

mined as positive (22/45) by fecal culture in September 2001.

Significance

Results indicated a significant detrimental effect on milk production (expressed as 305 days milk) and milk quality (total fat, total protein), which were reduced in cows with subclinical Johne's disease, during second and third lactation. This effect began at an average age of 5.41 years, which corresponds with the known chronic

nature of JD. The lack of a difference in older animals may be due to the relatively small numbers in this population or that heavily infected cows were previously removed from the herd. The reduction in prevalence of JD observed up to this point is indicative of a younger, purchased herd. Calves raised under the colostrum management program are now entering the herd, and the prevalence in this subpopulation will be monitored to determine if the management strategy has been effective in reducing the prevalence of the disease in home-reared animals.

Salmonella Antimicrobial Resistance Patterns on Midwest and Northeast Dairy Farms

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Introduction

Potential impact of antimicrobial use in livestock on the development of antimicrobial-resistant zoonotic pathogens is an ongoing and controversial public health issue. Our objective was to determine the prevalence of antimicrobial resistance among *Salmonella* isolates collected from dairy farms.

Materials and Methods

Thirty-two organic farms and 97 conventional farms in Michigan, Minnesota, New York, and Wisconsin were enrolled in the study. Herds were selected without regard to prior history of *Salmonella* infections. Environmental and cattle fecal samples were collected on each farm at two-month intervals from August 2000 to October 2001. *Salmonella* isolates were tested for susceptibility to amikacin, amoxicillin/clavulanic acid, ampicillin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline and trimethoprim/sulfamethoxazole using a broth dilution method. Isolates were classified as susceptible or

having decreased susceptibility (intermediate or resistant) for each antimicrobial based on minimum inhibitory concentrations.

Results

There were 63 distinct antimicrobial resistance patterns, but seven patterns accounted for greater than 90% of the isolates. A median of 75% of isolates shared the dominant pattern within farm for 60 farms, with at least four isolates tested. The most frequent pattern was susceptible to all 15 antimicrobials, with 91 farms having at least one isolate pan-susceptible and 50% of farms having two-thirds or more of isolates susceptible to all antimicrobials tested. There were 13 farms where the majority of isolates had decreased susceptibility to five or more antimicrobial agents. Strains with decreased susceptibility to 10 or 11 drugs were found on 12 farms. The most frequent patterns among these isolates were decreased susceptibility to amoxicillin/clavulanic acid, ampicillin, ceftiofur, cephalothin, chloramphenicol, gentamicin, kanamycin, streptomycin, sulfamethoxazole, tetracycline, and +/- ceftriaxone (eight farms).

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.