

Weighing the Evidence

Part III. What Measures do we have to reduce *E coli* O157:H7 shedding from cattle?

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When we think of infectious disease control in animals and people, we usually rely on preventing exposure to the infectious agent and on boosting the immune system – such as by using vaccines -- to provide resistance if and when an animal is exposed, and “enhancing the local immune system” or “enhancing the gut environment.”

Vaccine strategies show promise in reducing *E coli* O157:H7 shedding. There have been quite a few clinical trials to evaluate the effectiveness of two different vaccines on O157:H7 shedding reduction. The good news is that someone has already summarized all the trials for us ([Varela et al. 2012](#)). Their conclusion was that “Vaccination was found to be an effective pre-harvest intervention...” The results were focused on bacterial shedding as the primary outcome. How would this impact the public’s health? The logic is that reduced shedding would lead to less contamination of water, cattle hides, and, eventually meat. However, the exact reduction in the number or proportion of illnesses in which this preventive measure would result is not known. There is currently no requirement for cattle producers or feedlot operators to vaccinate their cattle. There is also no specific incentive, at this point, for them to vaccinate cattle, only an added cost.



Any other things that could reduce *E coli* O157:H7 shedding in cattle? In addition to vaccination to improve immunity, sometimes things that we eat can improve health by changing the composition of bacteria in the gut. [Direct-fed microbials](#) are feed additives that contain “beneficial” bacteria. They have been studied for their impact on daily weight gain in feedlot cattle as well as their effect on *E coli* O157:H7 shedding and cattle hide contamination. In a summary of a number of trials of direct-fed microbials (a.k.a. probiotics), Sargeant and others (2007) found that cattle fed this additive were more than two times less likely to shed *E coli* O157:H7 than cattle not fed these additives. The good news for cattle feeders is that these products also tend to help cattle gain weight more efficiently.

Management of cattle has some impact on the amount of *E coli* contamination. Cattle transport can result in one animal shedding *E coli* onto the hide of another – indicating that keeping trailers clean and managing the appropriate stocking density of animals in the trailer. Reducing the chances for hide contamination are considered critical controls points for

the reduction of meat and meat products. Many of those points occur just before or after harvest, not on the ranch or feedlot, however.

Since 1993, there has been a tremendous amount of research into our understanding of the bacterium, its relationship to its cattle reservoir, and ways to reduce risk for human illness. Additional research is looking at the reduction in shedding of *E coli* by cattle and the actual reduction in risk of infection by people

(<http://www.beefresearch.org/CMDocs/BeefResearch/Pre-Harvest%20Control%20of%20E.%20coli%20Literature%20Review.pdf>). We are guaranteed to see more research in all the steps along the food chain from cattle feeding and management to risk reduction to people bringing us more evidence to weigh in making decisions to improve public health.

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