

## DELAWARE

2018
BEHAVIORAL RISK FACTOR SURVEY

## BY WEI-MING CHEN <br> JUNE 2020

CENTER FOR APPLIED DEMOGRAPHY \& SURVEY RESEARCH UNIVERSITY OF DELAWARE

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## Executive summary

The 2018 Delaware Behavioral Risk Analysis Survey (BRFS) surveyed 5,233 Delaware adults aged 18 and older. This study uses the weighting variable offered by the U.S. Centers for Disease Control and Prevention (CDC) to generalize the prevalence rates and population of chronic diseases and behavioral risk factors. Analysis results and future BRFS recommendations are listed as below.

## - Key findings

1. In regards to overall health condition, 82.7 percent of Delaware adults positively describe their own health.
2. For health care coverage, 88.8 percent of Delaware adults aged 18 and older are covered. The rate drops to 64.3 percent when only considering adults aged 18 to 64 years old.
3. Health care coverage has statistically significant differences among races. The rate of coverage is 92.8 percent for White adults; 93.7 percent for Asian adults; 88.3 percent for Black adults; and 54.6 percent for Hispanic adults.
4. Arthritis, depressive disorder, and asthma are the three most widely prevalent chronic diseases, with prevalence rates of 25.9 percent, 16.9 percent, and 14.3 percent, respectively.
5. The diabetes rate for Hispanic adults is only 6.9 percent, not aligned with national studies.
6. Being overweight or obese is common in Delaware, with 34.3 percent of adults being overweight and 33.5 percent being obese.
7. Smoking tobacco products is common in Delaware, as 15.7 percent of Delaware adults smoke. About 8.6 percent Delaware adults currently use e-cigarettes every day.
8. In regards to alcohol consumption, respondents with higher household incomes are more likely to engage in heavy drinking. About one in four ( 24.2 percent) 18 to 24 year olds in Delaware engage in binge drinking.
9. The use of seat belts has significant differences across age and gender. The percentage of usage rises as age increases. Females ( 88.3 percent) are more likely to wear seatbelts than males (81.9).
10. Nearly seven in ten Delaware adults ( 73.1 percent) report they have engaged in physical activities or exercise in the past month, which is lower than the national average of 75.4 percent.
11. The flu shot immunization rate is 38.0 percent. Most Delaware adults received flu shots in a doctor's office, health maintenance organization (HMO), or a store.
12. Around 40.8 percent of Delaware adults have been tested for HIV. Black adults report a statistically significant greater testing rate ( 56.3 percent) than White ( 36.1 percent) and Hispanic adults (42.8 percent).
13. The cancer screening rates in Delaware are higher than those in the United States, including screenings for breast cancer, cervical cancer, colorectal cancer and lung cancer.
14. Delaware has a greater percentage of respondents who identify as LGBT+ ( 8.6 percent) than the percentage ( 4.9 percent) in the nation.
15. Appertaining to heroin and opioid usage in Delaware, 10.8 percent of respondents know a family member or a friend of the family that currently uses heroin or other opiates.

- Recommendations for future BRFS

1. Whites, Blacks, and Hispanics are three racial groups fully discussed in this report. Asian and American Indian/Alaskan data is included in this report but is not interpreted, due to limited sample sizes. Strategies to collect information from minor races and ethnicities are in need.
2. More public health outreach and education to the Hispanics. The Hispanic population shows unusually low rates of diabetes and high blood pressure, despite being found most likely to develop diabetes. These significant racial differences are generally consistent with disproportionate findings from the American Medical Group Foundation.
3. Some health data collected in other states or are highly related to Delaware's most prevalent diseases should be considered, such as the Adverse Childhood Experiences (ACEs), blood pressure control actions, and hypertension checking behavior.

## 1. Introduction

Public health is a crucial social issue in the United States. In 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 in order to improve policymaking decisions and budget allocation.

Cooperating with 15 participating states, the U.S. Centers for Disease Control and Prevention (CDC) started the BRFSS in 1984 to annually survey the U.S. adult population, ages 18 and older, about health-related risk behaviors, chronic health conditions, and use of preventive services. The 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 Department of Health and Social Services, Division of Public Health (DPH) partners with the CDC on behalf of the BRFS, with the CDC provides funding and basic data analysis (Delaware Department of Health and Social Services, 2019a). The annual sample in Delaware consists of approximately 4,000 adults aged 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).

This report is structured as follows: Section 2 contains the data and methodology for the 2018 BRFS. Section 3 reports the results of health condition and healthcare access and explores the behavioral risk factors. Section 4 is the conclusion. The objective of this report is to translate statistics into evidence-based information and health policy recommendations.

## 2. Data and methodology

### 2.1 Data sources

This report analyzes the 2018 BRFS data, 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 to allow for a more comprehensive analysis. Data sources include CDC's primary data analysis results, and the DPH's (DHSS) BRFS data reports and presentations.

In addition to a single year (i.e., 2018) data, this study also uses data/reports from 2011 to 2017 for comparisons and trend analysis. The BRFS data collection, structure, and weighting methodology changed in 2011 to allow the addition of data collection by cellular telephones, as to better generalize samples to the population. Aligned with the changes, this study examines and compares data collected after 2011.

