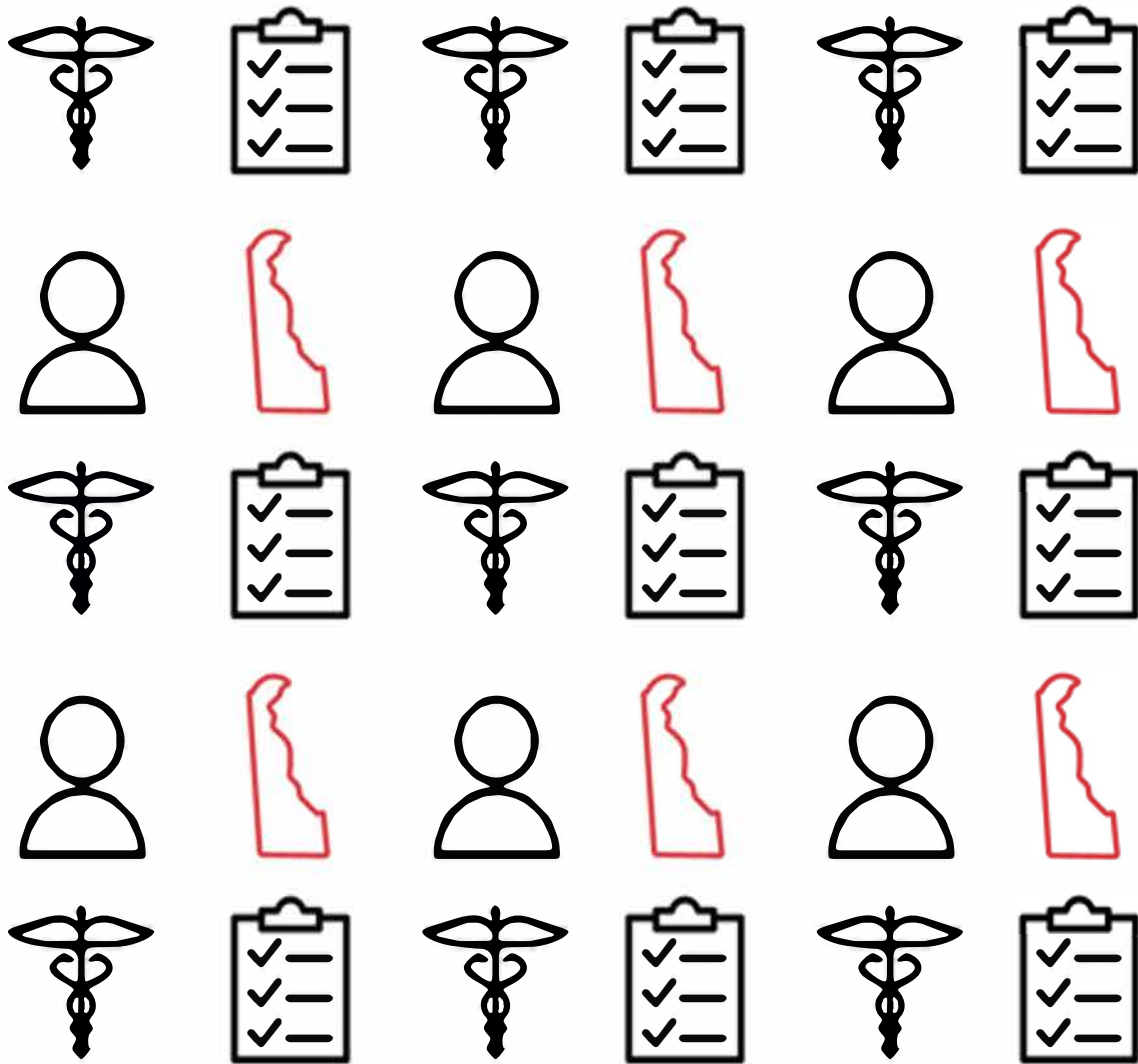




# DELAWARE

## 2017

BEHAVIORAL RISK FACTOR SURVEY

BY WEI-MING CHEN  
DECEMBER 2019

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## Summary

The 2017 BRFSS surveyed 4,139 Delaware adults age 18 and older. This study uses the weighting variable offered by CDC to generalize the prevalence rates and population of chronic diseases and behavioral risk factors. The following lists research findings and future BRFSS recommendations.

**[1] Health condition:** In Delaware, 80.8 percent describe their health positively, which is similar to the 81.2 percent nationally. Generally, respondents with higher education and household income tend to evaluate their health more positively.

**[2] Chronic disease:** Hypertension, cholesterol, and arthritis are the three most widely prevalent chronic diseases in Delaware, at 34.8 percent, 30.1 percent, and 25.2 percent, respectively. Hypertension and HBC prevalence rates for Hispanics are statistically significantly lower than other racial and ethnic groups. However, Hispanic's cholesterol checking rate is also lower than other groups, which may contribute to the low prevalence rate.

**[3] Overweight and obesity:** Nearly seven in ten Delaware adults are overweight or obese: 36.7 percent are overweight, and 31.8 percent are obese. Unlike many other health conditions strongly associated with age, being overweight and obese distribute relatively even among age groups. More Blacks are obese (40.2 percent) than Whites (30.2 percent) and Hispanics (33.4 percent).

**[4] Smoking:** In Delaware, 16.3 percent of adults indicate they smoke. Individuals with lower education and income levels present higher smoking rates. Young Delawareans are more likely to use e-cigarettes.

**[5] Alcohol consumption:** Respondents with higher household incomes are more likely to engage in heavy drinking. This phenomenon is unlike many other health behaviors. Most binge drinking is reported by 25 to 34 year olds. One in four (25 percent) of this age group engage in binge drinking.

**[6] Vegetables and fruits:** Delaware adults consume more vegetables than fruits. Vegetables and fruit consumption are greater among females, high education, and high-income groups in Delaware.

**[7] Physical activities:** Nearly six in ten Delaware adults (63.4 percent) report they have engaged in physical activities in the past month. However, only 24.8 percent of Delaware adults meet recommendations for aerobic conditioning; 25.6 percent meet the muscle-strengthening recommendation and 16.3 percent meet recommendations for both.

**[8] Seatbelt:** About 83.6 percent of Delaware adults report that they always wear their seatbelt when riding in a car. This seatbelt use rate is under the national average (88.0 percent). Those more likely to use seatbelts are women, respondents with higher education and higher income levels.

**[9] Vaccine and HIV screening:** Forty-five percent of Delaware adults received the flu vaccine in the past year. The pneumonia vaccine rate is 75.3 percent and shingles or zoster vaccine rate is 40.3 percent of the groups 65 years old and over. Around 44.8 percent of Delaware adults have taken HIV tests which is better than the national rate at 38.5 percent.

**[10] Future BRFs recommendations:** For future BRFs design, some health data collected in other states or are highly related to Delaware's most prevalent diseases could be considered. These include the Adverse Childhood Experiences (ACEs), blood pressure control actions, and hypertension checking behavior. The ACEs is widely included in other states' survey but has not adopted in BRFs. High blood pressure is the top one prevalent chronic disease in Delaware. The survey for blood pressure control actions could provide more information related to prevention and treatment. The survey of hypertension checking behavior may provide information for the prevalence of hypertension, particularly for Hispanics.

# DELAWARE 2017

## HEALTH AT A GLANCE

### TOP THREE CHRONIC DISEASES



**Hypertension**  
**34.8%**

Delaware adults have been told they have high blood pressure



**High Blood Cholesterol**  
**30.1%**

Delaware adults have been told they have high blood cholesterol

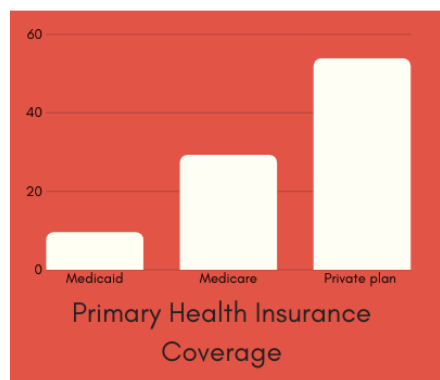


**Arthritis**  
**25.2%**

Delaware adults have been told they have arthritis



Seven in ten Delaware adults are overweight or obese  
36.7% are overweight and 31.8% are obese



Delaware adults have health care coverage

### BEHAVIORAL RISK FACTORS



16.3%  
Delaware adults use tobacco



5.7%  
Delaware adults are heavy drinkers



68.8%  
Delaware adults engage in physical activity



83.6%  
Delaware adults always use seat belt

## 1. Introduction

Public health is a crucial social issue in the U.S. As of 2017, U.S. health spending reached \$3.5 trillion (or \$10,739 per person), accounting for 17.9 percent of the national Gross Domestic Product (Centers for Medicare and Medicaid Services, 2018). Federal and state governments seek strategies to improve public health and the Behavioral Risk Factor Surveillance System (BRFSS) was established to collect public health data for better policy making and budget allocation.

Cooperating with 15 states, the U.S. Centers for Disease Control and Prevention (CDC) started the BRFSS in 1984 to annually survey the U.S. adult population age 18 and older about health-related risk behaviors, chronic health conditions, and use of preventive services. BRFSS now collects data in all U.S. states, the District of Columbia, and three U.S. territories. With more than 400,000 adult interviews each year, BRFSS is the largest continuously conducted health survey system in the world (CDC, 2019a).

The BRFSS in Delaware is named the Behavioral Risk Factor Survey (BRFS), which started in 1990. The Delaware Division of Public Health (DPH) partners with the CDC for BRFS and the CDC provides funding and basic data analysis (Delaware Department of Health and Social Services, 2019a). The annual sample in Delaware is about 4,000 adults age 18 and older. Survey results help both public and private health providers plan health programs as well as track program goals (Delaware Department of Health and Social Services, 2019b).

The DPH and CDC have published several reports based on the 2017 BRFS survey (see <https://dhss.delaware.gov/dhss/dph/dpc/brfsurveys.html>). Most reports present the BRFS results in the form of statistic tables and figures. In addition to review of the overall 2017 BRFS survey data, this report intends to explore the health stories behind the data through analyzing the health conditions of Delaware adults and the behavioral risk factors that shape Delawarean's health.

This report is structured as follows. Section 2 is the data and methodology for the 2017 BRFS, Section 3 reports the health condition of Delawarean adults in 2017 and explores the behavioral risk factors. It is challenging to translate the BRFS data into health policy recommendations. The objective of this report is to turn statistics into stories and provide insightful information for future policy making.

## **2. Data and methodology**

### **2.1 Data sources**

This report analyzes the 2017 BRFSS data, primarily using raw survey data that records the actual responses of each respondent before any adjustment is made. The supplemental (calculated) dataset and analytical report is also used in this study for making analysis more comprehensive. Data sources include CDC's basic data analysis results, and Delaware Department of Health and Social Services' (DHSS) BRFSS data reports and presentations.<sup>1</sup>

In addition to a single year (i.e., 2017) data, this study also uses data/reports from 2011 to 2016 for comparisons and trend analysis. The BRFSS data collection, structure, and weighting methodology changed in 2011 to allow the addition of data collection by cellular telephones and better generalize sample to the population. Aligned with the changes, this study examines and compares data collected after 2011.

### **2.2 Data structure**

The BRFSS questionnaire has three parts: (1) the core component, consisting of the fixed core, rotating core, and emerging core, (2) optional modules, and (3) state-added questions (CDC, 2019b). The core questionnaire is designed by CDC and is standardized. The state-chosen optional modules are also designed by CDC and adopted by each state.

Table 1 presents the structure of Delaware's 2017 BRFSS questionnaire. For the 2017 survey, the state optional modules cover questions of diabetes, health care access, pre-diabetes, preconception health/family planning, sexual orientation and gender identity, sugar sweetened beverages (CDC, 2019c). The state-added question is related to sexual assault.

Since each state could select modules and adjust the questionnaire annually, questions in the 2017 BRFSS may or may not be implemented every year. Some questions (e.g., health status, chronic health conditions, and alcohol consumption) are asked in every year's BRFSS while some questions (e.g., drinking and driving, hypertension awareness and oral health) are asked every other year. Table 2 summarizes questions selected in BRFSS from 2011 to 2019. For the 2017 BRFSS, the unique module is the "sexual assault," which was only included in the 2017 BRFSS. The e-cigarettes module was applied in 2016, 2017, and 2018 BRFSS.

It is noteworthy that additional health data is collected in other states but not in Delaware. For example, Delaware has not included the Adverse Childhood Experiences (ACEs) optimal modules into the BRFSS. The adverse childhood experiences are potentially traumatic events that occur in childhood (0-17 years), such as witnessing violence in the home or experiencing violence,

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<sup>1</sup> See <https://dhss.delaware.gov/dhss/dph/dpc/brfsurveys.html>

abuse, or neglect. ACEs have been linked to risky health behaviors, chronic health conditions, low life potential, and early death (CDC, 2019d). While Delaware has not included the ACEs modules in the BRFs, 42 states plus the District of Columbia have had ACE questions for at least one year on their survey since 2009 (CDC, 2019e).

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**Table 1: Delaware 2017 questionnaire structure**

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**Core Sections**

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|            |                                               |
|------------|-----------------------------------------------|
| Section 1  | Health Status                                 |
| Section 2  | Healthy Days – Health-Related Quality of Life |
| Section 3  | Health Care Access                            |
| Section 4  | Hypertension Awareness                        |
| Section 5  | Cholesterol Awareness                         |
| Section 6  | Chronic Health Conditions                     |
| Section 7  | Arthritis Burden                              |
| Section 8  | Demographics                                  |
| Section 9  | Tobacco Use                                   |
| Section 10 | E-Cigarettes                                  |
| Section 11 | Alcohol Consumption                           |
| Section 12 | Fruits and Vegetables                         |
| Section 13 | Exercise (Physical Activity)                  |
| Section 14 | Seatbelt Use                                  |
| Section 15 | Immunization                                  |
| Section 16 | HIV/AIDS                                      |

**Optional Modules**

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|           |                                        |
|-----------|----------------------------------------|
| Module 1  | Pre-Diabetes                           |
| Module 2  | Diabetes                               |
| Module 10 | Health Care Access                     |
| Module 14 | Sugar Sweetened Beverages              |
| Module 17 | Preconception Health/Family Planning   |
| Module 27 | Sexual Orientation and Gender Identity |

**State Added Questions**

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|                |
|----------------|
| Sexual Assault |
|----------------|

