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Yang Kuang* (kuang@asu.edu), Arizona State University, Tempe, AZ 85283. *Predictive Mathematical Models of Hormone Treatment for Prostate Cancer.*

Prostate cancer is commonly treated by a form of hormone therapy called androgen suppression. This form of treatment, while successful at reducing the cancer cell population, adversely affects quality of life and typically leads to a recurrence of the cancer in an androgen-independent form. Intermittent androgen suppression aims to alleviate some of these adverse effects by cycling the patient on and off treatment. We present several mathematical models of prostate cancer growth to study the dynamics of androgen suppression therapy and the production of prostate-specific antigen (PSA), a clinical marker for prostate cancer. Biologically crude models were based on the assumption of an androgen independent (AI) cell population with constant net growth rate. These models gave poor accuracy when fitting clinical data during simulation. More refined models presented hypothesized an AI population with increased sensitivity to low levels of androgen and these models generate high levels of accuracy in fitting clinical data. In general, we found that biologically more plausible models can forecast future PSA levels more accurately. These findings suggest that including more realistic mechanisms of resistance development may help predict the timing of androgen resistance. (Received February 19, 2020)