### 2.2 Data structure

The BRFSS has three types of questions: (1) the core component, consisting of the fixed core, rotating core, and emerging core, (2) optional modules, and (3) state-added questions. The CDC designed the core component and optional modules. The fixed core is a standard set of questions asked by all states, including questions regarding demographic characteristics and health behaviors, such as tobacco use and seatbelt use. The rotating core has two distinct sets of questions, each asked in alternating years by all states. In the year that rotating core questions are not used, they are supported as optional modules. The emerging core is a set of questions that typically focus on late-breaking issues. The state-chosen optional modules are also designed by the CDC and are adopted by individual states (CDC, 2019b).

Table 1 presents the structure of Delaware's 2018 BRFS questionnaire. In the 2018 survey, the state optional modules cover questions of excess sun exposure, lung cancer screening, cancer survivorship, prostate cancer screening decision making, industry and occupation, sexual orientation, and gender identity. The state-added question is related to tobacco use, preconception health/family planning, and heroin and opioids.

Since each state has the opportunity to select modules and adjust the questionnaire annually, questions in the 2018 BRFS 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 BRFS while other questions (e.g., breast/cervical cancer screening, drinking and driving, and falls) are asked every other year. Table 2 summarizes the questions selected in BRFS from 2011 to 2019. For the 2018 BRFS, the unique modules include cancer survivorship, excess
sun exposure, heroin and opioid use, industry and occupation, and lung cancer screening, which are included in the BRFS for the first time.

Table 1: Delaware 2018 Questionnaire Structure
Core Sections

| Section 1 | Health Status |
| :--- | :--- |
| Section 2 | Healthy Days - Health-Related Quality of Life |
| Section 3 | Health Care Access |
| Section 4 | Exercise |
| Section 5 | Inadequate Sleep |
| Section 6 | Chronic Health Conditions |
| Module 2 | Diabetes |
| Section 7 | Oral Health |
| Section 8 | Demographics |
| Section 9 | Tobacco Use |
| DE State-Added 1 | Tobacco Use |
| Module 6 | E-Cigarettes |
| Section 10 | Alcohol Consumption |
| Section 11 | Immunization |
| Section 12 | Falls |
| Section 13 | Seat Belt Use and Drinking and Driving |
| Section 14 | Breast and Cervical Cancer Screening |
| Section 15 | Prostate Cancer Screening |
| Section 16 | Colorectal Cancer Screening |
| Section 17 | HIV/AIDS |

## Optional Modules

| Module 12 | Excess Sun Exposure |
| :--- | :--- |
| Module 13 | Lung Cancer Screening |
| Module 14 | Cancer Survivorship |
| Module 15 | Prostate Cancer Screening Decision Making |
| Module 20 | Industry and Occupation |
| Module 21 | Sexual Orientation and Gender Identity |
| DE State-Added 2 | Preconception Health/Family Planning |
| DE State-Added 3 | Heroin and Opioids |

Source: (CDC and Delaware Health and Social Services, 2017)

Table 2: Core Sections and Optional Modules (2011-2019)

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


| Preconception Health/ Family Planning |  |  |  |  |  |  | $\bullet$ | $\bullet$ | $\bullet$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Prostate Cancer Screening | - | - | - | - | $\bullet$ | - |  | $\bullet$ |  |
| Prostate Cancer Screening |  | $\bullet$ | - |  | - |  |  |  |  |
| Decision Making |  |  |  |  |  |  |  |  |  |
| Random Child Selection | $\bullet$ |  |  |  |  |  |  |  |  |
| Seatbelt Use | $\bullet$ | - | - | $\bullet$ | - | $\bullet$ | $\bullet$ | $\bullet$ |  |
| Sexual Orientation/ Gender Identity |  |  |  | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ |
| Sexual Assault |  |  |  |  |  |  | $\bullet$ |  |  |
| Social Context |  |  |  |  | $\bullet$ |  |  |  |  |
| State-Added Tobacco | $\bullet$ | $\bullet$ | $\bullet$ |  |  |  |  |  |  |
| Questions | $\bullet$ |  |  |  |  |  |  |  |  |
| Sugar Sweetened Beverages | $\bullet$ | $\bullet$ |  |  |  | $\bullet$ | $\bullet$ |  |  |
| Tobacco Use | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ | - | $\bullet$ | $\bullet$ | $\bullet$ | $\bullet$ |

Note:

1. This table includes questions for core sections and optional modules and lists all sections/modules in alphabetical order.
2. The "chronic health conditions" section includes diverse types of diseases in different years. For example, the 2018 BRFS does not include hypertension and cholesterol, which are included in the 2017 BRFS.
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 a sample ( $n=5,233$ ), using the weighting variable "_LLCPWT" (CDC, 2019c, 2018a). The CDC uses weighting methodology comprised of design weight and raking ${ }^{1}$. Design weight adjusts the unequal probability of sample 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, 2019d). 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 (CDC, 2018b).

This report 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 that if a survey were to be conducted 100 times, 95 of the responses would lie within that C.I. 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 reflects little variability and high precision (CDC, 2013a). Additionally, if the C.I. between two estimates does not overlap, this indicates a statistically significant difference (Delaware Health and Social Services, 2019). For example, Table 3 shows the percentage of good or better health conditions among males and females. The difference between male and female is not statistically significant because the C.I. overlap.

| Table 3: Subjective Evaluations of General Health as Good or Better Health |  |  |  |
| :--- | :---: | :---: | :---: |
|  | Wt. $\%$ | $95 \%$ C.I. | Est. Pop. |
| Male | 48.3 | $[45.7,50.9]$ | 296,094 |
| Female | 51.7 | $[49.4,54.0]$ | 317,411 |

