Network modeling the impact of community-based male-screening on the Chlamydia trachomatis prevalence in women

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Abstract

We create and analyze a stochastic network-based model to understand the control of Chlamydia trachomatis (Ct) among young African American (AA) in New Orleans. Ct is the most commonly reported bacterial sexually transmitted infection in the United States and is a major cause of infertility, pelvic inflammatory disease, and ectopic pregnancy among women. Despite decades of screening women for Ct, the rates continue to increase among young AA compared to other groups. The community-based program "Check It" proposes that men are an important reservoir of infection for women and screening AA men could make an impact on the rates among women. To quantify the effectiveness of the male-screening strategy, we propose an agent-based network model to simulate a realistic sexual contact network for assortative mixing among the targeted population. We model both the existing intervention for women through the annual exam and the "Check It" male-screening based intervention through venue-based enrollment. The model accounts for various intervention strategies implemented in the program, including the expedited index treatment, expedited partner treatment, social network peer referral, and rescreening. We use sensitivity analysis to quantify the significance of each intervention component onto the prevalence in women. The findings suggested that male-screening has the potential to significantly reduce the prevalence among women.