

A Longitudinal Study of the Prevalence, Incidence and Duration of Fecal Shedding of *Escherichia coli* O157:H7 by Feedlot Cattle

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Introduction

Escherichia coli O157:H7 appears ubiquitous to pens of feedlot cattle; however, the percentage of cattle shedding the organism within different feedlot pens has been observed to vary widely over time and space.¹ The objective of this study was to describe the variability of *E. coli* O157:H7 fecal shedding within contiguous pens of cattle over the course of the feeding period.

Materials and Methods

At the beginning of the feeding period, 100 hundred feedlot steers were randomly assigned to 10 pens (10 animals each). Feces were collected from the rectums of each animal and cultured for *E. coli* O157:H7 once weekly throughout the 19-week feeding period (June-October, 2000). New cases of shedding were defined each week as animals cultured positive for the organism that had been culture negative the prior week. The number of animals at risk were defined each week as those cattle that were culture-negative the prior week. Duration of shedding was defined as the number of consecutive weeks an individual was culture-positive. Each individual could have more than one incident of shedding, each with its own duration.

Results and Conclusions

E. coli O157:H7 was recovered from the feces of each animal at least once during the feeding period. Percentage of pens from which at least one steer was shed-

ding *E. coli* O157:H7 ranged from 10% (Week 1) to 100% (Weeks 10, 11, 13, 14, 15, 16, 18). The point-prevalence of cattle shedding the pathogen ranged from 1% (Week 1) to 80% (Week 10) over the feeding period. The first seven weeks of the feeding period were characterized by low incidence (<0.1 new cases/animal-week) of shedding for periods of short mean duration (≤ 2.5 weeks). The mean duration of fecal shedding began to increase Week 8 (4.7 weeks); reached a maximum mean duration Week 9 (4.8 weeks); then gradually declined. Incidence increased dramatically during Week 9 (0.5 new cases/animal-week); reached a maximum Week 14 (0.7 new cases/animal-week); and then gradually decreased. On the final day of the feeding period 30 (30%) cattle were shedding detectable levels of *E. coli* O157:H7, and those cattle had been shedding the organism a mean of 3.4 weeks. The 30 animals culture-positive on the last day were distributed in nine of the 10 pens such that one pen contained 9, three pens contained 4 each, one pen contained 3, two pens contained 2 each, and two pens contained 1 each. We concluded that the prevalence of cattle shedding *E. coli* O157:H7 within a given group of feedlot cattle varies widely by time and space, and that variability in prevalence is a function of changes in both incidence and duration of fecal shedding.

References

1. Smith DR, Younts SM, Blackford MP, *et al.* 2000. Pen-level prevalence and environmental risk factors for *Escherichia coli* O157:H7 fecal shedding by feedlot cattle. *Proc Am Assoc Bov Prac* 33:160, 2000.