Quantifying the Contribution of Environmental Pathways to the Transmission of *Clostridioides difficile*

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Clostridioides difficile (formerly *Clostridium difficile*) is the leading cause of infectious diarrhea and the most frequently identified healthcare associated infection in United States hospitals. *C. difficile* is typically contracted after antibiotic use, when healthy gut microbiota that prevent colonization is compromised. Colonized patients, both symptomatic and asymptomatic, shed *C. difficile* endospores that can survive long periods on surfaces outside the host and are resistant to many commonly used disinfectants. Transmission pathways can include contact with environmental reservoirs of endospores on fomites, objects likely to carry infection.

This work focuses on the effect of fomite touch frequency on *C. difficile* transmission. The dynamics are modeled using a six-dimensional system representing the classes within the total patient and pathogen populations. Due to the small population size of the considered hospital, patient and endospore populations are simulated stochastically. The results can be utilized to examine the role surfaces with varying touch frequencies contribute to patient colonization of *C. difficile* in healthcare settings.