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Source: (CDC and Delaware Health and Social Services, 2016)

| <b>Table 2: Core Sections and Optional Modules (2011-2019)</b> |      |      |      |      |      |      |      |      |      |
|----------------------------------------------------------------|------|------|------|------|------|------|------|------|------|
|                                                                | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| Adult Human Papilloma Virus (HPV)                              | ●    | ●    |      | ●    |      |      |      |      |      |
| Adverse Childhood Experience                                   |      |      |      |      |      |      |      |      | ●    |
| Alcohol Consumption                                            | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Arthritis Burden                                               | ●    |      | ●    |      | ●    |      | ●    |      |      |
| Breast/Cervical Cancer Screening                               | ●    | ●    |      | ●    |      | ●    |      | ●    |      |
| Cancer Survivorship                                            |      |      |      |      |      |      |      | ●    |      |
| Cholesterol Awareness                                          | ●    |      | ●    |      |      |      | ●    |      | ●    |
| Chronic Health Conditions                                      | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Cognitive Decline                                              |      |      |      |      |      | ●    |      |      |      |
| Colorectal Cancer Screening                                    | ●    | ●    | ●    | ●    |      | ●    |      | ●    |      |
| Demographics                                                   | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Diabetes                                                       | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Disability                                                     | ●    | ●    |      |      |      |      |      |      |      |
| Drinking and Driving                                           |      | ●    |      | ●    |      | ●    |      | ●    |      |
| E-Cigarettes                                                   |      |      |      |      |      | ●    | ●    | ●    |      |
| Exercise (Physical Activity)                                   | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Excess Sun Explore                                             |      |      |      |      |      |      |      | ●    |      |
| Falls                                                          |      | ●    |      | ●    |      | ●    |      | ●    |      |
| Fruits and Vegetables                                          | ●    | ●    | ●    |      | ●    |      | ●    |      | ●    |
| Health Status                                                  | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Healthy Days                                                   | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Health Care Access                                             | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Heroin and Opioids                                             |      |      |      |      |      |      |      | ●    |      |
| HIV/AIDS                                                       | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Home/ Self-measured Blood Pressure                             |      |      |      |      |      |      |      |      | ●    |
| Hypertension Awareness                                         | ●    |      | ●    |      | ●    |      | ●    |      | ●    |
| Immunization                                                   | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    |
| Inadequate Sleep                                               |      |      | ●    | ●    |      | ●    |      | ●    |      |
| Industry and Occupation                                        |      |      |      |      |      |      |      | ●    |      |
| Lung Cancer Screening                                          |      |      |      |      |      |      |      | ●    |      |
| Oral Health                                                    |      | ●    |      | ●    |      | ●    |      | ●    |      |
| Other Tobacco Products                                         |      |      |      | ●    |      |      |      |      |      |
| Other Tobacco Use                                              |      |      | ●    |      |      |      |      |      |      |
| Pre-Diabetes                                                   | ●    | ●    | ●    | ●    |      | ●    | ●    |      | ●    |
| Preconception Health/ Family Planning                          |      |      |      |      |      |      | ●    | ●    | ●    |

| <b>Table 2: Core Sections and Optional Modules (2011-2019)</b> |   |   |   |   |   |   |   |   |   |
|----------------------------------------------------------------|---|---|---|---|---|---|---|---|---|
| Prostate Cancer Screening                                      | ● | ● | ● | ● | ● | ● |   |   | ● |
| Prostate Cancer Screening<br>Decision Making                   |   | ● | ● |   | ● |   |   |   |   |
| Random Child Selection                                         | ● |   |   |   |   |   |   |   |   |
| Seatbelt Use                                                   | ● | ● | ● | ● | ● | ● | ● | ● |   |
| Sexual Orientation/ Gender<br>Identity                         |   |   |   | ● | ● | ● | ● | ● | ● |
| Sexual Assault                                                 |   |   |   |   |   |   |   | ● |   |
| Social Context                                                 |   |   |   |   | ● |   |   |   |   |
| State-Added Tobacco Questions                                  | ● | ● | ● |   |   |   |   |   |   |
| Sugar Sweetened Beverages                                      | ● | ● |   |   |   | ● | ● |   |   |
| Tobacco Use                                                    | ● | ● | ● | ● | ● | ● | ● | ● | ● |

Note:

1. This table includes questions for core sections and optional modules and lists all sections/modules in alphabetical order.
2. The 2019 Questionnaire is a draft version, as accessed on November 20, 2019, from <https://www.dhss.delaware.gov/dhss/dph/dpc/brfsurveys.html>.
3. Source: this study compiled information from (Delaware Department of Health and Social Services, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010)

### 2.3 Data analysis

This study generalizes the prevalence rates and estimated population from sample (n=4,139), using weighting variable “\_LLCPWT” (CDC, 2019c, 2018a). The CDC uses weighting methodology which is comprised of design weight and raking<sup>2</sup>. Design weight adjusts the unequal probability of selection, caused by gender, age group, race/ethnicity, education, marital status, tenure, and housing type. Raking (or “iterative proportional fitting”) adjusts demographic differences between those persons who are sampled and the population they represent (CDC, 2019f). Therefore, rate and estimated population reported in this study is weighted to the variation in the respondents’ probability of selection, disproportionate selection of population subgroups relative to the state’s population distribution, and nonresponsive (CDC, 2018b).

This report also presents the confidence intervals (C.I.) for each prevalence rate estimate. The C.I. reflects the range of variation in the estimation. The 95 percent C.I. means if a survey were conducted 100 times, 95 of the responses would lie within the same range (Delaware Health and Social Services, 2019). This study computes C.I. of the prevalence rate by un-weighted sample data, which represents the actual responses of each respondent. A wide confidence interval reflects a large amount of variability or imprecision. A narrow confidence interval means little

<sup>2</sup> For detailed information, see [https://www.cdc.gov/brfss/annual\\_data/2017/pdf/weighting-2017-508.pdf](https://www.cdc.gov/brfss/annual_data/2017/pdf/weighting-2017-508.pdf)

variability and high precision (CDC, 2013). Also, if the C.I. between two estimates does not overlap, it refers to a statistically significant difference (Delaware Health and Social Services, 2019). For example, Table 3 shows the percentage of good or better health condition among two genders. The difference between male and female is not statistically significant because the C.I. overlap.

| <b>Table 3: Subjective Evaluations of General Health as “Good” or better health</b> |       |              |           |
|-------------------------------------------------------------------------------------|-------|--------------|-----------|
|                                                                                     | Wt. % | 95% C.I.     | Est. Pop. |
| Male                                                                                | 48.3  | [45.7, 50.9] | 296,094   |
| Female                                                                              | 51.7  | [49.4, 54.0] | 317,411   |

### 3. Results

#### 3.1 Subjective health evaluation and health care access

This part analyzes Section 1 (“Health Status”) of the 2017 BRFSS questionnaire. For the question “Would you say that in general your health is,” respondents could select answer options including excellent, very good, good, fair, poor, don’t know/not sure, and refused.

Delaware residents have a similar view of their health status as respondents across the United States do. Nationally, 81.2 percent of BRFSS respondents describe their health as “excellent,” “very good,” and “good.” Around 18.7 percent describe it as “fair” and “poor.” In Delaware, 80.8 percent describe their health positively and 18.7 percent describe it as “fair” or worse (Table 4).

| <b>Table 4: Health status in Delaware and the U.S.</b> |                                 |                                      |
|--------------------------------------------------------|---------------------------------|--------------------------------------|
|                                                        | Delaware<br>Weighted Percentage | United States<br>Weighted Percentage |
| Excellent                                              | 16.7                            | 17.9                                 |
| Very good                                              | 30.9                            | 31.3                                 |
| Good                                                   | 33.2                            | 32.0                                 |
| Fair                                                   | 13.9                            | 13.8                                 |
| Poor                                                   | 4.8                             | 4.9                                  |
| Don’t know/Not sure                                    | 0.3                             | 0.2                                  |
| Refused                                                | 0.1                             | 0.1                                  |

Source: 1. Delaware data: this study. 2. U.S. data: (CDC, 2018c)

Not surprising, self-assessment of health tends to decline with age but senior respondents still have a high rate of positive health description. Under the age of 55, more than 80 percent of Delaware residents believe their health is “good” or better. At the age group of 55 to 64, the rate is 78.5 percent. At the age group of 65 and older, the share drops to 74.8 percent. Based on the confidence interval, there are no statistical differences among age groups.

A slightly larger share of men than of women views their health positively – by 1.6 percentage points.

The divides by socio-economic status are even larger than by gender or age. Individuals with higher levels of educational attainment and higher household income tend to evaluate their health more positively than those with less education or lower household earnings. For example, 62.3 percent of Delaware adults without a high school diploma describe their overall health as “good” or better while 92.2 percent of those with a college or technical school degree rate their

health positively. The difference is 30 percentage points, and the C.I. indicates a statistical difference exists between these two groups.

In a similar pattern, only 54.6 percent of respondents with an annual household income less than \$15,000 evaluate their health positively, but 91.3 percent of individuals with annual household earnings above \$50,000 do so. A gap of 36.7 percentage points exists among the lowest and the highest household income groups.

White and Black Delaware residents share similar views on their health status. Around 81.4 percent of White and 81.9 percent of Black respondents report “good” or better health. A high portion of Asian Delaware adults rate their health positively, 88.7 percent of respondents with “good” or better health. However, there is a statistically significant gap among Hispanic respondents to the White and Black groups. Only 72.8 percent of Hispanics evaluate their health status as “good” or better. Look at another way, it could be said that more than a quarter of Hispanic respondents evaluate their health status as “poor” or “fair.”

However, socio-economic status across race groups likely reflects the differences. When statistically controlling for household income and educational attainment, Hispanics have similar health status evaluations as Whites and Blacks. When looking at households with more than \$50,000 income, 91.1 of Hispanics, 90.6 percent of Whites, and 94.7 percent of Blacks view their health as “good” or better. Of those who have graduated from college or technical school, 94 percent of Hispanics, 92.7 percents of Whites, and 92.8 percent of Blacks have “good” or better health.

Regarding healthcare access, nearly nine in ten (89.8 percent) Delaware adults have health care coverage. Among the coverage, 45.2 percent of respondents have a health plan purchased through an employer or union, 8.6 percent of respondents buy a plan by themselves or another family member, 29.2 percent have Medicare, and 9.5 percent have Medicaid or other state programs. Overall, the health care access rate for most types of plan is slightly higher than the national average.

| <b>Table 5: Subjective Evaluations of General Health</b> |                         |              |           |                         |              |           |
|----------------------------------------------------------|-------------------------|--------------|-----------|-------------------------|--------------|-----------|
|                                                          | “Good” or better health |              |           | “Poor” or “Fair” health |              |           |
|                                                          | Wt. %                   | 95% CI       | Est. Pop. | Wt. %                   | 95% CI       | Est. Pop. |
| <b>Total</b>                                             | 80.8                    | [79.4, 82.2] | 613,505   | 18.7                    | [16.1, 21.3] | 142,258   |
| <b>AGE</b>                                               |                         |              |           |                         |              |           |
| 18-24                                                    | 86.1                    | [84.3, 87.9] | 76,612    | 13.9                    | [10.4, 17.4] | 12,329    |
| 25-34                                                    | 86.8                    | [85.2, 88.4] | 109,952   | 12.8                    | [9.9, 15.7]  | 16,173    |
| 35-44                                                    | 82.6                    | [81.0, 84.2] | 93,579    | 16.9                    | [13.8, 20.0] | 19,187    |
| 45-54                                                    | 80.3                    | [76.7, 83.9] | 98,763    | 19.4                    | [12.5, 26.3] | 23,891    |
| 55-64                                                    | 78.5                    | [69.3, 87.7] | 104,168   | 21.1                    | [0, 42.5]    | 27,993    |
| 65 and over                                              | 74.8                    | [61.5, 88.1] | 130,431   | 24.5                    | [2.7, 46.3]  | 42,685    |
| <b>GENDER</b>                                            |                         |              |           |                         |              |           |
| Male                                                     | 81.7                    | [77.4, 86.0] | 296,094   | 17.9                    | [11.5, 24.3] | 64,930    |
| Female                                                   | 80.1                    | [70.8, 89.4] | 317,411   | 19.5                    | [4.8, 34.2]  | 77,328    |
| <b>RACE-ETHNICITY</b>                                    |                         |              |           |                         |              |           |
| White, Non-Hispanic                                      | 81.4                    | [76.4, 86.4] | 408,064   | 18.2                    | [4.6, 31.8]  | 91,271    |
| Black, Non-Hispanic                                      | 81.9                    | [78.1, 85.7] | 125,604   | 17.8                    | [8.7, 26.9]  | 27,273    |
| Asian, Non-Hispanic                                      | 88.7                    | [85.5, 91.9] | 19,672    | 9.4                     | [3.7, 15.1]  | 2,092     |
| American Indian/Alaskan Native, Non-Hispanic             | 77.6                    | [73.9, 81.3] | 6,190     | 22.4                    | [15.7, 29.1] | 1,791     |
| Hispanic                                                 | 72.8                    | [69.4, 76.2] | 42,964    | 26.8                    | [20.7, 32.9] | 15,818    |
| Other, Non-Hispanic                                      | 72.1                    | [69.4, 74.8] | 11,012    | 26.3                    | [21.5, 31.1] | 4,013     |
| <b>EDUCATION</b>                                         |                         |              |           |                         |              |           |
| < High School                                            | 62.3                    | [56.2, 68.4] | 55,684    | 36.4                    | [29.6, 43.2] | 32,537    |
| High School                                              | 76.2                    | [73.3, 79.1] | 179,736   | 23.5                    | [18.8, 28.2] | 55,438    |
| > High School and < College/Technical School             | 82.8                    | [80.2, 85.4] | 179,820   | 16.9                    | [11.7, 22.1] | 36,745    |
| College/Technical School                                 | 92.2                    | [90.7, 93.7] | 195,199   | 7.7                     | [3.6, 11.8]  | 16,266    |
| Don't know/not sure/missing                              | 63.5                    | [41.9, 85.1] | 3,067     | 26.3                    | [0, 69.4]    | 1,271     |
| <b>HOUSEHOLD INCOME</b>                                  |                         |              |           |                         |              |           |
| Less than \$15,000                                       | 54.6                    | [47.2, 62.0] | 28,016    | 44.5                    | [36.7, 52.3] | 22,835    |
| \$15,000-\$24,999                                        | 66.5                    | [61.8, 71.2] | 68,646    | 32.6                    | [26.5, 38.7] | 33,612    |
| \$25,000-\$34,999                                        | 77.2                    | [72.4, 82.0] | 51,166    | 22.2                    | [13.5, 30.9] | 14,694    |
| \$35,000-\$49,999                                        | 86.7                    | [83.3, 90.1] | 76,215    | 13.3                    | [5.9, 20.7]  | 11,674    |
| \$50,000 or more                                         | 91.3                    | [89.8, 92.8] | 272,399   | 8.5                     | [3.8, 13.2]  | 25,334    |
| Don't know/not sure/missing                              | 77.0                    | [73.7, 80.3] | 117,063   | 22.4                    | [16.6, 28.2] | 34,108    |

Note:

1. C.I. (95%) = Confidence Interval at 95 percent probability level, based on un-weighted data. C.I. lower range is reported as “0” if the calculated results are negative due to small sample
2. Prevalence is weighted by \_LLCPWT
3. For prevalence rate, denominator includes respondents with do not know/refused/missing responses
4. Asian and American Indian/Alaskan data is listed but is not discussed due to limited sample size

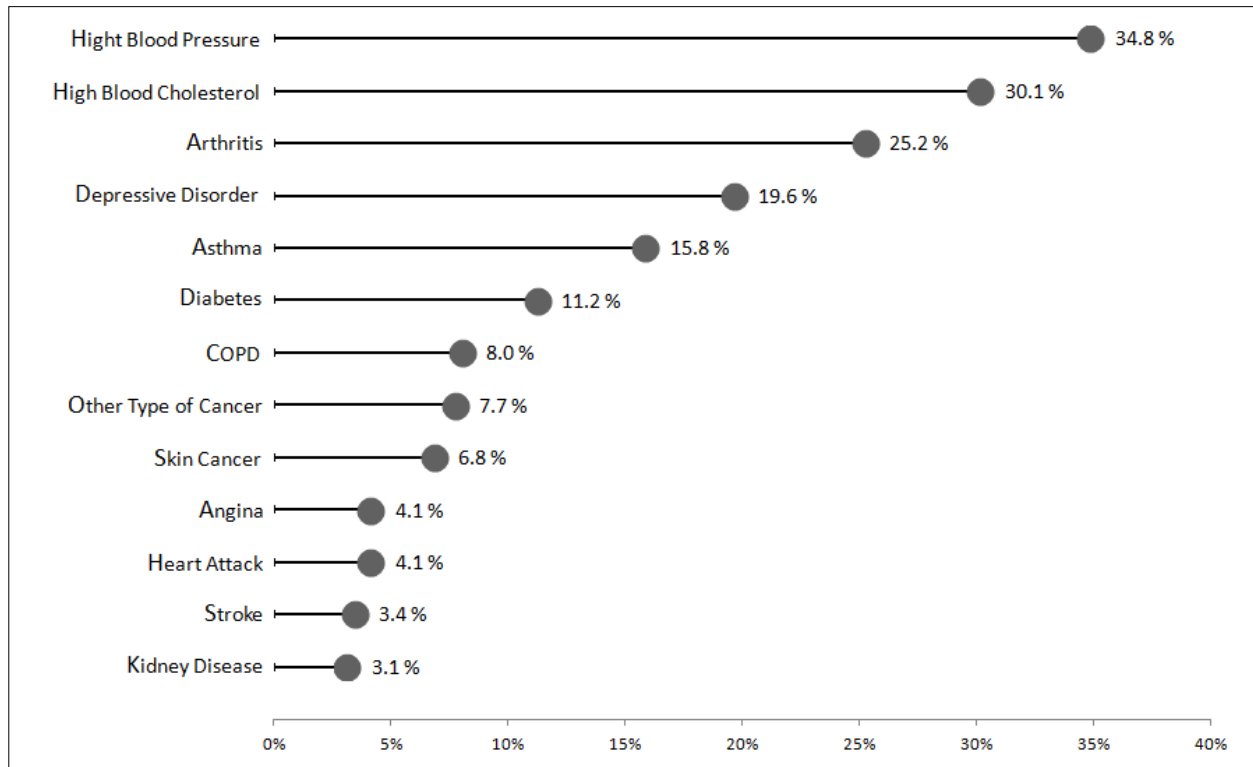
### 3.2 Chronic diseases

The CDC broadly defines chronic diseases as “conditions that last one year or more and require ongoing medical attention or limit activities of daily living or both” (CDC, 2019g). Six in ten adults in the US have a chronic disease and four in ten adults have two or more (CDC, 2019g). Chronic diseases are the leading causes of death and disability in the US. They are also the key contributors to the country’s \$3.5 trillion in annual healthcare costs (CDC, 2019g).

