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Comparison of Kidney Disease Risks Among African Americans in Maryland and Neighboring Regional States

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Walden University
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Abstract

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Nneka A. Offiah

MPH, Kaplan University, 2015

BSN, Washington Adventist University, 2013

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

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Abstract

Chronic kidney disease (CKD) is a recognized global health burden that has affected 10-15% of the general adult population, which is caused by diabetes and has disproportionately affected minority populations such as African Americans. Despite the prevalence of diabetes and hypertension, other variables could predispose this racial group to CKD, hence the need for this study. The purpose of this cross-sectional quantitative study using secondary data analysis methods was to investigate to what extent various factors such as gender, diet, age, exercise, socioeconomic status, diabetes, and hypertension were associated with the prevalence of CKD among African American~~s~~ residents in Maryland, compared with their level of association with CKD as found in a combined group of six other Centers for Disease Control and Prevention (CDC) Region B states. The theoretical framework for this study was the social cognitive theory of the health behavior model. The data source was an extracted subset of Region B data from the national-level CDC Behavioral Risk Factors Surveillance System Survey. Using weighted population data, the study showed that statistically significant relationships existed between such predictors as diabetes, hypertension, diet, gender, exercise, socioeconomic status, and occurrence of CKD among the study population ($p = 0.001$). This study may influence positive social change through social policies that target~~s~~ the improvement of health literacy and equality among minority populations, especially African Americans, in this case those residing in region B states.

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Dedication

Dedicated to the memory of the hardest worker that ever lived on this planet, my mother, Mrs. P.O Anih, and to my father, Dr. E.C. Anih, my husband, Mr. V. Offiah, and my children, Chimdalu, Chidubem, and Enuma Offiah.

Acknowledgments

I wish to acknowledge the tireless help of my chair Dr. Anderson, my committee member Dr. Gonzalez, Walden Library Resource Center, Dr. Milton. R. Goldsamt for his extensive help with the statistical analysis section of the study, and the Maryland State Department of Health for helping me with data collection. I also thank my husband and children who have stepped up in many ways to enable me have time to do my research. Most importantly, I thank Almighty God who has never disappointed me and has carried me along despite all my downs in life.

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Section 1: Foundation of the Study and Literature Review

Introduction

Chronic kidney disease (CKD) has affected 10-15% of the general adult population, regardless of income status (Markus et al., 2018). However, CKD had a 50% higher prevalence in African Americans compared to Whites, based on Medicare data (Regunathan-Shank, Hussian, & Ganda, 2016). Further, the leading cause of CKD and end-stage renal diseases in developed countries is diabetes, which has disproportionately affected minority populations such as African Americans. For instance, 13% of African Americans were diagnosed with diabetes compared to 8% for the entire U.S. population (Ford, Narayan, & Mahta, 2016). Data from the American Diabetes Association also showed that in 2015, 7.4% of Whites, 8.0% of Asian Americans, 12.1% of Hispanics, 12.7% of African Americans, and 15.1% of American Indians/Alaskan natives were diagnosed with diabetes (American Diabetes Association, 2019).

Problem Statement

There has been a disproportionate burden of CKD with an earlier onset that progressed rapidly among African Americans (Martins, Agoda, & Norris, 2012). Based on a racially and ethnically diverse group of 3,612 study of adults with high blood pressure, African Americans were 18% less likely to control their blood pressure to 140/90mm Hg and 28% were less likely to control their blood pressure to 130/80mm Hg, which suggests why this population progresses faster from CKD to end-stage renal disease (Martins et al., 2012). Hypertension related to the end-stage disease is also 5 times higher in African Americans than in the White race (Martins et al., 2012).

Additionally, as of 2014, the prevalence of high blood sugar among African Americans was 9.5 per 100 people compared to 5.8 per 100 people for the White population, and the diabetic ratio of African Americans to Whites was 1.6 times higher (U.S. Department of Health and Human Services, 2016).

Because the risk of CKD is higher among African Americans, this research focused on Maryland (MD) and other states in Centers for Disease Control and Prevention (CDC) Region B, which comprised Delaware, District of Columbia, Pennsylvania, Virginia, West Virginia, and New Jersey. As of July 2018, the population of Maryland was 6,042,718, with 29.4% of the total population being African Americans (U.S. Census Bureau, 2019). Education tailored to the needs of African Americans in this region, keeping in mind their diet, lifestyle, and exercise habits, can reduce the risk factors of kidney disease among this group. Many factors, such as ethnicity, gender, location, and lifestyle, have been associated with increased risk of kidney disease (Luyckx, Tonelli, & Stanifer, 2018). But evidence has suggested that self-management interventions based on education and skills training are effective in the metabolic control of diabetes (Williams et al., 2014). My study on kidney disease risks among African Americans in Maryland and other CDC Region B states helped in the identification of the relationship between CKD and diet, exercise habits, educational level, income status, and other chronic diseases as well as possible solutions for better health outcomes.

Purpose of the Study

Diabetes and hypertension are the major causes of CKD among high-, middle-, and low-income countries (Webster et al., 2016). But there has been a limited perception of risk factors for CKD among high-risk African Americans (Johnson et al., 2014). Although diabetes and hypertension are comorbidities of kidney disease, there are numerous complex causes (Luyckx et al. 2018). Moreover, factors like low socioeconomic status, health illiteracy, lack of health insurance, and ignorance of risk factors for the disease are contributors to the increased risk (Martins et al., 2012). Considering these factors, the purpose of this study was to identify any relationship between variables like diet, exercise, gender, age, diabetes, hypertension, socioeconomic status, and kidney disease among African Americans in selected states. Secondary data that contained variables that may predispose this group of people to CKDs were examined for possible relationships. The research findings on Maryland residents were compared with neighboring states in the same CDC region to see if conclusions based on Maryland. residents also result at about the same level of significance when based on residents from adjacent states in the same area at the same point in time.

Significance

Research has shown a 20% prevalence of CKD among African Americans and 15.8% awareness of the disease among the population, which meant higher prevalence and less knowledge of CKD (Flessner et al., 2010). This supports that there was a gap in providing education and resources to this population that predisposed them to CKD or made management of chronic illnesses almost impossible. There could also be an issue of this population not managing their conditions well while relying on government services, belief systems, and diet, which could have led to poor attitudes toward self-management of their potential problems.

The current study can lead to a better understanding of what predisposed this African American population at an increased risk for CKD and what can be done by this group, government, private organizations, companies, and public health professionals to help improve this burden of disease. This study may also promote social change by influencing the social policy that targets the improvement of health literacy and health equality among the minority population, especially those prone to certain illnesses. Changes could be in the form of providing fitness centers and bike trails, which could improve physical fitness. There could also be free monthly educational workshops in community centers addressing health issues prevalent among the population and how to prevent and manage the conditions. The study also created awareness that may bring about social changes in lifestyle of the population like proper diet, exercise, a regular visit to health care, and adequate management of diabetes and hypertension that may lead to CKD. The study also advances understanding of the role that the social environment like income, employment, education, social support, and access to healthcare (Norton et al., 2016), as one of the determinants of health inequities, plays in kidney diseases and its progression to end-stage renal diseases.

Framework

The theoretical framework for this study was the social cognitive theory of the health behavior model (Servick, 2018). The social cognitive theory postulated that a dynamic and reciprocal interaction existed between a person’s behavior and the environment that occurs in a social context (LaMorte, 2018). The way individuals pick up behaviors and maintain the behaviors within the social environment while paying attention to the past influence on the specific action is a tenet of this theory (LaMorte, 2018). Three dynamic reciprocal models of the person, environment, and practice of social cognitive theory determine the health outcome of a population. For example, physical and social environments have a relationship with the prevalence of CKD among African Americans. Personal factors like educational status, income level, and gender also are influenced by and influence the environment. Both individual factors and environmental factors affect a person's ability to adopt healthy behavior like regular exercise and a healthy diet. The relationships among these three factors represent reciprocal determinism, which relates to the prevalence and risk factors for CKD among African Americans. Education alone cannot create the changes needed by an individual with chronic conditions, especially CKD; behavioral changes need to be incorporated to bring the desired change. This approach combined behavior counseling with technology-based self-monitoring to reduce information complexity and bring about changes in behavior.

Conceptual Model Research Questions and Hypotheses

The conceptual model used as a basis for the research questions tested in this study contained three groups of factors (labeled as background characteristics, socioeconomic status and health conditions) with individual variables grouped into those factors. Figure 1 displays how these factors might be associated with the likelihood of having CKD.

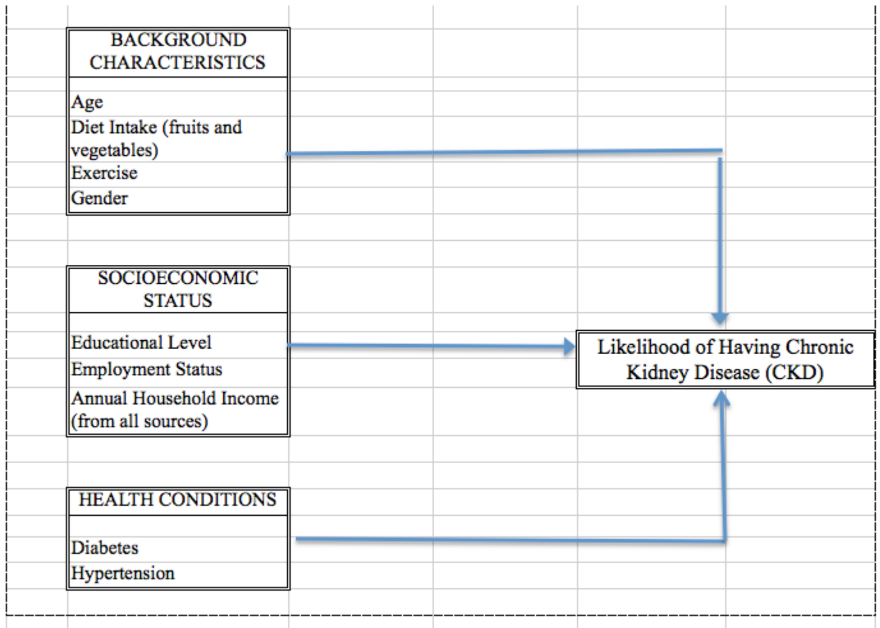

Figure 1. Conceptual model on which the statistical analyses are based.

The research questions tested in this study were the following:

Research Question 1: Are there significant associations between age, diet, exercise, gender, and prevalence of CKD among African Americans in Maryland and neighboring states in the same CDC Region B?

H_a1: There are significant associations between age, diet, exercise, gender, and prevalence of CKD among African Americans in Maryland and neighboring states in the same CDC Region.

H_01: There are no significant associations between age, diet, exercise, gender, and prevalence of CKD among African Americans in Maryland and neighboring states in the same CDC Region.

Research Question 2: Are there significant associations between educational level, employment status, income status, and prevalence of CKD among African Americans in

Maryland and neighboring states in the same CDC Region B? H_a2: There are significant associations between educational level, employment status, income status, and prevalence of CKD among African Americans in Maryland and neighboring states in the same CDC Region.

H_02: There are no significant associations between educational level, employment status, income status, and prevalence of CKD among African Americans in Maryland and neighboring states in the same CDC Region.

Research Question 3: Are there significant associations between diabetes, hypertension, and prevalence of CKD among African Americans in Maryland and neighboring states in the same CDC Region B?

H_a3: There are associations between diabetes, hypertension, and prevalence of CKD among African Americans in Maryland and neighboring states in the same CDC Region.

H_03: There are no associations between diabetes, hypertension, and prevalence of CKD among African Americans in Maryland and neighboring states in the same CDC Region.

Nature of the Study

The study was cross-sectional (since it compared two different subsets at the same point in time), and quantitative (Since its survey data source primarily contained numeric variables). It utilized secondary data analyses method to re-analyze data already collected from the CDC Behavioral Risk Factor Surveillance System (BRFSS) datasets that addressed the issues and risk factors for CKD. The study helped in answering questions on the relationships between independent variables such as exercise, diet, income status, and educational level and dependent variable CKDs among African Americans in Maryland and those in other neighboring CDC Region B states.

The target population of this study was the state of Maryland whose estimated population of Maryland in 2018 was 6,042,718 (U.S. Census Bureau, 2018). African Americans made up 29.4% of the total population of Maryland, with an increase from 1,477,411 persons in 2000 to 1,700,298 persons in 2010 (Maryland Department of Health and Mental Hygiene, 2010). According to the U.S. Census Bureau (2018), the estimated populations of the other regional states were Delaware 967,171, with 23.0% African Americans, District of Columbia was 70,245, with 46.4% African Americans, Pennsylvania was 12,807.060, with 12.0% African Americans. The population of Virginia was 8,517,685, with 19.9% African Americans, West Virginia was 1,805,832, with 3.6% African Americans, and New Jersey 8,908,520, with 15.0% African Americans. The total population of this region, therefore, was 33,708,723 with 19.98% African Americans.

Literature Search Strategy

Several online databases were used for the literature review, which focused on the variables identified in the study. Most of the literature articles assessed through Walden University library were from Medline Ebsco host, CINAHL plus, PubMed, and Google Scholar. The Search terms used to gather relevant studies included CKD, diabetes, hypertension, the prevalence of CKD, the prevalence of hypertension, race, race differences, CKD risks, high blood pressure, high blood sugar, African Americans, Maryland, Region B states, income status, educational level, and lifestyle. The articles relevant to the study and population were selected to all be recently published studies within the scope of fewer than five years.

Literature Review Related to Key Variables and/or Concepts.

Adjei et al. (2017) studied the relationship between educational, occupational level, and CKD. They learned that in all ethnic groups, CKD was related to low educational and occupational levels, although differences in severity were varied for each ethnic group. The theoretical concept of this study was based on the high incidence and prevalence of CKD and its association with global cardiovascular morbidity and mortality. The research questions tried to answer the relationships between educational, occupational level, and CKDs with a cross-sectional data analysis involving 21,433 adults 18 to 70years of age living in Amsterdam, the Netherlands. Logistic regression model analysis was used to compare educational levels, occupational levels, and CKD. Results showed that low-level and middle-level education correlated with a very high risk of CKD among Dutch residents. Moreover, Low-level education also was associated with a high risk of CKD among South Asian Surnames. A similar relationship existed between the professional level and CKD. Overall, diabetes was one of the identified causes of CKD.

