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University Scholars Research Progress Report- 2018  
College of Arts & Sciences 2020

As a University Scholar, I received funding this summer to begin working on a glioblastoma cost effectiveness study. Glioblastoma multiforme (GBM) is the most common intrinsic brain tumor and is one of the most aggressive solid tumors occurring in the human body. The median survival time across various studies is approximately 17 months, with only about 10% of patients surviving over 5 years. The current standard of care is surgical resection followed by chemoradiotherapy; the treatment of GBM requires a high level of resource intensity. To optimize care and the utilization of those resources, a thorough understanding of past and current outcomes must be established.

The cost of treating cancers has risen consistently over the past decade because of new treatments and advanced technologies, but glioblastoma has remained as one of the most expensive cancers to treat due to its severity and treatment paradigm. Cost-effectiveness studies on glioblastoma treatment with temozolomide have shown incremental cost-effectiveness ratios per quality adjusted life years ranging from \$73,000 (UK NHS perspective) to upwards of \$100,000 (US societal perspective) per patient in 2013 adjusted dollars. Increased spending, however, isn't necessarily associated with better outcomes. Thus, characterizing the costs and outcomes associated with glioblastoma and the differing treatment (i.e. chemotherapy) options is necessary for efficient decisions to be made for all parties.

The first step in this study was to determine baseline clinical outcomes from patients who have undergone surgery and treatment of glioblastoma at the Hospital of the University of Pennsylvania . I performed descriptive analytics to determine associations between trends in survival and key clinical variables. I was able to determine, through multivariate statistic modeling that chemoradiotherapy, postoperative Karnofsky Performance Scale Scores, tumor extent of resection, and Ki-67 protein indices were significantly associated with survival in a subset of patients diagnosed with GBM. Additionally, I spent much of the summer reviewing health economics literature via a bibliography provided to me by my project mentors.

The next steps in the project will be as follows: I plan to establish cost-effectiveness and cost per QALY (Quality Adjusted Life Years) for various treatments such as 1<sup>st</sup> surgical resection, 2<sup>nd</sup> surgical resection, extent of each resection, chemotherapy, and radiation, among others by using data I have previously analyzed. Once this is completed, the next phase of this study will identify an economic "life-cycle" of glioblastoma patients that represents the entirety of the patient process from presentation until death.