Researchers and farmers collaborate to prevent E. coli

July 6 2016, by Mark Kuykendall

Cristina Venegas-Vargas, a former graduate student and lead author of the study, poses in front of dairy cattle. Credit: Rebekah Mosci, a co-author of the study.

A collaborative Michigan State University study involving microbiologists, epidemiologists, animal scientists, veterinarians,

graduate students, undergraduates and farmers could lead to better prevention practices to limit dangerous *E. coli* bacteria transmissions.

The study, published in *Applied and Environmental Microbiology*, a journal of the American Society for Microbiology, found that dairy cattle under stress from hot weather and energy loss from milk production were significantly more likely to shed Shiga toxin-producing *Escherichia coli*—or *STEC* - a type of *E. coli* that can cause serious illnesses in humans through the production of a potent toxin. Shedding is the process of expelling bacteria from the body, whether through the respiratory tract, the genital tract, or in the case of cattle, the intestinal tract through their feces.

This new finding provides an opportunity for targeting prevention practices to reduce the prevalence of these potentially deadly strains of *E. coli*, which cause approximately 100,000 illnesses, 3,000 hospitalizations and 90 deaths annually in the United States.

"Most importantly, our study involved cattle farmers who were willing to be involved in projects that help to improve the safety and quality of the food they produce," said Dan Grooms, MSU large animal veterinarian and a collaborator in the study.

The study sampled more than 1,000 cattle from six dairy farms and five feedlots in Michigan. Cattle are a common carrier of STEC, and food or water contaminated with cattle feces is a common source of *E. coli* infections in humans.

"Reducing *STEC* colonization and shedding in cattle can decrease the likelihood of these bacterial pathogens from entering the food supply and causing foodborne infections in people," said Shannon Manning, MSU molecular biologist and principal investigator of the study. "By understanding specific factors that increase the risks of STEC shedding

in cattle, new management strategies, such as the isolation of high-risk animals, can be developed to limit transmission."

Next steps in the research include examining the diversity of different *STEC* strains that are shed and determining the rate at which animals acquire new *STEC* strains over time.

"We hope to assess how frequently individual animals acquire different types of *STEC* and determine which types are most commonly linked to disease in humans," Manning said.

Collaborators in the research included Cristina Venegas-Vargas, a former graduate student and lead author of the study, and Paul Bartlett, Julie Funk, Bo Norby and Steven Rust at the Colleges of Veterinary Medicine and Agriculture and Natural Resources.

"It would have been extremely difficult to do this study without such a wide range of expertise," Manning said.

More information: Cristina Venegas-Vargas et al. Factors associated with Shiga toxin-producingshedding in dairy and beef cattle, *Applied and Environmental Microbiology* (2016). DOI: 10.1128/AEM.00829-16

Provided by Michigan State University