Giving syphilis to friends: Using social network methods to study the spread and control of syphilis in Baltimore

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The United States has declared syphilis elimination a national health priority, but despite low national prevalence, pockets of syphilis persist, including Baltimore which leads the nation in prevalence of primary and secondary syphilis. Currently sexual contact tracing is used to control syphilis: patients with early infectious syphilis are asked to name their sexual partners during their likely window of infectivity so that partners may be notified, tested, and treated. It is known, however, that sexually-transmitted disease (STD) patients generally do not name all of their sexual contacts. Failure to name contacts leaves likely syphilis cases unidentified, untreated, and available to contribute to the further spread of the disease. Past studies of STD patients have found that they often choose sexual partners from within their social, personal, and drug networks. Exploring patients' broader social contexts may be an effective method of discovering unnamed sexual partners and thus additional cases of syphilis.

In this study we test the power of social and personal network analysis in explaining syphilis transmission. These findings can be applied to evaluate a new method of syphilis control by comparing the effectiveness of detecting early infectious syphilis cases by screening social network members of syphilis index cases compared to standard sexual partner notification techniques.

The social network was constructed using administrative data from the two Baltimore STD clinics and the Baltimore City Health Department. In the usual contact-tracing procedure, patients with incident (newly acquired) syphilis are asked at their STD clinic visit to name sexual contacts from their likely window of infectivity for partner notification purposes. For this study, approximately 500 patients with newly acquired syphilis were interviewed privately and asked to name members of their social and drug networks and given a self-administered questionnaire. Named network members were interviewed using the same questionnaire as the index case, and tested for syphilis. Blood and lesion specimens were used for genetic analysis of syphilis strains to confirm connections between reported contacts.

We map the sex and friendship networks of individuals with incident syphilis who have acquired and possibly transmitted syphilis through sexual behavior. We examine and compare the centrality of drug use behavior among the social and sexual networks of individuals with incident syphilis to find the importance of drug use in spreading syphilis. Finally, we compare the number of new syphilis cases identified in social contacts of the index cases versus sexual contacts. The data is analyzed using routines from the Statnet project.

References

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