

Evaluation of Bacteriological Culture for the Diagnosis of Clinical Salmonellosis in Dairy Cattle Using a Latent Class Model

P. Aubry¹, BSc, DMV; M. Bigras-Poulin¹, DMV, PhD; C.J. Cripps², DVM; L.D. Warnick², DVM, PhD; D.V. Nycham², DVM, PhD; Y.T. Grohn², DVM, PhD

¹Department of Clinical Sciences, Université de Montréal, Saint-Hyacinthe, Québec

²Department of Population Medicine, Cornell University, Ithaca, NY

Introduction

The diagnosis of clinical salmonellosis in dairy cattle is usually based on clinical examination of the animal and bacteriological culture of the feces. Bacteriological culture is considered the gold standard for the diagnosis of salmonellosis, but the few studies that have evaluated its performance have indicated that it might suffer from a less than ideal sensitivity (1,2). 1. Palmer JE, Whitlock RH, Benson CE, *et al.*: Comparison of rectal mucosal cultures and fecal cultures in detecting *Salmonella* infection in horses and cattle. *Am J Vet Res* 46:697-698 1985. 2. Richardson A, Fawcett AR: *Salmonella dublin* infection in calves: the value of rectal swabs in diagnosis and epidemiological studies. *Br Vet J* 129:151-156, 1973.

Materials and Methods

Eight hundred and thirty-one dairy herds serviced by 35 veterinary clinics in five states were enrolled in a prospective cohort study from March 2004 to January 2006. The veterinarians examined every suspected case of clinical salmonellosis, and obtained a fecal sample for bacteriological culture. The performance of the bacterio-

logical culture was estimated with a latent class model using two tests (the presence of diarrhea and fever, and a bacteriological culture) and two populations (the study population was divided in two subpopulations based on herd size). Because the typing of every *Salmonella* cultured was performed, the specificity of the bacteriological culture was set to 1.

Results

Bacteriological culture results and clinical signs were available for 873 calves and 1,452 cows. The sensitivity of the culture was estimated at 0.56 (95% credibility interval: 0.23-0.97) for calves and 0.79 (95% CI: 0.54-0.99) for cows.

Significance

The sensitivity of bacteriological culture for the diagnosis of clinical salmonellosis is low for calves and acceptable for cows. Therefore, a diagnosis of salmonellosis cannot be ruled out in the presence of a negative culture, especially for calves and in the presence of diarrhea and fever.