Kao et al. (2018) carried out a nationwide population cohort study associating a hyperglycemic crisis with an increased risk of end-stage renal disease. The participants were 9208 diabetic patients with hyperglycemic crisis episode (HCE) and diabetic patients without HCE as a comparison group from 2000 to 2002 and matched patients according to age (with a mean age of 55.85), gender (45.22% male and 54.78% female), and index date with and without HCE. Data collection was done using a longitudinal cohort of diabetes patients, a sub-dataset of the Taiwan National Insurance Research Database. In conducting statistical analyses between the two groups, an independent t-test was used for continuous variables and chi-square tests with categorical variables to check for significant differences in age, gender, underlying comorbidities, NSAIDs use, and monthly incomes. Cox proportional hazard regression analysis (using SAS 9.4 software) was used in comparing the risk of end-stage renal disease between the two cohorts. The result showed that diabetic patients with HCE had a higher prevalence of advancement to renal diseases and other kinds of chronic illnesses than did diabetic patients without HCE. These results showed that diabetic patients with HCE were highly likely to acquire CKD.

In investigating CKD among low and high socioeconomic status (SES), Priya, Sanders, Ron, Ute, and Sijmen (2017) systematic reviews and seven meta-analyses of 1775267 participants pooled by race. Their findings showed that a higher risk of CKD existed among low social, economic status individuals regardless of race. However, the percentage of CKD among this SES group was higher in Whites rather than Africans Americans. The study was based on a hypothesis that the risk of CKD was higher among African Americans than Whites due to low socioeconomic status. The results showed that whites with low socioeconomic status had a 91% higher risk of CKDs than did African Americans at 58%. The researchers searched the Medline and Embase systematically for studies focused on the association between CKD, socioeconomic status, and race. One of the limitations mentioned in the study was that the study was not conducted at one location, which might have given a different result.

Yu et al. (2019), using an observational study method, studied the relationship between hypertension, antihypertension medications, and CKDs over 30 years among individuals with healthy kidneys. The study involved 14,854 participants with normal high blood pressure, elevated blood pressure, stage 1 hypertension, and stage 2 hypertension, with or without medication. The statistical analysis used for this study was a mixed model (with random intercept and random slope) that was used to analyze relationships between the variables and advancement to CKD. The result showed that African Americans had a more predicted probability of developing CKD at all stages of hypertension and normal blood pressure compared to Whites. Overall, people with hypertension had a more significant decline in kidney function and hence CKD among all races compared to people with normal blood pressure.

Waldron et al. (2019) carried out a study captioned "prevalence and risk factors for a hypertensive crisis in predominantly African Americans inner-city." This three-year study had two purposes, to determine the prevalence of hypertensive crises, namely, hypertensive urgency and hypertensive emergency. And to determine the odds of development of organ failures, including kidney failures among African Americans with a diagnosis of hypertension. The study group was 90% African American. Patients with the diagnosis of hypertension were pooled by using emergency department medical records to match them by cases, age, gender, and race. The study showed a high prevalence of hypertension at different stages among African Americans and advancement to organ failure, including congestive heart failure and chronic renal insufficiency over time. The results also showed that despite the high prevalence in African Americans advancing to organ failure, the race was not a factor during the deterioration of hypertensive crisis to hypertensive emergencies.

A cross-sectional study carried out by Munter et al. (2010) of 36,125 racially and ethnically diverse participants, 21 years to 74 years with kidney disease and high blood pressure and data collected from chronic renal insufficiency, showed that blood pressure was higher among African Americans and older adults with kidney disease than any other race.

Section 2: Research Design, Data Collection and Statistical Methodology

Overall Scope of Research Design

Proceeding from the conceptual model (see Figure 1) used as a foundation for the research, the methodology used essentially was designed in two portions, then meshed. After conducting a thorough literature review, I built a conceptual model, series of research questions, and specified potential variables for use in investigating CKD issues affecting African Americans. I then focused on what data sources were the most recent and had the most relevant variables or indicators of CKD. Initially, I believed that investigating these health issues at the county level would be the most productive. But after reviewing online studies and directly contacting health department representatives, I found that county-level research was not feasible. As such, expanding the scope to the state level (Maryland) became the most feasible. I also found a well-regarded survey data source that most closely matched my research purpose: the CDC's BRFSS. BRFSS began in 1984 and since then, has evolved to have a wider scope (CDC, 2020).

Target Population

The target population for this study consisted of African Americans residing in the state of Maryland as of 2017, and as a comparison group, African Americans residing in nearby states within the same geographic region that same year. This year was chosen for research purposes because the data source's survey item pool for that year had the fullest, most recent and relevant data for addressing the present study's research questions.

The study target population represented a subset of the data source's overall scope: state-level data collected nationally on health characteristics. As stated in one of the study's technical documents, data were collected from all 50 states and the District of Columbia, Guam, and Puerto Rico from those 18 and older (CDC, 2020). The CDC also conducted analyses and made health recommendations at a regional level, using a regional grouping called the National Center for Chronic Disease and Health Promotion Regions. These regions had been initially based on the U. S. Department of Health and Human Services regions. Thus, CDC Region B and two comparison groups, formed from the region's seven geographic units, became the target population for this study (see Figure 2). Those units were Maryland and six other states and the District of Columbia: Delaware, The District of Columbia, Pennsylvania, Virginia, West Virginia, and New Jersey.

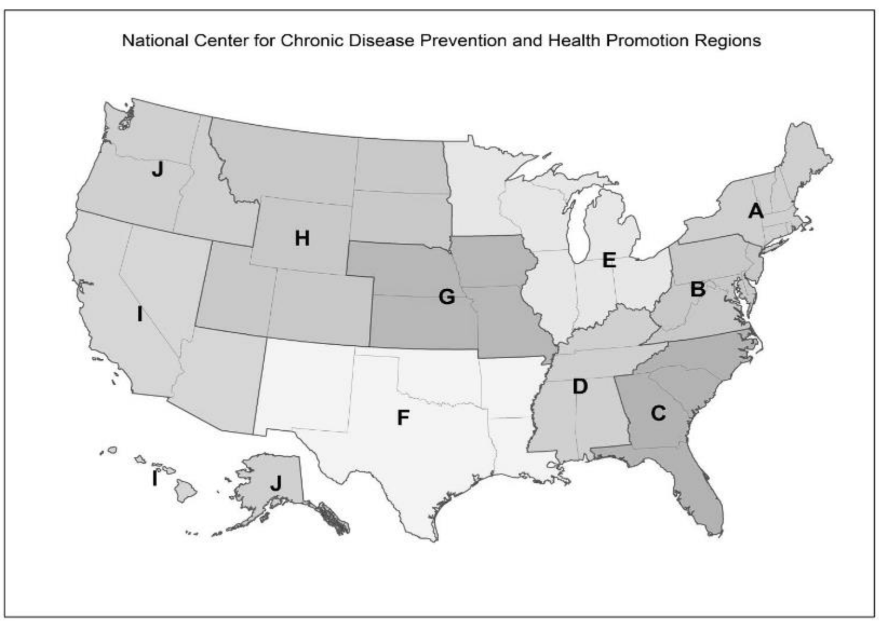

Figure 2. Centers for Disease Control and Prevention regions forming the national center for chronic disease prevention and health promotion regions.

Data Source and Data Collection Methodology

As mentioned, the CDC BRFSS 2017 survey was the only data source used in this study. A thorough description of the BFRSS survey data collection system is available in the BRFSS Overview 2017 Report (CDC, 2018). In general, a number of the system's features appealed to me as being technically sound and relevant. With that in mind, the survey became the foundation of the present study. These major features included (a) the BRFSS's objective to collect state-specific data on health risks and chronic disease as well as use of preventive services; (b) the use of telephone-based surveys of randomly selected adults; (c) the adherence of state health department protocols and technical assistance from the CDC for editing, processing, weighting, and analysis; (d) the comparison of data among states; (e) proposed questions go through cognitive and field testing as well as a vote, though all states ask the same core component questions; (f) the order of questioning never changes: core component, optional modules, then state-added questions (CDC, 2018) Further, the questionnaire has three parts including the core component on health-related perceptions, conditions, and behaviors (e.g., health status, health care access, alcohol consumption, tobacco use, fruits and vegetable consumptions, HIV/AIDS risks) as well as demographic questions (CDC, 2018, pp. 3-4). Two other parts of the 2017 three-part questionnaire were not used as a data source for this study: optional BRFSS modules and state-added questions.

Sample Description and Survey Data Collection

In 2017, all participating areas were able to draw a probability sample of all households with telephones in the state. Fifty-one areas used a disproportionate stratified sample design to draw samples of household with landline phones. Guam and Puerto used a simple random-sample design. State health departments had the option of either directly collecting data from their states or using a contractor. In 2017, eight state health departments collected their data in-house, whereas the rest contracted with other data collection organizations. In 2017, 53 states or territories used computer-assisted telephone interview systems to collect their data. The built-in software allowed for programming the core questions for data collectors, aid in scripting the state-added questions, and having a consultant available to assist states during the data collection process. State health personnel or contractors who are trained on the BRFSS conduct the interviews. Regarding interviewer performance and response rate quality, the overview report stated that the BRFSS requires evaluations of interviewers, which occur a few times each month and relates to data on disposition (CDC, 2018).

Data Collection and Processing

The CDC conducts several processing steps to collect monthly data from states. As an overview of these steps, the CDC runs routine processing activities on an ongoing basis. It uses data entry modules, programs telephone interviewer software, uses previously developed edit specifications to run edits, which include skip patterns, consistency edits, and response-code range checks, and computes telephone sample estimates. It also runs various data validation routines and output tables to examine response data patterns. In particular, those with potential issues surrounding certain survey questions. Following all the data cleanup activities, year-end programs are run and state-specific adjustments for technical issues are put into place as needed. Weighting factors are added to the cleaned datasets. Calculated variables in certain formats also are created to help data users. Refused and missing value codes are added to each data field. Missing values codes are assigned (1) both for questions where a legitimate skip or blank was valid due to skip logic and (2) in other fields where no answer was supplied, although it should have been (despite interviewer attempts to capture one; CDC, 2018)

The weighting factors attached to each respondent's data record are based on both the BRFSS survey and population characteristics. The CDC considers the probability of selection (using weights for each geographic area, the number of phones within a household and the number of adults 18 years and older in a respondent's household) and adjustments for response bias and non-response. The weighting process also uses a procedure called "raking" to adjust for demographic differences (CDC,2018). This process eventually obtains a final weight for each survey respondent. In the present study, that final weight was used as a factor to make the results regionally representative. A much fuller description of the weighting process appears in the CDC BRFSS overview report.

Eventually, a fully edited and weighted survey dataset containing all respondents' 2017 data from all states and other geographic areas is released to the public and various data user audiences and placed online at the BRFSS website. This process is annually done. The dataset was made available, in addition to technical publications describing each data field's contents (the 2017 Survey Questionnaire, CDC, October 2016; also the LLCP 2017 Codebook, CDC, October 2018). In addition, a series of health indicators and reports based on that survey's data patterns was released by CDC and various state health departments, as they began to use the data.

The 2017 computerized survey file contained data from both landline and cell phone sources. It totaled 450,016 records gathered via probability sampling methods from respondents in all participating states, District of Columbia, Guam and Puerto Rico. The file contained 358 variables and was placed in two formats for public use: ASCII character format, and SAS Transport format (which also could be read by STATA or SPSS software). The latter software was used for the present study and in that format it contained variable names attached to each data field, so it could be readily downloaded, imported into SPSS, and used for study descriptive and analytic purposes.

How the present study's research data set was extracted from the full 2017 dataset. The researcher selected the survey respondents fitting the study goals on the basis of two factors: residing in one of the CDC Region B states, and of that subset, being African American. To achieve that subset, the following steps were performed:

- First, a new variable was copied from the Federal Information Processing Standards state code variable stored on the data file. For convenience, the researcher kept the codes assigned to CDC Region B states (10= "Delaware," 11= "District of Columbia," 24= "Maryland," etc.)
- Next, a copy of that variable was used and the FIPS codes on data records stored there were collapsed into three groups: "24" for Maryland became code

1, all other state codes in CDC Region B became code 2, and all other non-Region B cases became code 9, which was considered a missing value code.

- A number of racial variables on the dataset then were reviewed to find which one best described the racial membership of respondents. One such variable was found and used to select all cases on the file with a code of 2 (representing “African-American, non-Hispanic”).
- The two variables created (of “CDC Region B Resident” and “African-American, Non-Hispanic”) were then used as criteria, and in combination to select any cases in the dataset that met both criteria.
- Those selected cases then were copied to a new dataset with its own filename. All other cases that had not been selected (as meeting both criteria) were excluded from the dataset.

Those procedures resulted in producing a ‘research dataset’ of 9,000 data records extracted from the full BRFSS data set of 450,016 records. Of those selected 9,000 cases, 2,641 African Americans had stated that they resided in Maryland (29.3% of the subset). The reminder, 6,359 African Americans residing in one of the other six CDC Region B states and the District of Columbia (or 70.7%), became the comparison group in this study.

Variables Used in the Present Research

Figure 3 (found on the next page) contains a listing of all variables used in this study. The listing consists of predictor variables, control variables, the dependent variable and the survey weighting factor. However, before being directly used for analytic purposes, a series of cleaning and editing procedures were conducted. (The need for this work was early anticipated since some exploratory frequency distributions showed that although key codes were on the file, it itself was not yet in SPSS analysis style. For example, variable labels were not in place, refusal and did not answer codes were not defined so that such responses could be screened out of analyses, etc.). As such, the next section lists the range of data cleaning and editing procedures conducted with the 9,000-case research dataset to ready it for analysis.

Var. #	Variable	Survey Wording	Survey Column Number	SPSS Label
INDEPENDENT VARIABLES				
1	Age	All ages were over 18, recorded in 14 five-year groupings; 14th category was DK/ Refused/ Missing	2028-2029	_AGEG5YR
2	Diabetes	Ever told you have diabetes? (Yes, No, DK/Not Sure)	117	DIABETE3
3	Diet (see note below)	A series of six survey questions asked one after another as Survey Core Section 12 (Fruits & Vegetables). Questions ask number of times eating (or drinking): fruits, 100% pure fruit juices, dark green vegetables, french fries or fried potatoes, other kinds of potatoes, or other vegetables	Six three-digit data fields, beginning in Columns 215-217.	FRUIT2 and others
4	Educational level	What is the highest grade or year of school you completed? (in ranges). Also fewer categories in: Computed level of education completed categories	163; 2052	EDUCA; _EDUCAG
5	Employment Status	Are you currently…? (Eight categories)	177	EMPLOY1
6	Exercise	During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise? (Yes, No, DK/Not Sure)	233	EXERANY2
7	Gender	Indicate sex of respondent	125	SEX
8	Hypertension	Hypertension awareness: Have you EVER been told by a doctor, nurse or other health professional that you have high blood pressure? (If ´Yes´ and respondent is female, ask ´Was this only when you were pregnant?´.)	101	BPHIGH4
9	Income status	Is your annual household income from all sources: (If respondent refuses at any income level, code ´Refused.´) Also used: computed income categories	180-181; 2053	INCOME2; _INCOMG
DEPENDENT VARIABLE				
10	Chronic Kidney Disease (CDK)	(Ever told) you have kidney disease? Do NOT include kidney stones, bladder infection or incontinence. (Incontinence is not being able to control urine flow.). (Yes, No, DK/Not Sure)	116	CHCKIDNY
DATA RECORD SELECTION OR WEIGHTING FACTORS				
11	FIPS State Selection Codes for CDC Region B States	24-MD; 10=DE; 11=DC; 34=NJ; 42=PA; 51=VA; 54=WVA	1-2	_STATE
12	Being African American	Among a series of race/ethnicity categories: 2= Black only, non-Hispanic	2024; 2026	_RACE, or _RACEGR3
13	Weighting Factor	Final weight assigned to each respondent: Land-line and cell-phone data	1798-1807	_LLCPWT

Figure 3. Study variables included in the 2017 BRFSS dataset.