Source: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

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## 3. Results

### 3.1 Subjective health evaluation and health care access

This segment analyzes Section 1 ("Health Status") of the 2018 BRFS 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 that of respondents across the United States. Nationally, 81.3 percent of respondents describe their health as "excellent," "very good," and "good." Around 18.5 percent describe it as "fair" or "poor." In Delaware, 82.7 percent of respondents describe their health positively and 17.1 percent describe it as "fair" or worse (Table 4).

| Table 4: Health Status in Delaware and the U.S. |  |  |
| :--- | :---: | :---: |
|  | Delaware |  |
|  | Wt. $\%$ | U. S. |
| Excellent | 18.4 | $\mathrm{Wt} \%$. |
| Very good | 32.1 | 17.7 |
| Good | 32.2 | 31.4 |
| Fair | 13.3 | 32.2 |
| Poor | 3.8 | 13.7 |
| Don't know/Not sure | 0.2 | 4.8 |
| Refused | 0.0 | 0.2 |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

Unsurprisingly, self-assessment of health tends to decline with age; however, 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 76.5 percent.

A slightly larger share of men views their health positively compared to women - by a difference of 3.5 percentage points. The divides between socio-economic status are larger than those of 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, 67.5 percent of Delaware adults without a high school diploma describe their overall health as "good" or better, while 92.1 percent of those with a college or technical school degree rate their health positively. The difference is 24.6 percentage points, meaning the C.I. indicates a statistical difference exists between these two groups.

In a similar pattern, only 61.2 percent of respondents with an annual household income less than $\$ 15,000$ evaluate their health positively, but 90.1 percent of individuals with annual household earnings above $\$ 50,000$ do so. A gap of 28.9 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 83.7 percent of White and 81.4 percent of Black respondents report "good" or better health. A higher portion of Asian Delaware adults rate their health positively, with 91.0 percent of respondents reporting "good" or better health. However, only 77.0 percent of Hispanics evaluate their health status as "good" or better.

Table 5: Subjective Evaluations of General Health

|  | "Good" or better health |  | "Poor" or "Fair" health |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Wt. \% | 95\% C.I. | Est. Pop. | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | $82.7 \%$ | $[81.5,83.9]$ | 635,815 | $17.1 \%$ | $[16.4,21.0]$ | 131,879 |
| AGE |  |  |  |  |  |  |
| 18-24 | $89.5 \%$ | $[85.9,93.2]$ | 79,152 | $13.9 \%$ | $[1.3,19.5]$ | 9,195 |
| 25-34 | $88.8 \%$ | $[85.9,91.7]$ | 113,135 | $12.8 \%$ | $[3.9,18.4]$ | 14,165 |
| 35-44 | $84.9 \%$ | $[81.8,88.0]$ | 96,999 | $16.9 \%$ | $[8.6,21.5]$ | 17,213 |
| 45-54 | $81.7 \%$ | $[78.7,84.7]$ | 99,495 | $19.4 \%$ | $[12.3,23.9]$ | 22,067 |
| 55-64 | $79.6 \%$ | $[76.9,82.3]$ | 107,509 | $21.1 \%$ | $[15.3,25.1$ | 27,255 |
| 65 and over | $76.5 \%$ | $[74.3,78.7]$ | 139,526 | $24.5 \%$ | $[19.1,27.0]$ | 41,983 |
| GENDER |  |  |  |  |  |  |
| Male | $84.5 \%$ | $[82.9,86.2]$ | 310,583 | $17.9 \%$ | $[12.0,18.6]$ | 9,195 |
| Female | $81.0 \%$ | $[79.3,82.6]$ | 325,231 | $19.5 \%$ | $[15.8,21.9]$ | 14,165 |
| RACE-ETHNICITY |  |  |  |  |  |  |
| White, Non-Hispanic | $83.7 \%$ | $[82.3,85.0]$ | 422,638 | $18.2 \%$ | $[13.5,19.0]$ | 81,961 |
| Black, Non-Hispanic | $81.4 \%$ | $[78.1,84.6]$ | 127,601 | $17.8 \%$ | $[12.8,24.4]$ | 29,162 |
| Asian, Non-Hispanic | $91.0 \%$ | $[85.9,96.0]$ | 28,345 | $9.4 \%$ | $[0,22.3]$ | 2,313 |
| American Indian/Alaskan | $74.3 \%$ | $[62.3,86.3]$ | 4,194 | $22.4 \%$ | $[5.5,45.9]$ | 1,450 |
| Native, Non-Hispanic |  |  |  |  |  |  |
| Hispanic | $77.0 \%$ | $[72.9,81.2]$ | 46,737 | $26.8 \%$ | $[15.5,29.2]$ | 13,556 |
| Other, Non-Hispanic | $64.7 \%$ | $[65.4,74.8]$ | 6,300 | $26.3 \%$ | $[21.6,49.0]$ | 3,439 |
| EDUCATION |  |  |  |  |  |  |
| < High School | $67.5 \%$ | $[62.3,72.7]$ | 57,954 | $36.4 \%$ | $[25.8,38.4]$ | 27,547 |
| High School | $79.3 \%$ | $[76.9,81.7]$ | 192,017 | $23.5 \%$ | $[16.6,24.7]$ | 49,924 |
| > High School and < | $83.2 \%$ | $[80.9,85.4]$ | 183,724 | $16.9 \%$ | $[12.4,20.9]$ | 36,781 |
| College/Technical School |  |  |  |  |  |  |
| College/Technical School | $92.1 \%$ | $[90.8,93.4]$ | 200,228 | $7.7 \%$ | $[3.9,11.4]$ | 16,673 |
| Don't know/not | $66.5 \%$ | $[45.3,87.7]$ | 1,893 | $26.3 \%$ | $[0,68.5]$ | 954 |
| sure/missing |  |  |  |  |  |  |
| HOUSEHOLD INCOME | $61.2 \%$ | $[54.7,67.7]$ | 29,754 | $44.5 \%$ | $[31.5,45.6]$ | 18,740 |
| Less than \$15,000 | $69.8 \%$ | $[65.8,73.8]$ | 76,233 | $32.6 \%$ | $[24.7,35.5]$ | 32,870 |
| \$15,000-\$24,999 | $79.9 \%$ | $[75.5,84.3]$ | 43,034 | $22.2 \%$ | $[11.8,28.4]$ | 10,825 |
| \$25,000-\$34,999 | $84.0 \%$ | $[80.6,87.4]$ | 69,764 | $13.3 \%$ | $[9.4,22.5]$ | 13,259 |
| \$35,000-\$49,999 | $90.1 \%$ | $[89.1,91.8]$ | 297,806 | $8.5 \%$ | $[5.4,13.3]$ | 30,795 |
| \$50,000 or more | $82.2 \%$ | $[79.5,84.9]$ | 119,223 | $22.4 \%$ | $[12.4,22.6]$ | 25,389 |
| Don't know/not |  |  |  |  |  |  |
| sure/missing |  |  |  |  |  |  |

