**ABIOST 2049**

**Spring 2023**

**Research Article Dissection 6 – Poisson Regression for Rates**

**Due 4/12/23 by 11:59 via the Assignment Link posted to Canvas**

Please read the article “Pediatric glioma and medulloblastoma risk and population demographics: a Poisson regression analysis” by Muskens et al. found on Canvas and answer the questions below.

This is an individual assignment. You can discuss the article with your classmates, but the answers you submit should be your own.

Please be brief but write in complete sentences with appropriate interpretations (a yes or no answer will not get full credit). A few sentences is all that is necessary to answer each question.

1. What is goal of this paper?

Test for associations between race/ethnicity and pediatric glioma and medulloblastoma incidence rates while adjusting for socioeconomic status.

1. Briefly describe the statistical methods used. Focus on the Poisson regression modelling for this question.

Poisson regression. Incidence counts were the dependent variable. Covariates were ethnicity, age, gender, median household income, and percentage without high school graduation. Population size was offset using a “weighted population” variable.

1. Was the use of Poisson regression appropriate? What did they use as an offset in these models? Did they state this specifically?

Yes, because they were attempting to predict counts. They used a ‘weighted population’ offset that they explicitly defined in their model statement.

1. Interpret the IRRs for race/ethnicity in Figures 2 and 4.

The incidence rate ratios for glioma in `Latino all races`, `Non-Latino black`, `Non-Latino API`, relative to `Non-Latino White` are all statistically significantly less than one. Indicating the incidence rates are lower for Non-`Non-Latino White` Ethnicities compared to `Non-Latino White` children, (i.e., they have lower risk)

1. What kind of statistical test do you think they used to assess the significance of the variables in the Poisson model that generated Figure 2?

They probably used a z-statistic to test for significance and obtain the 95% confidence intervals.

1. Did they assess model fit? If not, what would you do to assess it?

They used the GVIF to assess multicollinearity. Otherwise, they did not assess model fit. I would have used the Pearson “goodness-of-fit” statistic.