Solving *Clostridioides difficile*: Mathematical Models of Transmission and Control in Healthcare Settings

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Clostridioides difficile (*C. difficile*) is an infection-causing bacterium and one of the most frequently identified healthcare-acquired infections in United States hospitals. *C. difficile* is typically contracted after antibiotic use, when healthy gut microbiota that prevent colonization is compromised, increasing the likelihood of developing an infection. Colonized patients, both symptomatic and asymptomatic, shed *C. difficile* endospores that can survive for long periods on surfaces outside the host and are resistant to many commonly-used disinfectants. Transmission pathways can include contact between individuals or with endospores on fomites, objects likely to carry infection.

This talk will focus on various mathematical models aimed at quantifying the transmission of *C. difficile* in healthcare settings ranging from systems of ordinary differential equations to agent-based models – all developed by undergraduate research students! The focus of these projects have been understanding the contribution of several transmission pathways to the spread of *C. difficile*, including patient contact with low- and high-touch frequency fomites and healthcare workers. We will discuss how students became involved with their research projects as well as their progress and results. Simulated results can be applied by healthcare professionals by focusing on precautionary measures that reduce patient colonization with *C. difficile*.