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 a 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 not discussed due to limited sample size.

### 3.2 Health care access

The 2018 BRFS collects Delaware adults' health care coverage (including health insurance, prepaid plans, and government plans), health care provider, medical affordability, and routine checkup.

About 88.8 percent of Delaware adults aged 18 and above have health care coverage, slightly higher than the national average ( 87.3 percent). However, when only considering adults aged 18 to 64 years old, the coverage rate drops to 64.3 percent in Delaware and 65.6 percent in the United States. A large portion ( 26.1 percent in Delaware and 23.0 percent in the nation) of respondents in the 18-64 group answered "don't know, not sure, refused, or missing" to the health coverage information.

| Table 6: Health Care Coverage in Delaware and the U.S. | Age 18 to 64 |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
| Age 18 and above |  | Delaware Wt. \% |  | U.S. Wt. \% | Delaware Wt. \% | U.S. Wt. \% |
| :--- |
| Yes |
| Do |
| No |
| Don't know/Not sure/ |
| Refused/Missing |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

Health care coverage may influence the frequency and affordability of doctor visits. About one in ten ( 10.5 percent) adults in Delaware needed but could not see a doctor because of cost in the past 12 months. For routine checkups, 79.1 percent respondents did so within the past year; 10.2 percent within the past two years; 4.9 percent within the past 5 years. About 4.1 percent of respondents' last routine checkup occurred five or more years ago.

Table 7 reports the health care coverage across demographic characteristics. In Delaware, more females ( 89.9 percent) than males ( 87.5 percent) have health care coverage. The senior respondents have higher coverage rate.

A statistically significant difference presents among races. While White ( 92.8 percent) and Asian groups ( 93.7 percent) have high coverage rates, fewer Black adults ( 88.3 percent) have health coverage and only half ( 54.6 percent) Hispanic adults have coverage.

Social economic status also influences health care coverage. The coverage rate increases with higher educational attainment and household income. About 67.1 percent of adults without a high school diploma have health coverage. The rate increases to 95.7 percent among those who
have a college or technical school degree. Similarly, 79.1 percent of adults with household earnings below $\$ 15,000$ have health care coverage, compared to 96.0 percent of adults in households with $\$ 50,000$ or more.

Table 7: Health Care Access (Age 18 and above)

|  | Wt. $\%$ | $95 \%$ C.I. | Est. Pop. |
| :--- | :---: | :---: | :---: |
| Total | $88.8 \%$ | $[87.9,89.7]$ | 769,124 |
| AGE |  |  |  |
| 18-24 | $78.8 \%$ | $[73.5,84.1]$ | 69,652 |
| $25-34$ | $80.7 \%$ | $[76.8,84.6]$ | 102,757 |
| $35-44$ | $83.4 \%$ | $[80.1,86.7]$ | 95,249 |
| 45-54 | $91.9 \%$ | $[89.9,93.9]$ | 111,956 |
| 55-64 | $93.0 \%$ | $[91.4,94.6]$ | 125,508 |
| 65 and over | $97.5 \%$ | $[96.8,98.2]$ | 177,715 |
| GENDER |  |  |  |
| Male | $87.5 \%$ | $[86.1,88.9]$ | 321,542 |
| Female | $89.9 \%$ | $[88.8,91.0]$ | 361,295 |
| RACE-ETHNICITY |  |  |  |
| White, Non-Hispanic | $92.8 \%$ | $[91.9,93.7]$ | 468,776 |
| Black, Non-Hispanic | $88.3 \%$ | $[85.8,90.8]$ | 138,552 |
| Asian, Non-Hispanic | $93.7 \%$ | $[89.5,97.9]$ | 29,198 |
| American Indian/Alaskan Native, Non-Hispanic | $74.4 \%$ | $[63.3,85.5]$ | 4,199 |
| Hispanic | $54.6 \%$ | $[48.9,60.3]$ | 33,114 |
| Other, Non-Hispanic | $92.4 \%$ | $[87.7,97.1]$ | 8,997 |
| EDUCATION |  |  |  |
| < High School | $67.1 \%$ | $[62.0,72.2]$ | 57,619 |
| High School | $88.4 \%$ | $[86.7,90.1]$ | 214,006 |
| > High School and < College/Technical School | $91.0 \%$ | $[89.4,92.6]$ | 201,078 |
| College/Technical School | $95.7 \%$ | $[94.8,96.6]$ | 208,169 |
| Don’t know/not sure/missing | $69.0 \%$ | $[48.2,89.8]$ | 1,965 |
| HOUSEHOLD INCOME |  |  |  |
| Less than \$15,000 | $79.1 \%$ | $[74.7,83.5]$ | 38,443 |
| \$15,000-\$24,999 | $79.7 \%$ | $[76.6,82.8]$ | 87,034 |
| \$25,000-\$34,999 | $89.3 \%$ | $[86.1,92.5]$ | 48,091 |
| \$35,000-\$49,999 | $87.7 \%$ | $[84.9,90.5]$ | 72,827 |
| \$50,000 or more | $96.0 \%$ | $[95.1,96.9]$ | 316,109 |
| Don’t know/not sure/missing | $83.0 \%$ | $[80.4,85.6]$ | 120,333 |