Chronic health condition is a core section in Delaware BRFSS. Thirteen chronic diseases (i.e., angina, arthritis, asthma, cholesterol, chronic obstructive pulmonary disease (COPD), depressive disorder, diabetes, heart attack, hypertension, kidney disease, stroke, skin cancer, and other types of cancer) are surveyed each year. Figure 1 presents Delaware adults’ chronic disease prevalence rate in 2017.

Table 6 lists the prevalence rates and the estimated population of chronic conditions in Delaware. The chronic disease prevalence in Delaware shares a similar pattern with the US (aggregated data from states). Hypertension, cholesterol, and arthritis are the three most widely prevalent chronic diseases in Delaware, as well as in the entire nation. Specifically, the hypertension prevalence rate is 34.8% in Delaware and 32.4% in the US; high blood cholesterol rate is 30.1% in Delaware and 31.5% in the US; arthritis rate is 25.2% in Delaware and 24.4% in the U.S.

**Figure 1**  
**Chronic disease prevalence in Delaware**



Data source: Behavioral Risk Factor Survey (BRFS)

Figure source: this study

**Table 6: Chronic Disease Prevalence**

|                                          | Weighted % | Delaware<br>95% CI | Est. Pop. | The U.S.<br>Weighted % |
|------------------------------------------|------------|--------------------|-----------|------------------------|
| Angina                                   | 4.1        | [1.5, 6.7]         | 31,303    | 4.02                   |
| Arthritis                                | 25.2       | [22.8, 27.6]       | 191,293   | 24.4                   |
| Asthma                                   | 15.8       | [12.9, 18.7]       | 119,544   | 14.11                  |
| Cholesterol                              | 30.1       | [27.7, 32.5]       | 228,116   | 31.54                  |
| Chronic Obstructive<br>Pulmonary Disease | 8.0        | [5.3, 10.7]        | 60,988    | 6.51                   |
| Depressive Disorder                      | 19.6       | [16.8, 22.4]       | 149,045   | 19.03                  |
| Diabetes                                 | 11.2       | [8.6, 13.8]        | 85,130    | 10.87                  |
| Heart Attack                             | 4.1        | [1.5, 6.7]         | 31,908    | 4.24                   |
| Hypertension                             | 34.8       | [32.5, 37.1]       | 263,971   | 32.44                  |
| Kidney Disease                           | 3.1        | [0.4, 5.8]         | 23,641    | 3.15                   |
| Other Type of Cancer                     | 7.7        | [5.2, 10.2]        | 58,291    | 6.77                   |
| Skin Cancer                              | 6.8        | [4.3, 9.3]         | 51,796    | 6.04                   |
| Stroke                                   | 3.4        | [0.9, 5.9]         | 26,018    | 3.19                   |

Note:

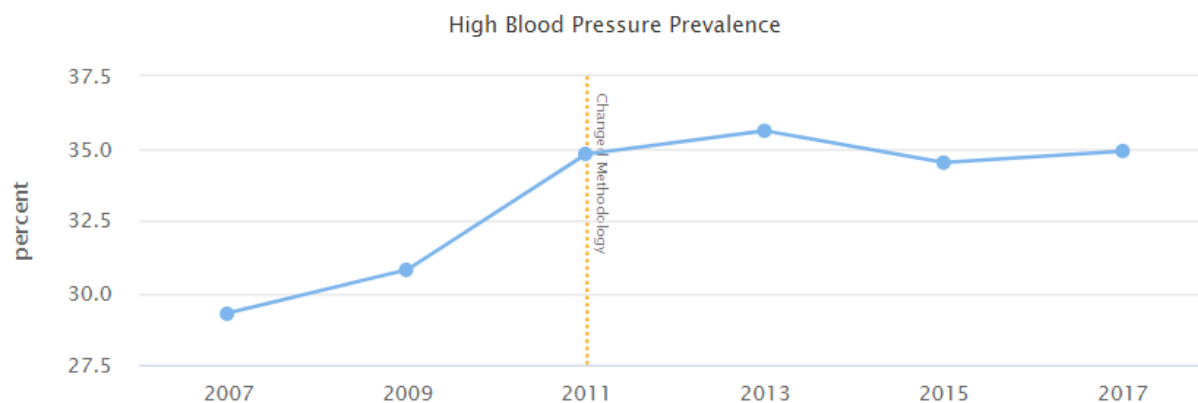
1. Prevalence percentages and estimated population are weighted to population characteristics, using variable “\_LLCPWT” computed by CDC
2. The denominator includes respondents with do not know/refused/missing responses
3. Delaware data source: this study
4. U.S. data source: (CDC, 2018c)

### 3.2.1 High blood pressure

High blood pressure (HBP), also known as hypertension, is the most prevalent chronic disease in Delaware in 2017. Around 34.8 percent of adults have been told to have HBP by doctors, nurses, or other health professional. In other words, more than 1 in 3 Delaware adults have been diagnosed with HBP. Among them, 77.1 percent took blood pressure medication. Many controllable factors contribute to HBP, including smoking, excessive alcohol consumption, unhealthy diet, overweight or obesity, physical inactivity, and other chronic conditions (e.g., diabetes) (Delaware Cancer Consortium, 2019). High blood pressure is also a risk factor contributing to other diseases, such as stroke, heart attacks, heart failure, kidney failure, and atherosclerosis (Delaware Healthcare Association, 2019).

Hypertension prevalence rate kept high according to previous surveys<sup>3</sup> —34.8 percent in 2011, 35.6 percent in 2013, 34.5 percent in 2015, and 34.8 percent in 2017 (Delaware Department of Health and Social Services, 2019c). While around 35 percent of Delaware adults have HBP (about 264,000 people), the BRFs only surveys medicine intake behavior for hypertension control (in 2011, 2013, 2015, 2017, and 2019 BRFs). The CDC designs additional modules for blood pressure control actions, which could be included in future BRFs. These questions are related to salt intake reduction, alcohol use reduction, exercising, and eating habits changing to help lower or control high blood pressure.

**Figure 2**  
**High blood pressure prevalence in Delaware, 2011-2017**



Note:

1. The BRFs 2011 should be considered as the baseline year of data analysis and comparison because the CDC added a cell phone sampling frame and changed weighting methodology
2. Figure source: (Delaware Health Tracker, 2019)

<sup>3</sup> The BRFs includes hypertension awareness modules in odd-numbered years.

Table 7 presents the hypertension awareness across demographic characteristics. As expected, HBP is most prevalent among senior populations. Nearly sixty percent (60.6 percent) of Delaware adults over 65 reports being diagnosed with HBP.

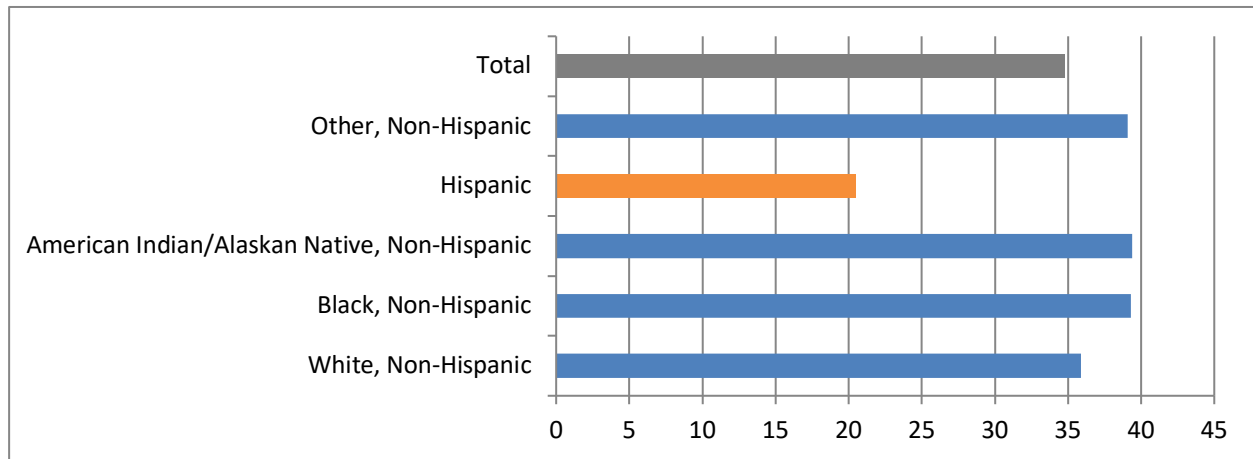
More male (36.9 percent) than female (32.9 percent) are told by a doctor or a health professional that they have HBP. However, the prevalence is not statistically significant different by gender.

HBP occurs more frequently among the less educated and those living in a household with lower income, although data shows no statistically significant difference. About 37 percent of adults without a high school diploma have been diagnosed with HBP. The prevalence rate falls to 31.5 percent among those who have a college or technical school degree. Similarly, 43.5 percent of adults with household earnings below \$15,000 have been diagnosed with HBP, compared to 30.3 percent of adults in households with \$50,000 or more income have had this disease.

A statistically significant difference presents among Hispanics compared to other racial and ethnic groups. While White (35.9 percent) and Black (39.3 percent) have similar prevalence rates, Hispanic adults have nearly half the prevalence rate (20.5 percent). In other words, Delaware Hispanic's HBP condition is significantly better. The 2013 and 2015 BRFs also reflect a similar pattern (Delaware Health Tracker, 2019).

The American Medical Group Foundation also showed a lower rate (i.e., 25 percent) of Hispanics with HBP (American Medical Group Foundation, 2019). However, some studies revealed controversial results and indicated more HBP prevalence among Hispanics compared with non-Hispanic Whites (Campos and Rodriguez, 2019). Moreover, in relation to other races, Hispanics are more likely unaware of their HBP, and the HBP data in Hispanics is lacking (American Medical Group Foundation, 2019; Campos and Rodriguez, 2019). Since Delaware BRFs has not covered questions related to HBP checking behavior, it is unclear that the low prevalence rate is from un-checking. However, BRFs surveys risk behaviors related to HBP, which will be examined in Section 3.3.

**Figure 3**  
**High blood pressure prevalence by race/ethnicity**



Note:

1. Orange (Hispanic): significantly better than the total value
2. Blue: No significant difference with the total value

**Table 7: Hypertension Awareness**

|                                              | (Ever been told) have high blood pressure |              |           |
|----------------------------------------------|-------------------------------------------|--------------|-----------|
|                                              | Weighted %                                | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 34.8                                      | [32.6, 37.2] | 263,971   |
| <b>AGE</b>                                   |                                           |              |           |
| 18-24                                        | 7.7                                       | [0, 19.7]    | 6,869     |
| 25-34                                        | 14.6                                      | [5.7, 23.5]  | 18,505    |
| 35-44                                        | 20.3                                      | [12.1, 28.4] | 23,001    |
| 45-54                                        | 32.2                                      | [26.1, 38.3] | 39,652    |
| 55-64                                        | 52.9                                      | [48.2, 57.6] | 70,225    |
| 65 and over                                  | 60.6                                      | [57.3, 63.9] | 105,719   |
| <b>GENDER</b>                                |                                           |              |           |
| Male                                         | 36.9                                      | [33.6, 40.3] | 133,666   |
| Female                                       | 32.9                                      | [29.9, 35.9] | 130,305   |
| <b>RACE-ETHNICITY</b>                        |                                           |              |           |
| White, Non-Hispanic                          | 35.9                                      | [33.2, 38.6] | 179,828   |
| Black, Non-Hispanic                          | 39.3                                      | [33.6, 45.0] | 60,363    |
| Asian, Non-Hispanic                          | 11.4                                      | [0, 25.3]    | 2,534     |
| American Indian/Alaskan Native, Non-Hispanic | 39.4                                      | [21.3, 57.5] | 3,142     |
| Hispanic                                     | 20.5                                      | [12.3, 28.7] | 12,130    |
| Other, Non-Hispanic                          | 39.1                                      | [25.0, 53.2] | 5,974     |
| <b>EDUCATION</b>                             |                                           |              |           |
| < High School                                | 37.2                                      | [29.9, 44.5] | 33,258    |
| High School                                  | 37.4                                      | [33.3, 41.5] | 88,143    |
| > High School and < College/Technical School | 34.3                                      | [29.6, 39.0] | 74,414    |
| College/Technical School                     | 31.5                                      | [27.7, 35.3] | 66,683    |
| Don't know/not sure/missing                  | 30.5                                      | [0, 64.6]    | 1,473     |
| <b>HOUSEHOLD INCOME</b>                      |                                           |              |           |
| Less than \$15,000                           | 43.5                                      | [35.7, 51.3] | 22,348    |
| \$15,000-\$24,999                            | 38.6                                      | [32.7, 44.5] | 39,805    |
| \$25,000-\$34,999                            | 40.3                                      | [33.0, 47.6] | 26,675    |
| \$35,000-\$49,999                            | 40.0                                      | [33.4, 46.6] | 35,171    |
| \$50,000 or more                             | 30.3                                      | [26.5, 34.1] | 90,488    |
| Don't know/not sure/missing                  | 32.5                                      | [27.4, 37.6] | 49,484    |

Note:

1. C.I. (95%) = Confidence Interval at 95 percent probability level, based on un-weighted data. C.I. lower range is reported as "0" if the calculated results is negative due to small sample
2. Prevalence is weighted by \_LLCPWT
3. For prevalence rate, denominator includes respondents with do not know/refused/missing responses
4. Asian and American Indian/Alaskan data is listed but is not discussed due to limited sample size

### 3.2.2 Cholesterol

High blood cholesterol (HBC) is the second-highest chronic disease that Delaware adults are aware of. Near 30 percent (30.1 percent, estimated 228,116 population) have been told to have HBC (Table 9a), and 62.5 percent of them currently taking high cholesterol medicine. The US aggregated prevalence rate is 31.5 percent (Table 7). HBC is a major risk factor for heart disease, the leading cause of death in the US, and for stroke, the fifth leading cause (CDC, 2019h). However, high cholesterol has no symptoms, so that many people are unaware of their HBC (CDC, 2019h).

