BIOS 841: Overview of Project Aims and Approaches

"We confirmed that we interacted directly with the investigators, have not worked on the study before, will not receive help from other statisticians and will determine the analysis independently."

Background

In 2016, a national health survey reported that only 55% of young children ages 12-23 months received all basic vaccinations in Uganda.[1] The investigators hypothesized that areas in Uganda with limited access to immunization services predict lower childhood vaccine uptake compared to areas with full access to immunization services.[2] In Bugoye sub-county, Uganda, this cross-sectional study will explore social determinants, such as caregiver attitudes and beliefs of vaccination that are associated with vaccination coverage for children ages 12-23 months living in a rural, under-resourced area. The data was collected from 1/20/2021 to 4/30/2021.

Research Questions

1. Are caregiver beliefs and experiences about vaccination associated with receiving all recommended immunizations for children ages 12-23 months in Bugoye sub-county, Uganda, after adjusting for demographic information?
2. If an association is present, what variables may confound this association?
3. Among those with vaccination cards, does vaccination status to specific individual vaccines (e.g. Measles, Rota2) vary by caregiver beliefs and experiences, after adjusting for confounders?

Dataset Description

The dataset has 1,689 observations with 67 variables. 24 of these variables are binary predictor variables which provide a yes/no response to questions about various vaccine beliefs and experiences. Nine of these variables are response variables which specify the immunization status for different vaccine types. The remaining variables are possible confounders, such as education level, marital status of caregiver, the number of children in family, the number of children born at home, and year of oldest child.

Methods

We will evaluate the summary statistics, sample distributions, correlation, outliers, and missing data of all variables for exploratory data analysis. A logistic regression model will be used to find any associations between immunization status and caregiver beliefs and experiences about vaccination, after adjusting for confounding variables. We plan to report adjusted odds ratios and 95% confidence interval for the ratios. We will also conduct sensitivity analyses to test the impact of a) possible inaccuracies in self-reported vaccination status and b) outliers/influential observations.

References

1. Uganda Bureau of Statistics (UBOS) and ICF. (2018). *Uganda Demographic and Health Survey 2016.* Kampala, Uganda and Rockville, Maryland, USA: UBOS and ICF.

2. Boyce, R. M., Delamater, P., Muhindo, R., Matte, M., Ntaro, M., Verity, R., & Mulogo, E. (2019). Accessible metrics of access: Novel tools to measure immunization coverage in rural sub-Saharan Africa. *Gates Open Research*, 3: 1540.