

The Effect of Race and Other Factors on the Utilization of Annual Physical Examinations and Preventive  
Healthcare Services in the District of Columbia

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## Abstract

**Conclusion:** This study shows a statistically and clinically significant gap between Whites and Blacks in the use of annual physical examination and preventive care services in the District of Columbia. The results of the study indicate that race (Whites versus Blacks) and work schedule conflicts are not significant factors in the noted gap. The study also found that income and education levels were not significant factors. Moreover, the study demonstrates a knowledge gap between Whites and Blacks pertaining to knowing that critical preventive care services are fully covered by insurance plans (Section 2713 of the Affordable Care Act mandate). This is important because the study indicates that knowing that critical preventive care services are covered by insurance companies is a (small) contributing factor in the difference in the utilization of preventive care services between Whites and Blacks in the District of Columbia. The study found that being prompted by a secondary party (insurance company, medical practitioners, educational material, and healthcare advertisement) is the primary motivation for Whites and Blacks to utilize preventive care services. Habit (self-directed) was ascertained to be the primary motivation for Whites and Blacks to undergo an annual physical examination. The study shows that 94.11% of the residents of the District of Columbia had health insurance coverage during 2017-2020.

**Background:** Despite the benefits of preventive care services and annual physical examinations, studies show that very few adults in the United States undergo an annual physical examination, and fewer utilize vital preventive care services. This study was designed to ascertain the number of adults in the District of Columbia that have utilized annual physical examinations and preventive care service at least once during 2017—2020, and whether a difference in the utilization of annual physical examinations and preventive care service exists between Black and White. This study was also designed to ascertain whether race, work schedule conflict, and knowing that preventive care services are fully covered by healthcare insurance plans are factors in the use of preventive care services in the District of Columbia.

**Method:** The first phase of the study required the development and testing of a survey questionnaire. The survey questionnaire was distributed blinded and randomly using Poll Fish, an online survey management and distribution platform. Excluding demographic questions (age, gender, and location), the survey questionnaire consists of thirteen (13) closed-ended questions: a survey screening question and twelve follow-up questions. Two surveys were conducted, and data from 509 respondents were collected from 29 January to 11 April 2021 (73 days). The data analyses for this study were conducted using Minitab, a statistics software developed at the Pennsylvania State University. The following statistical tests were performed: Independent t-tests, Pearson correlation coefficient, multiple linear regression, and Cohen's d-tests.

**Result:** This study shows that 78.78% (16.78% above national rate) of adults in the District of Columbia sought and received an annual physical examination and 66.21 % (29.09% below the national rate) of adults utilized preventive healthcare services at least once between 2017 and 2020. When broken down by race (Whites versus Blacks), the study shows that the utilization rate of preventive care services by Whites (72.17%) exceeds that of Blacks (59.57%) by 12.6%. As it pertains to annual physical examinations, Whites (84.35%) exceeds Blacks (72.61%) by 11.74%. All results were found to be statistically and clinically significant. The study also determined that Whites (66.96%) are more aware that preventive care healthcare service is covered fully by health insurance plans when compared to Blacks (56.09%). A Pearson correlation coefficient analysis was performed, and the results (Based on Chan [2003] interpretation of the Pearson and Spearman correlation coefficients) indicate a statistically significant fair ( $r = 0.3$ )

correlation between knowledge that preventive care services are fully covered by insurance plans and the utilization of preventive healthcare services. A regression analysis was performed, and a statistically significant regression ( $p = 0.00$ ) was achieved with a coefficient of 0.3 (predictive equation = preventive healthcare services =  $1.18 + 0.3$  [knowledge of 100% coverage]). The adjusted  $R^2$  for this model was only 9.23%. Data was collected and analyzed to ascertain whether race was a factor in the gap between Whites and Blacks. The study found no meaningful results to indicate that race and work schedule conflict were major factors. The study found that being prompted by a secondary party (insurance company, medical practitioners, and educational material) is the primary motivation for Whites and Blacks to utilize preventive care services. Habit (self-directed) was shown to be the primary motivation for Whites and Blacks to undergo an annual physical examination.

**Limitations, Biases, and Errors:** There is concern regarding selection and response biases due to the distribution method by which data was collected. There was an identified error in the survey questionnaire electronic response data collection sequence. Four survey questions designed to collect data as to the motivations behind the respondents' utilizing of annual physical examination and preventive services were only seen and answered by 57% of the respondents. This resulted in an increase of the margin of error to 6% for the study results pertaining to motivation versus from 4% (all races results) 5% (Black versus Whites results) for the rest of the results obtained in the study.

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## 1. INTRODUCTION

Preventative healthcare care is defined as “the maintenance and promotion of health and the reduction of risk factors that result in injury and disease” (Hensrud. 2000, p. 162). Studies have found that preventive care reduces the prevalence of diseases and increases life expectancy while reducing healthcare costs (Rasmussen, 2007; Neumann & Cohen, 2009). Section 2713 of the Public Health Service Act, as amended by Section 2713 of the Affordable Care Act (ACA) of 2010, mandates that all private health plans provide coverage for a range of preventive services at no additional cost to the patients receiving the noted preventive services (Seiler, Malcarney, Horton, & Dafflito, 2014). Some of the preventive services covered under the ACA are blood pressure, diabetes, cholesterol tests, colorectal cancer screening, depression screening, HIV screening, diet counseling, and hepatitis B and C screening (Fox & Shaw, 2015). The ACA also provides for preventive care services without cost-sharing under Medicare and requires that states cover preventive services under Medicaid without any cost-sharing (Reynolds & Fisher, 2020).

