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John G Alford*, jalford@shsu.edu, and **Edward Swim** and **Alacia Voth**. *Mathematical Modeling of Androgen Deprivation Therapy for Advanced Prostate Cancer*. Preliminary report.

One of the most important treatments for advanced prostate cancer has become androgen deprivation therapy (ADT). We present three models of ADT: continuous androgen suppression (CAS), intermittent androgen suppression (IAS), and periodic androgen suppression. These models quantify the serum prostate-specific antigen (PSA) levels typically used as a biomarker for cancer levels and treatment protocols. Currently, many patients receive CAS therapy; however, many patients undergo a relapse after several years and experience adverse side effects while receiving treatment. IAS therapy may delay the time to relapse and/or reduce the economic costs and adverse side effects of treatment. For each model, we compute and analyze parameter sensitivity which provides insight to effective data collection in future clinical trials. The PSA levels exhibit (approximately) periodic behavior prior to relapse in the IAS model and the periodic model exhibits similar qualitative behavior. Using the periodic model, we derive theoretical parameter bounds for which relapse will occur. Finally, we derive formulas to approximate the relapse time in both the continuous and periodic models and rank the parameter influence on relapse time using relative sensitivity analysis. (Received September 22, 2015)