1163-92-1575 **Cameron Browne*** (cambrowne@louisiana.edu), **Hayriye Gulbudak** and **Joshua Macdonald**. *Differential impacts of contact tracing and lockdowns on outbreak size in COVID-19 model applied to China.*

Rapid growth of the COVID-19 epidemic in China induced extensive efforts of contact tracing and social-distancing/lockdowns. We construct a novel infectious disease model incorporating these distinct quarantine measures (contact tracing and self-quarantine) as reactionary interventions dependent on current infection levels. Derivation of the final outbreak size leads to a simple inverse proportionality relationship with self-quarantine rate, revealing a fundamental principle of exponentially increasing cumulative cases when delaying mass quarantine or lockdown measures beyond a critical time period. In contrast, contact tracing results in a proportional reduction in reproduction number, flattening the epidemic curve but only having sizable impact on final size when a large proportion of contacts are traced. We fit the mathematical model to data from China on reported cases and quarantined contacts, finding that lockdowns had an overwhelming influence on compressing the outbreak, whereas contact tracing played a role in reducing peak number of infected. Sensitivity analysis under different re-opening scenarios illustrate the differential effects that responsive contact tracing and lockdowns can have on subsequent outbreaks. (Received September 15, 2020)