

## Estimating chlamydia prevalence: more difficult than modelling suggests

In their *Lancet Public Health* Article (June 2018) Joanna Lewis and Peter White<sup>1</sup> used national programme monitoring data<sup>2</sup> to infer chlamydia prevalence over time. In a previous article they used the same method to infer prevalence by local authority using national data for 2012.<sup>3</sup> The problem with using these data for these purposes is the inherent variability regarding who is being tested. Unfortunately Lewis and White haven't overcome this problem. They infer prevalence estimates using equations in which the number of diagnoses is a function of prevalence, rate of symptomatic infection presentation (and the rate of symptoms), and the amount of testing done. This prevalence estimate is achieved by assuming that "all non-symptomatic people are tested with the same probability per unit time."<sup>3</sup> This assumption makes the likelihood of being screened for chlamydia infection the same for an uninfected person as it is for an infected but non-symptomatic person and not variable by time or place except as a result of changing prevalence. This approach does not allow for the selection biases inherent in the population accepting testing. Although the mathematics are simplified neatly, the assumption that all non-symptomatic individuals are equally likely to be tested does not reflect the real-world setting.

In fact, individuals undergoing non-symptomatic, opportunistic screening are more likely to be infected than are those who do not,<sup>4</sup> and the increase in the likelihood that infected individuals are screened varies between testing settings largely because of the service settings preferred by different subgroups of non-symptomatic individuals. Therefore, the likelihood of testing positive varies between areas

with a different mix of testing setting types, and also over time, particularly as testing numbers change.<sup>5</sup>

Lewis and White's estimates of prevalence decreased alongside increases in testing from 2008 to 2010, and then increased alongside decreases in testing from 2010 to 2015.<sup>1</sup> However, when plotted over time alongside the percentage of individuals testing positive for all tests during the same period, the changes in positivity mirror the changes in estimated prevalence (appendix).

Variations in positivity might be due to changes in prevalence or to changes in who is being tested, or both. There is ample evidence that changes in who is being tested cannot be ignored, and therefore changes in prevalence cannot be estimated as simply as Lewis and White have done. Therefore, the claims that their approach provides "local chlamydia prevalence estimates from surveillance data"<sup>3</sup> and has produced "evidence for a reduction in chlamydia prevalence in England concurrent with large-scale population testing"<sup>1</sup> are unfounded.

We declare no competing interests.

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- 1 Lewis J, White PJ. Changes in chlamydia prevalence and duration of infection estimated from testing and diagnosis rates in England: a model-based analysis using surveillance data, 2000–15. *Lancet Public Health* 2018; **3**: e271–78.
- 2 Chandra N, Soldan K, Dangerfield C, et al. Filling in the gaps: estimating numbers of chlamydia tests and diagnoses by age group and sex before and during the implementation of the English National Screening Programme, 2000 to 2012. *Eurosurveillance* 2017; **22**: 30453.
- 3 Lewis J, White PJ. Estimating local chlamydia incidence and prevalence using surveillance data. *Epidemiology* 2017; **28**: 492–502.
- 4 Woodhall SC, Soldan K, Sonnenberg P, et al. Is chlamydia screening and testing in Britain reaching young adults at risk of infection? Findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). *Sex Transm Infect* 2016; **92**: 218–27.

- 5 Public Health England. Sexually transmitted infections and screening for chlamydia in England, 2017. June 8, 2018. Health Protection Report. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/713944/hpr2018\\_AA-STIs\\_v5.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/713944/hpr2018_AA-STIs_v5.pdf) (accessed Aug 6, 2018).



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