Feedlot- and Pen-Level Prevalence of Enterohemorrhagic *Escherichia coli* in Feces of Commercial Feedlot Cattle in Two Major U.S. Cattle Feeding Areas

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Abstract

The objective of this study was to determine feedlot- and pen-level fecal prevalence of seven enterohemorrhagic *Escherichia coli* (EHEC) belonging to serogroups (O26, O45, O103, O111, O121, O145, and O157, or EHEC-7) in feces of feedlot cattle in two feeding areas in the United States. Cattle pens from four commercial feedlots in each of the two major U.S. beef cattle areas were sampled. Up to 16 pen-floor fecal samples were collected from each of 4-6 pens per feedlot, monthly, for a total of three visits per feedlot, from June to August, 2014. Culture procedures including fecal enrichment in *E. coli* broth, immunomagnetic separation, and plating on selective media, followed by confirmation through polymerase chain reaction (PCR) testing, were conducted. Generalized linear mixed models were fitted to estimate feedlot-, pen-, and sample-level fecal prevalence of EHEC-7 and to evaluate associations between potential demographic and management risk factors with feedlot and within-pen prevalence of EHEC-7. All study feedlots and 31.0% of the study pens had at least one non-O157 EHEC-positive fecal sample, whereas 62.4% of pens tested positive for EHEC O157; sample-level prevalence estimates ranged from 0.0% for EHEC O121 to 18.7% for EHEC O157. Within-pen prevalence of EHEC O157 varied significantly by sampling month; similarly within-pen prevalence of non-O157 EHEC varied significantly by month and by the sex composition of the pen (heifer, steer, or mixed). Feedlot management factors, however, were not significantly associated with fecal prevalence of EHEC-7. Intraclass correlation coefficients for EHEC-7 models indicated that most of the variation occurred between pens, rather than within pens, or between feedlots. Hence, the potential combination of pre-harvest interventions and pen-level management strategies may have positive food safety impacts downstream along the beef chain.

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