

# Nonpoint Source Contamination—Risk of Cryptosporidium in Watersheds

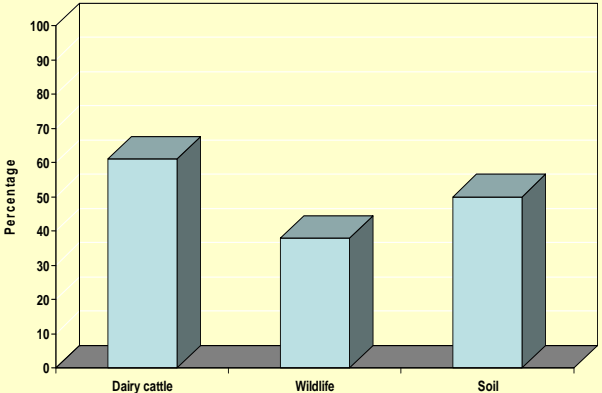
Hussni O. Mohammed, Susan E. Wade; Department of Population Medicine and Diagnostic Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853, USA

### Objective

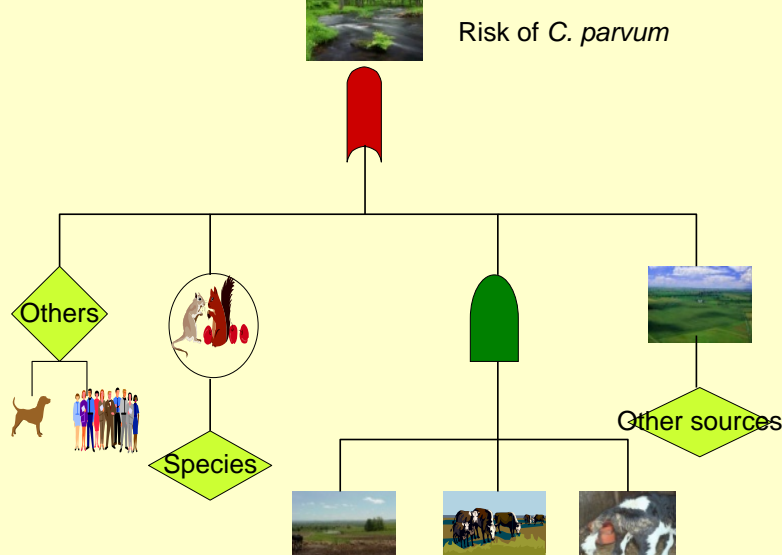
*Cryptosporidium* spp. is a coccidian protozoan that has zoonotic significance. We carried out a probabilistic risk assessment for contamination of a drinking water supply system with zoonotic *Cryptosporidium* spp. from nonpoint sources in watershed in New York State.

### Material and Methods

A quantitative risk assessment approach using the pathway model was used to address the stated objective. Data used in the risk model were obtained from our studies (deterministic) and from the literature. Genotyping of



**Figure 1.** Occurrence of zoonotic *C. parvum* Among different component of the ecosystem



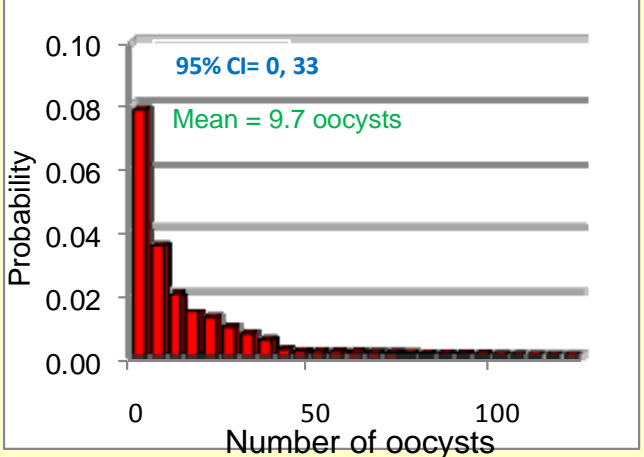
**Figure 2.** Fault-tree scenario describing the pathway by which *C. parvum* from sources to reservoir

isolates was performed by sequencing. To capture the variability and uncertainty associated with some of the parameters used in the simulation we assumed that these estimates were obtained from theoretical distributions. We ran Monte Carlo the simulations with respective parameters using @RISK .

### Results and discussions

*Cryptosporidium* species were prevalent in the three components of the ecosystem that were targeted in this study. Cattle were the major reservoirs for the zoonotic genotype, *C. parvum* (Figure 1). Our analysis using the

assumptions about the number of affected calves, the size of the herd, the decay and the wash off rates, the presence of oocysts in wildlife, and in agricultural fields, showed that on the average 10 oocysts could be detected per liter of water per day in the reservoir (Figure 3). However, in the majority of the times it was unlikely to detect the oocysts in the water (probability 0.078).



**Figure 3.** Results of the simulation of average number of *C. parvum* per liter per day

### Conclusions—Zoonotic genotypes of

*Cryptosporidium* were prevalent in watershed ecosystem and their risk could be mitigated by modification of several management practices.