Methods Used to Clean and Edit the Research Data set for SPSS use

Descriptive labels were assigned to already numerically coded response categories wherever useful, based on the 2017 BRFSS survey codebook (CDC, 2018).

Missing value codes were assigned to ‘don’t know/not sure’ and ‘refused’ responses, based on the 2017 codebook. Possibly invalid responses seemed present when reviewing the six distributions of variables measuring frequency of fruit and vegetable intake. These responses were screened out and/or recoded as missing values. Distributions of variables were reviewed to judge how approximately equal were the number of responses for each response option, and if extreme data outliers existed

In reviewing data categories for the educational level variable, it seemed best to combine one response category having few responses (the ‘never attended school or only kindergarten’ option) with answers to the next adjacent category (‘attended grades 1-8’) that had many more responses. Because these two categories were combined, that label and its interpretation also was broadened. Two conditional answers found in use with the blood pressure and hypertension variables were recoded into more likely ‘yes’ or ‘no’ answers.

For each of the six variables measuring frequency of fruit and vegetable intake, (which were recorded in daily, weekly or monthly response formats, recorded that way for respondents’ ease of response convenience) individual answers were grouped into five approximately equal categories. Survey interviewer guidelines for respondent answers to those questions also were reviewed to understand their data patterns.

To test if underlying assumptions affecting the valid use of certain analyses might be violated, cross-tabulations and correlations among subsets of predictors were conducted to see how closely correlated were they. This review led to using control variables with both Research Questions 1 and 2. Frequency distributions were conducted to see the proportion of missing answers per survey question. By and large, only one set of variables had relatively large percentages of missing responses: the six questions asking about fruit and vegetable intake. Some of these questions had about 17% non-response. Based on this review, additional analyses were conducted, as discussed in the next section of this chapter.

Extent of Missing Fruit and Vegetable Intake Responses, and Effects on Other Predictors

Additional analyses into the extent of these survey questions' level of non-response and its relationship to other predictors, revealed the following patterns. It was found that although non-response to fruit and vegetable items was greatest among the survey items used for this study, that level was not significantly associated with other study predictors, and thus did not seem to bias or alter response patterns.

The researcher reached that conclusion by conducting two types of analyses. First, a total count was created of each respondent's level of non-response across the six fruit and vegetable survey items. How many of the six survey questions were not answered was conducted. For the MD African American respondents included in this study, unweighted data analyses showed that 16.2% did not answer one or more of the six survey items. The biggest subgroup of non-respondents to these six survey items, 10.1 percent, did not answer any of the six questions. Among African American respondents living in other Region B states, 17.8% did not answer one or more fruit and vegetable survey items. In that geographic area, the biggest subgroup of non-respondents, 5.9%, did not answer any of the six questions.

Statistical tests were conducted of whether non-response to these fruit and vegetable items was related to other predictors. Chi-square and Pearson's bivariate correlation coefficients were run, using the total non-response count continuous variable and seven categorical or continuous variables being used as study predictors. These seven predictors were: gender, kidney disease, blood pressure, diabetes, recent exercise, education level, and income level. Analyses conducted separately for the MD and Other Region B state data subsets showed that five of the Chi-square or (two-tailed) correlation coefficient results were not statistically significant ($p>.05$). (The two statistically significant results both were based on Other Region B state data, rather than MD resident data.)

Summary

In summary, the study was a secondary data analysis of responses from a subset of the 2017 CDC BFRSS national probability survey dataset of 450,000 responses. which analyzed an already conducted comprehensive survey that addressed the need of the study. The design was cross-sectional giving the fact that the data were gathered at one point in time and result compared across two groups of respondents. The analysis primarily used chi square test of significance followed by measure of association to determine the strength of associations and which factors have more association with occurrence of CKD.

Section 3: Presentation of Results and Findings

The overall goal of this study was to determine whether certain factors were associated with the occurrence of CKD among African Americans in Maryland and neighboring regional states. The first section of Section 3 presents a series of nine descriptive analyses of the individual variables. Each variable was extracted from the 2017 BRFSS dataset and represents the subset of African American survey respondents residing in CDC Region B. Descriptive tables appear in Appendix A, which consist of frequency distributions, counts and percentages, and for continuous variables, they also contain overall means and standard deviations. Their purpose was descriptive, so no tests of statistical significance were conducted, although differences between certain subgroups are pointed out in text later in Section 3. Each statistical table contains two sets of analyses: African Americans in Maryland households and African Americans in all other six Region B households (considered as a single group). The same dependent variable, occurrence of CKD, was used in that role for each set of analyses.

The second part of this section focuses on testing the central hypothesis, as split into three research questions, each with their own set of predictor variables:

1. Were there significant associations between age, diet, exercise, gender, and prevalence of CKD among African Americans in Maryland, and neighboring states in the same CDC Region B?
2. Were there significant associations between educational level, employment status, income status, and prevalence of CKD among African Americans in Maryland, and neighboring states in the same CDC Region B?

3. Were there significant associations between diabetes, hypertension, and prevalence of CKD among African Americans in Maryland, and neighboring states in the same CDC Region B?

For Research Question 1, age, diet intake (represented by six survey items dealing with fruit and vegetable intake), exercise during the last 30 days, and gender were used as predictors. Preliminary analyses showed that gender was significantly related to the other predictors, so gender was also used as a control variable in conducting these analyses. For Research Question 2, socioeconomic status (educational level, employment status, and annual household income) were used as predictors. Preliminary analyses showed that educational level was significantly related to the other two predictors, so it was also used as a control variable when conducting these analyses. Finally, for Research Question 3, two indicators of major health issues (occurrence of diabetes and hypertension) were used as predictor variables.

Statistical Methods Used

Because control variables were used to test Research Questions 1 and 2, these two questions were tested by using several three-way contingency tables and Chi-Square tests of statistical significance. The Chi-square test of independence method was considered the most suitable to use because all three research questions dealt with whether certain categorical factors (and the variables in each set) were associated with the CKD dependent variable. As a follow-up procedure, if a Chi-Square test was found to be significant, measures of associations were used to interpret the relationship and its relative strength or magnitude. Two alternative measures of association were used to determine the size of the significant relationship. The choice of measure depended on whether the predictors were nominal or interval, in combination with the dependent variable (occurrence of CKD, a nominal, two-category variable). As such, the Cramer's V measure was used with nominal predictors, and the Eta measure with continuous or interval level predictor variables. Cramer's V seemed appropriate for the present study's use of weighted data and large sample sizes because it is useful for comparing multiple X2 statistics and is not affected by sample size (As supported by the Applied Statistics Handbook (http://www.acastat.com/statbook/chisqassoc.htm),

Research Question 3 was tested by using two-way chi-square analyses. This was because no control variables were used, and each of the two predictors used to test Research Question 3 was considered of equal interest. If Chi-square results were statistically significant, then those analyses were followed by Cramer's V measures of association (because both predictors used to test that research question were nominal). That coefficient was computed as the square root of a Chi-square value divided by the total sample size times the smaller number of rows or columns in the contingency table less one. Its magnitude ranged from 0 (no association) to 1 (perfect association). A Cramer's V value of .10 was suggested as a minimum threshold for suggesting when a substantive relationship between predictor and dependent measures might exist I also considered using Cohen's 1988 three-category set of descriptive labels (.10= Small effect size; .30=Medium effect size; and .50 or higher as Large effect size.) However, Kotrlik et al. (2011) preferred Rea and Parker's (1992) range of six labels used to categorize levels of association (ranging from .00-.10 as negligible association to .80-1.00 as very strong association). That set of descriptors seemed preferable, so that larger set of categories was used in this study.

The Eta measure of association was used with interval predictors and nominal dependent measures. Although the SPSS software used in the study provided Eta measures in both directions, I used the Eta value to estimate the proportion of variance in the dependent measure that could be predicted from the predictor variable. Thus, the Eta measure ranged in value from 0 (no association) to 1 (strong or perfect association).

Each contingency table consists of separate tables, with each predictor variable serving as a row variable and the dependent measure, occurrence of CKD, serving as the column variable. Such tables of counts and column percentages were accompanied by Chi-square and Fisher's Exact Test statistics (the latter for 2 x 2 tables), and measure of association indices if the Chi-square or Fisher's tests were statistically significant (at the two-tailed, p = .05 level). Test statistics were subdivided from the contingency tables on which the test statistics were based and appear in separate appendices. Preliminary analyses of weighted data also showed that virtually all tables contained statistically significant results. This was likely due to the large number of cases produced by the weighting process, which made even relatively small differences between groups seem likely to occur on a non-chance basis. Accordingly, after reviewing the Chi-square tests of independence for significance, measures of association were examined in all analyses for their size.

Contents of Appendices Containing Tables with Study Results

The highlights of the statistical analyses are presented in the body of this chapter, and the supporting statistical tables are grouped into three appendices. This approach was chosen so readers could better focus on results directly bearing on the three research questions. The three appendices contain the following supporting tables:

- Appendix A contains nine descriptive tables characterizing the 2017 African American CDC Region B BRFSS survey respondents included in this study.
- Appendices B and Appendix C both contain analyses of weighted survey data. Appendix B contains tables containing Chi-square Tests of Independence of weighted data testing Research Questions 1-3, followed by measures of association if a given Chi-square test was statistically significant. Appendix C contains the weighted contingency tables corresponding to Appendix B analyses.

This section will next provide an overview of the characteristics of survey respondents, as tabulated in Appendix A.

Characteristics of African American CDC Region B Survey Respondents

This section describes African American participants in the 2017 BRFSS survey who lived in CDC Region B. All tables (except the first one) at Appendix B are provided in both unweighted and regionally representative weighted form (using the CDC BRFSS-provided survey individual respondent weighting factor). Table A1 lists respondents from each Region B states, but all other tables compared Maryland respondents versus all other Region B states. Some of these tables contain footnotes mentioning that the number of respondents with valid data differed from the total number of respondents in that subgroup. This usually was due to respondents' refusals to provide information or not knowing what answer to provide. Some footnotes also provide the actual wording of a survey question used and any clarifications to that question that survey interviewers could provide.

Turning to Table A1 (found in Appendix A), Maryland had the largest proportion of 2017 survey African American respondents among all six CDC Region B states and the District of Columbia (27.5% in weighted form). Based on unweighted data, that latter jurisdiction was next largest after MD. In weighted data format, Virginia, and Pennsylvania, then New Jersey followed MD in survey respondent size. Table A2, a comparison of MD and its corresponding Region B states, showed that in unweighted form, MD had a slightly greater proportion of African American residents that reported they ever were told they had CKD (4.4%). However, based on weighted data, the balance shifted, and MD had a slightly smaller proportion of African Americans that stated having been told that they had CKD (3% compared with 3.4%). Table A3 presents three characteristics each recorded by survey interviewers in two-category format. With respect to gender, males represented 35.0% of African Americans providing survey data (based on unweighted data). That percentage increased to 45.3% in regionally representative weighted form. Turning to health issues, the proportion of survey respondents that were told they ever had diabetes was higher in MD when presented in unweighted data, although the reverse occurred in weighted data format. That same pattern of results occurred with high blood pressure and respondents' use of exercise during the last 30 days.

The age range of 2017 survey African American respondents ranged from 18 to over 80 years of age. The average age of those respondents was remarkably like the other states in Region B: the two sets of percentages were comparable with respect to each five-year age grouping, and their overall mean ages. As the data in Table A5 shows, based on weighted data, the average educational level of MD African American respondents was similar to residents living in other parts of Region B, and only differed by less than a quarter of a year. Regarding income levels, both in unweighted and weighted form, African American MD residents earned more than those in other parts of Region B. These two sets of findings provide the impression that in 2017 MD African American residents were slightly more educated and had more income than similar residents in other parts of CDC Region B. For Table A6, in both the unweighted and weighted datasets, a greater proportion of African Americans living in MD were wage-earners than were African Americans living in other states in the region. (54.7% vs. 49.2%) The next largest groups of African American residents were retired, and this group was relatively larger in MD than in the other six states. That was true of unweighted (28.9% vs. 25.3%) and weighted data.

The next three tables presented CDC Region B residents' frequencies of eating fruits and vegetables. The first part of Table A7 indicates that MD African American residents ate fruits just as much as non-MD residents. The second part of Table A7 shows that the greatest number of respondents stated that they never drank 100 percent pure fruit juices. (Those levels were 27.2% vs. 20.4% of MD residents based on weighted data.) Table A8 indicates that about the largest proportion of Region B residents (about 25%, as shown in the top half of that table) tended to eat dark green vegetables one or two times daily. These residents tended to eat other vegetables daily at a slightly higher rate (that is, close to 30%), as shown in the second part of Table A8. In the top half of Table A9, although CDC Region B African American residents reported eating French fries once daily-twice weekly, which was more often than what other residents reported, relatively fewer MD residents tended to eat that form of cooked potatoes than did those living in other CDC Region B states. This pattern was true when analyzing either unweighted or weighted data. (For instance, when using weighted data: 27.8% of MD residents compared with 31.8% of those in other Region B states.) This pattern also held true when asking about any other kind of potatoes or sweet potatoes (see the bottom half of Table A9). Here too, MD residents reported eating such types of potatoes once daily-twice.

This concludes the first section of the results chapter, devoted to describing the characteristics of the 2017 MD and non-MD African American residents of Region B who served as survey respondents. The next section of this chapter will focus on analytic results arising from using the above survey data to statistically test the three research questions of this study for between-groups differences.

Results of Analyses

Chi-Square Tests and Measures of Association Based on Weighted Data for Research Questions 1-3

This portion of the results chapter presents a series of Chi-square Test of Independence results and measures of association. All analyses were based on 2017 BRFSS survey data weighted so that it was regionally representative of African American residents from Maryland, and from residents of six other CDC Region B states, including the District of Columbia. (The actual Chi-square results appear in Appendix B, and the contingency tables on which they are based in Appendix C.)