HBC incidence is most closely associated with age. Nearly half (49.4 percent) of Delaware adults above 65 years old ever been told with HBC. The rate is 44.3 percent for the age group of 55 to 64, and 34.0 percent for the age group of 45 to 54. Males have higher HBC prevalence rate (34.6 percent) than females (29.8 percent) but the difference is statistically indistinguishable. Socio-economic status also reveals no statistically significant difference among groups, either for education or household income.

There is a racial/ethnic gap in the prevalence of HBC between Hispanics and other groups. The prevalence rates are 22.6 percent for Hispanic, 30.1 percent for Blacks, and 34.3 percent for Whites. Similar to hypertension, the HBC prevalence rate in Hispanics is nearly ten percentage points below Whites and Blacks.

Different from hypertension, the 2017 BRFSS includes questions related to HBC checking. Among Delaware adults, 83.8 percent report that they had their cholesterol checked within the past five years. The cholesterol checking behavior reflects a statistically significant difference among Hispanics to Blacks and Whites. Overall, 70.0 percent of the Hispanics report that they had their cholesterol checked within the past five years, compared to 84.3 percent of Whites and 88.0 percent of Blacks. It might be fair to surmise that the lack of checking is likely to contribute to the comparatively low prevalence rate in Hispanics.

Age and education are also related to the likelihood of having blood cholesterol checked. About six in ten (62.4 percent) of adults between the ages of 18 and 24 have had their blood cholesterol checked in the previous five years. The share increases with age and reaches 93.3 percent for those 65 years and older. Unsurprisingly, the percentage of diagnosed with HBC after cholesterol checking also increases with age. Nearly half (51.2 percent) of 65 years and older respondents are diagnosed with HBC.

A similar pattern is reflected among education levels. While 74.6 percent of respondents without high school degrees have cholesterol checked within the past five years, the rate increased to 89.5 percent of respondents with college/technical school degrees.

**Table 8a: Cholesterol Awareness**

|                                              | (Ever been told) blood cholesterol is high |              |           |
|----------------------------------------------|--------------------------------------------|--------------|-----------|
|                                              | Weighted %                                 | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 30.1                                       | [27.7, 32.5] | 228,116   |
| <b>AGE</b>                                   |                                            |              |           |
| 18-24                                        | 7.8                                        | [0, 23.0]    | 5,884     |
| 25-34                                        | 13.5                                       | [4.2, 22.8]  | 15,098    |
| 35-44                                        | 23.8                                       | [15.4, 32.2] | 24,826    |
| 45-54                                        | 34.0                                       | [27.7, 40.3] | 40,584    |
| 55-64                                        | 44.3                                       | [39.3, 49.3] | 56,987    |
| 65 and over                                  | 49.4                                       | [45.7, 53.1] | 84,737    |
| <b>GENDER</b>                                |                                            |              |           |
| Male                                         | 34.6                                       | [30.9, 38.3] | 117,220   |
| Female                                       | 29.8                                       | [26.6, 33.0] | 110,896   |
| <b>RACE-ETHNICITY</b>                        |                                            |              |           |
| White, Non-Hispanic                          | 34.3                                       | [31.5, 37.1] | 160,306   |
| Black, Non-Hispanic                          | 30.1                                       | [23.6, 36.6] | 44,341    |
| Asian, Non-Hispanic                          | 14.8                                       | [0, 32.2]    | 2,997     |
| American Indian/Alaskan Native, Non-Hispanic | 44.5                                       | [24.2, 64.8] | 3,394     |
| Hispanic                                     | 22.6                                       | [14.3, 30.9] | 12,414    |
| Other, Non-Hispanic                          | 35.0                                       | [18.2, 51.8] | 4,664     |
| <b>EDUCATION</b>                             |                                            |              |           |
| < High School                                | 33.4                                       | [25.6, 41.2] | 26,818    |
| High School                                  | 33.0                                       | [28.5, 37.5] | 73,173    |
| > High School and < College/Technical School | 32.1                                       | [27.3, 36.9] | 65,133    |
| College/Technical School                     | 30.9                                       | [26.9, 34.9] | 62,239    |
| Don't know/not sure/missing                  | 18.5                                       | [0, 52.5]    | 753       |
| <b>HOUSEHOLD INCOME</b>                      |                                            |              |           |
| Less than \$15,000                           | 35.6                                       | [26.9, 44.3] | 16,829    |
| \$15,000-\$24,999                            | 33.2                                       | [27.1, 39.3] | 32,199    |
| \$25,000-\$34,999                            | 34.7                                       | [27.3, 42.1] | 21,864    |
| \$35,000-\$49,999                            | 36.2                                       | [28.9, 43.5] | 29,997    |
| \$50,000 or more                             | 30.5                                       | [26.5, 34.5] | 84,961    |
| Don't know/not sure/missing                  | 29.7                                       | [24.2, 35.2] | 42,266    |

Note:

1. C.I. (95%) = Confidence Interval at 95 percent probability level, based on un-weighted data. C.I. lower range is reported as "0" if the calculated results is negative due to small sample
2. Prevalence is weighted by \_LLCPWT
3. For prevalence rate, denominator includes respondents with do not know/refused/missing responses
4. Asian and American Indian/Alaskan data is listed but is not discussed due to limited sample size

**Table 8b: Cholesterol Check**

|                                              | Cholesterol checked within past five years |              |           | Diagnosed with high blood cholesterol* |              |           |
|----------------------------------------------|--------------------------------------------|--------------|-----------|----------------------------------------|--------------|-----------|
|                                              | Wt. %                                      | 95% CI       | Est. Pop. | Wt. %                                  | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 83.8                                       | [82.6, 85.0] | 636,004   | 34.6                                   | [32.1, 37.1] | 225,335   |
| <b>AGE</b>                                   |                                            |              |           |                                        |              |           |
| 18-24                                        | 62.4                                       | [54.4, 70.3] | 55,465    | 9.1                                    | [0, 27.0]    | 5,305     |
| 25-34                                        | 69.8                                       | [64.8, 74.8] | 88,354    | 16.0                                   | [6.0, 26.0]  | 15,098    |
| 35-44                                        | 81.4                                       | [77.5, 85.3] | 92,189    | 25.3                                   | [16.7, 34.0] | 24,724    |
| 45-54                                        | 89.9                                       | [87.5, 92.4] | 110,656   | 35.5                                   | [29.1, 42.0] | 40,041    |
| 55-64                                        | 93.3                                       | [91.6, 95.0] | 123,780   | 45.2                                   | [40.2, 50.2] | 56,754    |
| 65 and over                                  | 94.9                                       | [93.8, 96.1] | 165,560   | 51.2                                   | [47.4, 55.0] | 83,413    |
| <b>GENDER</b>                                |                                            |              |           |                                        |              |           |
| Male                                         | 82.8                                       | [80.9, 84.6] | 300,091   | 37.2                                   | [33.5, 41.0] | 116,024   |
| Female                                       | 84.7                                       | [83.2, 86.3] | 335,913   | 32.2                                   | [28.9, 35.5] | 109,311   |
| <b>RACE-ETHNICITY</b>                        |                                            |              |           |                                        |              |           |
| White, Non-Hispanic                          | 84.3                                       | [82.9, 85.8] | 422,555   | 36.7                                   | [33.8, 39.5] | 158,498   |
| Black, Non-Hispanic                          | 88.0                                       | [85.2, 90.8] | 134,951   | 32.2                                   | [25.5, 38.9] | 43,686    |
| Asian, Non-Hispanic                          | 79.9                                       | [70.8, 89.0] | 17,714    | 16.9                                   | [0, 35.2]    | 2,997     |
| American Indian/Alaskan Native, Non-Hispanic | 83.4                                       | [72.4, 94.4] | 6,656     | 50.5                                   | [30.0, 70.9] | 3,394     |
| Hispanic                                     | 70.0                                       | [65.1, 74.9] | 41,343    | 26.2                                   | [17.4, 35.1] | 12,096    |
| Other, Non-Hispanic                          | 83.7                                       | [75.7, 91.6] | 12,784    | 37.1                                   | [20.1, 54.1] | 4,664     |
| <b>EDUCATION</b>                             |                                            |              |           |                                        |              |           |
| < High School                                | 74.6                                       | [69.8, 79.3] | 66,635    | 36.7                                   | [28.6, 44.9] | 25,911    |
| High School                                  | 81.4                                       | [79.0, 83.8] | 192,042   | 36.6                                   | [32.0, 41.2] | 72,420    |
| > High School and < College/Technical School | 84.9                                       | [82.6, 87.3] | 184,328   | 34.3                                   | [29.4, 39.9] | 64,396    |
| College/Technical School                     | 89.5                                       | [87.9, 91.2] | 189,554   | 32.3                                   | [28.3, 36.4] | 61,855    |
| Don't know/not sure/missing                  | 71.4                                       | [51.6, 91.2] | 3,446     | 19.8                                   | [0, 54.7]    | 753       |
| <b>HOUSEHOLD INCOME</b>                      |                                            |              |           |                                        |              |           |
| Less than \$15,000                           | 78.5                                       | [73.6, 83.5] | 40,307    | 40.4                                   | [31.5, 49.4] | 16,542    |
| \$15,000-\$24,999                            | 82.1                                       | [78.8, 85.4] | 84,669    | 36.1                                   | [29.8, 42.4] | 31,679    |
| \$25,000-\$34,999                            | 86.7                                       | [83.1, 90.3] | 57,412    | 37.1                                   | [29.5, 44.6] | 21,816    |
| \$35,000-\$49,999                            | 83.0                                       | [79.3, 86.6] | 72,913    | 38.4                                   | [31.0, 45.7] | 29,688    |
| \$50,000 or more                             | 86.4                                       | [84.5, 88.2] | 257,564   | 32.3                                   | [28.2, 36.4] | 84,428    |
| Don't know/not sure/missing                  | 81.0                                       | [78.0, 83.9] | 123,139   | 33.1                                   | [27.3, 38.9] | 41,182    |

Note:

\* Adults who have had their cholesterol checked and have been told by a doctor, nurse, or other health professional that it was high

### **3.2.3 Arthritis and arthritis burden**

Arthritis is a way of describing more than 100 types of joint diseases. Arthritis can cause symptoms like pain, aching, or stiffness in or around a joint. Over 50 million Americans have arthritis, making it the number one cause of disability (Arthritis Foundation, 2019).

Arthritis is one of the thirteen chronic health conditions that are included in BRFS every year. The burden caused by arthritis is surveyed in odd-numbered years, covering questions related to the degree that usual activities, work, and social activities are limited due to arthritis.

In 2017, around one-fourth (25.2 percent) of Delaware adults have been diagnosed with arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia. The prevalence rate is similar to the rate in the US as a whole (24.4 percent). As would be expected, arthritis is most strongly associated with age. While only 0.4 percent of the 18-24 age group reported having been diagnosed with arthritis, the prevalence rate increases to about 25 percent (24.9 percent) of the 45-54 age group; 36.3 percent among the 55-64 age group; 46.9 percent among age 65 and older.

Females have a significantly higher prevalence of arthritis (28.9 percent) than males (21.1 percent). White adults have a higher prevalence rate (29.9 percent) than Black adults (20.1 percent). Similar to the observations of hypertension and cholesterol awareness, Hispanics have a lower arthritis prevalence rate (13.7 percent).

Educational attainment causes no statistically significant differences in arthritis prevalence. However, arthritis affects those with lower household incomes. Among individuals with less than \$15,000 household income, 35.4 percent have been diagnosed with arthritis or a related condition. The share declines steadily with each wealthier income groups. The share drops to 21.1 percent of the household with the highest income.

The Arthritis Burden Section of the 2017 BRFS includes questions asked specifically to respondents already diagnosed with arthritis about their experiences with the condition. Because the section was administered to a subset of the total sample, the limited number of qualifying participants prohibits precise statistical analysis across demographic groups. However, the subset sample allows an overall estimation of the quality of life impact of those who have arthritis.

About half of Delaware adults (50.1 percent) with arthritis report that arthritis or joint symptoms limit their usual activities. Also, arthritis or joint symptoms affect 35.8 percent of arthritis patients' work. Finally, 22.9 percent of patients report symptoms affect a lot of their normal social activities, such as going shopping, going to the movies, or to religious or social gatherings.

As arthritis is the third top chronic disease in Delaware, more detailed information is needed. The 2019 questionnaire adds a new section for arthritis, exploring respondents' physical activity or exercise to alleviate arthritis or joint symptoms, and the educational course for managing arthritis problems.

**Table 9: Arthritis**

|                                              | (Ever been told) have some form of arthritis,<br>rheumatoid arthritis, gout, lupus, or fibromyalgia? |              |           |
|----------------------------------------------|------------------------------------------------------------------------------------------------------|--------------|-----------|
|                                              | Weighted %                                                                                           | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 25.2                                                                                                 | [22.8, 27.6] | 191,293   |
| <b>AGE</b>                                   |                                                                                                      |              |           |
| 18-24                                        | 0.4                                                                                                  | [0, 4.3]     | 3,548     |
| 25-34                                        | 9.8                                                                                                  | [0, 20.3]    | 12,411    |
| 35-44                                        | 13.0                                                                                                 | [4.4, 21.6]  | 14,667    |
| 45-54                                        | 24.9                                                                                                 | [18.5, 31.3] | 30,659    |
| 55-64                                        | 36.3                                                                                                 | [31.1, 41.5] | 48,217    |
| 65 and over                                  | 46.9                                                                                                 | [43.1, 50.7] | 81,791    |
| <b>GENDER</b>                                |                                                                                                      |              |           |
| Male                                         | 21.1                                                                                                 | [17.4, 24.8] | 76,669    |
| Female                                       | 28.9                                                                                                 | [25.8, 32.0] | 114,624   |
| <b>RACE-ETHNICITY</b>                        |                                                                                                      |              |           |
| White, Non-Hispanic                          | 29.9                                                                                                 | [26.2, 31.8] | 145,333   |
| Black, Non-Hispanic                          | 20.1                                                                                                 | [13.7, 26.5] | 30,834    |
| Asian, Non-Hispanic                          | 4.8                                                                                                  | [0, 20.6]    | 1,062     |
| American Indian/Alaskan Native, Non-Hispanic | 33.0                                                                                                 | [14.2, 51.8] | 2,630     |
| Hispanic                                     | 13.7                                                                                                 | [5.4, 22.0]  | 8,109     |
| Other, Non-Hispanic                          | 21.8                                                                                                 | [5.6, 38.0]  | 3,326     |
| <b>EDUCATION</b>                             |                                                                                                      |              |           |
| < High School                                | 26.3                                                                                                 | [18.0, 34.6] | 23,499    |
| High School                                  | 26.2                                                                                                 | [21.9, 30.5] | 61,757    |
| > High School and < College/Technical School | 27.8                                                                                                 | [23.0, 32.6] | 60,288    |
| College/Technical School                     | 21.4                                                                                                 | [17.5, 25.3] | 45,228    |
| Don't know/not sure/missing                  | 10.8                                                                                                 | [0, 45.9]    | 522       |
| <b>HOUSEHOLD INCOME</b>                      |                                                                                                      |              |           |
| Less than \$15,000                           | 35.4                                                                                                 | [27.2, 43.6] | 18,163    |
| \$15,000-\$24,999                            | 31.4                                                                                                 | [25.1, 37.7] | 32,345    |
| \$25,000-\$34,999                            | 25.9                                                                                                 | [18.4, 33.4] | 17,171    |
| \$35,000-\$49,999                            | 25.9                                                                                                 | [18.9, 32.9] | 22,775    |
| \$50,000 or more                             | 21.1                                                                                                 | [17.1, 25.1] | 63,036    |
| Don't know/not sure/missing                  | 24.9                                                                                                 | [19.4, 30.4] | 37,804    |

