Name
Dr. Kayoko Shioda
Department
School of Public Health, Boston University
Position
Assistant Professor
Lecture title
“Achieving One Health from Infectious Disease Research: Health and Well-Being of Humans and Animals”
Lecture abstract (400-500 words)

The burden of diarrheal diseases remains a critical issue among children in low- and middle-income countries (LMICs). Beyond causing gastroenteritis, enteropathogens contribute to undernutrition and growth faltering, leading to long-term cognitive deficits, poorer academic performance and school retention, and lower economic productivity in adulthood.

A substantial portion of these enteropathogen infections is attributed to zoonotic pathogens. Chickens, for instance, serve as common carriers of enteropathogens such as *Campylobacter*, *Salmonella*, and *Cryptosporidium*, collectively responsible for the greatest fraction of the global burden of diarrheal disease. Transmission of these enteropathogens to humans occurs through direct contact with chickens or via contaminated food, water, and soil. Inadequate sanitation practices and a lack of biosecurity measures throughout the chicken meat production system escalate the risk of exposure to these pathogens in LMICs. At the same time, poultry farming is the major source of animal protein and nutrition, which has been promoted as an important growth and development strategy in LMICs. With the anticipated increase in poultry production and consumption in this setting, there is an urgent need to control poultry-origin enteropathogens. Given the intricate connections between enteropathogens, animals, food systems, and the environment, a comprehensive One Health approach is critical for effective control.

To address this challenge, our work in Maputo, Mozambique focused on understanding the structure of the local chicken value chain. We identified locations and behaviors exposing people to poultry-associated pathogens through interviews, surveys, and sample collection at farms, informal markets, grocery stores, and households. Fecal and carcass rinse samples were tested for *Campylobacter jejuni/coli* and *Salmonella* spp. to assess microbial hazards in these settings. We found that contamination of these pathogens increased from no contamination at the start of the value chain to 100% contamination of carcasses with *C. jejuni/coli* at informal markets. Leveraging infectious disease transmission modeling, we estimated the potential impact of control measures to mitigate infection risks among children in Maputo. Our model simulation showed that if foodborne transmission could be reduced by 90%, the prevalence of *Campylobacter* and *Salmonella* infection would decline by 52% (95% credible interval: 40-64%) and 46.9% (39-55%), respectively. Our findings have been shared with key stakeholders in Mozambique, including the Ministry of Health, fostering discussions on One Health approaches to control zoonotic enteropathogens.

This comprehensive approach underscores the interconnectedness of animals, food systems, and the environment, providing a foundation for sustainable solutions to alleviate the burden of enteropathogens on human health and wellness in LMICs.