An annual physical examination involves a physical examination that includes bloodwork, urinalysis, and other tests as prescribed by the attending primary care provider. Most Americans believe that undergoing an annual examination is an important element in maintaining good health, and “a 2002 study showed that more than 90% endorse the value of routine examination of the heart, lungs, abdomen, reflexes, and prostate (Oboler, 2002, as cited in Bloomfield & Wilt, 2011, p. 102). However, there is disagreement among researchers about the benefits of an annual physical examination. Some researchers have questioned the effectiveness of an annual physical examination (Oboler, 2002; Chacko & Anderson, 2007). According to Birtwhistle (2017), “the traditional annual physical examination of asymptomatic adults is not supported by evidence of effectiveness and might result in harm” (p. 825). Nevertheless, a study by Chiou and Chang (2002) showed lower mortality among individuals  $\geq 65$  who received annual health examinations when compared to individuals  $\geq 65$  who did not receive annual health examinations.

Annual physical examination and preventive care services save lives (Centers for Disease and Prevention [CDC], 2012). Despite the noted benefits of participation in preventive care services and annual physical examinations, studies show that very few Americans undergo an annual physical examination, and fewer utilize vital preventive care services. According to Mehrotra et al. (2007), only 20% (95% CI: 18.2%, 23.6 %) of adults in the United States receive an annual physical examination once a year. Nevertheless, it must be noted that a more recent study by the Kaiser Family Foundation found that 62% of adults ( $\geq 18$ ) reported receiving an annual physical examination at least once a year (Hamel et al., 2014). In the case of preventive care services, Borsky et al. (2015) note that only 8% (95% CI: 6.5%, 9.5%) of adults ( $\geq 35$ ) in the United States had received the fifteen recommended vital preventive services. Some of these recommended vital preventive services include blood pressure, cholesterol, breast cancer, colon cancer, cervical cancer screening, osteoporosis, and tobacco use screening and counseling. Borsky et al. (2015) note that nearly 4.7 % (95% CI: 3.6%, 5.8%) received none of the vital preventive care services.

The primary goal of this study is to ascertain the number of adults in the District of Columbia who had undergone an annual physical examination and at least utilized one preventive care service during the past four years (2017—2020). The primary goal is also aimed at ascertaining whether a difference in the utilization of annual physical examinations and preventive care services exists between Black and White residents of the District of Columbia. The secondary goal of this study is to determine whether race and knowing that preventive care services (Per Section 2713 of the ACA) covered by insurance plans (no copayment or deductible) are factors in the use of preventive care services in the District of Columbia.

## 2. RESEARCH QUESTIONS

- PRQ 1. What is the utilization rate of annual physical examinations and preventive care services in the District of Columbia?
- PRQ 2. Is there a statistically ( $p = \leq 0.05$ ) or clinically ( $d = \geq 0.2$ ) significant difference in the utilization of annual physical examinations between individuals aged  $\geq 18$  (Living in the District of Columbia) who identify as White versus Black?
- PRQ 3. Is there a statistically ( $p = \leq 0.05$ ) or clinically ( $d = \geq 0.2$ ) significant difference in the utilization of preventive health services between individuals aged  $\geq 18$  (Living in the District of Columbia) who identify as White versus Black?
- PRQ 4. Is there statistically ( $p = \leq 0.05$ ) or clinically ( $d = \geq 0.2$ ) significant differences between individuals aged  $\geq 18$  (Living in the District of Columbia) who identify as White versus Black as it pertains to knowing that critical preventive health services are covered 100% by insurance plans and require no copay, no deductible, and no fee?
- PRQ 5. Is there a ( $p = \leq 0.05$ ) statistically significant correlation between knowing critical preventive health services are covered 100% by health insurance plans and require no copay, no deductible, and no fee, and the utilization of preventive healthcare services? (Include simple regression analysis)
- PRQ 6. Is there a ( $p = \leq 0.05$ ) statistically significant correlation between identified confounding factors (marital status, age, parent to a minor ( $< 18$ ), education level, income level, employment status, respondent's race, knowledge of preventive services being covered 100% by insurance plan, and the utilization of annual physical examination and preventive healthcare services? (Include multiple regression analysis)
- PRQ 7. Are there statistically ( $p = \leq 0.05$ ) or clinically ( $d = \geq 0.2$ ) significant differences in the identified motivations [Secondary party prompt, self-directed, health concern) why preventive care was sought between individuals aged  $\geq 18$  (Living in the District of Columbia) who identify as Black versus White?
- PRQ 8. Are there statistically ( $p = \leq 0.05$ ) or clinically ( $d = \geq 0.2$ ) significant differences in the identified motivation (work scheduling issues) why preventive care was not sought between individuals aged  $\geq 18$  (Living in the District of Columbia)?
- PRQ 9. Are there statistically ( $p = \leq 0.05$ ) or clinically ( $d = \geq 0.2$ ) significant differences in the identified motivations why the annual physical examination was sought between individuals aged  $\geq 18$  (Living in the District of Columbia)?
- PRQ 10. Was race a factor in the utilization of annual physical examination and preventive healthcare services in the District of Columbia between 2017 and 2020?

### **3. METHOD**

#### **3.1. Inclusion Criteria**

This study's inclusion criteria are individuals aged  $\geq 18$  who have resided continuously in the District of Columbia between 2017 and 2020.

#### **3.2. Data Collection**

The first phase of the study required the development and testing of a survey questionnaire. A pilot program was developed, and a survey questionnaire was developed and tested. Using Poll Fish, an online survey management and distribution platform, 70 responses were collected, and the survey questionnaire was modified to address issues with wording clarity, and two new questions were added to the questionnaire. The data from the pilot survey was discarded and not included as part of this study. The modified survey questionnaire was distributed blinded and randomly using Poll Fish. In addition to demographic questions (age, gender, and location), the modified survey questionnaire consists of twelve (12) closed-ended questions: a survey screening question and eleven follow-up questions. Two surveys were conducted, and data from 509 respondents were collected from 29 January to 11 April 2021 (73 days).

#### **3.3. Analysis**

The data analyses for this study were conducted using Minitab, a statistics software developed at the Pennsylvania State University. The following statistical tests were performed: Independent t-tests, Pearson correlation coefficient, multiple linear regression, and Cohen's d-tests.