Note:

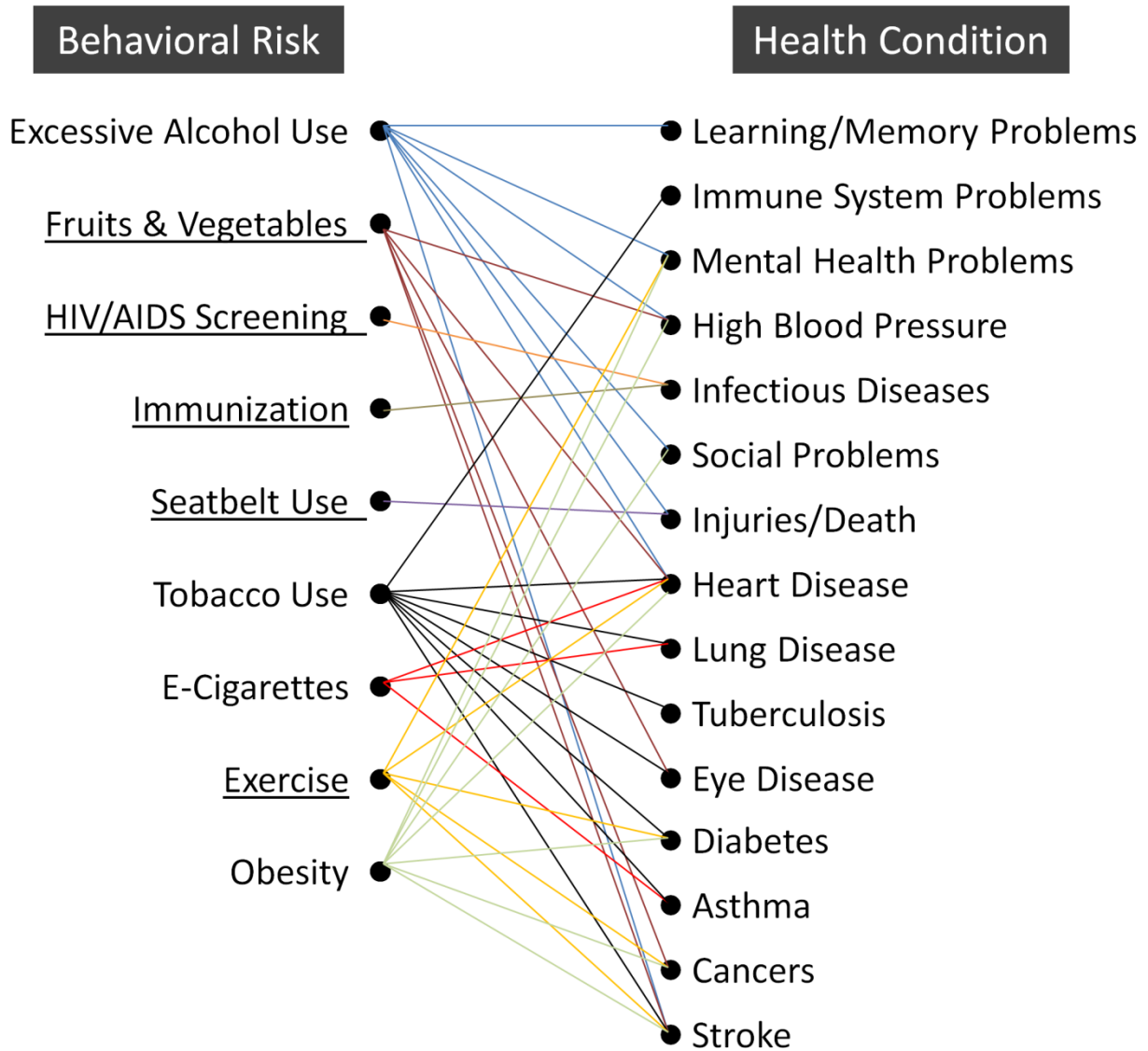
1. C.I. (95%) = Confidence Interval at 95 percent probability level, based on un-weighted data. C.I. lower range is reported as "0" if the calculated results is negative due to small sample
2. Prevalence is weighted by \_LLCPWT
3. For prevalence rate, denominator includes respondents with do not know/refused/missing responses
4. Asian and American Indian/Alaskan data is listed but is not discussed due to limited sample size

### **3.3 Behavioral risk factors**

BRFS gathers respondent's health risk behaviors to better understand correlations between behaviors and health conditions. The 2017 BRFS covers eight behavioral risk factors, including tobacco use, E-cigarettes, alcohol consumption, fruits and vegetables, exercise (physical activity), seatbelt use, immunization, and HIV/AIDS screening. CDC also identifies obesity as a health risk. Obesity is evaluated based on the Body Mass Index (BMI), which is a specific ratio of weight and height, collected in the Demographics section of BRFS.

Risk behaviors may cause or are highly related to certain diseases. For example, smokers are more likely than nonsmokers to develop lung cancer (CDC, 2017a). Excessive alcohol use causes both short-term (e.g. injuries) and long-term (e.g. high blood pressure) effects. In addition to behaviors which bring negative impact on health, the BRFS also records positive behaviors that enhance health life (e.g. exercise) or reduce injuries and death (e.g. seat belt use). Figure 4 presents some behavior and risk correlation.

**Figure 4**  
**Behavior risks and health conditions**



Source: (CDC, 2019i, 2019j, 2019k, 2019l, 2019m, 2018d, 2017a, 2017b; Harvard School of Public Health, 2012)

Note: Underline behaviors cause positive impact on health

### 3.3.1 Overweight and obesity

The BRFs collects weight and height data in the “Demographics” section (Table 1) every year. Then CDC computes the ratio of height and weight into the Body Mass Index (BMI)<sup>4</sup>, which is an indicator of body fatness. BMI is an inexpensive and easy-to-perform method of screening weight category (e.g. underweight and overweight). It also appears to be as strongly associated with different metabolic and disease outcome as those methods that directly measure body fatness (CDC, 2019n). CDC interprets adults (20 years old and older) BMI by standard weight status categories (Table 11). These categories are the same for men and women of all body types and ages (CDC, 2019n).

**Table 10: Four-categories of BMI**

|                          |                |
|--------------------------|----------------|
| Underweight              | Below 18.5     |
| Normal or healthy weight | 18.5 – 24.9    |
| Overweight               | 25.0 – 29.9    |
| Obese                    | 30.0 and above |

Obese people, compared to those with a normal or healthy weight, are at increased risk for serious diseases and health conditions, such as hypertension, type 2 diabetes, stroke, and mental illness (CDC, 2019m).<sup>5</sup> The 2017 BRFs indicates that 36.7 percent of Delaware adults are overweight; 31.8 percent of them are obese. In other words, nearly seven in ten (68.5 percent) Delaware adults are overweight or obese. The overweight and obesity rate is close to the rates of the entire U.S., which is 35.3 percent overweight and 30.1 percent obese (CDC, 2018c).

Unlike many other health conditions strongly associated with age, being overweight and obese are distributed relatively evenly among age groups. The combined percentages of being overweight and obese are 67.2 percent for 25-34 years-old; 68.8 percent for 35-44; 75.4 percent for 45-54; 76.7 percent for 55-64; and 69.4 for 65 and over. Also, no statistically significant differences present among race-ethnicity and socio-economic groups, in either the overweight rate or obesity rate.

However, there is a statistically significant difference when looking at gender for those that are overweight. Males are more overweight (40.9 percent) than females (32.5 percent). However, the obesity percentages are similar between genders, which are 32.3 percent for male and 31.3 for female.

<sup>4</sup> BMI formula: weight (kg) / [height (m)]<sup>2</sup>

<sup>5</sup> For more information, see <https://www.cdc.gov/healthyweight/effects/index.html>

| <b>Table 11: Overweight and Obesity</b>      |            |               |           |       |              |           |
|----------------------------------------------|------------|---------------|-----------|-------|--------------|-----------|
|                                              | Overweight |               |           | Obese |              |           |
|                                              | Wt. %      | 95% CI        | Est. Pop. | Wt. % | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 36.7       | [34.1, 39.3]  | 248,600   | 31.8  | [29.2, 34.4] | 215,565   |
| <b>AGE</b>                                   |            |               |           |       |              |           |
| 18-24                                        | 28.7       | [16.9, 40.5]  | 21,401    | 15.5  | [4.6, 26.4]  | 11,562    |
| 25-34                                        | 39.8       | [31.8, 47.8]  | 44,873    | 27.4  | [19.0, 35.8] | 30,948    |
| 35-44                                        | 32.9       | [24.7, 41.1]  | 32,244    | 35.7  | [28.0, 43.4] | 34,962    |
| 45-54                                        | 40.8       | [34.3, 47.3]  | 44,659    | 34.6  | [28.1, 41.1] | 37,857    |
| 55-64                                        | 39.4       | [33.90, 44.9] | 48,449    | 37.3  | [31.9, 42.7] | 45,875    |
| 65 and over                                  | 35.5       | [31.2, 39.8]  | 56,974    | 33.9  | [29.3, 38.5] | 54,361    |
| <b>GENDER</b>                                |            |               |           |       |              |           |
| Male                                         | 40.9       | [37.2, 44.6]  | 137,399   | 32.3  | [28.4, 36.2] | 108,399   |
| Female                                       | 32.5       | [28.9, 36.1]  | 111,201   | 31.3  | [27.8, 34.8] | 107,166   |
| <b>RACE-ETHNICITY</b>                        |            |               |           |       |              |           |
| White, Non-Hispanic                          | 36.3       | [33.3, 39.3]  | 167,606   | 30.2  | [27.1, 33.3] | 139,305   |
| Black, Non-Hispanic                          | 38.7       | [31.66, 45.8] | 53,711    | 40.2  | [33.9, 46.5] | 55,910    |
| Asian, Non-Hispanic                          | 28.4       | [13, 43.8]    | 5,039     | 7.4   | [0, 28.3]    | 1,318     |
| American Indian/Alaskan Native, Non-Hispanic | 28.2       | [2.7, 43.7]   | 2,096     | 33.4  | [13.7, 53.1] | 2,476     |
| Hispanic                                     | 39.5       | [30.4, 48.6]  | 15,081    | 30.3  | [21.0, 39.6] | 11,568    |
| Other, Non-Hispanic                          | 35.5       | [18.4, 52.6]  | 5,067     | 34.9  | [18.4, 51.4] | 4,988     |
| <b>EDUCATION</b>                             |            |               |           |       |              |           |
| < High School                                | 34.8       | [25.6, 44.0]  | 24,637    | 35.2  | [26.7, 43.7] | 24,878    |
| High School                                  | 33.9       | [29.1, 38.7]  | 71,727    | 35.3  | [30.5, 40.1] | 74,565    |
| > High School and < College/Technical School | 37.0       | [31.8, 42.2]  | 75,057    | 31.1  | [26.0, 36.2] | 63,120    |
| College/Technical School                     | 40.2       | [36.0, 44.4]  | 76,236    | 27.9  | [23.5, 32.3] | 52,914    |
| Don't know/not sure/missing                  | 32.2       | [0, 69.6]     | 943       | 3.0   | [0, 26.6]    | 89        |
| <b>HOUSEHOLD INCOME</b>                      |            |               |           |       |              |           |
| Less than \$15,000                           | 33.9       | [24.0, 43.8]  | 14,947    | 37.0  | [27.7, 46.3] | 16,313    |
| \$15,000-\$24,999                            | 37.0       | [29.9, 44.1]  | 33,022    | 34.1  | [27.4, 40.8] | 30,466    |
| \$25,000-\$34,999                            | 34.8       | [26.3, 43.3]  | 21,350    | 39.8  | [31.7, 47.9] | 24,436    |
| \$35,000-\$49,999                            | 35.2       | [27.8, 42.6]  | 29,296    | 31.6  | [24.4, 38.8] | 26,241    |
| \$50,000 or more                             | 40.8       | [36.8, 44.8]  | 115,929   | 29.9  | [25.7, 34.1] | 84,940    |
| Don't know/not sure/missing                  | 29.4       | [23.1, 35.7]  | 34,056    | 28.7  | [22.1, 35.3] | 33,168    |

Note:

1. C.I. (95%) = Confidence Interval at 95 percent probability level, based on un-weighted data. C.I. lower range is reported as "0" if the calculated results is negative due to small sample
2. For prevalence rate, denominator includes respondents with do not know/refused/missing responses
3. Asian and American Indian/Alaskan data is listed but is not discussed due to limited sample size

4. Overweight: BMI greater than or equal to 25 but less than 30; Obese: BMI greater than or equal to 30.

### **3.3.2 Tobacco and e-cigarettes**

Cigarette smoking is the leading preventable cause of death in the U.S., which causes more than 480,000 deaths each year. Smoking causes 90 percent of all lung cancer deaths and 80 percent of all deaths from chronic obstructive pulmonary disease (COPD). Smoking also causes a greater risk for diseases that affect the heart and blood vessels (cardiovascular disease) and diminishes overall health (CDC, 2019i).

In Delaware, 16.3 percent of adults smoke, which is slightly higher than the smoking rate of the US as a whole (15.5 percent). Nearly one in four (25.3 percent) adults in the 25-34 age group smoke which is a greater percentage compared to other age groups. Socio-economic characters may be correlated to smoking behavior. Individuals of lower education and income level present higher smoking rates. Specifically, 27.1 percent adults without high school diplomas are smoking and 6.3 percent of college graduates do so, showing a gap of 20.8 percentage points. Also, individuals with lower household incomes are more likely to smoke. Thirty percent of individuals with less than \$15,000 household income engage in smoking, while the percentage declines to 13 percent of those with \$50,000 or more household income.

Electronic cigarettes (e-cigarette) is an alternative option of tobacco which may cause less harm. However, the usage of e-cigarettes also has brought emerging concerns. E-cigarettes produce several dangerous chemicals including acetaldehyde, acrolein, and formaldehyde. These aldehydes can cause lung disease, as well as cardiovascular (heart) disease. E-cigarettes also contain acrolein, which can cause acute lung injury and COPD and may cause asthma and lung cancer (American Lung Association, 2019).

The rate of e-cigarette use is slightly higher in Delaware (4.6 percent) than in the nation (4.1 percent). Young Delawareans are more likely to use e-cigarettes. Around 12 percent young adults within the 18-24 age group and 8.9 percent of the 25-34 age group use e-cigarettes. More males (5.6 percent) use e-cigarette than females (3.7 percent) and more Whites (5.4 percent) use e-cigarettes than Blacks (3.7 percent). Socio-economic factors present less correlation to the e-cigarette usage.

