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Model or meal?



Why in the world are the National Institutes of Health (NIH) funding a veterinary epidemiologist to study *Clostridium difficile* (CDI), the leading cause of infectious diarrhea in human hospitals? Yrjo Grohn, Professor of Epidemiology and Chair of the Department of Population Medicine and Diagnostic Sciences, has traditionally conducted research on common food-borne pathogens, such as salmonella, listeria, and e-coli, in farm animal populations. Like many food supply epidemiologists, Grohn used mathematical modeling to understand the spread of these infectious agents as a means of optimizing food production systems. His work helped producers operate efficiently while keeping the risk of economic loss and zoonotic transmission (animal to human) within acceptable limits. Now, Grohn and his colleagues have found an important new application for their empirical animal models – the study of infectious disease in human populations.

While the use of animal models to advance our understanding of human diseases is well established, this type research has traditionally been conducted at the level of the individual organism. In a literature review to be published in the February issue of the journal *Nature*, Grohn argues that similar work can be done at the population level, particularly since humans and farm animals share many pathogens and transmission mechanisms. “We propose that farm animal populations, coupled with mathematical models, are well-suited model systems to study infectious disease population dynamics...that are relevant to control of human infectious diseases,” he writes. According to Grohn and his co-authors, the same factors that contribute to outbreaks in livestock, such as crowding, close contact, poor hygiene, and contaminated objects, are also prevalent in human settings such as hospitals, the military, and schools.

For the NIH-supported CDI study, Grohn is using the modeling expertise that he has gained working with livestock to quantify how infection is introduced and how it is passed around the hospital environment. This work will also help determine risk factors for susceptibility and design control measures. “As veterinarians, we need to keep our eyes open,” said Grohn. “When it comes to population-based studies, which are relevant in public health and food safety, we are well trained because we’re used to looking at the world at a population level.”