

Emergence of domestically acquired ceftriaxone-resistant *Salmonella* infections associated with AmpC beta-lactamase

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CONTEXT: Ceftriaxone, an expanded-spectrum cephalosporin, is an antimicrobial agent commonly used to treat severe *Salmonella* infections, especially in children. Ceftriaxone-resistant *Salmonella* infections have recently been reported in the United States, but the extent of the problem is unknown.

OBJECTIVES: To summarize national surveillance data for ceftriaxone-resistant *Salmonella* infections in the United States and to describe mechanisms of resistance.

DESIGN AND SETTING: Case series and laboratory evaluation of human isolates submitted to the Centers for Disease Control and Prevention from 17 state and community health departments participating in the National Antimicrobial Resistance Monitoring System (NARMS) for enteric bacteria between 1996 and 1998.

PATIENTS: Patients with ceftriaxone-resistant *Salmonella* infections between 1996 and 1998 were interviewed and isolates with decreased ceftriaxone susceptibility were further characterized.

MAIN OUTCOME MEASURES: Exposures and illness outcomes, mechanisms of resistance.

RESULTS: The prevalence of ceftriaxone-resistant *Salmonella* was 0.1% (1 of 1326) in 1996, 0.4% (5 of 1301) in 1997, and 0.5% (7 of 1466) in 1998. Ten (77%) of the 13 patients with ceftriaxone-resistant infections were aged 18 years or younger. The patients lived in 8 states (California, Colorado, Kansas, Massachusetts, Maryland, Minnesota, New York, and Oregon). Nine (82%) of 11 patients interviewed did not take antimicrobial agents and 10 (91%) did not travel outside the United States before illness onset. Twelve of the 15 *Salmonella* isolates with ceftriaxone minimum inhibitory concentrations of 16 microg/mL or higher were serotype Typhimurium but these isolates had different pulsed-field gel electrophoresis patterns. Thirteen of these 15 isolates collected between 1996 and 1998 were positive for a 631-base pair polymerase chain reaction product obtained by using primers specific for the ampC gene of *Citrobacter freundii*.

CONCLUSIONS: Domestically acquired ceftriaxone-resistant *Salmonella* has emerged in the United States. Most ceftriaxone-resistant *Salmonella* isolates had similar AmpC plasmid-mediated resistance.

[Source: PubMed,
www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11135779&dopt=Abstract]