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Tina Huang* (huangyu@lafayette.edu) and **Allison Lewis**. *Predicting tumor response to radiotherapy based on pre-treatment parameter estimates*. Preliminary report.

Due to continuous improvement in medical technology, it is now possible for clinicians to collect detailed information about a variety of tumor characteristics as the tumor evolves. As a result, a variety of cancer treatments have been developed to inhibit tumor growth dynamics. However, it remains difficult to predict the efficacy of a given treatment prior to administration. Additionally, the process of collecting information about the tumor may be invasive and expensive. Thus, the creation of a framework for predicting patient response to treatment using only limited data collected prior to the start of the treatment regimen is invaluable to clinicians in designing a targeted treatment protocol for each individual. In this study, we employ ODE models for tumor growth to simulate tumor dynamics and utilize synthetic data from a cellular automaton model for calibration. We investigate which model parameters drive a tumor's response to radiotherapy by clustering model simulations according to the final tumor volume after treatment and comparing the associated parameter distributions. Additionally, we develop a framework for determining the probability of observing complete tumor remission following radiotherapy based only on a patient's pre-treatment parameter values. (Received September 09, 2020)