Note: Same with Table 5.

### 3.3 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).

The chronic health condition section is a core component of the Delaware BRFS. Eleven types of chronic diseases (i.e., angina, arthritis, asthma, chronic obstructive pulmonary disease (COPD), depressive disorder, diabetes, heart attack, kidney disease, stroke, skin cancer, and other types of cancer) were surveyed in 2018. Figure 1 presents Delaware adults' chronic disease prevalence rate in 2018.

Figure 1
BRFS 2018 Chronic disease prevalence in Delaware


Data source: 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e)
Figure source: This study

Table 8 lists the prevalence rates and the estimated population of chronic conditions in Delaware based on the 2018 BRFS. The chronic disease prevalence in Delaware shares a similar pattern with that of the U.S. (aggregated data from states). Arthritis, depressive disorder, and asthma are the three most widely prevalent chronic diseases in Delaware, as well as in the entire nation. Specifically, the Arthritis prevalence rate is $25.9 \%$ in Delaware and $25.7 \%$ in the U.S.; the
depressive disorder rate is $16.9 \%$ in Delaware and $18.2 \%$ in the U.S.; and the asthma rate is $14.3 \%$ in Delaware and 14.5\% in the U.S.

Table 8: Chronic Disease Prevalence

|  | Wt. \% | Delaware <br> $95 \% ~ C . I . ~$ | Est. Pop. | U.S. <br> Wt. $\%$ |
| :--- | :---: | :---: | :---: | :---: |
| Angina | 4.2 | $[2.0,6.4]$ | 32,479 | 4.3 |
| Arthritis | 25.9 | $[23.8,28.0]$ | 199,406 | 25.7 |
| Asthma | 14.3 | $[11.7,16.9]$ | 110,079 | 14.5 |
| Chronic Obstructive <br> Pulmonary Disease | 7.0 | $[4.7,9.3]$ | 53,782 | 6.8 |
| Depressive Disorder | 16.9 | $[14.4,19.4]$ | 129,739 | 18.2 |
| Diabetes | 11.9 | $[9.6,14.2]$ | 91,358 | 11.4 |
| Heart Attack | 4.3 | $[2.1,6.5]$ | 33,289 | 4.6 |
| Kidney Disease | 3.6 | $[1.1,6.1]$ | 27,982 | 3.1 |
| Other Type of Cancer | 7.5 | $[5.3,9.7]$ | 57,794 | 6.8 |
| Skin Cancer | 6.0 | $[3.8,8.2]$ | 46,136 | 6.2 |
| Stroke | 3.8 | $[1.5,6.1]$ | 29,267 | 3.4 |

Note:

1. Prevalence percentages and estimated population are weighted to population characteristics, using variable "_LLCPWT" computed by the CDC.
2. The denominator includes respondents with "do not know/refused/missing" responses.
3. Delaware data source: This study compiles data from 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e); U.S. data source: (CDC, 2019f).

It is noteworthy that the 2018 BRFS does not survey the prevalence of hypertension and cholesterol. In 2017, hypertension and cholesterol were the two chronic diseases with the greatest prevalence in Delaware. Appendix A presents hypertension and cholesterol analysis based on the 2017 BRFS data. However, the 2018 BRFS includes a module of diabetes for additional data collection. Therefore, the following sections examine arthritis (the most prevalent chronic disease in Delaware in the 2018 BRFS) and diabetes.

### 3.3.1 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 the 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 2018, around one-fourth ( 25.2 percent) of Delaware adults had been diagnosed with arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia. The prevalence rate is similar to the rate in the U.S. 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; and 46.9 percent among the age group of those 65 and older.

Females have a significantly higher prevalence rate 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 a household income of less than $\$ 15,000,35.4$ percent have been diagnosed with arthritis or a related condition. This share declines steadily with each wealthier income group. The share drops to 21.1 percent of the households with incomes of $\$ 50,000$ or greater.

The Arthritis Burden Section of the 2018 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 for an overall estimation of the impact of quality of life for those who have arthritis.