Results based on Research Question 1. The first research question was tested by using the following variables as predictors in separate analyses: gender (as both a predictor and in other analyses as a control variable), age, occurrence of exercise in the last 30 days, and diet, measured by six predictors each dealing with the frequency of eating or drinking certain types of fruits or vegetables. A Chi-square Test of Independence using Fisher's Exact Test was performed to examine the relation between gender and the occurrence of CKD. The relation between these variables was statistically significant, $p < .0001$ (two-sided. These two variables had a negligible degree of association for both MD and Other Region B survey respondents. The two Fisher's Exact Test results indicated that Cramer's V=.008, and .015, respectively (see Table B1, Appendix B).

In testing whether age (measured in five-year age categories) was related to CKD, with gender as a control variable, statistically significant results were obtained, (X2, 12, p<.0001). This was regardless of gender and whether the survey data came from Maryland or Other CDC Region B African American residents. Based on Maryland residents' data, age was slightly more associated with the occurrence of CKD for females than for males (Eta= .246 vs. .167, the latter considered a moderate degree of association). As Table B2 showed in Appendix B, compared with results from MD residents, age was less related to occurrence of CKD for residents of either gender living in other parts of Region B, as their corresponding Eta values were lower (see Table B2, Appendix B).

How closely exercise was related to CKD was examined, using gender as a control variable. Exercise and CKD were found to be significantly related relation, p <.0001 (two-sided, However, these two variables were-negligibly related. The pattern of results-based on the two Fisher's Exact Test results indicated that-Cramer's V=.095, and .039, for African American MD and Other Region B survey respondents, respectively. (see Table B3, Appendix B).

A Chi-square Test of Independence between diet (how many times did you eat fruits) and the occurrence of CKD, with gender as a control variable, also produced statistically significant results, (X2, 5, p<.0001), regardless of gender and whether the survey data came from MD or Other CDC Region B African American residents.

Turning to the six predictors of dietary intake, one measure of diet (frequency of eating fruit) was slightly more associated with the occurrence of CKD in males living in MD than in females living there (Eta= 0.110 vs. 0.086) while the reverse was the case in other states in this region (Eta= .087 vs. 0.069; see Table B4, Appendix B). How many times did respondents drink 100% fruit juice) was tested for its possible occurrence of CKD (with gender as a control variable) similarly produced statistically significant results, (X2, 4, p<.0001). This was whether the survey data came from MD or Other CDC Region B African American residents. With respect to MD residents' data, drinking fruit juice was significantly associated with the occurrence of CKD and at a slightly stronger level for males than in females (Eta= 0.110 vs. 0.049. However, the degree of association was lower in other-states in this region, although at the same level for both genders (Eta= 0.042 vs. 0.042; see Table B5, Appendix B).

Other measures of diet (how many times did you eat dark green vegetables) and the occurrence of CKD, with gender as a control variable, were found to be statistically significant at (X2, 5, p<.0001). This was regardless of gender and whether the survey data came from MD or Other CDC Region B African American residents. The degree of association was very low, when comparing genders or MD vs. other regional states (See Tables B1.6, Appendix B).

Measures of potato intake diet (how often do you eat French fries or fried potatoes) and the occurrence of CKD, with gender as a control variable, also produced statistically significant results, (X2, 5, p<.0001). This was regardless of gender and whether the survey data came from MD or Other CDC Region B African American residents. That measure of dietary intake was slightly more associated with the occurrence of CKD in males than in females (Eta= 0.156 to 0.039) in MD, and other regional states (Eta= 0.083 vs 0.034; see Table B7, Appendix B).

Another measure of potato intake (how often do you eat other kinds of potatoes or sweet potatoes?) and the occurrence of CKD, with gender as a control variable, also produced statistically significant results, (X2, 5, p<.0001). This was regardless of gender whether the survey data came from MD or Other CDC Region B African American residents. Based on MD residents' data, diet was slightly more associated with the occurrence of CKD in males than in females (Eta= 0.112 to 0.072) in MD. This pattern also held true for other regional states (Eta= 0.076 vs 0.041; see Table B8, Appendix B). The sixth/final measure of diet included in survey questions (how often did you eat other vegetables?) and the occurrence of CKD, with gender as a control variable, was statistically significant, (X2, 5, p<.0001). This was regardless of gender and whether the survey data came from MD or Other CDC Region B African American residents. Based on MD residents' data, diet was slightly more associated with the occurrence of CKD in males than in females (Eta= 0.110 to 0.087), The pattern was lower in-other-states in this region. (Eta= 0.076 vs. 0.070; see Table B9, Appendix B).

Results based on Research Question 2. The second research question was tested by using the following measures of socioeconomic status as predictors: Education level (as first a predictor and in other analyses as a control variable), income status and employment status. Educational level and the occurrence of CKD also proved to be statistically significant, (X2, 4, p<.0001), for MD African Americans, and those in other CDC Region B states. The degree of association was moderate (Eta=0.148 vs. 0.169) residents; see Table B10, Appendix B). Employment status and the occurrence of CKD also was tested, with education level as a control variable. The relation between these two variables was statistically significant, p <.0001 (two-sided). Based on survey data from both Maryland African American and all other CDC Region B African American residents, these two variables were negligibly associated (Kotrlik et al., 2011). The two Fisher's Exact Test results of these hypotheses indicated that total Cramer's V=.197, and .168, respectively; see Table B11, Appendix B). Testing the relationship between income status and the occurrence of CKD, with educational level as a control variable, also produced statistically significant results, (X2, 7, p<.0001). This was regardless of educational level for survey data-provided by MD or other CDC Region B African American residents. The Eta levels (Eta= .201 vs. .078), showed a moderate degree of association for MD residents' data. As Table B12 showed, compared with results from MD residents, income status was less related to occurrence of CKD for residents of any educational level living in other Region B states. That is because as their corresponding Eta values were lower (see Table B14)

Results based on Research Question 3. The third research question examined the relation between first diabetes then hypertension, and the occurrence of CKD. Results for diabetes found that it and CKD was statistically significant, p <.0001 (two-sided). Based on survey data from both Maryland African Americans and all other CDC Region B African American residents, these two variables were negligibly associated Although the two Fisher's Exact Test strength of association results were Cramer's V=.147, and .197, respectively, the Other Region B state level was greater; see Table B13, Appendix B). High blood pressure and the occurrence of CKD also was found to be statistically significant, p <.0001 (two-sided). Based on survey data from both subsets of data, these two variables were negligibly associated. Fisher’s Exact Test results indicated that Cramer’s V=.156 and .169, respectively (see Table B14, Appendix B.).

Summary

The results found that all predictor variables have significant relationships with the dependent variable CKD in MD and other states in the same CDC region B groups. the strength of association or relationship between the variables ranged from mild to moderate. There were association between predictors variables and occurrence of CKD among AA in MD compared to other states in CDC Region B. Overall. Age followed by income status regardless of gender were more associated with the occurrence of CKD among African Americans in MD than any other predictor variables while diabetes followed by hypertension were more associated with the occurrence of CKD in other CDC region B states. In both groups, HTN, DM, and employment status were more significantly associated with occurrence of CKD while Gender as a predictor was least related to occurrence of CKD

Section 4: Application to Professional Practice and Implications for Social Change

Discussion of Findings

Overall, this study found that all-predictor variables (age, gender, diet, exercise, high blood pressure, diabetes, and socioeconomic status) were significantly associated with the occurrence of CKD. This pattern held for both MD and the other six-state portion of CDC region B. This was expected because all significance tests used weighted data, which made the denominators of the significance formula large and small differences between group percentages in the numerator likely to be considered non-chance results. Thus, the degree of association for most of the variables with the CKD dependent measure were relatively small.

These results were consistent with most of the findings in the literature, although these studies used different geographic regions and racial groups. For instance, Adjei et al. (2017) showed that in all ethnicities, socioeconomic factors were associated with the risk of CKD. Priya, Sanders, Ron, Ute, and Sijmen (2017) also showed higher occurrence of CKD among low socioeconomic status individuals, regardless of race. These results in the literature are consistent with finding that socioeconomic status among African American MD residents and those in other CDC Region B states were highly correlated with occurrences of CKD. In the present study, high blood pressure was also significantly correlated with CKD; however, the degree of association was negligible. This finding was also consistent with a 3-year study result obtained by Waldron et al. (2019) that showed significant association between hypertension and CKD and other organ failures among African Americans.

Limitations of the Present Study

Several changes in the original study design affected the results and changed the original research purpose. The original goal was to investigate health issues existing in Prince George's County in Maryland. As several studies have shown, this county's African American/Black, non-Hispanic residents have lower health and demographic levels than those of other neighboring counties and even the state. For instance, most of the county's population consists of African Americans (62%), who have lower median household incomes ($89,611 vs. $95,122 for White residents) and may not have health insurance (as gathered from a series of indicators available at www.pgchealthzone.org). However, when I delved deeper into what health issue-oriented databases were available for secondary analysis, contacted Maryland health department representatives, and gathered information on other similar national surveys, I found that although various indicators were available, no statistically representative surveys and large-scale databases with suitable survey items existed at the county level. I was forced to expand my research design, having it become a Maryland-level study and adding a comparison group of neighboring states. But I found that researching African American residents in CDC's regional grouping of Region B states best fit my purposes.

Based on the change in scope, the study lost its desired county-level precision. In addition, because of needing to choose an already-chosen data source, the study became a secondary data analysis where I had no control or say over methodology. Instead, the sponsoring organization's study purposes, design, survey item topics, response formats, data collection methods, and data cleaning strategies became the basis for my work.

These realities affected several research alternatives of the present study. For example, although the data source chosen was the CDC BRFSS annual survey database (a well-regarded and statistically sound survey), it was found that certain desired survey items only were included in alternating years. One such survey item was whether respondents had ever been told they had hypertension. To work around this, I systematically compared which survey topics over the last 5 years fit my conceptual research model. In doing so, I found that the 2017 CDC BRFSS survey instrument (then approximately 2 years old) contained all relevant variables. Being forced to select that period may have limited the recency and generalizability of the present study's findings.

Choosing 2017 as the survey year also affected the present study's key dependent variable of CKD. The long-standing BRFSS methodology rests on telephone data collection and asks relatively few questions in multiple choice response formats. Such formats may be difficult to reliably use by phone, because respondents may not remember all response options for given questions if a list is read them. Thus, in the 2017 survey (and in other survey years), a number of health issue questions, including one on kidney disease, were asked in dichotomous yes-no response format. As with other questions, it seemed that the term could have been defined for respondents' understanding. Instead, a single question was asked about the topic, with no follow-up questions asked to clarify that answer. If available, such a question in continuous variable format ("At about what age were you told that?") could have assisted in the present study's analysis and provided more precision in the results. However, delving into certain health issues including that one was unavailable for the present study.

Similarly, to what extent dietary intake was associated with CKD could not be fully measured here. For a number of years, BRFSS surveys have only asked about fruit and vegetable intake and not included other questions about dietary issues such as the extent of meat or fish intake. Such survey items might be included in U. S. Department of Agriculture surveys but likely was not available for the present study's needs. Rather, the fruit and vegetable questions used in BRFSS surveys have included the same six questions each year, with only two changes in the same module since 1989, perhaps useful for longitudinal analyses to see trends in those food items and because those topic areas apparently are associated with other health issues. Additionally, in the BRFSS Data User's Guide, the CDC explained that in 2017, the module on fruit and vegetable intake was redesigned to reduce interviewers' burden and align with other national surveys. In that module, survey interviewers asked respondents how frequently they ate or drank these items, with instructions on what types of food items to include or not include in deciding on their answers. These self-reported responses were recorded in daily, weekly, or monthly levels. Respondents were told to phrase their answer in one of these formats.

I also noticed that whatever was reported by respondents were used as answers. No editing seems to have been done, including removing some apparently unlikely responses. Faced with these three differing response formats that made analyses complicated and required specialized programming (CDC, n.d.; Appendix B), I eventually decided to group the wide range of responses into five categories, representing frequencies of intake across the three formats.

Some other limitations in the study and effects on data fullness or quality may have existed:

- The only survey data collection approach was that of calling households with either landline or cell phones. No other data collection approach, such as personal interviews, seems to have been used to supplement or confirm those interviews (It seems that validity checks on whether respondents were reached and the quality of responses to certain items were conducted, but here too in telephone format.) Telephone data collection probably was much more cost-efficient than personal interviews (especially when making multiple calls to reach certain initially not-at-home residents or to reduce initial refusals). However, it is possible that based on the level of rapport between interviewer and respondent, responses to some questions might have been affected.
- As a telephone survey that apparently did not use FaceTime, Skype or other visual means, interviewers had no way of verifying the self-reported responses they heard. They also could not see copies of documents to verify responses (or probably even ask for those, due to HIPAA privacy regulations).
- Respondents may have had some recollection/memory bias of when events occurred, having or being told of having certain medical conditions, or to what extent they ate or drank certain foods or liquids (especially if eaten or drunk a month or so ago).
- Potential response biases that exist in telephone surveys may have existed here. That includes social desirability bias: providing an answer considered more

socially acceptable than actually existed, such as not mentioning having a certain health condition.

- Finally, in reviewing the full set of questions used, relatively few follow-up or verifiability questions seem present (certain questions asked to verify responses to other questions). Due to the length of the survey, it may have been necessary to choose breadth of survey coverage over depth, and only include a single survey question on certain health issues, within the average 18-minute length.

Suggestions for Further Research

The present study might be considered ‘exploratory’ in some ways. It relied on a foundation of another study design and survey item pool to research issues in CKD. (As one example of being bound by the 2017 survey design, the widely accepted term in the field of ‘chronic’ was not even used in asking survey respondents if they ever had that disease. Perhaps the survey designers did not consider the term necessary for their purposes.) The study analytic approach also chose to use single predictors in each analysis (rather than using several potentially related predictors in combination) to assess if that one predictor was statistically associated with having CKD. Although two research questions used control variables to strengthen the tested relationship, and perhaps make those corresponding measures of association more accurate, an overall stronger, more statistically defensible research design could have been used.

