

Antimicrobial resistance prevalence in fecal *Escherichia coli* of preweaned dairy calves housed either in individual pens or in group pens.

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Abstract:

Group housing of preweaned dairy calves fed acidified milk is a growing practice in the US. The objective of this practice is to increase the average daily gain of calves in a healthy and humane environment while reducing labor requirements. However direct contact between calves in group pens increases the risk of transmission of infection between calves and potentially the exchange of resistant bacteria and genes. The objective of this study was to compare antimicrobial resistance in fecal *E. coli* of preweaned calves housed either in individual pens fed milk or milk replacer two to three times a day or in group pens fed free choice acidified milk. Twelve farms from central NY were used for the study: 6 farms housing calves in individual pens (**IP**) and feeding them whole milk or milk replacer two to three times a day, and 6 farms housing calves in group pens (**GP**) and feeding them free choice acidified milk. None of the farms added antibiotics to the calves' food. Fecal swabs for culture of *E. coli* were collected from 290 calves from IP farms and 351 calves from GP farms. A maximum of three isolates per calf were tested for susceptibility to 12 antimicrobials using a Kirby-Bauer disk diffusion assay. A higher proportion (95% confidence interval in parentheses) of gentamycin resistant *E. coli* isolates (GEN) ($P=0.01$) were observed for IP farms (GEN: 0.07–0.19) compared to GP farms (GEN: 0.02–0.09). In contrast, a higher proportion of *E. coli* isolates resistant to ciprofloxacin (CIP) ($P=0.05$) and nalidixic acid (NAL) ($P=0.05$) was observed for GP farms (CIP: 0.02–0.09; NAL: 0.03–0.10) compared to IP farms (CIP: 0.02–0.04; NAL: 0.02–0.05). Among the 1960 *E. coli* isolates tested, the most common resistance pattern in IP isolates was ampicillin-cefoxitin-ceftiofur-streptomycin-tetracycline (6%) and in GP isolates it was chloramphenicol-streptomycin-tetracycline (9%). Overall, more isolates from GP calves belonged to the same resistance patterns than did isolates from IP calves. We found the calf housing type has an effect on resistance to individual antibiotics and on the diversity of resistance patterns in *E. coli*, but there was no clear-cut advantage to either system with regard to overall resistance frequency.