About half of Delaware adults ( 50.1 percent) with arthritis report that their arthritis or joint symptoms limit their usual activities. Similarly, arthritis or joint symptoms affect 35.8 percent of arthritis patients' work. Finally, 22.9 percent of patients report that these symptoms affect many 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 includes an educational course for managing arthritis problems.

| Table 9: Arthritis |  |  |  |
| :---: | :---: | :---: | :---: |
|  | (Ever been told) have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia? |  |  |
|  | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 25.2\% | [22.8, 27.6] | 191,293 |
| AGE |  |  |  |
| 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 |
| GENDER |  |  |  |
| Male | 21.1\% | [17.4, 24.8] | 76,669 |
| Female | 28.9\% | [25.8, 32.0] | 114,624 |
| RACE-ETHNICITY |  |  |  |
| 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 |
| EDUCATION |  |  |  |
| < 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 |
| HOUSEHOLD INCOME |  |  |  |
| 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: Same with Table 5.

### 3.3.2 Diabetes

Diabetes is a chronic, progressive disease that affects how a body turns dietary glucose into energy. People with diabetes have elevated blood glucose levels (high blood sugar) within their bloodstream, which can damage nerves, blood vessels, and organs. Diabetes also increases the risk for other serious health problems, such as heart disease, vision loss, and kidney disease. While there is no cure for diabetes, the condition is controllable with effective management strategies (CDC, 2020a; Delaware Department of Health and Social Services, 2019c).

There are three major types of diabetes: type 1, type 2, and gestational diabetes. Type 1 diabetes is typically diagnosed in children, teens, and young adults, whose pancreas is not making insulin or making very little. Insulin is a hormone that allows people's cells to use glucose from the food and helps control the levels of blood sugar. Approximately 5-10 percent of people with diabetes have type 1. Type 1 diabetes is caused by an autoimmune reaction (the body attacks itself by mistake) and in some cases, may be genetic. Type 1 diabetes is not preventable based on current knowledge, but can be managed by controlling blood sugar and living a healthy lifestyle (CDC, 2020b).

Type 2 diabetes is more common than type 1 -approximately 90-95 percent of people with diabetes have type 2. Type 2 diabetes often develops in people over 45, but is becoming more common in teens and youth. The cause of type 2 diabetes is "insulin resistance", in which the pancreas makes insulin, but cells do not respond normally to the hormone. Type 2 diabetes symptoms often develop over many years and may be unnoticed for a long time. Having one's blood sugar tested and being knowledgeable about the risk factors for type 2 diabetes are strategies to prevent the disease. Similarly to type 1, type 2 diabetes is also manageable through diet and lifestyle modifications, as well as insulin or other injectable medications (CDC, 2020c).

Gestational diabetes develops in pregnant women who did not have diabetes before pregnancy. Gestational diabetes may lead to problems for the pregnant woman and the baby, such as high blood pressure or low blood sugar for the mother, or an extra-large baby. Gestational diabetes can often be controlled through healthy eating, regular exercise, or, if needed, taking insulin (CDC, 2020d).

According to CDC, the number of adults diagnosed with diabetes has more than doubled in the past 20 years, as the population has aged and become more overweight or obese (CDC, 2020e). In 2018, 34.2 million Americans—just over 1 in 10—have diabetes (CDC, 2020f). Table 10 lists adult diabetes rates in Delaware and the U.S. since $2011^{2}$. The rate of diagnosed diabetes in

[^1]Delaware is slightly higher than that of the U.S. Also, the diabetes prevalence rate ${ }^{3}$ in Delaware keeps rising, from 9.7 percent in 2011 to 11.9 percent in 2018.

| Table 10: Adult Diabetes Prevalence in Delaware and the U.S. |  |  |
| :--- | :---: | :---: |
|  | Delaware | U.S. |
|  | Wt. $\%$ | Wt. $\%$ |
| 2011 | 9.7 | 9.8 |
| 2012 | 9.6 | 10.2 |
| 2013 | 11.1 | 10.3 |
| 2014 | 11.1 | 10.5 |
| 2015 | 11.5 | 10.5 |
| 2016 | 10.6 | 10.8 |
| 2017 | 11.3 | 10.9 |
| 2018 | 11.9 | 11.4 |

Source: 1. Delaware data: (Delaware Department of Health and Social Services, 2020) 2. U.S. data: This study compiles data from 2011-2018 BRFSS Codebooks (CDC, 2019f, 2018c, 2017a, 2016, 2015, 2014, 2013b, 2012).

In 2018, 11.9 percent of Delaware adults reported having either type 1 or type 2 diabetes, while only 0.7 percent reported having gestational diabetes. Diabetes becomes more prevalent with age. Only 0.6 percent of $18-24$ year olds have diabetes, but the prevalence rises to 13.9 percent among adults age 45-54; 19.2 percent among adults age 55-64; and 21.9 percent among those 65 and older. There is no statistically significant difference between rates of diabetes in men (13.1 percent) and women (10.7 percent).

Significant differences exist among non-Hispanic and Hispanic groups in Delaware: 15.2 percent of African-American adults and 11.7 percent of White adults reported having diabetes in 2018. However, the diabetes rate is only 6.9 percent for Hispanic adults. Delaware's survey results are very different compared to the nationwide prevalence pattern among racial or ethnic categories. A national study in the U.S. shows that Hispanic adults are 1.7 times more likely than non-Hispanic white adults to have diabetes (US Department of Health and Human Services Office of Minority Health, 2019). The CDC also reports that Hispanic Americans are more likely to develop diabetes (17 percent) than non-Hispanic whites (8 percent) (CDC, 2019h). Therefore, it is crucial to explore the reason for such low diabetes rates in Delaware's Hispanic population.