This seems especially true since the weighted CKD base rate found in this study of CDC Region African American survey respondents was fairly low. That calls for a more statistically rigorous design to detect significant relationships. Across the seven states comprising CDC Region B, the median CKD base rate was 3.4 percent (ranging from 2.7 percent in Delaware to 3.7 percent in New Jersey). The base rate of 3.0 percent found among Maryland African American respondents also was lower than the median rate in Region B. Thus, a future research design on ~~of~~ this topic might build on the present study's findings (particularly in using what variables had higher strengths of association than others in being related to CKD, and which did not):

- After reviewing current research in this field (especially research based on post-2017 data), expand the underlying conceptual model used in this study to include more logically relevant predictors, their interactions, and possibly more control variables, to rule out less relevant or confounding factors. The latter is considered a real concern, given the Corona-19 virus and its impact on minority homes, their incomes, and health status.
- Add research hypotheses particularly relevant to Maryland African American households, and to those living within Prince George's County (the original intent of the researcher).
- Turn to a statistically more rigorous statistical approach (assuming a sound continuous variable could be used as a dependent measure). Such relevant methods might include: multiple regression (including hierarchical or stagewise regression where certain types of explanatory variables could be entered into the prediction equation ahead of other types of variables), path analysis (to understand the direct and indirect pattern of relationships among

predictors and dependent measures), or multivariate analysis of variance (assuming more than one relevant dependent measure was found to be useful).

- It also may be necessary to conduct a meta-analysis, perhaps supplementing other research, that uses certain criteria to appraise various large-scale correlational studies and statistically representative surveys for the strength of relationships they found. In that way, they might obtain a stronger measure of what factors are most associated with CKD.

The researcher's intent was to measure the role of an overall diet in being associated with the occurrence of kidney disease, not strictly focus on fruit and vegetable intake. Nonetheless, including the BRFSS survey questions on this topic was useful in providing some insight into the role of diet. One of the BRFSS Statistical Brief reports points out the merits of researching fruit and vegetable intake. They stress in their Data User's Guide to that module that: "Surveillance of fruit and vegetable intake is important because it can identify populations at risk, track trends in intake over time, and inform policy and program development." Furthermore, they state (CDC, n.d., p. 3) that: "Fruits and vegetables are major contributors of important under-consumed nutrients, may reduce the risk of many chronic diseases, and may help individuals achieve and maintain a healthy weight when consumed instead of higher calorie foods. Fruit and vegetable intake is also an indicator of a healthy overall diet. Specifically, total fruit (whole fruit and 100% fruit juice) and whole fruit intake are the second and third most correlated factors with an overall healthy eating pattern, respectively, after amount of empty calories consumed."

In general, it is believed that the present study has advanced research into the onset of CKD among African Americans, and particularly in this seven-state region of the United States. It might be considered a stepping-stone for future studies.

Study Findings and their Application to Professional Practice and Implications for

In terms of public health practice and implementation of social change, this study may influence social policies that target~~s~~ the improvement of health literacy and equality among minority populations, especially African Americans, in this case those residing in region B states. Changes could be in the form of providing fitness centers and bike trails, which could improve physical fitness, thereby decreasing a sedentary lifestyle. Advocating for big chain grocery stores that sell healthy food and less fast-food restaurants to be located in this regions. Besides, there could be free monthly educational workshops in community centers addressing health issues prevalent among the population and how to prevent and manage the conditions for a better outcome It can also create an awareness that may bring about social change on lifestyle of the study population. like proper diet, exercise, a regular visit to health care, and adequate management of diabetes and hypertension that may lead to CKD. Likewise, it may advance our understanding of the role of socioeconomic status, health status, and social environment in health outcomes especially the role these variables play in CKD and its progression to end stage renal disease requiring dialysis or transplant. Conditions in which people are born, live, grow, work, age, and factors like income, employment, educations, social supports, and access to healthcare are social determinants that may have influenced the population's health by interfering with the availability of health resources and access to healthcare (Norton et al., 2016).

Conclusion

In conclusion, this study was a secondary data analysis about health causes that investigated to what extent health, demographic, and socioeconomic factors were associated with the risk of CKD among African Americans in MD and other states in the same region, including the District of Columbia. The study found a number of statistically significant associations between the variables and CKD among the study population. The strength of associations of these predictors and the CKD dependent measures were also tested and generally found to be low.

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Appendix A: Characteristics of African American CDC Region B Survey Respondents

Table A1

Number and Percent of CDC Region B Survey Respondents by State

State	Unweighted		Weighted	
	Frequency	Percent	Frequency	Percent
MARYLAND	2641	29.30	1333391	27.50
DELAWARE	585	6.50	153343	3.20
DISTRICT OF COLUMBIA	2197	24.40	231714	4.80
NEW JERSEY	1357	15.10	860497	17.80
PENNSYLVANIA	552	6.10	1011264	20.90
VIRGINIA	1546	17.20	1209941	25.00
WEST VIRGINIA	122	1.40	47136	1.00
Total (not including Maryland)	6359	70.70	3513895	72.70
Grand Total	9000	100.00%	4847285	100.00

Table A2

Percent of Survey Respondents Ever Told They Had Kidney Disease

Topic			Unweighted CDC Region B MD	Unweighted CDC Region B DE, DC, PA, VA, WVA, NJ	Weighted CDC Region B MD	Weighted CDC Region B DE, DC, PA, VA, WVA, NJ
			(*N* = 2,641)	(*N* = 6,359)	(*N* = 1,333,391)	(*N* = 3,513,894)
Ever Told You Have Kidney Disease?	Yes	Count	116	272	39801	120199
		Percent	4.40%	4.30%	3.00%	3.40%
	No	Count	2515	6056	1290579	3377249
		Percent	95.60%	95.70%	97.00%	96.60%
	Total	Count	2631	6328	1330380	3497448
		Percent	100.00%	100.00%	100.00%	100.00%

Note. The total number of respondents to each survey question varies slightly from the total number contacted due to 'don't know/unsure' or 'refusal' responses.

1) The total number of respondents to each survey question varies slightly from the total number contacted due to 'don't know/unsure' or 'refusal' responses.

(2) Respondents were told by survey interviewers to NOT include kidney stones, bladder infection or incontinence. They then defined the latter term to respondents as: (Incontinence is not being able to control urine flow.)

Table A3

Percent Male, Diabetic, Hypertensive, and Regularly Exercising Among Survey

Characteristic			Unweighted		Weighted	
			CDC Region B		CDC Region B	
			MD	DE, DC, PA, VA, WVA, NJ	MD	DE, DC, PA, VA, WVA, NJ
			(*N* = 2,641)	(*N* = 6,359)	(*N* = 1,333,391)	(*N* = 3,513,894)
Gender	Male	Count	924	2,429	603,064	1,622,156
		Percent	35%	38.20%	45.30%	46.20%
	Female	Count	1,716	3,930	729,502	1,891,738
		Percent	65%	61.80%	54.70%	53.80%
	Total	Count	2,640	6359	1,332,566	3,513,894
		Percent	100%	100%	100%	100%
Ever Told You Have Diabetes?	Yes	Count	518	1,206	184,407	534,077
		Percent	19.70%	19.00%	13.90%	15.20%
		Count	2,113	5141	1,144,679	2,969,736
	No	Percent	80.30%	81.00%	86.10%	84.80%
	Total	Count	2,631	6,347	1,329,086	3,503,813
Ever Told Blood Pressure Was Too High?		Percent	100%	100%	603,064	100%
	Yes	Count	1,378	3,195	500,820	1,480,865
		Percent	52.30%	50.40%	37.60%	42.30%
	No	Count	1,258	3,143	830,921	2,020,740
		Percent	47.70%	49.60%	62.40%	57.70%
	Total	Count	2,636	6,338	1,331,741	3,501,605
		Percent	100%	100%	100%	100%
Any Exercise in the Past 30 Days?	Yes	Count	1,613			
		Percent	69.60%	3,892	849,053	2,172,924
	No	Count	704	66.20%	72.80%	68.40%
		Percent	30.40%	1,986	316,703	1,004,111
	Total	Count	2,317	33.80%	27.20%	31.60%
		Percent	100%	5,878	1,165,756	3,177,035

Note. (1) The total number of respondents to each survey question varies slightly from the total number contacted due to ‘don’t know/unsure’ or ‘refusal’ responses.
2) The exercise question was read to respondents by survey interviewers as follows: “During the past month, other than your regular job, did you participate in any physical activities, or exercises such as running, calisthenics, golf, gardening or walking for exercise?” If the respondent did not have a “regular job duty” or was retired, the respondent was allowed to include the physical activity or exercise they spent the most time doing in a regular month.

Table A4

Age Distribution and Mean Age of Survey Respondents

Reported Age in 5-Year Groups		Unweighted CDC Region B MD (*N* = 2,641)	Unweighted CDC Region B DE, DC, PA, VA, WVA, NJ (*N* = 6,359)	Weighted CDC Region B MD (*N* = 1,333,391)	Weighted CDC Region B DE, DC, PA, VA, WVA, NJ (*N* = 3,513,894)
Age 18-24	Count	105	392	164316	448402
	Percent	4.10%	6.30%	12.50%	12.90%
Age 25-29	Count	118	376	122195	278356
	Percent	4.60%	6.00%	9.30%	8.00%
Age 30-34	Count	111	374	121280	270326
	Percent	4.30%	6.00%	9.30%	7.80%
Age 35-39	Count	158	427	120567	314979
	Percent	6.20%	6.80%	9.20%	9.10%
Age 40-44	Count	171	426	120764	315541
	Percent	6.70%	6.80%	9.20%	9.10%
Age 45-49	Count	214	488	104455	275615
	Percent	8.30%	7.80%	8.00%	7.90%
Age 50-54	Count	305	681	145113	383982
	Percent	11.90%	10.90%	11.10%	11.00%
Age 55-59	Count	292	673	105355	302577
	Percent	11.40%	10.70%	8.00%	8.70%
Age 60-64	Count	286	710	96668	309592
	Percent	11.10%	11.30%	7.40%	8.90%
Age 65-69	Count	301	599	71785	219155
	Percent	11.70%	9.60%	5.50%	6.30%
Age 70-74	Count	228	451	62749	143712
	Percent	8.90%	7.20%	4.80%	4.10%
Age 75-79	Count	137	298	37487	97785
	Percent	5.30%	4.80%	2.90%	2.80%
Age 80 or older	Count	143	375	38397	117785
	Percent	5.60%	6.00%	2.90%	3.40%
Total	Count				
	Percent	2569	6270	1311131	3477807
Mean in years		54.93	52.80	45.75	46.60
SD		16.08	15.15	17.13	17.21

Note. The total number of respondents to each survey question varies slightly from the total number contacted due to “don’t know/unsure” or “refusal” responses.

Table A5

Education and Income Level of Survey Respondents

		Unweighted		Weighted	
		CDC Region B		CDC Region B	
Education Level		MD	DE, DC, PA, VA, WVA, NJ	MD	DE, DC, PA, VA, WVA, NJ
		(*N* = 2,641)	(*N* = 6,359)	(*N* = 1,333,391)	(*N* = 3,513,894)
Never attended school, only kindergarten, or grades 1-8 (Elementary)	Count	23	91	11690	83720
	Percent	0.90%	1.40%	0.90%	2.40%
Grades 9-11 (Some high school)	Count	157	471	114657	360986
	Percent	6.00%	7.40%	8.60%	10.30%
Grade 12 or GED (High school graduate)	Count	755	2148	390476	1251265
	Percent	28.70%	33.90%	29.40%	35.70%
College 1-3 years (Some college or technical school)	Count	706	1707	443912	1049481
	Percent	26.80%	26.90%	33.40%	29.90%
College 4 years or more (College graduate)	Count	990	1925	369110	760127
	Percent	37.60%	30.40%	27.80%	21.70%
Total	Count	2631	6342	1329845	3505579
	Percent	100%	100.00%	100.00%	100.00%
Mean in years		13.86	13.49	13.54	13.10
SD		2.09	2.16	2.06	1.99
Income Level					
Less than $10,000	Count	134	423	63783	236821
	Percent	6.20%	8.10%	5.70%	8.20%
$10,000-$15,000	Count	99	336	40400	186212
	Percent	4.60%	6.50%	3.60%	6.40%
$15,000-$20,000	Count	172	534	77027	288519
	Percent	7.90%	10.30%	6.90%	10.00%
$20,000-$25,000	Count	203	608	106209	350608
	Percent	9.30%	11.70%	9.50%	12.10%
$25,000-$35,000	Count	202	651	97389	370449
	Percent	9.30%	12.50%	8.80%	12.80%
$35,000-$50,000	Count	268	750	141002	386295
	Percent	12.30%	14.40%	12.70%	13.30%
$50,000-$75,000	Count	342	677	164332	358114
	Percent	15.70%	13.00%	14.80%	12.40%
$75,000 or more	Count	753	1217	422623	720653
	Percent	34.70%	23.40%	38.00%	24.90%
Total	Count	2173	5196	1112765	2897671
	Percent	100%	100%	100%	100%
Mean in dollars		$52,553	$44,177	$54,572	$44,663
SD		$29,885	$28,758	$29,847	$29,185

Note. The total number of respondents to each survey question varies slightly from the total number contacted due to "don't know/unsure" or "refusal" responses.

Table A6

Employment Status of Survey Respondents

Employment Status		Unweighted CDC Region B MD (*N* = 2,641)	Unweighted CDC Region B DE, DC, PA, VA, WVA, NJ (*N* = 6,359)	Weighted CDC Region B MD (*N* = 1,333,391)	Weighted CDC Region B DE, DC, PA, VA, WVA, NJ (*N* = 3,513,894)
Employed for wages	Count	1220	2769	723621	1712958
	Percent	46.70%	44.00%	54.70%	49.20%
Self-employed	Count	129	354	70501	238101
	Percent	4.90%	5.60%	5.30%	6.80%
Out of work for one year or more	Count	79	338	36524	163380
	Percent	3.00%	5.40%	2.80%	4.70%
Out of work for less than one year	Count	77	236	53233	155548
	Percent	2.90%	3.80%	4.00%	4.50%
A homemaker	Count	42	121	18153	70834
	Percent	1.60%	1.90%	1.40%	2.00%
A student	Count	66	202	98689	231974
	Percent	2.50%	3.20%	7.50%	6.70%
Retired	Count	755	1591	216624	554593
	Percent	28.90%	25.30%	16.40%	15.90%
Unable to work	Count	247	679	105790	356864
	Percent	9.40%	10.80%	8.00%	10.20%
Total	Count	2615	6290	1323135	3484252
	Percent	100.00%	100.00%	100.00%	100.00%

Note. The total number of respondents to each survey question varies slightly from the total number contacted due to “don’t know/ unsure” or “refusal” responses

Table A7

Frequency of Eating Fruit or Drinking 100% Pure Fruit Juices in the Last Month Among Survey Respondents

			Unweighted		Weighted	
			CDC Region B		CDC Region B	
			MD (*N* = 2,641)	DE, DC, PA, VA, WVA, NJ (*N* = 6,359)	MD (*N* = 1,333,391)	DE, DC, PA, VA, WVA, NJ (*N* = 3,513,894)
Frequency of Eating Fruit	Once daily	Count	526	1266	257574	672240
		Percent	22.50%	21.80%	21.80%	21.20%
	Twice daily-three times daily	Count	575	1095	263034	663138
		Percent	24.60%	18.90%	22.30%	20.90%
	Four times daily-three times weekly	Count	527	1307	286056	728257
		Percent	22.50%	22.50%	24.20%	23.00%
	Four times weekly-three times monthly	Count	366	1012	196058	588323
		Percent	15.60%	17.50%	16.60%	18.60%
	Four times monthly-unsure how often monthly	Count	262	906	131094	365730
		Percent	11.20%	15.60%	11.10%	11.50%
	Never	Count	86	213	48041	151419
		Percent	3.70%	3.70%	4.10%	4.80%
	Total	Count	2342	5799	1181857	3169107
		Percent	100.00%	100.00%	100.00%	100.00%
Frequency of Drinking 100% Pure Fruit Juices	Once daily-three times daily	Count	492	1157	238775	664065
		Percent	21.10%	20.10%	20.40%	21.10%
	Four times daily-three times weekly	Count	498	1153	267656	658059
		Percent	21.30%	20.10%	22.90%	20.90%
	Four times weekly-four times monthly	Count	445	1202	246192	681662
		Percent	19.10%	20.90%	21.00%	21.70%
	Five times monthly-unsure how often monthly	Count	173	550	100183	254447
		Percent	7.40%	9.60%	8.60%	8.10%
	Never	Count	726	1685	318419	889521
		Percent	31.10%	29.30%	27.20%	28.30%
	Total	Count	2334	5747	1171225	3147754
		Percent	100.00%	100.00%	100.00%	100.00%

Note. (1) The total number of respondents to each survey question varies slightly from the total number contacted due to ‘don’t know/ unsure’ or ‘refusal’ responses. (2) Fruit Juice question wording: Not including fruit-flavored drinks or fruit juices with added sugar, how often did you drink 100% fruit juice such as apple or orange juice?

