

Characterization of shiga-toxin producing *E. coli* infections and cryptosporidia in South Dakota with respect to agricultural exposures and other risk factors

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Project Summary:

Shiga-toxin producing strains of *Escherichia coli* (STEC) and *Cryptosporidium* spp. are significant causes of illness in humans. Incidence rates of these illnesses are higher in South Dakota than in the United States as a whole. Transmission of these agents to people through direct contact with animals has been identified as one of the many possible routes of exposure.



Methods

A review and compilation of the South Dakota Department of Health reports for cases of STEC and cryptosporidiosis from 2011 and 2012 was assembled. A database was designed using standard software, whereby the data was entered. Specific risk factors were identified largely to coordinate with interview instruments used by the Minnesota Department of Health. These factors were also included in the database design. Using the same or similar set of risk factors as projects carried out by the Minnesota Department of Health significantly helped both entities determine significant similarities or differences between their cases.

Patients reported with either STEC or cryptosporidiosis in South Dakota in 2012 were interviewed regarding 7 categories of animal exposure: 1) Petting zoo/fair attendance, 2) animal event/rodeo attendance, 3) feed/pet store visits, 4) farm visits, 5) employment or residence at a farm, 6) residence with pets, and 7) visiting other households with pets.

Results:

A high proportion of the 50 STEC cases (78.0%) reported animal exposure prior to illness onset. Living with pets was the most commonly reported animal exposure (63.6%), followed by visiting other households with pets (35.3%), and living or working on a farm (23.3%). People who reported visiting a farm had a high level of direct animal contact and infrequently practiced personal protective measures.

Animal exposures were reported by 87.8% of the 115 cryptosporidiosis cases, with living with pets the most commonly reported exposure (63.7%), followed by living or working on a farm (45.6%), and visiting a farm (29.0%). Those with farm exposure reported a high degree of direct contact with animals and inconsistent use of personal protective measures such as hand washing.

Cryptosporidiosis patients were significantly more likely than STEC patients to have lived or worked on a farm or attended an animal event in the days prior to their illness, and were older on average. STEC cases were more likely to occur in the Sioux Falls area, with cryptosporidiosis more prevalent in northeastern South Dakota.

Conclusion:

Animal contact on farms emerged as an important exposure route, one that will benefit from more study and educational messages regarding personal protective measures. This study created the opportunity for ongoing and new outreach efforts aimed at the health of agricultural workers and their families. Stakeholders and various organizations benefit from these findings and can aid in the dissemination of pertinent information. Collaborators include: SD Department of Health, South Dakota State University (SDSU) academic programs, SDSU Extension, Dairy Producers of SD, SD 4-H and FFA programs, SD Cattlemen's Association, SD Stockgrowers and SD Pork Producers, as well as UMASH.

This project has fostered and enhanced the strong ties and collaboration among SDSU, the SD DOH, the Minnesota Department of Health, and UMASH.