The population (all races) of the District of Columbia ( $\geq 18$  years old) as of 2020 was 564,048 (United States Census Bureau, 2021). Based on this population size and the collected sample size, the calculated margin of error is 4% with a confidence level of 95%. To answer the research question about the Black (46%) and White (46%) population (combined 518,924) of the District of Columbia, the calculated margin of error is 5% with a confidence level of 95%. *Due to an error in the electronic data collection sequence, the margin of error of results pertaining to motivation is 6% with a confidence level of 95%.* A statistical power analysis was also performed to estimate the required sample size needed to detect an effect size if an effect size existed. Using a two-sample test, and based on the pilot study data, a standard deviation of 0.45 was ascertained. With a standard deviation of 0.45, an  $\alpha = .05$ , and power = 0.80, the projected sample population needed to detect a significant practical difference if such a difference exists, which was calculated to be 14 respondents from each survey group.

#### **3.4. Results**

The survey invitations were sent out randomly and blinded by Poll Fish to the targeted population across the District of Columbia. The survey screening question ensured that only individuals who matched the inclusion criteria participated in the survey. No information was provided to the researcher by Poll fish regarding the total number of survey invitations distributed. Ultimately, 509 survey respondents completed the survey and were included in the survey analysis.



#### **3.4.1 Respondents by Ward**

The survey's respondents (n=509) were distributed across the eight (8) wards of the District of Columbia. The breakdown of the survey respondents by ward is as follows: Ward 1 (8.64%), Ward 2 (11.20%), Ward 3 (15.13%), Ward 4 (16.31%), Ward 5 (13.95%), Ward 6 (10.61%), Ward 7 (9.63%), and Ward 8 (14.54%).

#### **3.4.2. Survey Respondents by Age Group**

The breakdown by age of the respondents was 18-24 (22.79%), 25-34 (27.31%), 35-44 (26.13%), 45-54 (13.75%), and 55 and above (10.02%).

#### **3.4.3. Survey Respondents by Gender**

Of the survey respondents, 46.56% identified as male, while 53.44% identified as female.

#### **3.4.4. Survey Respondents by Income**

Of the survey respondents, 21.61% had income under \$25,000, 16.70% had an income of between \$25,000 and \$49,999, 12.97% had income between \$50,000 to \$74,999, 9.04% had income between \$75,000 and \$ 99,999, 6.29% had income between \$100,000 and \$124,999, 6.09% had income between \$125,000 and \$ 149,999, and 16.31% had income of \$150,000 and more. Eleven percent did not disclose their income.

#### **3.4.5 Survey Respondent by Race**

Of the survey respondents, 3.14% identified as Asian, 45.19% as Black, 4.13% as Hispanic, 1.57% as Multiracial, 0.79% as Other, and 45.19% identified as White.

#### **3.4.6 Survey Respondent by Insurance Type**

Of the survey respondents, 36.35% are enrolled in private insurance alone, 14.15% are enrolled in private insurance and Medicare or Medicaid, 21.41% are enrolled in Medicare alone, 22.20% are enrolled in Medicaid alone, and 5.89% were not enrolled in any insurance program. This equates to 94.11% of the residents of the District of Columbia had health insurance coverage during 2017-2020.

#### **3.4.7 Primary Research Question 1: Results**

An analysis was conducted to determine the utilization rate of annual physical examinations and preventive care services among adults ( $\geq 18$ ) in the District of Columbia. The data shows that 78.78% (95% CI: 95% CI: 74.78, 82.78) of the survey respondents sought and received an annual physical examination at least once between 2017 and 2020. The result of the survey also shows that 66.21% (95% CI: 62.21%, 70.21%) of the survey respondents sought and received a preventive care service (blood pressure screening, cholesterol screening, alcohol misuse screen, diabetes screening, etc.) at least once between 2017 and 2020.

#### **3.4.8 Primary Research Question 2: Results**

An analysis was performed to determine whether there is a statistically ( $p = \leq 0.05$ ) or clinically ( $d = \geq 0.2$ ) significant difference in the utilization of annual physical examination

between individuals aged  $\geq 18$  (living in the District of Columbia) who identify as White versus Black. The analysis showed that 72.61% (95% CI: 67.61%, 77.61%) of the survey respondents who identified as Black sought and received an annual physical examination at least once between 2017 and 2020. The analysis showed that 84.35% (95% CI: 79.35%, 89.35%) of survey respondents that identified as White sought and received an annual physical examination at least once between 2017 and 2020. This is an 11.74% (95% CI: 6.74%, 16.74%) difference between the two racial groups. A follow-up statistical analysis was performed to determine whether a statistically and clinically significant difference exists regarding the noted results. A two-sample t-test was performed, and the result was statistically significant at ( $M=1.361$ ,  $SD=0.637$ ) versus ( $M=1.178$ ,  $SD=0.437$ );  $t(405) = 3.58$ ,  $p = 0.00$ . An effect size analysis was also conducted, and the effect size ( $d = 0.5$ ) is at the range of Cohen's (1988) convention for a medium effect ( $d = 0.5$ ).

#### **3.4.9 Primary Research Question 3: Results**

An analysis was performed to determine whether there is a statistically ( $p \leq 0.05$ ) or clinically ( $d \geq 0.2$ ) significant difference in the utilization of preventive healthcare services between individuals aged  $\geq 18$  (living in the District of Columbia) who identify as White versus Black. The analysis shows that 59.57% (95% CI: 54.57%, 64.57%) of the survey respondents who identified as Black sought and received an annual physical examination at least once between 2017 and 2020. The analysis shows that 72.17% (95% CI: 67.17%, 77.17%) of the survey respondent that identified as White sought and received an annual physical examination at least once between 2017 and 2020. This is a 12.61% (95% CI: 7.61%, 17.61%) difference between the two racial groups. A two-sample t-test was performed, and the result was statistically significant at ( $M=1.452$ ,  $SD=0.587$ ) versus ( $M=1.313$ ,  $SD=0.535$ );  $t(454) = 2.66$ ,  $p = 0.00$ . An effect size analysis was also conducted, and the effect size ( $d = 0.2$ ) is at the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ).

