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Impact of Undiagnosed Diabetes on Renal Function

Part 1
Connor Swingle and Sriram Boppana are working together as partners.

Part 2
Our team will be looking at risk factors associated with undiagnosed diabetes in the United States. What is the effect of undiagnosed diabetes on urine albumin concentration while adjusting for age, physical activity, blood pressure, and weight in Americans? We hypothesize that there will be a strong correlation between urine albumin concentration and having undiagnosed diabetes. High urine albumin concentration is an indicator of renal disease, so we predict that those with an undiagnosed diabetes condition will be more likely to have signs of renal disease than those with a diagnosed diabetes condition. We will be using the nHanes dataset. NHANES is a very useful dataset because it includes both survey responses and laboratory diagnostics. Because of this, we will be able to determine if a respondent has undiagnosed diabetes by looking at the glycohemoglobin test results and crosscheck it with their response about a current diabetes diagnostic.

Part 3
This dataset can be found at this link:https://wwwn.cdc.gov/nchs/nhanes/search/datapage.aspx?Component=Questionnaire&CycleBeginYear=2013

We will be using the NHANES 2013-2014 dataset. NHANES is the National Health and Nutrition Examination Survey, and has been assessing the health and nutritional status of adults and children in the United States since the early 1960s. NHANES is an initiative of the Center for Disease Control and Prevention (CDC). Since 1999, NHANES has become a continuous program involving both an examination of medical, dental, and physiological measurements as well as a laboratory test. The data collection team consists of a physician, health technicians as well as dietary and health interviewers. Health interviews occur at participants home, and questions are given and responses noted on a computer. The target population for NHANES is the noninstitutionalized civilian population of the United States. To select a population to sample, NHANES first starts by selecting contiguous counties to be primary sampling units. Within the PSU

segments are picked to contain a cluster of households, which is then narrowed down to specific households. Then, individuals within that household are selected. In the 2013-2014 dataset, 14,332 persons were initially selected from 30 different primary sampling units. Of those selected, 10,175 completed the interview and 9,813 were examined.

The outcome we will be looking at is urine albumin concentration, a measure of renal function and an indicator of renal disease in high concentrations. This is found in the laboratory section of the data. Urine albumin concentration is measured in μg/mL. , and standard ranges are within 0.5–20 μg/mL. With urine albumin concentration we are able to detect both microalbuminaria, a moderate amount of albumin in the urine, and creatinine.

We will looking at the impact of an undiagnosed diabetes condition. We are able to determine if someone is diabetic because in the laboratory section glycohemoglobin blood levels are taken. In this test, multiple different types of hemoglobin are measured. Hemoglobin A1c is a predictor of diabetes, and reporting a level of 6.5% or greater is defined as total diabetes. In the questionnaire portion respondents over the age of twelve are asked if they have ever been diagnosed with diabetes. By comparing hemoglobin A1c levels with the survey data, we will be able to determine if a respondent has undiagnosed diabetes. Our primary predictors of interest are age, weight, activity and blood pressure. These 4 factors are found in the NHANES 2013-2014 questionaire data set.