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Using transmission models to understand the epidemiology of sexually transmitted infections in the United States

The overall burden of sexually transmitted infections (STI) in the United States is large and increasing, and there are marked disparities by race/ethnicity and sexual orientation. In the case of gonorrhea, increasing antibiotic resistance limits treatment options. We have developed a suite of compartmental transmission models with the aims of understanding current epidemiologic trends in syphilis and gonorrhea and evaluating the impact of screening on disease burden. We have also developed a model to investigate the potential utility of a point-of-care test for gonorrhea that reports antibiotic susceptibilities. These novel transmission models provide a platform for evaluating the impact of interventions in a way that captures important population characteristics and disease dynamics. We find that taking into account changing epidemic context is important for controlling STI and ensuring that screening is reaching the appropriate populations at the right time. We also show that although rapid diagnostics have the potential to extend the lifetime of existing antibiotics for the treatment of gonorrhea, ongoing surveillance of resistance patterns will be critical.