(3) If respondent asked for examples of fruit-flavored drinks, interviewers were told to not include: “fruit-flavored drinks with added sugar like cranberry cocktail, Hi-C, Lemonade, Kook-Aid, Gatorade, Tampico and Sunny Delight. Interviewers were told to include (if asked) as examples: “only 100% pure juices or 100% juice blends.”

Table A8

Frequency of Eating Dark Green Vegetables or Other Vegetables in the Last Month Among Survey Respondents

		Unweighted		Weighted	
		CDC Region B		CDC Region B	
		MD	DE, DC, PA, VA, WVA, NJ	MD	DE, DC, PA, VA, WVA, NJ
		(*N* = 2,641)	(*N* = 6,359)	(*N* = 1,333,391)	(*N* = 3,513,894)
Frequency of Eating Dark Green Vegetables					
Once daily-twice daily	Count	591	1,349	263,873	747,116
	Percent	25.40%	23.30%	22.70%	23.50%
Three times daily-twice weekly	Count	482	1,251	235,661	727,607
	Percent	20.70%	21.60%	20.30%	22.90%
Three times weekly-four times weekly	Count	455	897	211,835	490,150
	Percent	19.60%	15.50%	18.20%	15.40%
Five times weekly-five times monthly	Count	408	1,137	245,009	626,907
	Percent	17.60%	19.60%	21.10%	19.80%
Six times monthly-unsure how often monthly	Count	233	734	126,054	334,154
	Percent	10.00%	12.70%	10.80%	10.50%
Never	Count	155	432	80,000	247,328
	Percent	6.70%	7.40%	6.90%	7.80%
Total	Count	2,324	5,800	1,162,432	3,173,262
	Percent	100%	100%	100%	100%
Frequency of Eating Other Vegetables					
Once daily	Count	706	1681	309,751	1,002,189
	Percent	30.50%	29.30%	26.60%	31.90%
Twice daily-three times daily	Count	364	567	165,991	367,297
	Percent	15.70%	9.90%	14.30%	11.70%
Four times daily-three times weekly	Count	472	1,201	248,366	649,481
	Percent	20.40%	20.90%	21.40%	20.70%
Four times weekly-four times monthly	Count	413	1,135	236,789	631,462
	Percent	17.90%	19.80%	20.40%	20.10%
Five times monthly-unsure how often monthly	Count	309	1,027	174,400	400,890
	Percent	13.40%	17.90%	15.00%	12.80%
Never	Count	48	128	27986	87,094
	Percent	2.10%	2.20%	2.40%	2.80%
Total	Count	2,312	5,739	1,163,283	3,138,413
	Percent	100%	100%	100%	100%

Note. (1) The total number of respondents to each survey question varies slightly from the total number contacted due to ‘don’t know/ unsure’ or ‘refusal’ responses.
(2) The question on dark green vegetables read as: “How often did you eat a green leafy or lettuce salad, with or without other vegetables?” If the respondent asked about spinach, respondent was told to include spinach salads.

(3) Regarding the question on other vegetables, the respondent was told to exclude lettuce salads and potatoes. If the respondent asked what to include, interviewer was told to say: “Include tomatoes, green beans, carrots, corn, cabbage, bean sprouts, collard greens, and broccoli. Include raw, cooked, canned, or frozen vegetables. Do not include rice.”

Table A9

Frequency of Eating French Fries/Fried Potatoes, Sweet Potatoes, or Any Other Kinds of Potatoes in the Last Month Among Survey Respondents

		Unweighted		Weighted	
		CDC Region B		CDC Region B	
		MD	DE, DC, PA, VA, WVA, NJ	MD	DE, DC, PA, VA, WVA, NJ
		(*N* = 2,641)	(*N* = 6,359)	(*N* = 1,333,391)	(*N* = 3,513,894)
Frequency of Eating French Fries/Fried Potatoes					
Once daily-twice weekly	Count	649	1,743	325,578	1,009,332
	Percent	27.90%	30.10%	27.80%	31.80%
Three times weekly-monthly (unspecified)	Count	202	742	123,640	400,957
	Percent	8.70%	12.80%	10.50%	12.60%
Once monthly-twice monthly	Count	541	1,171	234,825	649,220
	Percent	23.30%	20.20%	20.00%	20.50%
Three times monthly-16 times monthly	Count	453	998	271,383	543,783
	Percent	19.50%	17.20%	23.10%	17.20%
17 times monthly-unsure how often monthly	Count	23	103	16,848	53,881
	Percent	1.00%	1.80%	1.40%	1.70%
Never	Count	457	1,039	200,369	513,501
	Percent	19.70%	17.90%	17.10%	16.20%
Total	Count	2,325	5,796	1,172,643	3,170,674
	Percent	100%	100%	100%	100%
Frequency of Eating Any Other Kind of Potatoes, or Sweet Potatoes					
Once daily-twice weekly	Count	609	1,690	295,519	901,856
	Percent	26.30%	29.50%	25.30%	28.70%

Three times weekly-once monthly	Count	453	1278	221,525	711,511
	Percent	19.60%	22.30%	19.00%	22.70%
Two times monthly	Count	297	655	142,365	345,718
	Percent	12.80%	11.50%	12.20%	11.00%

(table continues)

		Unweighted		Weighted	
		CDC Region B		CDC Region B	
		MD	DE, DC, PA, VA, WVA, NJ	MD	DE, DC, PA, VA, WVA, NJ
		(*N* = 2,641)	(*N* = 6,359)	(*N* = 1,333,391)	(*N* = 3,513,894)
Three times monthly-10 times monthly	Count	507	1031	260030	570201
	Percent	21.90%	18.00%	22.30%	18.20%
11 times monthly-unsure how often monthly	Count	49	145	25818	62288
	Percent	2.10%	2.50%	2.20%	2.00%
Never	Count	401	921	222651	548637
	Percent	17.30%	16.10%	19.10%	17.50%
Total	Count	2316	5720	1167908	3140211
	Percent	100%	100%	100%	100%

Note. (1) The total number of respondents to each survey question varies slightly from the total number contacted due to ‘don’t know/ unsure’ or ‘refusal’ responses.
(2) Question on fried potatoes included French fries, home fries or hash browns
(3) Question on other kinds of potatoes included baked, boiled, mashed potatoes, or potato salad. If respondent asked what types of potatoes to include, respondent was told to include: “all types of potatoes except fried. Include potatoes au gratin, and scalloped potatoes.”

Appendix B: Chi-Square Tests and Measures of Association

Based on Weighted Data for Research Questions 1-3

This Appendix contains a series of Chi-square Test of Independence results and measures of association, based on contingency table comparisons appearing in Appendix C. They are based on 2017 BRFSS survey data weighted to be regionally representative of African American residents from MD, and residents of six other CDC Region B states. The first digit in each table number indicates the relevant research question and the second digit the specific predictor.

Table B1

Gender by Occurrence of Chronic Kidney Disease

CDC REGION B		Value	df	Exact Sig. (2-sided)	Cramer's V	Approx Sig.
MARYLAND	Fisher's Exact Test		1	.000	.008	.000
	N of Valid Cases	1329556				
DE, DC, PA, VA, WVA, NJ	Fisher's Exact Test		1	.000	.015	.000
	N of Valid Cases	3497447				

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 17977.62.

b. Computed only for a 2x2 table

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 55459.15.

Table B2

Age by Occurrence of Chronic Kidney Disease

CDC REGION B	RESPONDENT GENDER		Value	df	Asymp. Sig. (2-sided)	Eta
MARYLAND	Male	Pearson Chi-Square	16551.266[b]	12	.000	.167
		N of Valid Cases	595936			
	Female	Pearson Chi-Square	42988.701[c]	12	.000	.246
		N of Valid Cases	711361			
	Total	Pearson Chi-Square	51726.811[a]	12	.000	.199
		N of Valid Cases	1307297			
DE, DC, PA, VA, WVA, NJ	Male	Pearson Chi-Square	43445.076[e]	12	.000	.165
		N of Valid Cases	1599069			
	Female	Pearson Chi-Square	36727.697[f]	12	.000	.140
		N of Valid Cases	1862294			
	Total	Pearson Chi-Square	67500.557[d]	12	.000	.140
		N of Valid Cases	3461363			

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1137.49.

b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 480.50.

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 587.80.

d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 3228.45.

e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1197.26.

f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1616.76.

Table B3

Exercise During Last 30 Days by Occurrence of Chronic Kidney Disease

CDC Region B	Respondent Gender		Value	df	Exact Sig. (2-sided)	Cramer's V
MARYLAND	Male	Fisher's Exact Test		1	.000	.069
		N of Valid Cases	520,607			
	Female	Fisher's Exact Test		1	.000	.119
		N of Valid Cases	641,396			
	Total	Fisher's Exact Test		1	.000	.095
		N of Valid Cases	1,162,003			
DE, DC, PA, VA, WVA, NJ	Male	Fisher's Exact Test		1	.000	.047
		N of Valid Cases	1,449,771			
	Female	Fisher's Exact Test		1	.000	.032
		N of Valid Cases	1,711,623			
	Total	Fisher's Exact Test		1	.000	.039
		N of Valid Cases	3,161,394			

Table B4

Eating Fruit by Occurrence of Chronic Kidney Disease

CDC Region B	Respondent Gender		Value	df	Asymp. Sig (2-tailed)	Eta
MARYLAND	Male	Pearson Chi-Square	6,290.542[b]	5	.000	.110
		N of Valid Cases	521,952			
	Female	Pearson Chi-Square	4,869.149[c]	5	.000	..086
		N of Valid Cases	656,112			
	Total	Pearson Chi-Square	439.493[a]	5	.000	.019
		N of Valid Cases	1,178,064			
DE, DC, PA, VA, WVA, NJ	Male	Pearson Chi-Square	10,917.270[e]	5	.000	.087
		N of Valid Cases	1,449,073			
	Female	Pearson Chi-Square	8,007.402[f]	5	.000	.069
		N of Valid Cases	1,705,825			
	Total	Pearson Chi-Square	7,851.516[d]	5	.000	.050
		N of Valid Cases	3,154,898			

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1371.22.
b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 878.52.
c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 527.07.
d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5417.16.
e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 3382.54.
f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 2136.74.

Table B5

Drinking 100% Pure Fruit Juices by Occurrence of Chronic Kidney Disease

CDC Region B	Respondent Gender		Value	df	Asymp. Sig. (2-sided)	Eta
MARYLAND	Male	Pearson Chi-Square	6363.799[b]	4	.000	.110
		N of Valid Cases	523796			
	Female	Pearson Chi-Square	1574.715[c]	4	.000	.049
		N of Valid Cases	643636			
	Total	Pearson Chi-Square	4579.538[a]	4	.000	.063
		N of Valid Cases	1167432			
DE, DC, PA, VA, WVA, NJ	Male	Pearson Chi-Square	2495.035[e]	4	.000	.042
		N of Valid Cases	1436113			
	Female	Pearson Chi-Square	2940.167[f]	4	.000	.042
		N of Valid Cases	1696515			
	Total	Pearson Chi-Square	1654.527[d]	4	.000	.023
		N of Valid Cases	3132628			

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 2986.31.
b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1524.74.
c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1470.61.
d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9061.26.
e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5552.03.
f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 3652.01.

Table B6

Eating Dark Green Vegetables by Occurrence of Chronic Kidney Disease

CDC Region B	Respondent Gender		Value	df	Asymp. Sig. (2-sided)	Eta
MARYLAND	Male	Pearson Chi-Square	5,007.053[b]	5	.000	.099
		N of Valid Cases	513,327			
	Female	Pearson Chi-Square	4,206.871[c]	5	.000	.081
		N of Valid Cases	645,444			
	Total	Pearson Chi-Square	3,289.518[a]	5	.000	.053
		N of Valid Cases	1,158,771			
DE, DC, PA, VA, WVA, NJ	Male	Pearson Chi-Square	10,400.526[e]	5	.000	.084
		N of Valid Cases	1,456,727			
	Female	Pearson Chi-Square	4,034.107[f]	5	.000	.049
		N of Valid Cases	1,701,170			
	Total	Pearson Chi-Square	3,706.447[d]	5	.000	.034
		N of Valid Cases	3,157,897			

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 2378.38.

b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1511.26.

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 931.79.

d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8793.62.

e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5248.73.

f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 3662.30.

Table B7

Eating French Fries or Fried Potatoes by Occurrence of Chronic Kidney Disease

CDC Region B	Respondent Gender		Value	df	Asymp. Sig. (2-sided)	Eta
MARYLAND	Male	Pearson Chi-Square	12,702.765[b]	5	.000	.156
		N of Valid Cases	523,867			
	Female	Pearson Chi-Square	971.603[c]	5	.000	.039
		N of Valid Cases	645,034			
	Total	Pearson Chi-Square	8,820.108[a]	5	.000	.087
		N of Valid Cases	1,168,901			
DE, DC, PA, VA, WVA, NJ	Male	Pearson Chi-Square	9,937.304[e]	5	.000	.083
		N of Valid Cases	1,452,450			
	Female	Pearson Chi-Square	1,931.740[f]	5	.000	.034
		N of Valid Cases	1,704,770			
	Total	Pearson Chi-Square	7,421.075[d]	5	.000	.048
		N of Valid Cases	3,157,220			

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 496.33.

b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 249.16.