**Table 12: Tobacco Use & E-Cigarette**

|                                              | Current tobacco use* |              |           | Current e-cigarette use |             |           |
|----------------------------------------------|----------------------|--------------|-----------|-------------------------|-------------|-----------|
|                                              | Weighted %           | 95% CI       | Est. Pop. | Weighted %              | 95% CI      | Est. Pop. |
| <b>Total</b>                                 | 16.3                 | [13.3, 19.3] | 124,011   | 4.6                     | [1.1, 8.1]  | 35,083    |
| <b>AGE</b>                                   |                      |              |           |                         |             |           |
| 18-24                                        | 12.3                 | [5.0, 24.1]  | 10,983    | 12.1                    | [1.0, 23.2] | 10,796    |
| 25-34                                        | 25.3                 | [16.6, 34.0] | 32,024    | 8.9                     | [0, 18.6]   | 11,282    |
| 35-44                                        | 20.6                 | [12.3, 28.9] | 23,365    | 3.4                     | [0, 12.0]   | 3,877     |
| 45-54                                        | 17.9                 | [11.1, 24.7] | 21,985    | 2.9                     | [0, 10.7]   | 3,546     |
| 55-64                                        | 17.1                 | [11.2, 23.0] | 22,749    | 2.9                     | [0, 9.9]    | 3,886     |
| 65 and over                                  | 7.4                  | [2.3, 12.5]  | 12,906    | 1.0                     | [0, 5.9]    | 1,697     |
| <b>GENDER</b>                                |                      |              |           |                         |             |           |
| Male                                         | 17.2                 | [12.8, 21.6] | 62,506    | 5.6                     | [0.5, 10.7] | 20,284    |
| Female                                       | 15.5                 | [11.5, 19.5] | 61,506    | 3.7                     | [0, 8.5]    | 14,799    |
| <b>RACE-ETHNICITY</b>                        |                      |              |           |                         |             |           |
| White, Non-Hispanic                          | 16.8                 | [13.1, 20.5] | 84,239    | 5.4                     | [1.1, 9.7]  | 27,235    |
| Black, Non-Hispanic                          | 16.5                 | [9.3, 23.7]  | 25,358    | 2.4                     | [0, 11.4]   | 3,751     |
| Hispanic                                     | 9.1                  | [0, 18.4]    | 5,362     | 1.7                     | [0, 12.0]   | 997       |
| Other, Non-Hispanic                          | 26.4                 | [9.8, 43.0]  | 4,028     | 6.5                     | [0, 26.2]   | 992       |
| <b>EDUCATION</b>                             |                      |              |           |                         |             |           |
| < High School                                | 27.1                 | [18.0, 36.2] | 24,203    | 4.4                     | [0, 14.1]   | 3,902     |
| High School                                  | 19.8                 | [14.8, 24.8] | 46,641    | 6.0                     | [0, 12.3]   | 14,180    |
| > High School and < College/Technical School | 17.8                 | [12.0, 23.6] | 38,712    | 6.4                     | [0, 13.3]   | 13,939    |
| College/Technical School                     | 6.3                  | [1.1, 11.5]  | 13,242    | 1.3                     | [0, 6.4]    | 2,671     |
| Don't know/not sure/missing                  | 25.2                 | [0, 74.3]    | 1,214     | 8.1                     | [0, 61.6]   | 391       |
| <b>HOUSEHOLD INCOME</b>                      |                      |              |           |                         |             |           |
| Less than \$15,000                           | 30.0                 | [20.8, 39.2] | 15,407    | 4.7                     | [0, 15.4]   | 2,400     |
| \$15,000-\$24,999                            | 22.4                 | [15.1, 29.7] | 23,141    | 5.4                     | [0, 14.6]   | 5,556     |
| \$25,000-\$34,999                            | 22.3                 | [12.6, 32.0] | 14,752    | 3.2                     | [0, 12.8]   | 2,117     |
| \$35,000-\$49,999                            | 16.0                 | [7.3, 24.7]  | 14,027    | 4.8                     | [0, 14.2]   | 4,217     |
| \$50,000 or more                             | 13.0                 | [7.5, 18.5]  | 38,875    | 4.1                     | [0, 10.5]   | 12,185    |
| Don't know/not sure/missing                  | 11.7                 | [5.0, 18.4]  | 17,810    | 5.7                     | [0, 13.9]   | 8,608     |

\*Respondents who reported having smoked at least 100 cigarettes in their lifetime and currently smoke

### 3.3.3 Alcohol consumption

Excessive alcohol use<sup>6</sup> causes both short-term and long-term health risks. Short-term impacts include injuries, violence, alcohol poisoning, risky sexual behaviors, miscarriage and stillbirth or fetal alcohol spectrum disorders (FASDs) among pregnant women. Long-term impacts are high blood pressure, heart disease, stroke, liver disease, and digestive problems. Various types of cancer (breast, mouth, throat, esophagus, liver, and colon) are also related to alcohol consumption. In addition to physical diseases, excessive alcohol use leads to mental health problems (i.e., depression and anxiety), learning and memory problems, and social problems (e.g., family problems) (CDC, 2018d).

Heavy drinking for adult men is defined as consuming more than 14 drinks per week. For adult women, it is defined as having more than 7 drinks per week. A drink is defined as a twelve-ounce beer, a five-ounce glass of wine, or a drink with one shot of liquor. Binge drinking is defined as males having five or more drinks on one occasion, females having four or more drinks on one occasion.

The heavy drinking rate of Delaware adults is the same as the U.S. rates (5.7 percent). Unlike many other health behaviors, the respondents with higher household incomes are more likely to engage in heavy drinking. About 2.4 percent of respondents with a household income less than \$15,000 are heavy drinkers, but the rate increases to 7.7 percent in the top income group. Similar trends can also be seen with binge drinking. The binge drinking rate is 10.8 percent in the lowest income group and increases to 18.4 percent in the highest income group. However, the strongest demographic association with binge drinking is age. One in four (25 percent) of 25 to 34 year olds engage in binge drinking. The rate steadily falls throughout middle age and dips to only 3.6 percent among the elderly. Similar age pattern for binge drinking is shown in the US data (CDC, 2019o).

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<sup>6</sup> Excessive drinking includes binge drinking, heavy drinking, and any drinking by pregnant women or people younger than age 21

**Table 13: Alcohol Use**

|                                              | Heavy drinking* |             |           | Binge drinking^ |              |           |
|----------------------------------------------|-----------------|-------------|-----------|-----------------|--------------|-----------|
|                                              | Weighted %      | 95% CI      | Est. Pop. | Weighted %      | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 5.7             | [2.7, 8.7]  | 43,514    | 13.7            | [10.6, 16.8] | 104,007   |
| <b>AGE</b>                                   |                 |             |           |                 |              |           |
| 18-24                                        | 7.3%            | [0, 18.7]   | 6,526     | 19.4%           | [9.4, 29.4]  | 17,292    |
| 25-34                                        | 6.7%            | [0, 16.0]   | 8,532     | 25.0%           | [16.9, 33.1] | 31,654    |
| 35-44                                        | 4.7%            | [0, 12.5]   | 5,291     | 16.0%           | [8.1, 23.9]  | 18,103    |
| 45-54                                        | 6.5%            | [0, 14.4]   | 7,979     | 12.9%           | [5.6, 20.2]  | 15,856    |
| 55-64                                        | 5.9%            | [0, 12.4]   | 7,870     | 11.2%           | [4.5, 17.9]  | 14,882    |
| 65 and over                                  | 4.2%            | [0, 9.0]    | 7,317     | 3.6%            | [0, 8.4]     | 6,221     |
| <b>GENDER</b>                                |                 |             |           |                 |              |           |
| Male                                         | 5.3%            | [0.7, 9.9]  | 19,134    | 16.6%           | [12.2, 21.0] | 60,090    |
| Female                                       | 6.2%            | [2.2, 10.2] | 24,380    | 11.1%           | [6.8, 15.4]  | 43,917    |
| <b>RACE-ETHNICITY</b>                        |                 |             |           |                 |              |           |
| White, Non-Hispanic                          | 6.6%            | [3.0, 10.2] | 33,236    | 15.4%           | [11.6, 19.2] | 77,010    |
| Black, Non-Hispanic                          | 4.4%            | [0, 12.1]   | 6,683     | 9.7%            | [1.6, 17.8]  | 14,911    |
| Hispanic                                     | 3.4%            | [0, 12.9]   | 2,008     | 13.4%           | [4.9, 21.9]  | 7,924     |
| Other, Non-Hispanic                          | 6.7%            | [0, 23.0]   | 1,024     | 12.1%           | [0, 30.6]    | 1,843     |
| <b>EDUCATION</b>                             |                 |             |           |                 |              |           |
| < High School                                | 4.3%            | [0, 13.7]   | 3,860     | 8.4%            | [0, 17.5]    | 7,518     |
| High School                                  | 5.9%            | [0.2, 11.6] | 14,035    | 13.1%           | [7.5, 18.7]  | 30,884    |
| > High School and < College/Technical School | 6.3%            | [0, 12.7]   | 13,705    | 15.5%           | [9.2, 21.8]  | 33,670    |
| College/Technical School                     | 5.6%            | [0.9, 10.3] | 11,915    | 15.1%           | [9.8, 20.4]  | 31,935    |
| Don't know/not sure/missing                  | 0.0%            | --          | 0         | 0.0%            | --           | 0         |
| <b>HOUSEHOLD INCOME</b>                      |                 |             |           |                 |              |           |
| Less than \$15,000                           | 2.4%            | [0, 11.9]   | 1,243     | 10.8%           | [0.2, 21.4]  | 5,558     |
| \$15,000-\$24,999                            | 5.3%            | [0, 13.9]   | 5,446     | 11.3%           | [3.1, 19.5]  | 11,641    |
| \$25,000-\$34,999                            | 4.9%            | [0, 14.4]   | 3,243     | 12.3%           | [2.5, 22.1]  | 8,165     |
| \$35,000-\$49,999                            | 5.4%            | [0, 13.5]   | 4,711     | 13.4%           | [4.8, 22.0]  | 11,747    |
| \$50,000 or more                             | 7.7%            | [2.8, 12.6] | 23,063    | 18.4%           | [13.4, 23.4] | 54,866    |
| Don't know/not sure/missing                  | 3.8%            | [0, 10.3]   | 5,809     | 7.9%            | [0.7, 15.1]  | 12,030    |

\* Adult men having more than 14 drinks per week and adult women having more than 7 drinks per week

^ Males having five or more drinks on one occasion, females having four or more drinks on one occasion

### 3.3.4 Fruits and vegetables

A diet rich in vegetables and fruits can bring positive effects on blood sugar, as well as lower blood pressure, reduce the risk of heart diseases and stroke, prevent some types of cancer, and lower risks of eye and digestive problems (Harvard School of Public Health, 2012). However, only one in ten adults consumed enough fruits or vegetables<sup>7</sup> in the U.S. (CDC, 2016).

The 2017 BRFSS survey asked how often during the previous 30 days the respondent consumed a variety of foods and beverages: fruits (fresh, frozen or canned fruit), 100% fruit juice, green leafy, lettuce salad, other vegetables, fried potatoes, other kind of potatoes, and sweet potatoes. These responses are combined to calculate the share of individual who intake vegetables and fruits regularly.

Delaware adults consume more vegetables than fruits. About 71.6 percent respondents eat vegetables at least once a day and the percentage for fruit intake falls to 57.3 percent. Fruit and vegetable consumption have no statistical differences among age groups or among race-ethnicity groups.

However, there are statistically significant differences by gender in vegetable consumption. More female (74.7 percent) than male (68.2 percent) respondents have at least one serving of vegetables per day. For fruit consumption, females also consume more than males but the difference is not statistically significant.

Socio-economic status is a strong predictor of vegetable consumption. For example, the share of adults who eat vegetables daily is 82.7 percent with college/technical school degrees and 52.8 percent of those who did not finish high school. Household income also reveals a similar pattern. About half (55.5 percent) of individuals with less than \$15,000 household income eat vegetables daily, while 82.5 percent of adults with \$50,000 or more household income do so – a gap of 27 percentage points. For fruit consumption, higher education and income levels have a greater percentage of respondents that consume fruit per day, although the gap is smaller than for vegetables consumption.

Overall, vegetables and fruits consumption is greater among those who are females, highly education, and have a high income in Delaware. The differences are more obvious in vegetable than in fruits consumption.

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<sup>7</sup> The 2015–2020 *Dietary Guidelines for Americans* recommend that Americans adults should consume 1.5–2.0 cup equivalents of fruits and 2.0–3.0 cups of vegetables per day (Lee-Kwan, 2017).

**Table 14: Consuming Fruits and Vegetables**

|                                              | Consume at least one serving of fruit per day |              |           | Consume at least one serving of vegetables per day |              |           |
|----------------------------------------------|-----------------------------------------------|--------------|-----------|----------------------------------------------------|--------------|-----------|
|                                              | Weighted %                                    | 95% CI       | Est. Pop. | Weighted %                                         | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 57.3                                          | [55.3, 59.3] | 434,723   | 71.6                                               | [70.0, 73.2] | 543,341   |
| <b>AGE</b>                                   |                                               |              |           |                                                    |              |           |
| 18-24                                        | 55.0                                          | [46.6, 63.3] | 48,895    | 64.8                                               | [57.3, 72.3] | 57,604    |
| 25-34                                        | 54.4                                          | [48.5, 60.3] | 68,858    | 68.1                                               | [63.0, 73.3] | 86,279    |
| 35-44                                        | 60.2                                          | [54.6, 65.8] | 68,165    | 71.7                                               | [66.7, 76.7] | 81,224    |
| 45-54                                        | 55.2                                          | [50.0, 60.3] | 67,886    | 74.3                                               | [70.4, 78.2] | 91,471    |
| 55-64                                        | 55.4                                          | [51.0, 59.8] | 73,516    | 72.5                                               | [69.0, 75.9] | 96,177    |
| 65 and over                                  | 61.6                                          | [58.4, 64.8] | 107,403   | 74.9                                               | [72.3, 77.5] | 130,586   |
| <b>GENDER</b>                                |                                               |              |           |                                                    |              |           |
| Male                                         | 56.7                                          | [53.7, 59.6] | 205,425   | 68.2                                               | [65.7, 70.8] | 247,309   |
| Female                                       | 57.8                                          | [55.2, 60.5] | 229,298   | 74.7                                               | [72.6, 76.7] | 296,032   |
| <b>RACE-ETHNICITY</b>                        |                                               |              |           |                                                    |              |           |
| White, Non-Hispanic                          | 57.8                                          | [55.4, 60.1] | 289,422   | 76.4                                               | [74.7, 78.2] | 382,921   |
| Black, Non-Hispanic                          | 53.9                                          | [48.4, 59.3] | 82,659    | 65.3                                               | [60.5, 70.0] | 100,120   |
| Asian, Non-Hispanic                          | 61.1                                          | [48.7, 73.4] | 13,541    | 65.5                                               | [53.5, 77.5] | 14,524    |
| American Indian/Alaskan Native, Non-Hispanic | 63.8                                          | [47.1, 80.4] | 5,091     | 60.6                                               | [44.4, 76.8] | 4,833     |
| Hispanic                                     | 59.7                                          | [53.8, 65.7] | 35,271    | 49.7                                               | [43.1, 56.3] | 29,352    |
| Other, Non-Hispanic                          | 57.2                                          | [44.7, 69.7] | 8,740     | 75.8                                               | [65.8, 85.9] | 11,590    |
| <b>EDUCATION</b>                             |                                               |              |           |                                                    |              |           |
| < High School                                | 53.1                                          | [46.7, 59.4] | 47,445    | 52.8                                               | [46.1, 59.5] | 47,161    |
| High School                                  | 52.3                                          | [48.4, 56.3] | 123,511   | 66.4                                               | [63.0, 69.7] | 156,608   |
| > High School and < College/Technical School | 55.3                                          | [51.3, 59.3] | 119,993   | 74.7                                               | [71.6, 77.7] | 162,029   |
| College/Technical School                     | 66.9                                          | [63.9, 69.8] | 141,561   | 82.7                                               | [80.5, 84.8] | 175,044   |
| Don't know/not sure/missing                  | 45.8                                          | [18.8, 72.9] | 2,214     | 51.8                                               | [25.6, 78.0] | 2,500     |
| <b>HOUSEHOLD INCOME</b>                      |                                               |              |           |                                                    |              |           |
| Less than \$15,000                           | 49.5                                          | [41.8, 57.3] | 25,424    | 55.5                                               | [48.4, 62.5] | 28,460    |
| \$15,000-\$24,999                            | 52.2                                          | [46.9, 57.5] | 53,873    | 65.8                                               | [61.2, 70.3] | 67,829    |
| \$25,000-\$34,999                            | 54.2                                          | [47.6, 60.8] | 35,891    | 69.1                                               | [63.6, 74.6] | 45,780    |
| \$35,000-\$49,999                            | 54.2                                          | [48.3, 60.1] | 47,609    | 70.1                                               | [65.3, 75.0] | 61,653    |
| \$50,000 or more                             | 62.9                                          | [59.9, 65.8] | 187,474   | 82.5                                               | [80.5, 84.6] | 246,199   |
| Don't know/not sure/missing                  | 55.5                                          | [50.9, 60.2] | 84,452    | 61.4                                               | [57.1, 65.7] | 93,421    |

### 3.3.5 Exercise (physical activity)

Exercise (physical activity) in BRFS refers to exercise, recreation, or physical activities other than regular job duties. Examples include running, calisthenics, golf, gardening, or walking for exercise. The 2017 BRFS surveys respondents' physical activities or exercise during the past month of interviewing. In general, physically active people live longer and face lower risks for heart disease, stroke, type 2 diabetes, depression, and some cancers (CDC, 2017b).

