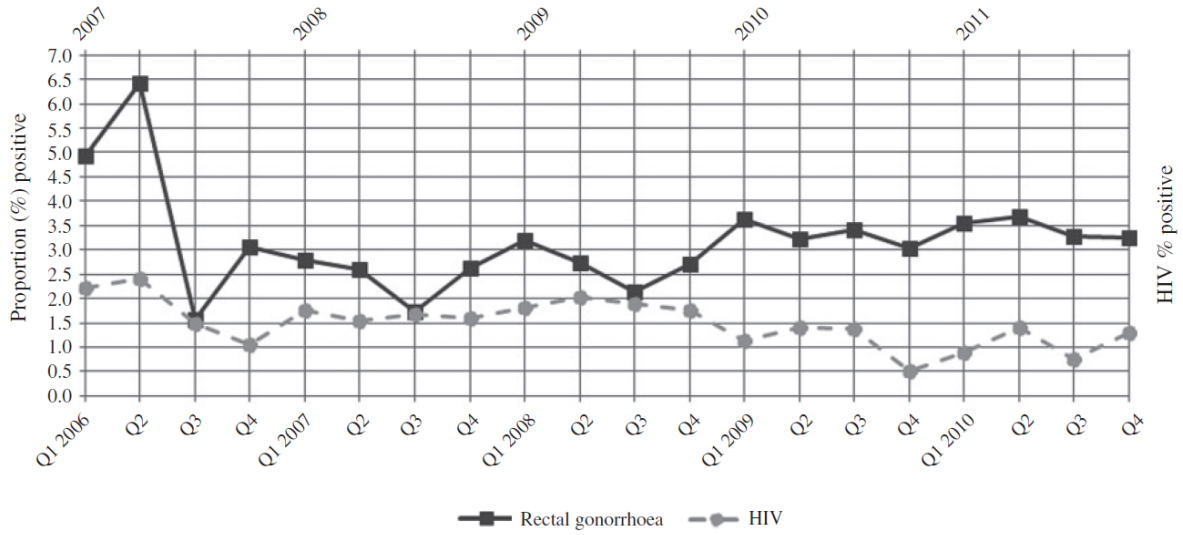

HIV	2.2	2.4	1.5	1.0	1.8	1.6	1.7	1.6	1.8	2.0	1.9	1.7	1.1	1.4	1.4	0.5	0.9	1.4	0.8	1.3
Rectal gonorrhoea	4.9	6.4	1.6	3.1	2.8	2.6	1.7	2.6	3.2	2.7	2.1	2.7	3.6	3.2	3.4	3.0	3.6	3.7	3.3	3.3

Fig. 1. Proportion (%) positive for rectal gonorrhoea (RG) and HIV; 12-month lead time by quarters (Q).