#### **3.4.10 Primary Research Question 4: Results**

An analysis was performed to determine whether there is a statistically ( $p \leq 0.05$ ) or clinically ( $d \geq 0.2$ ) significant difference between individuals aged  $\geq 18$  (living in the District of Columbia) who identify as Black versus White as it pertains to knowing that preventive health services for individuals with health insurance are free (requires no copay, no deductible, and no fee). The analysis shows that 56.09% (95% CI: 51.09%, 61.09%) of the survey respondents who identified as Black reported knowing about preventive healthcare being covered fully by insurance plans. The analysis shows that 66.96% (95% CI: 61.95%, 71.95%) of the survey respondents that identified as White reported knowing about preventive healthcare being covered fully by insurance plans. This is a 10.87% (95% CI: 5.87%, 15.87%) difference between the two racial groups. A statistical analysis was performed to determine whether a statistically and clinically significant difference exists between the two racial groups. A two-sample t-test was performed, and the result was statistically significant at ( $M=1.439$ ,  $SD=0.497$ ) versus ( $M=1.330$ ,  $SD=0.471$ );  $t(456) = 2.41$ ,  $p = 0.01$ . An effect size analysis was also conducted, and the effect size ( $d = 0.2$ ) is at the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ).

#### 3.4.11 Primary Research Question 5 Results

A series of analyses were conducted to determine whether there is a statistically significant ( $p = \leq 0.05$ ) correlation between the following factors:

- I. Knowledge of preventive healthcare services being covered fully by insurance plans and the utilization of preventive care services.

Based on Chan's (2003) interpretation of the Pearson and Spearman correlation coefficients within biostatistics, the following results were attained:

The analysis found a statistically significant fair positive correlation between:

- I. Knowledge that preventive health services require no copay, no deductible, and no fee and the utilization of preventive care services,  $r(458) = 0.3$ ,  $p = 0.00$ .

#### Simple Regression

A simple regression analysis was performed and a statistically significant regression equation was found ( $F(1,458) = 47.69$ ,  $p = 0.00$ ), with an  $R^2$  of 9.23%. The predicted number of preventive services utilizations is equal to  $1.18 + 0.30$  (knowledge that preventive health services are fully covered by insurance plans).

#### 3.4.12 Primary Research Question 6: Results

- I. Knowledge of preventive healthcare services being covered fully by insurance plans and the utilization of preventive care services.
- II. Education level and the utilization of annual physical examination and preventive care services.
- III. Employment status and the utilization of annual physical examination and preventive care services.
- IV. Income level and the utilization of annual physical examination and preventive care services
- V. Marital status and the utilization of annual physical examination and preventive care services.
- VI. Age and the utilization of annual physical examination and preventive care services.
- VII. Being a parent to a minor ( $< 18$ ) and the utilization of annual physical examination and preventive care services
- VIII. Receiving annual physical examinations and the utilization of annual physical examination and preventive care services.
- IX. Respondent's race and the utilization of annual physical examination and preventive care services.
- X. Healthcare practitioner's race and the utilization of annual physical examination and preventive care services.

XI. Healthcare practitioners' race and respondents' race

Based on Chan's (2003) interpretation of the Pearson and Spearman correlation coefficients within biostatistics, the following results were attained:

The analysis found a statistically significant **poor** positive correlation between:

- I. **Income level** and the utilization of annual physical examination  $r(458) = 0.1$ ,  $p = 0.00$ , and preventive care services,  $r(458) = 0.1$ ,  $p = 0.00$ .
- II. **Employment status** and the utilization of annual physical examination  $r(458) = 0.2$ ,  $p = 0.00$ , and preventive care services,  $r(458) = 0.1$ ,  $p = 0.00$ .
- III. **Marital status** and the utilization of annual physical examination  $r(458) = 0.1$ ,  $p = 0.00$ , and preventive care services,  $r(458) = 0.2$ ,  $p = 0.00$ .
- IV. **Age** and the utilization of annual physical examination  $r(458) = 0.2$ ,  $p = 0.00$ , and preventive care services,  $r(458) = 0.1$ ,  $p = 0.00$ .
- V. **Being a parent to a minor (< 18)** and the utilization of annual physical examination  $r(458) = 0.2$ ,  $p = 0.00$ , and preventive care services,  $r(458) = 0.2$ ,  $p = 0.00$ .
- VI. **Respondent's Race** and the utilization of annual physical examination,  $r(458) = 0.1$ ,  $p = 0.00$ , and preventive care services,  $r(458) = 0.1$ ,  $p = 0.00$ .
- VII. **Healthcare practitioner's** race and the utilization of preventive care services,  $r(458) = 0.1$ ,  $p = 0.05$ .

Based on Chan's (2003) interpretation of the Pearson and Spearman correlations coefficients within biostatistics, the following results were obtained:

The analysis found a **not** statistically significant, poor positive correlation between:

- I. **Healthcare practitioner's** race and the utilization of annual physical examination,  $r(458) = 0.0$ ,  $p = 0.63$ .

Based on Chan's (2003) interpretation of the Pearson and Spearman correlation coefficients within biostatistics, the following results were obtained:

The analysis found a statistically significant **fair** positive correlation between:

- II. Knowledge that preventive health services required no copay, no deductible, and no fee and the utilization of preventive care services,  $r(458) = 0.3$ ,  $p = 0.00$ .

- III. Receiving annual physical examinations and the utilization of preventive care services,  $r(458) = 0.3$ ,  $p = 0.00$ .

Based on Chan's (2003) interpretation of the Pearson and Spearman correlation coefficients within biostatistics, the following results were obtained:

The analysis found a statistically significant **moderately strong** positive correlation between:

- I. Healthcare practitioners' race and respondents' race,  $r(458) = 0.6$ ,  $p = 0.00$ .