[^2]There is not a statistically significant difference in diabetes rates between adults with different socio-economic statuses. However, adults with college/technical school degrees or household incomes above $\$ 50,000$ show lower prevalence rates than that of other groups.

| Table 11: Diabetes | (Ever been told) have diabetes? |  |  |
| :--- | :---: | :---: | :---: |
|  | Wt. $\%$ | $95 \%$ C.I. | Est. Pop. |
| Total | 11.9 | $[9.6,14.2]$ | 91,358 |
| AGE |  |  |  |
| 18-24 | $0.6 \%$ | $[0,11.6]$ | 559 |
| $25-34$ | $1.7 \%$ | $[0,10.1]$ | 2,134 |
| $35-44$ | $5.0 \%$ | $[0,12.3]$ | 5,765 |
| 45-54 | $13.9 \%$ | $[7.4,20.5]$ | 16,977 |
| 55-64 | $19.2 \%$ | $[13.9,24.5]$ | 25,961 |
| 65 and over | $21.9 \%$ | $[17.9,26.0]$ | 39,961 |
| GENDER |  |  |  |
| Male | $13.1 \%$ | $[9.7,16.6]$ | 48,240 |
| Female | $10.7 \%$ | $[7.7,13.8]$ | 43,118 |
| RACE-ETHNICITY |  |  |  |
| White, Non-Hispanic | $11.7 \%$ | $[9.0,14.5]$ | 59,249 |
| Black, Non-Hispanic | $15.2 \%$ | $[9.3,21.2]$ | 23,846 |
| Asian, Non-Hispanic | $5.8 \%$ | $[0,18.5]$ | 1,813 |
| American Indian/Alaskan Native, Non-Hispanic | $12.5 \%$ | $[0,29.9]$ | 708 |
| Hispanic | $6.9 \%$ | $[0,14.2]$ | 4,161 |
| Other, Non-Hispanic | $16.2 \%$ | $[1.8,30.7]$ | 1,580 |
| EDUCATION |  |  |  |
| < High School | $13.3 \%$ | $[6.0,20.7]$ | 11,447 |
| High School | $14.1 \%$ | $[9.8,18.4]$ | 34,133 |
| > High School and < College/Technical School | $11.5 \%$ | $[7.2,15.8]$ | 25,374 |
| College/Technical School | $9.0 \%$ | $[5.1,12.8]$ | 19,539 |
| Don't know/not sure/missing | $30.4 \%$ | $[0,64.4]$ | 865 |
| HOUSEHOLD INCOME |  |  |  |
| Less than \$15,000 | $13.7 \%$ | $[5.6,21.9]$ | 6,677 |
| \$15,000-\$24,999 | $16.9 \%$ | $[11.1,22.7]$ | 18,452 |
| \$25,000-\$34,999 | $14.1 \%$ | $[5.8,22.3]$ | 7,573 |
| \$35,000-\$49,999 | $15.7 \%$ | $[8.9,22.6]$ | 13,060 |
| \$50,000 or more | $9.0 \%$ | $[5.3,12.7]$ | 29,657 |
| Don’t know/not sure/missing | $11.0 \%$ | $[5.7,16.3]$ | 15,939 |
|  |  |  |  |

Note: Same with Table 5.

In addition to prevalence rates, the 2018 BRFS also provides information about compliance with recommendations for people with diabetes. Table 12 listed the compliance rate of each action taken by respondents with diabetes. Among them, 83.5 percent had seen a health professional ${ }^{4}$ for their diabetes in the past 12 months; 85.0 percent had received an "A-one-C"5 test in the past 12 months; 74.8 percent had an eye exam in which their pupils were dilated in the past year; 72.1 percent had a health professional check their feet for any sores or irritations in the past 12 months; 52.5 percent monitored their blood glucose (or sugar) every day; 49.1 percent have taken a course or class in self-managing their diabetes; and 32.7 percent are now taking insulin.

## Table 12: Percentage of Delaware Adults Aged 18 or Older with Diagnosed Diabetes who Reported Receiving Recommended Preventive Care Practices

|  | Delaware <br> Wt. \% | U.S. <br> Wt. \% |
| :--- | :---: | :---: |
| 1. One or more A-one-C tests in the past 12 months | 85.0 | 83.3 |
| 2. See health professional for diabetes in the past 12 months | 83.5 | 86.3 |
| 3. Dilated eye exam in the past year | 74.8 | 64.8 |
| 4. Foot exam by health professional in the past 12 months | 72.1 | 69.0 |
| 5. Daily self-monitoring of blood glucose | 52.5 | 58.5 |
| 6. Ever attended diabetes self-management class | 49.1 | 49.6 |
| 7. Take insulin | 32.7 | 34.5 |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

[^3]
### 3.3.3 Oral health

Oral health affects a person's ability to eat, speak, smile, and show emotions (CDC, 2019i). Oral health problems in adults include untreated cavities (also called tooth decay), gum disease, tooth loss, and oral cancer (CDC, 2019j). Cavities are one of the most common chronic diseases in the United States (CDC, 2019i).

The BRFS addresses two oral health questions on even numbered years: (1) the time period since last dentist or dental clinic visit, (2) number of permanent teeth removed because of tooth decay or gum disease (not including teeth lost for injury or orthodontics).