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 247.50.

d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1910.01.

e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1183.97.

f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 752.59.

Table B8

Eating Other Kinds of Potatoes by Occurrence of Chronic Kidney Disease

CDC Region B	Respondent Gender		Value	df	Asymp. Sig. (2-sided)	Eta
MARYLAND	Male	Pearson Chi-Square	6463.946[b]	5	.000	.112
		N of Valid Cases	517244			
	Female	Pearson Chi-Square	3322.226[c]	5	.000	.072
		N of Valid Cases	646870			
	Total	Pearson Chi-Square	3590.070[a]	5	.000	.056
		N of Valid Cases	1164114			
DE, DC, PA, VA, WVA, NJ	Male	Pearson Chi-Square	8339.579[e]	5	.000	.076
		N of Valid Cases	1437422			
	Female	Pearson Chi-Square	2871.018[f]	5	.000	.041
		N of Valid Cases	1689142			
	Total	Pearson Chi-Square	8267.252[d]	5	.000	.051
		N of Valid Cases	3126564			

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 752.56.

b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 340.76.

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 408.39.

d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 2204.21.

e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 891.86.

f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1282.24.

Table B9

Eating Other Vegetables by Occurrence of Chronic Kidney Disease

CDC Region B	Respondent Gender		Value	df	Asymp. Sig. (2-sided)	Eta
MARYLAND	Male	Pearson Chi-Square	6154.788[b]	5	.000	.110
		N of Valid Cases	511975			
	Female	Pearson Chi-Square	4952.328[c]	5	.000	.087
		N of Valid Cases	647607			
	Total	Pearson Chi-Square	7022.789[a]	5	.000	.078
		N of Valid Cases	1159582			
DE, DC, PA, VA, WVA, NJ	Male	Pearson Chi-Square	8304.294[e]	5	.000	.076
		N of Valid Cases	1424092			
	Female	Pearson Chi-Square	8414.642[f]	5	.000	.070
		N of Valid Cases	1698852			
	Total	Pearson Chi-Square	11846.635[d]	5	.000	.062
		N of Valid Cases	3122944			

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 834.10.
b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 486.27.

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 362.13.

d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 3026.68.

e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1827.28.

f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1245.91.

Table B10

Educational Level by Occurrence of Chronic Kidney Disease

CDC Region B		Value	df	Asymp. Sig. (2-sided)	Eta
MARYLAND	Pearson Chi-Square	28949.611[a]	4	.000	.148
	N of Valid Cases	1326834			
DE, DC, PA, VA, WVA, NJ	Pearson Chi-Square	16751.730[b]	4	.000	.169
	N of Valid Cases	3489133			

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 350.55.
b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 2847.98.

Table B11

Employment Status by Occurrence of Chronic Kidney Disease

CDC Region B	Education Level		Value	df	Asymp. Sig. (2-sided)	Cramer's V	Approx. Sig.
MD	Never attended school, only kindergarten, or grades 1-8 (Elementary)	Pearson Chi-Square	2,099.498[b]	4	.000	.424	.000
		N of Valid Cases	11690				
	Grades 9-11 (Some high school)	Pearson Chi-Square	4,020.632[c]	7	.000	.188	.000
		N of Valid Cases	114,061				
	Grade 12 or GED (High school graduate)	Pearson Chi-Square	29,820.902[d]	7	.000	.277	.000
		N of Valid Cases	388,462				
	College 1-3 years (Some college or technical school)	Pearson Chi-Square	19,170.984[e]	7	.000	.209	.000
		N of Valid Cases	438,456				
	College 4 years or more (College graduate)	Pearson Chi-Square	11,768.288[f]	7	.000	.180	.000
		N of Valid Cases	364,888				
	Total	Pearson Chi-Square	51,076.252[a]	7	.000	.197	.000
		N of Valid Cases	1,317,557				
DE, DC, PA, VA, WVA, NJ	Never attended school, only kindergarten, or grades 1-8 (Elementary)	Pearson Chi-Square	30,835.682[h]	6	.000	.612	.000
		N of Valid Cases	82,427				
	Grades 9-11 (Some high school)	Pearson Chi-Square	12,471.421[i]	7	.000	.186	.000
		N of Valid Cases	360,010				
	Grade 12 or GED (High school graduate)	Pearson Chi-Square	47,897.370[j]	7	.000	.197	.000
		N of Valid Cases	1,231,330				
	College 1-3 years (Some college or technical school)	Pearson Chi-Square	37,843.891[k]	7	.000	.191	.000
		N of Valid Cases	1,041,279				
	College 4 years or more (College graduate)	Pearson Chi-Square	62,581.524[l]	7	.000	.290	.000
		N of Valid Cases	744,803				
	Total	Pearson Chi-Square	980,40.227[g]	7	.000	.168	.000
		N of Valid Cases	3,459,849				

Note. Educational level as control variable.
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 542.31.
b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 214.02.
c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 98.47.
d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 219.67.
e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 98.58.
f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 47.25.
g. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 2422.55.
h. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 99.76.
i. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 512.23.
j. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 678.60.
k. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 615.17.
l. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 140.04.

Table B12

Income Status by Occurrence of Chronic Kidney Disease

CDC Region B	Education Level		Value	df	Asymp. Sig. (2-sided)	Eta
MD	Never attended school, only kindergarten, or grades 1-8 (Elementary)	Pearson Chi-Square	3,809.325[b]	3	.000	.662
		N of Valid Cases	8681			
	Grades 9-11 (Some high school)	Pearson Chi-Square	43,878.124[c]	7	.000	.702
		N of Valid Cases	88936			
	Grade 12 or GED (High school graduate)	Pearson Chi-Square	28,401.560[d]	7	.000	.299
		N of Valid Cases	316638			
	College 1-3 years (Some college or technical school)	Pearson Chi-Square	4,380.765[e]	7	.000	.109
		N of Valid Cases	3,71,859			
	College 4 years or more (College graduate)	Pearson Chi-Square	2,725.370[f]	7	.000	.092
		N of Valid Cases	323,856			
	Total	Pearson Chi-Square	44,676.169[a]	7	.000	.201
		N of Valid Cases	1,109,970			
DE, DC, PA, VA, WVA, NJ	Never attended school, only kindergarten, or grades 1-8 (Elementary)	Pearson Chi-Square	23,789.364[h]	7	.000	.668
		N of Valid Cases	53,377			
	Grades 9-11 (Some high school)	Pearson Chi-Square	4,024.653[i]	7	.000	.120
		N of Valid Cases	277,961			
	Grade 12 or GED (High school graduate)	Pearson Chi-Square	7,331.603[j]	7	.000	.086
		N of Valid Cases	996,744			
	College 1-3 years (Some college or technical school)	Pearson Chi-Square	17,666.027[k]	7	.000	.142
		N of Valid Cases	878,913			
	College 4 years or more (College graduate)	Pearson Chi-Square	11,791.808[l]	7	.000	.132
		N of Valid Cases	672,812			
	Total	Pearson Chi-Square	17,479.880[g]	7	.000	.078
		N of Valid Cases	2,879,807			

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1053.29.
b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 122.46.
c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 19.37.
d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 368.67.
e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 246.11.
f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16.81.
g. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6817.75.
h. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 105.59.
i. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 466.79.
j. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 2147.28.
k. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1898.25.
l. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 114.92.

Table B13

Occurrence of Diabetes by Occurrence of Chronic Kidney Disease

CDC Region B		Value	df	Exact Sig. (2-sided)	Cramer's V	Approx. Sig.
MARYLAND	Fisher's Exact Test		1	.000	.147	.000
	N of Valid Cases	1327599				
DE, DC, PA, VA, WVA, NJ	Fisher's Exact Test		1	.000	.197	.000
	N of Valid Cases	3489510				

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5513.79.
b. Computed only for a 2x2 table

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 18182.79.

Table B14

Occurrence of Hypertension by Occurrence of Chronic Kidney Disease

CDC Region B		Value	df	Exact Sig. (2-sided)	Cramer's V	Approx. Sig.
MARYLAND	Fisher's Exact Test		1	.000	.156	.000
	N of Valid Cases	1328774				
DE, DC, PA, VA, WVA, NJ	Fisher's Exact Test		1	.000	.169	.000
	N of Valid Cases	3487253				

Note. a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14545.14.
b. Computed only for a 2x2 table

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 50343.62.

Appendix C: Weighted Data in Contingency Tables for Research Questions 1-3

This appendix contains a series of contingency or cross-tabulation tables. Their corresponding Chi-square Test of Independence results and measures of association appear in Appendix B.

Tables for Research Question 1

Table C1

Gender by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	KIDNEY DISEASE No	Total
MD	RESPONDENT GENDER	Male	Count	18,889	581,655	600,544
			% within	47.5%	45.1%	45.2%
		Female	Count	20,912	708,100	729,012
			% within	52.5%	54.9%	54.8%
	Total		Count	39,801	1,289,755	1,329,556
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	RESPONDENT GENDER	Male	Count	60,335	1,553,381	1,613,716
			% within	50.2%	46.0%	46.1%
		Female	Count	59,863	1,823,868	1,883,731
			% within	49.8%	54.0%	53.9%
	Total		Count	120,198	3,377,249	3,497,447
			% within	100.0%	100.0%	100.0%

Table C2

Age by Occurrence of Chronic Kidney Disease

CDC REGION B				KIDNEY DISEASE Yes	No	Total
MD	Age	Age 18-24	Count	0	164,316	164,316
			% within	0.0%	13.0%	12.6%
		Age 25-29	Count	0	120,672	120,672
			% within	0.0%	9.5%	9.2%
		Age 30-34	Count	0	121,280	121,280
			% within	0.0%	9.6%	9.3%
		Age 35-39	Count	2,799	117,768	120,567
			% within	7.0%	9.3%	9.2%
		Age 40-44	Count	2,809	117,956	120,765
			% within	7.1%	9.3%	9.2%
		Age 45-49	Count	2,406	102,049	104,455
			% within	6.0%	8.1%	8.0%
		Age 50-54	Count	2,229	142,059	144,288
			% within	5.6%	11.2%	11.0%
		Age 55-59	Count	4,741	100,256	104,997
			% within	11.9%	7.9%	8.0%
		Age 60-64	Count	5,993	90,346	96,339
			% within	15.1%	7.1%	7.4%
		Age 65-69	Count	4,332	67,309	71,641
			% within	10.9%	5.3%	5.5%
		Age 70-74	Count	8,180	54,040	62,220
			% within	20.6%	4.3%	4.8%
		Age 75-79	Count	4,250	33,110	37,360
			% within	10.7%	2.6%	2.9%
		Age 80 or older	Count	2,064	36,333	38,397
			% within	5.2%	2.9%	2.9%
	Total		Count	39,803	1,267,494	1,307,297
			% within	100.0%	100.0%	100.0%

(table continues)

CDC Region				KIDNEY DISEASE Yes	No	Total
DE, DC, PA, VA, WVA, NJ	Age	Age 18-24	Count	8,131	434,479	442,610
			% within	6.9%	13.0%	12.8%
		Age 25-29	Count	1,109	277,094	278,203
			% within	0.9%	8.3%	8.0%
		Age 30-34	Count	3,338	266,987	270,325
			% within	2.8%	8.0%	7.8%
		Age 35-39	Count	2,688	311,534	314,222
			% within	2.3%	9.3%	9.1%
		Age 40-44	Count	8,526	304,870	313,396
			% within	7.3%	9.1%	9.1%
		Age 45-49	Count	9,256	266,360	275,616
			% within	7.9%	8.0%	8.0%
		Age 50-54	Count	9,481	374,501	383,982
			% within	8.1%	11.2%	11.1%
		Age 55-59	Count	13,640	288,498	302,138
			% within	11.6%	8.6%	8.7%
		Age 60-64	Count	13,403	294,747	308,150
			% within	11.4%	8.8%	8.9%
		Age 65-69	Count	18,269	199,916	218,185
			% within	15.6%	6.0%	6.3%
		Age 70-74	Count	11,039	132,106	143,145
			% within	9.4%	4.0%	4.1%
		Age 75-79	Count	7,942	87,300	95,242
			% within	6.8%	2.6%	2.8%
		Age 80 or older	Count	10,509	105,640	116,149
			% within	9.0%	3.2%	3.4%
	Total		Count	117,331	3,344,032	3,461,363
			% within	100.0%	100.0%	100.0%

Table C3

Exercise in Past 30 Days by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	No	Total
MD	EXERCISE IN PAST 30 DAYS	Yes	Count	16,944	830,876	847,820
			% within	49.0%	73.7%	73.0%
		No	Count	17,657	296,526	314,183
			% within	51.0%	26.3%	27.0%
	Total		Count	34,601	1,127,402	1,162,003
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	EXERCISE IN PAST 30 DAYS	Yes	Count	66,440	2,098,932	2,165,372
			% within	59.2%	68.8%	68.5%
		No	Count	45,864	950,158	996,022
			% within	40.8%	31.2%	31.5%
	Total		Count	112,304	3,049,090	3,161,394
			% within	100.0%	100.0%	100.0%

Table C4

Eating Fruit by Occurrence of Chronic Kidney Disease

CDC REGION B				KIDNEY DISEASE Yes	No	Total
MD	Ate fruit	Once daily	Count	6,416	251,066	257,482
			% within	18.5%	22.0%	21.9%
		Twice daily-three times daily	Count	7,690	254,986	262,676
			% within	22.1%	22.3%	22.3%
		Four times daily-three times weekly	Count	9,198	275,559	284,757
			% within	26.5%	24.1%	24.2%
		Four times weekly-three times monthly	Count	6,342	189,588	195,930
			% within	18.3%	16.6%	16.6%
		Four times monthly-unsure how often monthly	Count	3,416	127,285	130,701
			% within	9.8%	11.1%	11.1%
		Never	Count	1,664	44,854	46,518
			% within	4.8%	3.9%	3.9%
	Total		Count	34,726	1,143,338	1,178,064
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	Ate fruit	Once daily	Count	21,258	6,47956	669,214
			% within	18.8%	21.3%	21.2%
		Twice daily-three times daily	Count	28,830	633,072	661,902
			% within	25.5%	20.8%	21.0%
		Four times daily-three times weekly	Count	21,980	700,476	722,456
			% within	19.5%	23.0%	22.9%
		Four times weekly-three times monthly	Count	15,137	573,083	588,220
			% within	13.4%	18.8%	18.6%
		Four times monthly-unsure how often monthly	Count	16,228	345,544	361,772
			% within	14.4%	11.4%	11.5%
		Never	Count	9,500	141,834	151,334
			% within	8.4%	4.7%	4.8%
	Total		Count	112,933	3,041,965	3,154,898
			% within	100%	100%	100%

