Significance

Most isolates from the same farm shared the same antimicrobial susceptibility pattern, and a small number of antimicrobial susceptibility patterns accounted for most of the isolates. For drugs of importance in treating human salmonellosis, ciprofloxacin resistance occurred in only one isolate and no isolates were resistant to ceftriaxone. However, eight farms had isolates with intermediate susceptibility to ceftriaxone.

Antimicrobial Susceptibility of Salmonella Isolates from Organic and Conventional Dairy Farms

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Introduction

Use of antimicrobials in livestock is under scrutiny as a potential contributing factor to the increased prevalence of antimicrobial-resistant *Salmonella*. The purpose of this study was to compare antimicrobial resistance for *Salmonella* isolated on conventional and organic dairy farms in the midwest and northeastern United States.

Materials and Methods

Thirty-two organic farms and 97 conventional farms in Michigan, Minnesota, New York and Wisconsin were enrolled in the study. Environmental and fecal samples were collected from each farm every two months from August 2000 to October 2001. Susceptibility to 15 antimicrobial drugs was tested for 1518 *Salmonella* isolates from 106 farms using a broth dilution method. Drugs tested were amikacin, amoxicillin/clavulanic acid, ampicillin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline and trimethoprim/sulfamethoxazole. Isolates were classified as being susceptible or having decreased susceptibility to each antimicrobial based on minimum inhibitory concentrations. Each isolate was also classified as multi-drug resistant (MDR) if decreased susceptibility was observed for five or more drugs. The association of organic versus conventional management with decreased antimicrobial susceptibility was tested in herd-level logistic regression models controlling for state and number of cows in the herd.

Results

One hundred forty eight (9.8%) isolates exhibited MDR, with 25% of farms having at least one MDR *Salmonella* isolate. A significant association ($P<0.05$) between decreased susceptibility of individual antimicrobials and conventional management was found only for streptomycin (OR=5.7; 95% CI 1.2, 28). Although not statistically significant, conventional farms tended to be more likely to have at least one MDR *Salmonella* isolate when compared to organic farms. (OR = 3; 95% C.I. 0.8, 14). Larger herd size was associated with increased probability of isolating at least one MDR strain ($P = 0.005$), but state was not significant ($P= 0.2$).

Significance

In general, antimicrobial susceptibility of *Salmonella* isolates was similar on organic and conventional herds when controlling for herd size and state. Isolates with decreased susceptibility to multiple drugs and with decreased susceptibility to streptomycin (which was highly correlated with MDR) tended to be more common on conventional farms. Whether this difference was related to differences in antimicrobial use or other management factors was not addressed in this analysis.