Nearly six in ten Delaware adults (63.4 percent) report they have participated in physical activities in the past month. The top two activities are walking (33.1 percent) and running (5.8 percent). Generally, Delaware adults do less exercise than their peers across the country. Nationally, 72.8 percent of individuals participated in physical activities or exercise other than regular job in the past month. Among demographic characteristics, male (71.7 percent), high education level (80.3 percent in the group of college/technical school degree), and high income (77.8 percent in the group of \$50,000 or more household income) individuals have more physical activities or exercise reporting. Statistically significant differences exist when looking at gender. More males (71.7 percent) engage in physical activity than females (66.2 percent).

The BRFS also surveys the time and frequency of activity and compares respondents' reports to the recommended guidelines. The recommendation for aerobic activity is doing at least 150 minutes (or vigorous equivalent) of physical activity a week. The muscle strengthening recommendation is defined as the frequency of strengthening activity per week, divided by one thousand. The index needs to be equal or greater than two (i.e., times per week for strengthening activity/1000  $\geq$  2). Only one in four Delaware adults meets the recommendation guidelines for aerobic conditioning and muscle strengthening. Specifically, only 24.8 percent of Delaware adults meet recommendations for aerobic conditioning; 25.6 percent meet the muscle strengthening recommendation; and just 16.3 percent meet recommendations for both. The gender gap is statistically significant in muscle strengthening. Around 30 percent (29.9 percent) of males meet the recommendations while 21.7 females do.

| <b>Table 15a: Exercise</b>                   |                                                           |              |           |                               |              |           |
|----------------------------------------------|-----------------------------------------------------------|--------------|-----------|-------------------------------|--------------|-----------|
|                                              | Engaged in physical activity other than job in past month |              |           | Meet aerobic recommendations* |              |           |
|                                              | Wt. %                                                     | 95% CI       | Est. Pop. | Wt. %                         | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 68.8                                                      | [67.0, 70.6] | 481,516   | 24.8                          | [22.2, 27.4] | 188,517   |
| <b>AGE</b>                                   |                                                           |              |           |                               |              |           |
| 18-24                                        | 70.7                                                      | [63.9, 77.4] | 57,511    | 22.9                          | [12.2, 33.6] | 20,359    |
| 25-34                                        | 71.5                                                      | [66.4, 76.6] | 83,811    | 22.1                          | [13.6, 30.5] | 27,928    |
| 35-44                                        | 74.9                                                      | [70.0, 79.8] | 76,724    | 22.1                          | [13.9, 30.3] | 25,016    |
| 45-54                                        | 70.5                                                      | [66.1, 74.8] | 79,598    | 22.8                          | [16.3, 29.3] | 28,085    |
| 55-64                                        | 66.0                                                      | [62.0, 70.0] | 81,515    | 24.4                          | [18.6, 30.1] | 32,332    |
| 65 and over                                  | 63.1                                                      | [59.8, 66.3] | 102,357   | 31.4                          | [27.1, 35.7] | 54,797    |
| <b>GENDER</b>                                |                                                           |              |           |                               |              |           |
| Male                                         | 71.7                                                      | [69.1, 74.2] | 238,782   | 26.0                          | [22.3, 29.7] | 94,284    |
| Female                                       | 66.2                                                      | [63.7, 68.7] | 242,734   | 23.8                          | [20.2, 27.4] | 94,233    |
| <b>RACE-ETHNICITY</b>                        |                                                           |              |           |                               |              |           |
| White, Non-Hispanic                          | 69.8                                                      | [67.7, 71.9] | 327,256   | 27.0                          | [24.0, 30.1] | 135,528   |
| Black, Non-Hispanic                          | 66.2                                                      | [61.2, 71.3] | 90,292    | 21.5                          | [14.0, 29.0] | 32,974    |
| Asian, Non-Hispanic                          | 72.0                                                      | [60.8, 83.2] | 14,367    | 20.6                          | [1.4, 39.8]  | 4,563     |
| American Indian/Alaskan Native, Non-Hispanic | 61.6                                                      | [45.0, 78.2] | 4,688     | 17.5                          | [0, 36.2]    | 1,399     |
| Hispanic                                     | 64.4                                                      | [58.5, 70.4] | 34,177    | 15.6                          | [7.8, 23.5]  | 9,234     |
| Other, Non-Hispanic                          | 75.9                                                      | [65.5, 86.1] | 10,736    | 31.5                          | [15.4, 47.6] | 4,818     |
| <b>EDUCATION</b>                             |                                                           |              |           |                               |              |           |
| < High School                                | 61.2                                                      | [54.8, 67.5] | 48,749    | 21.2                          | [12.4, 30.0] | 18,958    |
| High School                                  | 61.5                                                      | [57.7, 65.3] | 131,858   | 21.5                          | [16.6, 26.5] | 50,836    |
| > High School and < College/Technical School | 68.4                                                      | [64.8, 72.1] | 137,029   | 26.5                          | [21.2, 31.8] | 57,550    |
| College/Technical School                     | 80.3                                                      | [78.0, 82.7] | 161,297   | 28.9                          | [24.7, 33.1] | 61,173    |
| Don't know/not sure/missing                  | 56.2                                                      | [30.3, 82.2] | 2,583     | 0                             | --           | 0         |
| <b>HOUSEHOLD INCOME</b>                      |                                                           |              |           |                               |              |           |
| Less than \$15,000                           | 55.6                                                      | [48.2, 62.9] | 24,890    | 16.8                          | [7.6, 25.9]  | 8,616     |
| \$15,000-\$24,999                            | 57.8                                                      | [52.4, 63.2] | 54,435    | 21.4                          | [14.0, 28.8] | 22,063    |
| \$25,000-\$34,999                            | 65.3                                                      | [59.0, 71.6] | 39,672    | 28.9                          | [20.3, 37.4] | 19,140    |
| \$35,000-\$49,999                            | 66.1                                                      | [60.5, 71.6] | 53,303    | 28.3                          | [20.7, 35.9] | 24,869    |
| \$50,000 or more                             | 77.8                                                      | [75.4, 80.3] | 220,594   | 28.6                          | [24.5, 32.6] | 85,202    |
| Don't know/not sure/missing                  | 65.2                                                      | [60.9, 69.5] | 88,622    | 18.8                          | [12.9, 24.7] | 28,627    |

Note:

\* Respondents who reported doing enough physical activity to meet the 150+ minute aerobic recommendation

| <b>Table 15b: Exercise</b>                   |                                            |              |           |                        |              |           |
|----------------------------------------------|--------------------------------------------|--------------|-----------|------------------------|--------------|-----------|
|                                              | Meet muscle strengthening recommendations* |              |           | Meet both guidelines** |              |           |
|                                              | Wt. %                                      | 95% CI       | Est. Pop. | Wt. %                  | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 25.6                                       | [23.0, 28.2] | 194,522   | 16.3                   | [13.5, 19.1] | 123,555   |
| <b>AGE</b>                                   |                                            |              |           |                        |              |           |
| 18-24                                        | 33.0                                       | [23.8, 42.2] | 29,333    | 19.3                   | [9.3, 29.4]  | 17,209    |
| 25-34                                        | 28.7                                       | [21.3, 36.0] | 36,276    | 17.1                   | [8.7, 25.5]  | 21,653    |
| 35-44                                        | 25.9                                       | [18.1, 33.7] | 29,304    | 18.1                   | [9.7, 26.6]  | 20,534    |
| 45-54                                        | 24.2                                       | [17.7, 30.6] | 29,738    | 14.5                   | [7.8, 21.2]  | 17,859    |
| 55-64                                        | 24.1                                       | [18.4, 29.8] | 32,030    | 15.8                   | [9.7, 21.9]  | 20,961    |
| 65 and over                                  | 21.7                                       | [17.1, 26.3] | 37,840    | 14.5                   | [9.7, 19.3]  | 25,339    |
| <b>GENDER</b>                                |                                            |              |           |                        |              |           |
| Male                                         | 29.9                                       | [26.1, 33.7] | 108,391   | 19.1                   | [15.0, 23.3] | 69,320    |
| Female                                       | 21.7                                       | [18.2, 25.3] | 86,131    | 13.7                   | [9.9, 17.4]  | 54,235    |
| <b>RACE-ETHNICITY</b>                        |                                            |              |           |                        |              |           |
| White, Non-Hispanic                          | 25.5                                       | [22.3, 28.6] | 127,668   | 16.5                   | [13.2, 19.8] | 82,650    |
| Black, Non-Hispanic                          | 27.7                                       | [20.6, 34.9] | 42,528    | 18.4                   | [10.7, 26.2] | 28,258    |
| Asian, Non-Hispanic                          | 23.6                                       | [8.2, 39.1]  | 5,237     | 10.1                   | [0, 25.9]    | 2,240     |
| American Indian/Alaskan Native, Non-Hispanic | 33.8                                       | [8.1, 59.5]  | 2,699     | 14.8                   | [0, 39.4]    | 1,181     |
| Hispanic                                     | 17.8                                       | [9.8, 25.7]  | 10,490    | 10.1                   | [1.5, 18.7]  | 5,959     |
| Other, Non-Hispanic                          | 38.6                                       | [21.2, 56.0] | 5,900     | 21.4                   | [1.9, 40.9]  | 3,267     |
| <b>EDUCATION</b>                             |                                            |              |           |                        |              |           |
| < High School                                | 16.6                                       | [7.8, 25.4]  | 14,839    | 11.7                   | [2.0, 21.4]  | 10,443    |
| High School                                  | 21.5                                       | [16.4, 26.7] | 50,834    | 12.5                   | [7.0, 17.9]  | 29,419    |
| > High School and < College/Technical School | 27.1                                       | [21.7, 32.5] | 58,884    | 18.2                   | [12.4, 24.0] | 39,471    |
| College/Technical School                     | 32.3                                       | [28.1, 36.6] | 68,478    | 20.9                   | [16.4, 25.4] | 44,222    |
| Don't know/not sure/missing                  | 30.8                                       | [0, 71.3]    | 1,487     | 0                      | --           | 0         |
| <b>HOUSEHOLD INCOME</b>                      |                                            |              |           |                        |              |           |
| Less than \$15,000                           | 19.6                                       | [10.1, 29.0] | 10,033    | 7.4                    | [0, 16.9]    | 3,787     |
| \$15,000-\$24,999                            | 21.6                                       | [14.3, 28.9] | 22,307    | 13.1                   | [5.3, 20.9]  | 13,511    |
| \$25,000-\$34,999                            | 29.1                                       | [20.1, 38.1] | 19,301    | 20.6                   | [10.5, 30.8] | 13,673    |
| \$35,000-\$49,999                            | 19.4                                       | [11.6, 27.3] | 17,068    | 11.7                   | [3.5, 19.9]  | 10,272    |
| \$50,000 or more                             | 31.2                                       | [27.2, 35.3] | 93,108    | 20.7                   | [16.4, 25.0] | 61,756    |
| Don't know/not sure/missing                  | 21.5                                       | [15.3, 27.7] | 32,704    | 13.5                   | [7.0, 20.0]  | 20,556    |

Note:

\* Respondents who reported doing enough physical activity to meet the recommendation (times per week for strengthening activity/1000 >= 2)

\*\* Respondents who reported doing enough physical activity to meet the aerobic and strengthening recommendations

### 3.3.6 Seatbelt use

Seat belt is one of the most effective ways to save lives and reduce injuries in motor vehicle crashes, which are a leading cause of death among those aged 1-54 in the U.S. (CDC, 2019i). In Delaware, 83.6 percent of adults report that they always wear their seatbelt when riding in a car. This seatbelt use rate is under the national average (88.0 percent).

The use of seat belts has significant differences across age, gender, race, and socio-economic groups. While 79.3 percent of 18 to 24 year-old always wear their seat belts, the percentage rises as age increases and reaches 87.6 percent among individuals who are 65 and over.

Females (85.7 percent) are more likely than males (81.4 percent) to always wear seat belts and the difference is statistically significant. A larger share of Whites (85.4 percent) than Blacks (77.9 percent) always buckle up.

Education and income levels also correlate to seatbelt use. Those with higher education and income levels are more likely to use seatbelts. For example, 89.6 percent of individuals with college/technical school degree buckle up when riding in a car. This is about nine percentage points greater than those without a high school diploma (80.2 percent). Household income levels also show different seatbelt behavior. While 87.6 percent of individuals use seatbelts in the \$50,000 or more household income, the rate declines to 76.4 percent in the group of less than \$15,000 household income.

**Table 16: Seat Belt Use**

|                                              |            | Always wears seatbelt |           |
|----------------------------------------------|------------|-----------------------|-----------|
|                                              | Weighted % | 95% CI                | Est. Pop. |
| <b>Total</b>                                 | 83.6       | [82.4, 84.8]          | 634,835   |
| <b>AGE</b>                                   |            |                       |           |
| 18-24                                        | 79.3       | [73.7, 84.9]          | 70,556    |
| 25-34                                        | 79.0       | [74.8, 83.1]          | 99,985    |
| 35-44                                        | 81.5       | [77.6, 85.3]          | 92,245    |
| 45-54                                        | 85.1       | [82.2, 88.1]          | 104,765   |
| 55-64                                        | 86.3       | [83.8, 88.7]          | 114,517   |
| 65 and over                                  | 87.6       | [85.8, 89.4]          | 152,767   |
| <b>GENDER</b>                                |            |                       |           |
| Male                                         | 81.4       | [79.5, 83.4]          | 295,248   |
| Female                                       | 85.7       | [84.1, 87.2]          | 339,587   |
| <b>RACE-ETHNICITY</b>                        |            |                       |           |
| White, Non-Hispanic                          | 85.4       | [84.0, 86.8]          | 427,985   |
| Black, Non-Hispanic                          | 77.9       | [74.1, 81.7]          | 119,524   |
| Asian, Non-Hispanic                          | 86.6       | [78.9, 94.2]          | 19,193    |
| American Indian/Alaskan Native, Non-Hispanic | 88.1       | [78.8, 97.3]          | 7,028     |
| Hispanic                                     | 83.9       | [80.2, 87.6]          | 49,552    |
| Other, Non-Hispanic                          | 75.6       | [65.9, 85.3]          | 11,553    |
| <b>EDUCATION</b>                             |            |                       |           |
| < High School                                | 80.2       | [76.0, 84.4]          | 71,651    |
| High School                                  | 78.9       | [76.3, 81.4]          | 186,061   |
| > High School and < College/Technical School | 84.2       | [81.8, 86.6]          | 182,811   |
| College/Technical School                     | 89.6       | [88.0, 91.3]          | 189,718   |
| Don't know/not sure/missing                  | 95.1       | [86.3, 100]           | 4,593     |
| <b>HOUSEHOLD INCOME</b>                      |            |                       |           |
| Less than \$15,000                           | 76.4       | [71.4, 81.4]          | 39,208    |
| \$15,000-\$24,999                            | 82.8       | [79.5, 86.0]          | 85,380    |
| \$25,000-\$34,999                            | 80.1       | [75.7, 84.4]          | 53,037    |
| \$35,000-\$49,999                            | 82.8       | [79.1, 86.5]          | 72,813    |
| \$50,000 or more                             | 87.6       | [85.8, 89.3]          | 261,216   |
| Don't know/not sure/missing                  | 81.0       | [78.0, 84.0]          | 123,181   |

Note:

1. C.I. (95%) = Confidence Interval at 95 percent probability level, based on un-weighted data. C.I. lower range is reported as "0" if the calculated results is negative due to small sample
2. Prevalence is weighted by \_LLCPWT
3. For prevalence rate, denominator includes respondents with do not know/refused/missing responses
4. Asian and American Indian/Alaskan data is listed but is not discussed due to limited sample size

### 3.3.7 Immunization

Immunization could prevent infectious diseases. BRFS surveys three types of immunizations, including the flu shot (or nose sprayed flu vaccine and Fluzone Intradermal vaccine), the pneumococcal vaccine, and the shingles or zoster vaccine. The immunization frequency of each vaccine is different. Flu vaccine is recommended to get once a year. Pneumococcal vaccine is usually given only once or twice in a person's lifetime. And CDC recommends that healthy adults 50 years and above receive two doses of the shingles vaccine, separated by two to six months. No frequency of shingles vaccine is specified (CDC, 2019p).

