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## Ciprofloxacin May be Efficacious in Treating Wild-Type Gyrase A Genotype *Neisseria gonorrhoeae* Infections

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### Dear Editor

We read with great interest the article by Chesson et al. which illustrated the possible economic losses that may be averted by slowing the emergence of ceftriaxone resistant *Neisseria gonorrhoeae* infections [1]. As the threat of untreatable *Neisseria gonorrhoeae* infection increases [2], rapid molecular assays for the timely prediction of antimicrobial susceptibility are increasingly being utilized to target antimicrobial therapy [3]. A recent modeling study demonstrated the theoretical delay in the emergence of multidrug-resistant *Neisseria gonorrhoeae* with the use of such rapid molecular assays [4]. The University of California, Los Angeles Health System has implemented a rapid molecular assay for the determination of mutation in the gyrase A (*gyrA*) gene of *Neisseria gonorrhoeae* [5, 6]. The absence of mutation in that gene has been shown to reliably predict susceptibility to ciprofloxacin [7]. As suggested by the article by Chesson et al. the use of ciprofloxacin may spare ceftriaxone, and thus reduce the emergence of ceftriaxone resistant *Neisseria gonorrhoeae* infections [8].

Ciprofloxacin has been shown to be >99% effective among infections with phenotypic susceptibility [9], however one concern regarding the current utility of ciprofloxacin in the treatment of *Neisseria gonorrhoeae* infections is that there have been no studies evaluating patient outcomes among those with wild-type (non-mutated) *gyrA* genotype *Neisseria gonorrhoeae* infection. We have collected outcome data from participants with wild-type

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*Neisseria gonorrhoeae* infections treated with ciprofloxacin at the University of California, Los Angeles Health System. We completed a retrospective review of 25 patient records between June 2016 and September 2017 with a repeat *Neisseria gonorrhoeae* test performed between 7-90 days after single dose ciprofloxacin 500 mg oral treatment of the initial infection. Of those 25 participants, 100% (95% CI 83% – 100%) had a negative test of cure. The anatomic sites of infection included rectal (n=7), pharyngeal (n=7), urethral (n=7), and unspecified genital swabs (n=4). There was no difference in repeat test results by time to repeat test 7–21 days (100%) vs. 22–90 days (100%) ( $p$ -value>0.1).

Those preliminary results provide promising evidence of the efficacy of ciprofloxacin for the treatment of wild-type *gyrA* genotype *Neisseria gonorrhoeae* infections. There are additional costs to *gyrA* genotyping and genotype-based therapy compared with recommended empiric two-drug therapy with ceftriaxone and azithromycin [10]; however, in the light of the potential costs incurred by the emergence of ceftriaxone resistant infections as suggested by Chesson et al. we advocate for further implementation of the *gyrA* genotypic assay in other health systems for the promotion of targeted *Neisseria gonorrhoeae* therapy.

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## References

1. Chesson HW, Kirkcaldy RD, Gift TL, et al. An illustration of the potential health and economic benefits of combating antibiotic resistant gonorrhea. *Sexually Transmitted Diseases*, 9000. Publish Ahead of Print.
2. Unemo M, Nicholas RA. Emergence of multidrug-resistant, extensively drug-resistant and untreatable gonorrhea. *Future Microbiol.* 2012; 7(12):1401–22. [PubMed: 23231489]
3. Low N, Unemo M. Molecular tests for the detection of antimicrobial resistant *Neisseria gonorrhoeae*: when, where, and how to use? *Curr Opin Infect Dis.* 2016; 29(1):45–51. [PubMed: 26658656]
4. Tuite AR, Gift LT, Chesson HW, et al. Impact of rapid susceptibility testing and antibiotic selection strategy on the emergence and spread of antibiotic resistance in gonorrhea. *The Journal of Infectious Diseases.* 2017 (In Press).
5. Allan-Blitz LT, Humphries RM, Hemarajata P, et al. Implementation of a Rapid Genotypic Assay to Promote Targeted Ciprofloxacin Therapy of *Neisseria gonorrhoeae* in a Large Health System. *Clin Infect Dis.* 2017; 64(9):1268–1270. [PubMed: 28034887]
6. Hemarajata P, Yang S, Soge OO, et al. Performance and Verification of a Real-Time PCR Assay Targeting the *gyrA* Gene for Prediction of Ciprofloxacin Resistance in *Neisseria gonorrhoeae*. *J Clin Microbiol.* 2016; 54(3):805–8. [PubMed: 26739156]
7. Allan-Blitz LT, Wang X, Klausner JD. Wild-Type Gyrase A Genotype of *Neisseria gonorrhoeae* Predicts In Vitro Susceptibility to Ciprofloxacin: A Systematic Review of the Literature and Meta-Analysis. *Sex Transm Dis.* 2017; 44(5):261–265. [PubMed: 28407640]
8. Fingerhuth SM, Bonhoeffer S, Low N, et al. Antibiotic-Resistant *Neisseria gonorrhoeae* Spread Faster with More Treatment, Not More Sexual Partners. *PLoS Pathog.* 2016; 12(5):e1005611. [PubMed: 27196299]
9. Echols RM, Heyd A, O'Keefe BJ, et al. Single-dose ciprofloxacin for the treatment of uncomplicated gonorrhea: a worldwide summary. *Sex Transm Dis.* 1994; 21(6):345–52. [PubMed: 7871449]

10. Allan-Blitz L, Hemarajata P, Humphries R, et al. A Cost Analysis of Gyrase A Testing and Targeted Ciprofloxacin Therapy Versus Recommended 2-Drug Therapy for *Neisseria gonorrhoeae* Infection. *Sex Transm Dis.* 2017 (In Press).

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