### **Multiple Regression**

A stepwise backward elimination multiple linear regression was then performed to determine the best fit and to predict the use of preventive care services and annual physical examination based on the noted factors. Concerning preventive care services, a statistically significant regression equation was found ( $F(3,456) = 29.08$ ,  $p = 0.00$ ), with an  $R^2$  of 16.06%. The predicted number of preventive services utilizations is equal to  $0.664 + 0.003(\text{age}) + 0.270(\text{annual physical examination}) + 0.246(\text{knowledge that preventive health services are fully covered by insurance plans})$ . The remaining factors were removed from the equation by the stepwise backward elimination regression analysis. Concerning annual physical examination, a statistically significant regression equation was found ( $F(4,456) = 18.61$ ,  $p = 0.00$ ), with an  $R^2$  of 14.06%. The predicted number of preventive services utilizations is equal to  $0.954 + 0.004(\text{age}) + 0.108(\text{employment status}) + 0.199(\text{preventive care services}) + 0.104(\text{knowledge of preventive healthcare services being covered fully by insurance plans})$ . The remaining variables were removed from the equation by the stepwise backward elimination regression analysis.

#### **3.4.13 Primary Research Question 7: Results**

Data was collected to help understand the motivation behind why respondents' (all races) utilized preventive care services. The data shows that being prompted (33.8%) by a secondary party was the main reason the respondents sought and received a preventive care service. The prompt grouping is broken down into 9.66% (saw an ad or commercial about preventive care service), 15.86% (was prompted to seek a preventive care service due to educational material received from the insurance company (private or Medicare/Medicaid), and 8.28% (primary healthcare practitioner advised/encouraged the respondent to utilize preventive care services. The second reason respondents (all races) sought and received a preventive care service was because of habit (22.76%), and the third reason was due to a health concern (20.00%). The data for Black and White respondents were then extracted from the dataset and analyzed. The data shows that being prompted (38.52%) by a secondary party was the main reason Black respondents sought and received a preventive care service. The prompt grouping is broken down into 12.59% (saw an ad or commercial about preventive care service), 15.56% (was prompted to seek a preventive care service due to educational material received from the insurance company (private or Medicare/Medicaid), and 10.37% (primary healthcare practitioner advised/encouraged respondents to utilize preventive care services. The second reason Black respondents sought and received a preventive care service was because of habit (20.74%), and the third

reason was due to a health concern (17.78%). In the case of respondents that identified as White, being prompted by a secondary party (28.3%) was the main reason for seeking and receiving a preventive care service. The prompt grouping is broken down into 4.72% (Saw an ad or commercial about preventive care service), 15.09% (was prompted to seek a preventive care service due to educational material received from the insurance company (private or Medicare/Medicaid), and 8.49% (primary healthcare practitioner advised/encouraged respondents to utilize preventive care services. Seeking preventive care service due to habit (27.36%) was the second reason White respondents sought and received a preventive care service. The third reason White respondents' sought and received a preventive care service was due to a health concern (23.58%). See Table 1.

Table 1			
<i>Motivating Factors Per Utilization of Preventive HealthCare Services</i>			
Reason for Preventive Care Services	All Races in the District of Columbia	Black Respondents	White Respondents
Secondary Party Prompt	33.8%	38.52%	28.30%
Habit (Self Directed)	22.76%	20.74%	27.36%
Health Concern	20.00%	17.78%	23.58%
<i>Note.</i> Secondary party prompt is a combination of three secondary prompt factors			

A two-sample t-test was performed to determine whether a statistically significant difference exists between Black versus White survey respondents as it pertains to seeking and receiving a preventive care service as a result of being prompted by a secondary party. The result was not statistically significant at ( $M=1.615$ ,  $SD=0.488$ ) versus ( $M=1.717$ ,  $SD=0.453$ );  $t(232) = -1.68$ ,  $p = 0.09$ . An effect size analysis was also conducted, and the effect size ( $d = 0.2$ ) is at the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ). A two-sample t-test was performed to determine whether a statistically significant difference exists between Black versus White survey respondents as it pertains to seeking and receiving a preventive care service due to habit (self-directed). The result was not statistically significant at ( $M=1.793$ ,  $SD=0.407$ ) versus ( $M=1.726$ ,  $SD=0.448$ );  $t(214) = -1.18$ ,  $p = 0.23$ . An effect size analysis was also conducted, and the effect size ( $d = 0.2$ ) is at the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ). A two-sample t-test was performed to determine whether a statistically significant difference exists between Black versus White survey respondents as it pertains to seeking and receiving a preventive care service due to a health concern. The result was not statistically significant at ( $M=1.178$ ,  $SD=0.384$ ) versus ( $M=1.236$ ,  $SD=0.427$ );  $t(213) = -1.10$ ,  $p = 0.27$ . An effect size analysis was also conducted, and the effect size ( $d = 0.1$ ) is below the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ).

#### 3.4.14 Primary Research Question 8: Results

Data was also collected to help understand the motivation why survey respondents (all races) did not utilize preventive care services. The data shows 8.62% of survey respondents (all races) in the District of Columbia did not seek or receive a preventive care service due to work scheduling issues. When this data was broken down by Black and White

respondents, the data shows that 10.37% of Black respondents and 7.55% of White respondents did not seek or receive a preventive care service due to work scheduling issues. A two-sample t-test was performed to determine whether a statistically significant difference exists between Black versus White survey respondents as it pertains to not seeking and receiving a preventive care service as a result of work schedule issues. The result was not statistically significant at ( $M=1.896$ ,  $SD=0.306$ ) versus ( $M=1.925$ ,  $SD=0.265$ );  $t(236) = -0.77$ ,  $p = 0.44$ . An effect size analysis was also conducted, and the effect size ( $d = 0.1$ ) is below the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ).