Table C5

Drank 100% Fruit Juice by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	No	Total
MARY-LAND	Drank 100% fruit juice	Once daily-three times daily	Count	5,354	233,146	238,500
			% within	15.3%	20.6%	20.4%
		Four times daily-three times weekly	Count	5,540	259,295	264,835
			% within	15.9%	22.9%	22.7%
		Four times weekly-four times monthly	Count	5,566	240,447	246,013
			% within	15.9%	21.2%	21.1%
		Five times monthly-unsure how often monthly	Count	4,247	95,593	99,840
			% within	12.2%	8.4%	8.6%
		Never	Count	14,212	304,032	318,244
			% within	40.7%	26.8%	27.3%
	Total		Count	34,919	1,132,513	1,167,432
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	Drank 100% fruit juice	Once daily-three times daily	Count	26,314	633,463	659,777
			% within	23.3%	21.0%	21.1%
		Four times daily-three times weekly	Count	18,340	639,076	657,416
			% within (EVER TOLD) YOU HAVE KIDNEY DISEASE?	16.3%	21.2%	21.0%
		Four times weekly-four times monthly	Count	25,083	651,927	677,010
			% within	22.3%	21.6%	21.6%
		Five times monthly-unsure how often monthly	Count	9,515	242,293	251,808
			% within	8.4%	8.0%	8.0%
		Never	Count	33,475	853,142	886,617
			% within	29.7%	28.3%	28.3%
	Total		Count	112,727	3,019,901	3,132,628
			% within	100.0%	100.0%	100.0%

Table C6

Ate Dark Green Vegetables by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	No	Total
MARY-LAND	Ate dark green vegetables	Once daily-twice daily	Count	5990	257136	263126
			% within	17.4%	22.9%	22.7%
		Three times daily-twice weekly	Count	8165	225147	233312
			% within	23.7%	20.0%	20.1%
		Three times weekly-four times weekly	Count	7314	204428	211742
			% within	21.2%	18.2%	18.3%
		Five times weekly-five times monthly	Count	6069	238856	244925
			% within	17.6%	21.2%	21.1%
		Six times monthly-unsure how often monthly	Count	2502	123208	125710
			% within	7.3%	11.0%	10.8%
		Never	Count	4429	75527	79956
			% within	12.8%	6.7%	6.9%
	Total		Count	34469	1124302	1158771
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	Ate dark green vegetables	Once daily-twice daily	Count	35005	707731	742736
			% within	31.0%	23.2%	23.5%
		Three times daily-twice weekly	Count	24338	700912	725250
			% within	21.5%	23.0%	23.0%
		Three times weekly-four times weekly	Count	15134	473800	488934
			% within	13.4%	15.6%	15.5%
		Five times weekly-five times monthly	Count	19829	602891	622720
			% within	17.5%	19.8%	19.7%
		Six times monthly-unsure how often monthly	Count	11054	321450	332504
			% within	9.8%	10.6%	10.5%
		Never	Count	7637	238116	245753
			% within	6.8%	7.8%	7.8%
	Total		Count	112997	3044900	3157897
			% within	100.0%	100.0%	100.0%

Table C7

Ate French Fries or Fried Potatoes by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	No	Total
MARY-LAND	Ate french fries/fried potatoes	Once daily-twice weekly	Count	6457	318663	325120
			% within	18.8%	28.1%	27.8%
		Three times weekly-monthly (unspecified)	Count	1340	119952	121292
			% within	3.9%	10.6%	10.4%
		Once monthly-twice monthly	Count	12974	221625	234599
			% within	37.7%	19.5%	20.1%
		Three times monthly-16 times monthly	Count	6379	264661	271040
			% within	18.5%	23.3%	23.2%
		17 times monthly-unsure how often monthly	Count	149	16698	16847
			% within	0.4%	1.5%	1.4%
		Never	Count	7138	192865	200003
			% within	20.7%	17.0%	17.1%
	Total		Count	34437	1134464	1168901
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	Ate french fries/fried potatoes	Once daily-twice weekly	Count	29753	979091	1008844
			% within	26.6%	32.2%	32.0%
		Three times weekly-monthly (unspecified)	Count	9239	390184	399423
			% within	8.3%	12.8%	12.7%
		Once monthly-twice monthly	Count	29672	618145	647817
			% within	26.5%	20.3%	20.5%
		Three times monthly-16 times monthly	Count	17478	519166	536644
			% within	15.6%	17.0%	17.0%
		17 times monthly-unsure how often monthly	Count	1366	52516	53882
			% within	1.2%	1.7%	1.7%
		Never	Count	24409	486201	510610
			% within	21.8%	16.0%	16.2%
	Total		Count	111917	3045303	3157220
			% within	100.0%	100.0%	100.0%

Table C8

Ate Other Potatoes by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	No	Total
MARY-LAND	Ate other potatoes	Once daily-twice weekly	Count	5245	287925	293170
			% within	15.5%	25.5%	25.2%
		Three times weekly-once monthly	Count	9994	210990	220984
			% within	29.5%	18.7%	19.0%
		Two times monthly	Count	4551	137814	142365
			% within	13.4%	12.2%	12.2%
		Three times monthly-10 times monthly	Count	7144	252399	259543
			% within	21.1%	22.3%	22.3%
		11 times monthly-unsure how often monthly	Count	1078	24741	25819
			% within	3.2%	2.2%	2.2%
		Never	Count	5919	216314	222233
			% within	17.4%	19.1%	19.1%
	Total		Count	33931	1130183	1164114
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	Ate other potatoes	Once daily-twice weekly	Count	27646	872502	900148
			% within	25.0%	28.9%	28.8%
		Three times weekly-once monthly	Count	29191	675800	704991
			% within	26.4%	22.4%	22.5%
		Two times monthly	Count	12433	333286	345719
			% within	11.2%	11.1%	11.1%
		Three times monthly-10 times monthly	Count	11618	554507	566125
			% within	10.5%	18.4%	18.1%
		11 times monthly-unsure how often monthly	Count	3372	58916	62288
			% within	3.0%	2.0%	2.0%
		Never	Count	26381	520912	547293
			% within	23.8%	17.3%	17.5%
	Total		Count	110641	3015923	3126564
			% within	100.0%	100.0%	100.0%

Table C9

Ate Other Vegetables by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	No	Total
MARY-LAND	Ate other vegetables	Once daily	Count	11736	297278	309014
			% within	34.0%	26.4%	26.6%
		Twice daily-three times daily	Count	1057	164659	165716
			% within	3.1%	14.6%	14.3%
		Four times daily-three times weekly	Count	8394	239972	248366
			% within	24.3%	21.3%	21.4%
		Four times weekly-four times monthly	Count	5777	228664	234441
			% within	16.7%	20.3%	20.2%
		Five times monthly-unsure how often monthly	Count	5253	168805	174058
			% within	15.2%	15.0%	15.0%
		Never	Count	2342	25645	27987
			% within	6.8%	2.3%	2.4%
	Total		Count	34559	1125023	1159582
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	Ate other vegetables	Once daily	Count	47141	949258	996399
			% within	42.2%	31.5%	31.9%
		Twice daily-three times daily	Count	7636	358208	365844
			% within	6.8%	11.9%	11.7%
		Four times daily-three times weekly	Count	27398	619366	646764
			% within	24.5%	20.6%	20.7%
		Four times weekly-four times monthly	Count	14200	617066	631266
			% within	12.7%	20.5%	20.2%
		Five times monthly-unsure how often monthly	Count	14429	383600	398029
			% within	12.9%	12.7%	12.7%
		Never	Count	868	83774	84642
			% within	0.8%	2.8%	2.7%
	Total		Count	111672	3011272	3122944
			% within	100.0%	100.0%	100.0%

Tables for Research Question 2

Table C10

Education Level by Occurrence of Chronic Kidney Disease

CDC REGION B				KIDNEY DISEASE Yes	No	Total
MD	EDUCATION LEVEL	Never attended school, only kindergarten, or grades 1-8 (Elementary)	Count	2421	9269	11690
			% within	6.1%	0.7%	0.9%
		Grades 9-11 (Some high school)	Count	9835	104337	114172
			% within	24.7%	8.1%	8.6%
		Grade 12 or GED (High school graduate)	Count	12733	377507	390240
			% within	32.0%	29.3%	29.4%
		College 1-3 years (Some college or technical school)	Count	8521	433487	442008
			% within	21.4%	33.7%	33.3%
		College 4 years or more (College graduate)	Count	6278	362446	368724
			% within	15.8%	28.2%	27.8%
	Total		Count	39788	1287046	1326834
			% within	100%	100.0%	100%
DE, DC, PA, VA, WVA, NJ	EDUCATION LEVEL	Never attended school, only kindergarten, or grades 1-8 (Elementary)	Count	8592	74106	82698
			% within	7.2%	2.2%	2.4%
		Grades 9-11 (Some high school)	Count	16880	343246	360126
			% within	14.0%	10.2%	10.3%
		Grade 12 or GED (High school graduate)	Count	36865	1207469	1244334
			% within	30.7%	35.8%	35.7%
		College 1-3 years (Some college or technical school)	Count	38794	1005445	1044239
			% within	32.3%	29.8%	29.9%
		College 4 years or more (College graduate)	Count	19029	738707	757736
			% within	15.8%	21.9%	21.7%
	Total		Count	120160	3368973	3489133
			% within	100.0%	100.0%	100.0%

Table C11

Employment Status by Occurrence of Chronic Kidney Disease

				KIDNEY DISEASE		
CDC Region B				Yes	No	Total
MD	EMPLOY-MENT STATUS	Employed for wages	Count	6152	714450	720602
			% within	15.5%	55.9%	54.7%
		Self-employed	Count	725	69493	70218
			% within	1.8%	5.4%	5.3%
		Out of work for one year or more	Count	2341	34183	36524
			% within	5.9%	2.7%	2.8%
		Out of work for less than one year	Count	1319	51913	53232
			% within	3.3%	4.1%	4.0%
		A homemaker	Count	742	17283	18025
			% within	1.9%	1.4%	1.4%
		A student	Count	1196	97493	98689
			% within	3.0%	7.6%	7.5%
		Retired	Count	15716	199460	215176
			% within	39.6%	15.6%	16.3%
		Unable to work	Count	11450	93641	105091
			% within	28.9%	7.3%	8.0%
	Total		Count	39641	1277916	1317557
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	EMPLOYMENT STATUS	Employed for wages	Count	27109	1675321	1702430
			% within	22.6%	50.2%	49.2%
		Self-employed	Count	662	237441	238103
			% within	0.6%	7.1%	6.9%
		Out of work for one year or more	Count	7733	155404	163137
			% within	6.4%	4.7%	4.7%
		Out of work for less than one year	Count	6774	148774	155548
			% within	5.6%	4.5%	4.5%
		A homemaker	Count	2930	66823	69753
			% within	2.4%	2.0%	2.0%
		A student	Count	48	228334	228382
			% within	0.0%	6.8%	6.6%
		Retired	Count	43294	506109	549403
			% within	36.0%	15.2%	15.9%
		Unable to work	Count	31612	321481	353093
			% within	26.3%	9.6%	10.2%
	Total		Count	120162	3339687	3459849
			% within	100.0%	100.0%	100.0%

Table C12

Income Level by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	No	Total
MD	INCOME LEVEL	Less than $10,000	Count	2667	61032	63699
			% within	9.1%	5.6%	5.7%
		$10,000-$15,000	Count	7271	32799	40070
			% within	24.9%	3.0%	3.6%
		$15,000-$20,000	Count	3895	72586	76481
			% within	13.3%	6.7%	6.9%
		$20,000-$25,000	Count	1689	103600	105289
			% within	5.8%	9.6%	9.5%
		$25,000-$35,000	Count	2582	94808	97390
			% within	8.8%	8.8%	8.8%
		$35,000-$50,000	Count	1510	139344	140854
			% within	5.2%	12.9%	12.7%
		$50,000-$75,000	Count	3921	159642	163563
			% within	13.4%	14.8%	14.7%
		$75,000 or more	Count	5642	416982	422624
			% within	19.3%	38.6%	38.1%
	Total		Count	29177	1080793	1109970
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	INCOME LEVEL	Less than $10,000	Count	13276	223239	236515
			% within	12.6%	8.0%	8.2%
		$10,000-$15,000	Count	12808	173097	185905
			% within	12.1%	6.2%	6.5%
		$15,000-$20,000	Count	10516	275749	286265
			% within	10.0%	9.9%	9.9%
		$20,000-$25,000	Count	17889	329411	347300
			% within	16.9%	11.9%	12.1%
		$25,000-$35,000	Count	14461	353652	368113
			% within	13.7%	12.7%	12.8%
		$35,000-$50,000	Count	12643	368327	380970
			% within	12.0%	13.3%	13.2%
		$50,000-$75,000	Count	10672	345558	356230
			% within	10.1%	12.5%	12.4%
		$75,000 or more	Count	13347	705162	718509
			% within	12.6%	25.4%	24.9%
	Total		Count	105612	2774195	2879807
			% within	100.0%	100.0%	100.0%

Tables for Research Question 3

Table C13

Diabetes by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	No	Total
MARY-LAND	DIABETES	Yes	Count	16997	166925	183922
			% within	42.7%	13.0%	13.9%
		No	Count	22803	1120874	1143677
			% within	57.3%	87.0%	86.1%
	Total		Count	39800	1287799	1327599
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	DIABETES	Yes	Count	63057	464814	527871
			% within	52.5%	13.8%	15.1%
		No	Count	57141	2904498	2961639
			% within	47.5%	86.2%	84.9%
	Total		Count	120198	3369312	3489510
			% within	100.0%	100.0%	100.0%

Table C14

High Blood Pressure by Occurrence of Chronic Kidney Disease

CDC Region B				KIDNEY DISEASE Yes	No	Total
MARY-LAND	EVER TOLD BLOOD PRESSURE HIGH	Yes	Count	31411	468439	499850
			% within	81.2%	36.3%	37.6%
		No	Count	7255	821669	828924
			% within	18.8%	63.7%	62.4%
	Total		Count	38666	1290108	1328774
			% within	100.0%	100.0%	100.0%
DE, DC, PA, VA, WVA, NJ	EVER TOLD BLOOD PRESSURE HIGH	Yes	Count	103388	1366307	1469695
			% within	86.6%	40.6%	42.1%
		No	Count	16066	2001492	2017558
			% within	13.4%	59.4%	57.9%
	Total		Count	119454	3367799	3487253
			% within(	100.0%	100.0%	100.0%