Background. Nontyphoidal Salmonella (NTS) is a leading cause of foodborne bacterial infections. Annually, ~200,000 antimicrobial-resistant (AMR) NTS illnesses occur in the United States. NTS infections resistant to ceftriaxone and ciprofloxacin, drugs used for the treatment of severe infections, are a growing concern.

Methods. We identified patient NTS isolates submitted to the Pennsylvania Bureau of Laboratories by two hospitals from the same health system during 2018–2020. All were tested by broth microdilution for susceptibility to antibiotics tracked by the National Antimicrobial Resistance Monitoring System and analyzed by whole-genome sequencing. We identified resistance mechanisms and plasmids with ResFinder and PlasmidFinder, respectively, and compared each isolate in selected serotypes against the PulseNet database to identify genetic relatedness within ≤5 allele differences to non-human sequences uploaded during 2017–2021.

Results. Of 164 human NTS analyzed for susceptibility, 28 (17%) had decreased susceptibility to ciprofloxacin (DSC) [MIC ≥0.12 µg/mL] while 6 (3.7%) were ceftriaxone-resistant. AMR varied by serotype; 8 (50%) S. Typhimurium and 16 (42%) Enteritidis had DSC, representing 86% of all isolates with DSC (Figure). Six ceftriaxone-resistant isolates had genes that confer resistance to third-generation cephalosporins including blacmY−2 in 1 Dublin and 2 Typhimurium and blacTX-M-65 in 3 Infantis isolates. The 3 Infantis isolates also had a mutation in gyrA that results in DSC, plus a known transmissible plasmid IncFIB(pN55391) linked to multiple resistance genes. An Infantis isolate was related to a chicken meat isolate and a Hadar isolate was related to isolates from 3 animals and 3 meat sources. One Dublin isolate was related to 2 isolates from beef in Pennsylvania.

Conclusion. Ceftriaxone resistance and DSC in NTS from patients in Pennsylvania varied by serotype and some isolates harbored blacmY−2 and blacTX-M-65 genes. Dissemination of mechanisms that confer resistance to ceftriaxone and DSC is concerning as is the genetic relatedness of isolates from human and animal sources. Our study highlights the need for enhanced One Health AMR monitoring combined with a review of animal production and food processing practices.

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