#### **3.4.15 Primary Research Question 9: Results**

Data was collected to help understand why survey respondents sought and received annual physical examinations. As it pertains to the utilization of annual physical examinations in the District of Columbia by all races, the data shows that habit (self-direction) was the main reason the respondents (41.38%) sought and received annual physical examinations. The second reason why the respondents sought and received annual physical examinations was prompted by a secondary party (30.7%). The prompted grouping is broken down into 8.28% (saw an ad or commercial about preventive care service), 15.52% (was prompted to seek a preventive care service due to educational material received from the insurance company (private or Medicare/Medicaid), and 6.90% (primary healthcare practitioner advised/encouraged respondents to seek annual physical examinations. The third reason respondents sought and received annual physical examinations was due to a health concern (14.83%)

The data for Black and White respondents was then extracted and analyzed. In the case of respondents that identified as Black, the data shows that habit/self-directed (44.44%) was the main reason Black respondents sought and received annual physical examinations. The second reason why the respondents sought and received annual physical examinations was prompting by a secondary party (31.12%). The prompt grouping is broken down into 7.41% (saw an ad or commercial about annual physical examinations), 15.56% (was prompted to seek annual physical examinations due to educational material received from the insurance company (private or Medicare/Medicaid), and 8.15% (primary healthcare practitioner advised/encouraged respondents to seek annual physical examinations. The third reason Black respondents sought and received annual physical examinations was due to a health concern (12.59%). As it pertains to respondents that identified as White, the data shows that habit/self-directed (39.62%) was the main reason White respondents sought and received annual physical examinations. The second reason why White respondents sought and received annual physical examinations was being prompt by a secondary party (29.25%). The prompt grouping is broken down into 5.66% (Saw an ad or commercial about annual physical examinations), 16.04% (was prompted to annual physical examinations due to educational material received from the insurance company (private or Medicare/Medicaid), and 7.55% (primary healthcare practitioner advised/encouraged respondents to seek annual physical examination. The third reason White respondents sought and received annual physical examinations was due to a health concern (17.92%). See Table 2.

Table 2			
<i>Motivating Factors Per Utilization of Annual Physical Examination</i>			
Reason for Preventive Care Services	All Races in the District of Columbia	Black Respondents	White Respondents
Secondary Party Prompt	41.38%	44.44%	39.62%
Habit (Self Directed)	30.70%	31.12%	29.25%
Health Concern	14.83%	12.59%	17.92%
<i>Note.</i> Secondary party prompt is a combination of three secondary prompt factors			

A two-sample t-test was performed to determine whether a statistically significant difference exists between Black versus White survey respondents as it pertains to seeking and receiving annual physical examinations due to habit (self-directed). The result was not statistically significant at ( $M=1.519$ ,  $SD=0.502$ ) versus ( $M=1.453$ ,  $SD=0.500$ );  $t(225) = 1.01$ ,  $p = 0.31$ . An effect size analysis was also conducted, and the effect size ( $d = 0.1$ ) is below the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ). A two-sample t-test was performed to determine whether a statistically significant difference exists between Black versus White survey respondents as it pertains to seeking and receiving annual physical examinations because of being prompted by a secondary party. The result was not statistically significant at ( $M=1.311$ ,  $SD=0.465$ ) versus ( $M=1.292$ ,  $SD=0.457$ );  $t(227) = 0.31$ ,  $p = 0.75$ . An effect size analysis was also conducted, and the effect size ( $d = 0.0$ ) is below the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ). A two-sample t-test was performed to determine whether a statistically significant difference exists between Black versus White survey respondents as it pertains to seeking and receiving annual physical examination due to a health concern. The result was not statistically significant at ( $M=1.200$ ,  $SD=0.401$ ) versus ( $M=1.236$ ,  $SD=0.427$ );  $t(218) = -0.66$ ,  $p = 0.50$ . An effect size analysis was also conducted, and the effect size ( $d = 0.1$ ) is below the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ).

### 3.4.16 Primary Research Question 10: Results

Data was collected to help determine whether race was a factor in the utilization of annual physical examination and preventive healthcare services in the District of Columbia between 2017 and 2020. The data shows that the respondents that identified as Black identified the race of their primary healthcare practitioner as Black (62%), White (19.26%), Hispanic (2.96%), Asian (5.93%), and Other (9.63%). The data also shows that the survey respondents that identified as White identified the race of their primary healthcare practitioner as White (78.30%), Black (8.49%), Other (5.66%), Asian (3.77%), and Hispanic (3.77%). A two-sample t-test was performed to determine whether a statistically significant difference exists between the racial make-up of Black versus white survey respondents and the result was statistically significant at ( $M=1.68$ ,  $SD=1.06$ ) versus ( $M=2.159$ ,  $SD=0.779$ );  $t(238) = -4.03$ ,  $p = 0.00$ . An effect size analysis was also conducted, and the effect size ( $d = 0.5$ ) is at the range of Cohen's (1988) convention for a medium effect ( $d = 0.5$ ).



The data also shows that the survey respondents that identified as Black rate their healthcare practitioners as great (43.70%), normal (48.15%), poor (3.70%), and no rating (4.44%) due to not having or visiting a primary healthcare practitioner during the period of interest (2017–2020). Of the noted healthcare practitioners that were rated normal or great, 64.52% were identified as Black, 18.55% were identified as White, 8.87% were identified as Other, 6.45% were identified as Asian, and 1.61% were identified as Hispanic. Of the noted healthcare practitioners that were rated poor, 80% were identified as Black and 20% were identified as White. The data also shows that the survey respondents that identified as White rate their healthcare practitioners as great (44.34%), normal (44.34%), poor (1.89%), and no rating (9.43%) due to not having or visiting a primary healthcare practitioner during the period of interest (2017–2020). Of the noted healthcare practitioners that were rated normal or great, 81.91% were identified as White, 8.55% were identified as Black, 4.26% were identified as Other, 3.19% were identified as Asian, and 2.13% were identified as Hispanic. Of the noted healthcare practitioners that were rated poor, 50% were identified as White and 50% were identified as Other.