Although the rates of flu and pneumonia vaccination for all adults in Delaware are greater than national rates, the rate of shingles or zoster vaccine lags behind the national rate (Table 18).

| <b>Table 17: Immunization in Delaware and the U.S.</b> |                              |                                   |
|--------------------------------------------------------|------------------------------|-----------------------------------|
|                                                        | Delaware<br>Vaccination Rate | United States<br>Vaccination Rate |
| Flu shot/spray                                         | 45.0                         | 39.8                              |
| Pneumonia vaccine                                      | 35.9                         | 33.8                              |
| Shingles or zoster vaccine                             | 25.3                         | 27.0                              |

Forty-five percent of Delaware adults received the flu vaccine in the past year. Although flu vaccination rates are similar (around 33 percent) among the three age groups under 45, the rate increases to 40.9 percent of the 45-54 age group; 48.7 percent of the 55-64 age group and is statistically significant higher in the age group of 65 and over (64.9 percent). More females (47.9 percent) get the flu shot than males (41.9 percent), and more Whites (47.6 percent) than Blacks (38.2 percent) do so. Flu vaccination also varies by socio-economic status. Respondents with higher educational achievement or higher household income are more likely to get the flu vaccine.

Although the frequency of pneumonia and shingles vaccination varies by gender, race, and socio-economic status, the most noticeable difference occurs among the elderly population. The pneumonia vaccine rate is 75.3 percent and shingles or zoster vaccine rate is 40.3 percent in the 65 years old and over group. Both rates are significantly higher than the rates of other age groups. It is also noteworthy that Hispanic respondents report statistically significant lower pneumonia vaccination rate (17.6 percent) than Whites (38.8 percent) and Blacks (36.0 percent).

**Table 18a: Immunizations**

|                                              | Flu shot/spray in past year |              |           |
|----------------------------------------------|-----------------------------|--------------|-----------|
|                                              | Weighted %                  | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 45.0                        | [42.7, 47.3] | 309,184   |
| <b>AGE</b>                                   |                             |              |           |
| 18-24                                        | 33.9                        | [22.7, 45.0] | 27,104    |
| 25-34                                        | 33.5                        | [25.5, 41.6] | 38,242    |
| 35-44                                        | 33.5                        | [27.8, 43.2] | 35,520    |
| 45-54                                        | 40.9                        | [34.7, 47.1] | 45,177    |
| 55-64                                        | 48.7                        | [43.8, 53.6] | 59,387    |
| 65 and over                                  | 64.9                        | [61.6, 68.1] | 103,754   |
| <b>GENDER</b>                                |                             |              |           |
| Male                                         | 41.9                        | [38.4, 45.4] | 136,497   |
| Female                                       | 47.9                        | [44.9, 50.9] | 172,687   |
| <b>RACE-ETHNICITY</b>                        |                             |              |           |
| White, Non-Hispanic                          | 47.6                        | [45.0, 50.2] | 219,200   |
| Black, Non-Hispanic                          | 38.2                        | [31.6, 44.8] | 50,512    |
| Asian, Non-Hispanic                          | 43.2                        | [26.1, 60.4] | 8,622     |
| American Indian/Alaskan Native, Non-Hispanic | 47.8                        | [28.2, 67.4] | 3,611     |
| Hispanic                                     | 40.2                        | [32.4, 48.0] | 21,006    |
| Other, Non-Hispanic                          | 44.5                        | [28.3, 60.8] | 6,233     |
| <b>EDUCATION</b>                             |                             |              |           |
| < High School                                | 38.2                        | [30.8, 45.7] | 30,195    |
| High School                                  | 40.8                        | [36.2, 45.3] | 84,329    |
| > High School and < College/Technical School | 46.1                        | [41.6, 50.6] | 90,901    |
| College/Technical School                     | 51.4                        | [47.8, 55.0] | 102,288   |
| Don't know/not sure/missing                  | 32.0                        | [3.1, 60.9]  | 1,471     |
| <b>HOUSEHOLD INCOME</b>                      |                             |              |           |
| Less than \$15,000                           | 38.2                        | [29.6, 46.8] | 16,912    |
| \$15,000-\$24,999                            | 42.0                        | [35.9, 48.1] | 39,479    |
| \$25,000-\$34,999                            | 41.4                        | [33.8, 48.9] | 23,975    |
| \$35,000-\$49,999                            | 44.5                        | [37.8, 51.3] | 35,393    |
| \$50,000 or more                             | 46.6                        | [43.0, 50.2] | 130,070   |
| Don't know/not sure/missing                  | 48.0                        | [42.7, 53.4] | 63,355    |

Note:

1. C.I. (95%) = Confidence Interval at 95 percent probability level, based on un-weighted data. C.I. lower range is reported as "0" if the calculated results is negative due to small sample
2. Prevalence is weighted by \_LLCPWT
3. For prevalence rate, denominator includes respondents with do not know/refused/missing responses
4. Asian and American Indian/Alaskan data is listed but is not discussed due to limited sample size

| <b>Table 18b: Immunizations</b>              |                   |              |           |                            |              |           |
|----------------------------------------------|-------------------|--------------|-----------|----------------------------|--------------|-----------|
|                                              | Pneumonia vaccine |              |           | Shingles or zoster vaccine |              |           |
|                                              | Wt. %             | 95% CI       | Est. Pop. | Wt. %                      | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 35.9              | [33.5, 38.3] | 246,181   | 25.3                       | [22.1, 28.5] | 88,978    |
| <b>AGE</b>                                   |                   |              |           |                            |              |           |
| 18-24                                        | 25.8              | [15.0, 36.6] | 20,580    | --                         | --           | --        |
| 25-34                                        | 21.5              | [12.1, 30.9] | 24,491    | --                         | --           | --        |
| 35-44                                        | 16.3              | [7.7, 24.9]  | 16,299    | 15.6                       | [0, 86.8]    | 77        |
| 45-54                                        | 20.1              | [13.3, 26.9] | 22,118    | 8.8                        | [0, 18.8]    | 6,210     |
| 55-64                                        | 34.8              | [29.1, 40.6] | 42,438    | 15.2                       | [9.1, 21.3]  | 18,534    |
| 65 and over                                  | 75.3              | [72.6, 78.0] | 120,255   | 40.3                       | [36.1, 44.4] | 64,158    |
| <b>GENDER</b>                                |                   |              |           |                            |              |           |
| Male                                         | 34.9              | [31.3, 38.5] | 113,741   | 22.8                       | [17.9, 27.6] | 37,399    |
| Female                                       | 36.8              | [33.7, 40.0] | 132,440   | 27.4                       | [23.2, 31.7] | 51,579    |
| <b>RACE-ETHNICITY</b>                        |                   |              |           |                            |              |           |
| White, Non-Hispanic                          | 38.8              | [36.1, 41.5] | 178,676   | 28.5                       | [25.0, 32.1] | 76,120    |
| Black, Non-Hispanic                          | 36.0              | [29.3, 42.7] | 47,399    | 13.0                       | [3.3, 22.7]  | 7,887     |
| Asian, Non-Hispanic                          | 23.0              | [4.5, 41.4]  | 4,584     | 20.4                       | [0, 55.6]    | 1,327     |
| American Indian/Alaskan Native, Non-Hispanic | 29.0              | [10.4, 47.5] | 2,190     | 37.3                       | [8.8, 65.9]  | 1,431     |
| Hispanic                                     | 17.6              | [9.2, 26.0]  | 9,186     | 15.5                       | [0, 32.7]    | 1,520     |
| Other, Non-Hispanic                          | 29.6              | [13.0, 46.3] | 4,147     | 15.4                       | [0, 39.0]    | 693       |
| <b>EDUCATION</b>                             |                   |              |           |                            |              |           |
| < High School                                | 35.2              | [26.7, 43.7] | 27,814    | 20.6                       | [5.6, 35.6]  | 7,232     |
| High School                                  | 32.7              | [28.2, 37.2] | 67,692    | 22.3                       | [16.0, 28.6] | 23,870    |
| > High School and < College/Technical School | 42.4              | [37.9, 46.9] | 83,242    | 24.5                       | [18.1, 30.9] | 25,223    |
| College/Technical School                     | 33.4              | [29.6, 37.2] | 66,366    | 30.5                       | [25.6, 35.4] | 32,150    |
| Don't know/not sure/missing                  | 23.2              | [0, 57.0]    | 1,068     | 27.5                       | [0, 78.1]    | 504       |
| <b>HOUSEHOLD INCOME</b>                      |                   |              |           |                            |              |           |
| Less than \$15,000                           | 33.6              | [24.9, 42.3] | 14,878    | 12.5                       | [0, 25.3]    | 2,631     |
| \$15,000-\$24,999                            | 39.5              | [33.5, 45.5] | 37,053    | 19.9                       | [10.9, 28.9] | 9,535     |
| \$25,000-\$34,999                            | 43.5              | [35.9, 51.0] | 25,157    | 28.1                       | [17.6, 38.6] | 8,728     |
| \$35,000-\$49,999                            | 34.6              | [27.8, 41.4] | 27,484    | 23.3                       | [14.4, 32.2] | 10,097    |
| \$50,000 or more                             | 32.5              | [28.6, 36.4] | 90,461    | 27.4                       | [22.4, 32.3] | 38,297    |
| Don't know/not sure/missing                  | 39.0              | [33.5, 44.4] | 51,148    | 28.5                       | [21.0, 36.1] | 19,691    |

Note:

1. C.I. (95%) = Confidence Interval at 95 percent probability level, based on un-weighted data. C.I. lower range is reported as "0" if the calculated results is negative due to small sample
2. Prevalence is weighted by \_LLCPWT
3. For prevalence rate, denominator includes respondents with do not know/refused/missing responses
4. Asian and American Indian/Alaskan data is listed but is not discussed due to limited sample size

### **3.3.8 HIV/AIDS screening**

HIV stands for human immunodeficiency virus. HIV weakens a person's immune system by destroying cells that fight disease and infection. With proper medical care, HIV can be controlled, but no effective cure exists (CDC, 2019l). An estimated 1.1 million people in the U.S. have HIV, including about 162,500 people who are unaware of their infection. For people with undiagnosed HIV, testing is the first step in maintaining a healthy life and reducing the spread of HIV (CDC, 2019q). The 2017 BRFs surveys the incidence of HIV testing, which includes testing fluid from their mouth but does not count tests as part of a blood donation.

Around 44.8 percent of Delaware adults have been tested for HIV, better than the national rate (38.5 percent). By age, the 35-44 age group reports the most testing rate (65.2 percent). More females (46.7 percent) get the screening than males (42.8 percent). By race-ethnicity, Blacks report statistically significant greater testing rate (62.1 percent) than Whites (40.8 percent) and Hispanics (42.5 percent).

In addition to the HIV testing behavior, 2017 BRFs also surveys "high risk situations," including intravenous drug use, treating for a sexually transmitted disease or STD, receiving money or drugs in exchange for sex, having sex without a condom, and having four or more sex partners in the past year. Around 6.4 percent of respondents report that at least one of these situations apply to them. The U.S. percentage is also 6.4 percent.

**Table 19: HIV Testing**

|                                              | Have ever been tested for HIV?                 |              |           |
|----------------------------------------------|------------------------------------------------|--------------|-----------|
|                                              | Do not count tests as part of a blood donation |              |           |
|                                              | Weighted %                                     | 95% CI       | Est. Pop. |
| <b>Total</b>                                 | 44.8                                           | [42.3, 47.3] | 306,094   |
| <b>AGE</b>                                   |                                                |              |           |
| 18-24                                        | 42.3                                           | [31.9, 52.7] | 33,659    |
| 25-34                                        | 58.4                                           | [52.1, 64.8] | 66,309    |
| 35-44                                        | 65.2                                           | [59.7, 70.7] | 64,794    |
| 45-54                                        | 59.7                                           | [54.5, 64.9] | 65,499    |
| 55-64                                        | 38.4                                           | [32.9, 43.9] | 46,521    |
| 65 and over                                  | 18.4                                           | [13.5, 23.3] | 29,311    |
| <b>GENDER</b>                                |                                                |              |           |
| Male                                         | 42.8                                           | [39.0, 46.6] | 138,417   |
| Female                                       | 46.7                                           | [43.3, 50.0] | 167,676   |
| <b>RACE-ETHNICITY</b>                        |                                                |              |           |
| White, Non-Hispanic                          | 40.8                                           | [37.6, 43.9] | 186,707   |
| Black, Non-Hispanic                          | 62.1                                           | [56.6, 67.7] | 81,223    |
| Asian, Non-Hispanic                          | 22.6                                           | [4.7, 40.5]  | 4,512     |
| American Indian/Alaskan Native, Non-Hispanic | 53.8                                           | [33.0, 74.6] | 4,063     |
| Hispanic                                     | 42.5                                           | [35.4, 49.7] | 22,189    |
| Other, Non-Hispanic                          | 52.9                                           | [38.1, 67.6] | 7,399     |
| <b>EDUCATION</b>                             |                                                |              |           |
| < High School                                | 39.9                                           | [31.5, 47.1] | 30,905    |
| High School                                  | 42.6                                           | [37.9, 47.3] | 87,711    |
| > High School and < College/Technical School | 51.5                                           | [46.6, 56.5] | 100,653   |
| College/Technical School                     | 43.6                                           | [39.3, 47.8] | 86,282    |
| Don't know/not sure/missing                  | 11.8                                           | [0, 37.7]    | 543       |
| <b>HOUSEHOLD INCOME</b>                      |                                                |              |           |
| Less than \$15,000                           | 49.2                                           | [40.9, 57.5] | 21,776    |
| \$15,000-\$24,999                            | 51.3                                           | [45.1, 57.6] | 47,935    |
| \$25,000-\$34,999                            | 46.0                                           | [38.0, 54.1] | 26,246    |
| \$35,000-\$49,999                            | 42.8                                           | [35.1, 50.5] | 34,031    |
| \$50,000 or more                             | 46.8                                           | [42.7, 50.8] | 129,780   |
| Don't know/not sure/missing                  | 35.4                                           | [29.0, 41.8] | 46,326    |

Note:

1. C.I. (95%) = Confidence Interval at 95 percent probability level, based on un-weighted data. C.I. lower range is reported as "0" if the calculated results is negative due to small sample
2. Prevalence is weighted by \_LLCPWT
3. For prevalence rate, denominator includes respondents with do not know/refused/missing responses
4. Asian and American Indian/Alaskan data is listed but is not discussed due to limited sample size

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