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Detection of Ciprofloxacin-resistant, β -lactamase-producing *Neisseria meningitidis* Serogroup Y Isolates, United States, 2019–2020

Summary

Meningococcal disease, which typically presents as meningitis or meningococemia, is a life-threatening illness requiring prompt antibiotic treatment for patients and antibiotic prophylaxis for their close contacts. *Neisseria meningitidis* isolates in the United States have been largely susceptible to the antibiotics recommended for treatment and prophylaxis. However, 11 meningococcal disease cases reported in the United States during 2019–2020 had isolates containing a *bla*_{ROB-1} β -lactamase gene associated with penicillin resistance, as well as mutations associated with ciprofloxacin resistance. An additional 22 cases reported during 2013–2020 contained a *bla*_{ROB-1} β -lactamase gene but did not have mutations associated with ciprofloxacin resistance.

Background

Meningococcal disease is a sudden-onset, life-threatening illness caused by the bacterium *Neisseria meningitidis*. Prompt antibiotic treatment can reduce morbidity and mortality among patients and antibiotic prophylaxis can prevent secondary disease in close contacts (<https://redbook.solutions.aap.org/chapter.aspx?sectionid=189640131&bookid=2205>). Resistance to the antibiotics used for meningococcal treatment and prophylaxis, including penicillin and ciprofloxacin, has been rare in the United States. Recently, however, penicillin- and ciprofloxacin-resistant *N. meningitidis* serogroup Y (NmY) isolates have been detected in the United States.

The U.S. Centers for Disease Control and Prevention (CDC) made a request for isolate submissions from state health departments and reviewed the existing whole genome sequencing data for those isolates. CDC identified 33 meningococcal disease cases occurring between 2013 and 2020 that were caused by NmY isolates containing a *bla*_{ROB-1} β -lactamase enzyme gene conferring resistance to penicillins. The 33 cases were reported from 12 geographically disparate states. A majority of the cases (22/33, 67%) occurred in Hispanic individuals. Isolates from 11 of these cases, reported during 2019–2020 from nine states, were also resistant to ciprofloxacin. These cases represent a significant increase in penicillin- and ciprofloxacin-resistant meningococci in the United States.

Recommendations

- **Healthcare providers** should perform antimicrobial susceptibility testing (AST) to determine susceptibility of all meningococcal isolates to penicillin before changing from empirical treatment with cefotaxime or ceftriaxone to penicillin or ampicillin.
- In states that have experienced meningococcal disease cases caused by ciprofloxacin-resistant strains within the past 1–2 years, **clinicians and public health staff** should consider AST on meningococcal isolates to inform prophylaxis decisions. AST should not delay the initiation of prophylaxis with ciprofloxacin, rifampin, or ceftriaxone.
- **State and territorial health departments** should continue submitting all meningococcal isolates to CDC for AST and whole genome sequencing. Health departments also should report any suspected meningococcal treatment or prophylaxis failures.
- For cases with isolates determined to be β -lactamase screen-positive or ciprofloxacin-resistant, **health departments** should complete a supplemental case report form (available at <https://www.cdc.gov/meningococcal/surveillance/index.html>) or on request from

meningnet@cdc.gov). Forms can be submitted to CDC via secure email (meningnet@cdc.gov) or FTP site.

For More Information

MMWR on Detection of Ciprofloxacin-resistant, β -lactamase-producing *Neisseria meningitidis* Serogroup Y Isolates: https://www.cdc.gov/mmwr/volumes/69/wr/mm6924a2.htm?s_cid=mm6924a2_w

CDC Meningococcal Disease Website: <https://www.cdc.gov/meningococcal/index.html>

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