A two-sample t-test was performed to determine whether a statistically significant difference exists between how the Black versus White survey respondents rank their comfort and satisfaction level concerning their respective healthcare practitioners, and the result was not statistically significant at ( $M=2.311$ ,  $SD=0.748$ ) versus ( $M=2.215$ ,  $SD=0.911$ );  $t(203) = 0.88$ ,  $p = 0.38$ . An effect size analysis was also conducted, and the effect size ( $d = 0.1$ ) is at the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ).

## 4. DISCUSSION

### 4.1 Utilization of annual physical examinations and preventive healthcare services in the District of Columbia (2017 to 2020)

This study shows that 78.78% of the survey respondents in the District of Columbia sought and received an annual physical examination at least once between 2017 and 2020. If these results were extrapolated to the population of the District of Columbia, it would mean that the District of Columbia annual physical utilization rate exceeds the national average (by 16.78%) per the utilization of annual physical examinations. As noted earlier, Mehrotra et al. (2007) report that only 20% of adults ( $\geq 18$ ) in the United States receive an annual physical examination once a year. Nevertheless, a recent study by the Kaiser Family Foundation found that 62% of adults ( $\geq 18$ ) reported receiving an annual physical examination at least once a year (Hamel et al., 2014). For this study, the results as reported by Kaiser Family Foundation were used as a benchmark. Concerning preventive healthcare services, this study shows that 66.21 % of the survey respondents ( $\geq 18$ ) utilized preventive healthcare services at least once between 2017 and 2020. According to Borsky et al. (2015), 95.3% of adults ( $\geq 35$ ) (*no relevant study was found that assessed individuals  $\geq 18$* ) utilized at least one preventive care service. If these results were extrapolated to the population of the District of Columbia, it would mean that the District of Columbia preventive healthcare services utilization is below the national average by 29.09%. It must be noted that the Borsky et al. (2015) study only pertains to individuals  $\geq 35$ . The study shows that the utilization

rate of annual physical examinations by White survey respondents (72.17%) exceeds Black survey respondents (59.57%) by 12.6% and that this difference is both statistically ( $p = 0.00$ ) and clinically ( $d = 0.5$ ) significant. The study shows that the utilization rate of preventive care services by White survey respondents (84.35%) exceeds that of Black survey respondents (72.61%) by 11.74% and that this difference is both statistically ( $p = 0.00$ ) and clinically ( $d = 0.2$ ) significant.

**Note:** According to a 2012 study by the CDC, in 2012, 62.03 unique office visits per 100 persons were made for annual physical examination and preventive care (combined) in the United States (Hing & Albert, 2016). Based on the results of this study, this equates to 72.50 unique office visits per 100 persons in the District of Columbia. This exceeds the national per capita rate by 10.47 points.

#### **4.2 Knowledge that preventive healthcare services are covered fully by insurance plans and correlation to the utilization of preventive healthcare services**

This study shows that White respondents (66.96%) are more aware of the fact that preventive care healthcare service is covered 100% by health insurance plans when compared to Black respondents (56.09%). This is a 10.87% difference between the two racial groups and the difference is both statistically ( $p = 0.01$ ) and clinically ( $d = 0.2$ ) significant. This study also shows a statistically significant ( $p = 0.00$ ) and fair ( $r = 0.3$ ) correlation between knowledge that preventive healthcare care service is fully covered by insurance plans and the utilization of preventive healthcare services. A regression analysis was performed, and a statistically significant regression ( $p = 0.00$ ) was achieved with a coefficient of 0.3 (predictive equation = preventive healthcare services =  $1.18 + 0.3$  [knowledge of 100% coverage]). In other words, with every 1.5 unit increase in the population being aware that preventive care services are fully covered by insurance plans, there will be a 1 unit increase in the utilization of preventive care services in the District of Columbia. It must be noted that the adjusted  $R^2$  for this model was only 9.23%. In other words, only 9.23% of the movement in the utilization of preventive healthcare services is due to the knowledge that preventive care services are fully covered by insurance plans.

#### **4.3 Confounding factors and the utilization of annual physical examination and preventive healthcare services**

Possible confounding factors were identified during the data analysis. These include education level, employment status, income level, marital status, respondent's age, being a parent of a minor, utilization of annual physical examinations, respondent's race, and healthcare practitioners' race. It was decided that these factors would be examined to ascertain their effect on the utilization of annual physical examination and preventive healthcare services. Income level, employment status, marital status, being a parent to a minor, respondent's age, and respondent's race were found to be statistically significant but with poor positive correlation ( $\leq 0.02$ ) with the utilization of either annual physician examination or preventive healthcare services. Healthcare practitioner's race and the utilization of preventive care services were also found to be statistically significant but with a poor correlation. On the other hand, healthcare practitioner's race and the utilization of annual physical examination were found not to be statistically significant with no correlation ( $r=0.00$ ). The study, however, found a statistically significant and moderately strong positive correlation between the respondent's race and the healthcare

practitioner's race. This particular result confirmed a trend that was noticed during the analysis period. Black respondents were predominantly receiving medical care from Black healthcare practitioners and White respondents were predominantly receiving medical care from White healthcare practitioners.

An analysis was then performed to determine whether the noted factors predicted the utilization of annual physical examination and preventive healthcare services. A stepwise backward elimination multiple linear regression analysis was employed. According to Smith (2018), "A backward-elimination rule starts with all possible explanatory variables and then discards the least statistically significant variables, one by one. The discarding stops when each variable remaining in the equation is statistically significant" (p. 2). The regression analysis found that the predicted number of preventive services utilizations is equal to  $0.954 + 0.004 (\text{age}) + 0.108 (\text{employment status}) + 0.199 (\text{preventive care services}) + 0.104 (\text{knowledge of preventive healthcare services being covered fully by insurance plans})$ . The remaining variables were removed from the equation by the stepwise backward elimination regression analysis. The regression adjusted R<sup>2</sup> for this model was 16.06%. In other words, all these factors only accounted for 16.06% of the movement in preventive care services. As it pertains to annual physical examination, the analysis found that the predicted number of preventive services utilizations is equal to  $0.954 + 0.004 (\text{age}) + 0.108 (\text{employment status}) + 0.199 (\text{preventive care services}) + 0.104 (\text{knowledge of preventive healthcare services being covered fully by insurance plans})$ . The remaining variables were removed from the equation by the stepwise backward elimination regression analysis. The adjusted R<sup>2</sup> for this model was 14.06%. Thus, all these factors only accounted for 14.06% of the movement in the utilization of annual physical examinations.

#### **4.4 Respondents' motivation for utilizing preventive healthcare services**

The data shows that being prompted (33.8%) by a secondary party was the main reason the respondents (all races) sought and received a preventive care service. The data also shows that habit (22.76%) and health concern (20.00%) were the second and third reason respondents (all races) sought and received a preventive care service. When the analysis focused on Black and White respondents exclusively, the data shows that being prompted (38.52%) by a secondary party was the main reason Black respondents sought and received a preventive care service. The data shows that habit (20.74%) and health concern (17.78%) were the second and third reasons respondents (all races) sought and received a preventive care service. As it pertains to White respondents, being prompted by a secondary party (28.3%) was also the main reason for seeking and receiving a preventive care service. This was followed by habit (27.36%) and health concerns (23.58%). A series of two-sample t-tests and effect size analyses were performed to determine whether a statistically or clinically significant difference exists between Black versus White survey respondents as it pertains to the three categories of motivation concerning seeking and receiving a preventive care service. The results for the three categories were not statistically significant ( $p \leq 0.05$ ). The effect size for being prompted by a secondary party and habit (self-directed) were at ( $d = 0.2$ ) the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ). The effect size for health concern was below ( $d = 0.1$ ) the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ).

#### **4.5 Respondents' motivation for utilizing annual physical examinations**

Unlike preventive care services, the data shows that habit (self-directed) (41.38%) was the main reason the respondents (all races) sought and received annual physical examinations. The data shows that being prompted by a secondary party (30.7%) and health concern (14.83%) were the second and third reason respondents (all races) sought and received a preventive care service. When the analysis focused on Black and White respondents exclusively, the data shows that habit (self-directed) (44.44%) was the main reason Black respondents sought and received annual physical examinations. The data shows that being prompted by a secondary party (31.12%) and health concern (12.59%) were the second and third reason Black respondents sought and received annual physical examinations. As it pertains to White respondents, habit (self-directed) (39.62%) was the main reason for seeking and receiving annual physical examinations. This was followed by being prompted by a secondary party (29.25%) and health concern (17.92%). A series of two-sample t-tests and effect size analyses were performed to determine whether a statistically or clinically significant difference exists between Black versus White survey respondents as it pertains to the three categories of motivation concerning seeking and receiving annual physical examinations. The results for the three categories were not statistically significant ( $p = \leq 0.05$ ). The effect size for all three categories was at the range below ( $d = \leq 0.2$ ) Cohen's (1988) convention for a small effect ( $d = 0.2$ ).

#### **4.6 Work scheduling conflict and race as factors in the utilization of preventive care services**

Data was also collected to help understand why survey respondents (all races) did not utilize preventive care services. The data shows that 10.37% of Black respondents and 7.55% of White respondents did not seek or receive a preventive care service due to work scheduling issues. These results were not statistically significant and resulted in effect size ( $d = 0.1$ ) below the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ). Data was also collected to determine whether race was a factor in the utilization of annual physical examination and preventive healthcare services. The data shows that the Black respondents' healthcare practitioners are predominantly Black and other minorities (80.74%) and that the White respondents' healthcare practitioners predominantly White (78.30%). A two-sample t-test and an effect size analysis confirmed the difference: A statistically significant difference ( $p = 0.00$ ) exists between the racial difference of the Black versus White survey respondents' healthcare practitioners and the effect size ( $d = 0.5$ ) is at the range of Cohen's (1988) convention for a medium effect ( $d = 0.5$ ). The data also shows that the Black (91.85%) and White (88.68%) respondents rated their healthcare practitioners as normal or great. Moreover, 3.70% of Black and 1.89% of White respondents rated their healthcare practitioners as poor, while 4.44% of Black and 9.43% of White respondents gave no rating due to not having or visiting a primary healthcare practitioner during 2017–2020. A two-sample t-test and effect size analysis was performed to determine whether a statistically or clinically significant difference exists between how Black versus White survey respondents rank their comfort and satisfaction level with their respective healthcare practitioners. The result was not statistically significant ( $p = 0.38$ ) and the effect size was below ( $d = 0.1$ ) the range of Cohen's (1988) convention for a small effect ( $d = 0.2$ ).

## **5. LIMITATIONS, BIASES, AND ERRORS**

5.1 There is concern regarding selection and response biases due to the distribution method by which data was collected. There was an identified error in the survey questionnaire electronic response data collection sequence. Four survey questions designed to collect data as to the motivations behind the respondents' utilization of annual physical examination and preventive services were only seen and answered by 57% of the respondents. This resulted in an increase of the margin of error to 6% for the study results pertaining to motivation versus from 4% (all races results) 5% (Black versus Whites results) for the rest of the results obtained in the study.

## **6. CONCLUSION**

6.1 This study shows a statistically and clinically significant gap between Whites and Blacks as it pertains to utilizing annual physical examination and preventive care services in the District of Columbia. The results of the study indicate that race (Whites versus Blacks) and work schedule conflicts are not significant factors in the noted gap. The study also found that income and education levels were not significant factors. Furthermore, the study demonstrates a knowledge gap between White and Blacks as it pertains to knowing that critical preventive care services are fully covered by insurance plans (Section 2713 of the Affordable Care Act mandate). This is important because the study shows that knowing that critical preventive care services are covered fully by insurance companies is a (small) contributing factor in the utilization of preventive care services between Whites and Blacks in the District of Columbia. The study found that being prompted by a secondary party (insurance company, medical practitioners, educational material, and healthcare advertisement) is the primary motivation for Whites and Blacks to utilize preventive care services. Habit (self-directed) was the primary motivation for Whites and Blacks to undergo an annual physical examination.

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