Table 13 and 14 compare the survey results in Delaware and the United States. The percentage distribution in both questions are similar in Delaware and the entire country. Around six in ten people visited a dentist or a dental clinic in the past year ( 65.3 percent in Delaware; 65.8 percent in the U.S.). Around half of the respondents report that none of their permanent teeth had been removed ( 54.9 percent in Delaware; 56.7 percent in the U.S.). More than a quarter of respondents have had one to five permanent teeth removed ( 26.9 percent in Delaware; 27.3 percent in the U.S.).

| Table 13: Last Visited Dentist or Dental Clinic |  |  |
| :--- | :---: | :---: |
|  | Delaware | U.S. |
|  | Wt. $\%$ | Wt. $\%$ |
| 1. Within the past year (anytime less than 12 months ago) | 65.3 | 65.8 |
| 2. Within the past 2 years (1 year but less than 2 years ago) | 12.0 | 11.9 |
| 3. Within the past 5 years (2 years but less than 5 years ago) | 8.5 | 9.5 |
| 4. 5 or more years ago | 11.6 | 10.7 |
| 5. Don't know/not sure, never, refused, missing | 1.6 | 2.1 |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

| Table 14: Number of Permanent Teeth Removed |  |  |
| :--- | :---: | :---: |
|  | Delaware | U.S. |
|  | Wt. $\%$ | Wt. $\%$ |
| 1. One to five | 26.9 | 27.3 |
| 2. Six or more, but not all | 9.6 | 9.2 |
| 3. All | 5.9 | 4.8 |
| 4. None | 54.9 | 56.7 |
| 5. Don't know/not sure, never, refused, missing | 2.6 | 2.0 |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

Table 15 presents dentist visits and permanent teeth extractions by age, sex, race and ethnicity, education, and income. For the percentage of visiting a dentist within a year, statistically significant differences have been identified in categories of race and ethnicity, education, and income. Nearly seven in ten White adults ( 69.3 percent) have visited a dentist in the past year. The rate for Black adults is 56.9 percent, and 56.7 percent for Hispanic adults. Nearly 85 percent ( 84.1 percent) of respondents with college/technical school degrees visited a dentist within the past year. The dentist visiting rate is only 41.6 percent for those who do not have a high school degree. Eight in ten ( 79.2 percent) of respondents with a household income of $\$ 50,000$ or more have visited a dentist in the past 12 months. Only 35.2 percent of those who have household incomes less than $\$ 15,000$ have visited a dentist within the past year.

Regarding permanent teeth, 42.3 percent of respondents reported having had permanent teeth removed. The percentage increases with the age of respondents. More than six in ten (63.4 percent) respondents aged 65 and over have had permanent teeth extracted. More females (43.7 percent) have had permanent teeth removed than males ( 41.1 percent). Black adults reported higher rates of teeth extraction (47.0 percent) than White ( 42.5 percent) and Hispanic adults (39.5 percent). Statistically significant differences are identified among various socio-economic groups. Higher educational attainment and higher household income groups have fewer percentages of permanent teeth removed. In detail, the rate is 29.2 percent for respondents with a college/technical school degree, and 62.0 percent for respondents without a high school diploma. The rate of permanent teeth removal is 34.6 percent for respondents with a household income of $\$ 50,000$ or more. The rate is above 50.0 percent for respondents who have household income less than $\$ 34,999$.

Table 15: Dentist Visit and Permanent Teeth Extracted

|  | Visited a dentist in past year |  |  | Permanent teeth extracted |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Wt. \% | 95\% C.I. | Est. Pop. | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 65.3\% | [63.7, 66.9] | 502,367 | 42.3\% | [40.5, 44.4] | 326,535 |
| AGE |  |  |  |  |  |  |
| 18-24 | 64.2\% | [57.6, 70.8] | 56,787 | 13.2\% | [3.9, 22.5] | 11,668 |
| 25-34 | 57.1\% | [51.4, 62.8] | 72,742 | 23.9\% | [16.8, 31.0] | 30,433 |
| 35-44 | 62.4\% | [57.5, 67.3] | 71,320 | 36.3\% | [30.2, 42.4] | 41,496 |
| 45-54 | 68.4\% | [64.4, 72.4] | 83,263 | 43.2\% | [38.0, 48.4] | 52,619 |
| 55-64 | 65.2\% | [61.7, 68.7] | 88,049 | 55.4\% | [51.5, 59.3] | 74,803 |
| 65 and over | 71.4\% | [69.0, 73.8] | 130,205 | 63.4\% | [60.6, 66.2] | 115,515 |
| GENDER |  |  |  |  |  |  |
| Male | 62.7\% | [60.2, 65.2] | 230,447 | 41.1\% | [38.2, 44.0] | 151,043 |
| Female | 67.7\% | [65.6, 69.8] | 271,920 | 43.7\% | [41.1, 46.3] | 175,492 |
| RACE-ETHNICITY |  |  |  |  |  |  |
| White, Non-Hispanic | 69.3\% | [67.5, 71.1] | 350,184 | 42.5\% | [40.2, 44.8] | 214,876 |
| Black, Non-Hispanic | 56.9\% | [52.1, 61.7] | 89,257 | 47.0\% | [42.0, 52.0] | 73,720 |
| Asian, Non-Hispanic | 64.5\% | [54.8, 74.2] | 20,105 | 22.8\% | [10.3, 35.3] | 7,094 |
| American Indian/Alaskan Native, Non-Hispanic | 59.1\% | [43.7, 74.5] | 3,337 | 47.9\% | [30.9, 64.9] | 2,702 |
| Hispanic | 56.7\% | [51.0, 62.4] | 34,380 | 39.5\% | [33.5, 45.5] | 23,963 |
| Other, Non-Hispanic | 52.4\% | [40.7, 64.1] | 5,104 | 42.9\% | [31.0, 54.8] | 4,179 |
| EDUCATION |  |  |  |  |  |  |
| < High School | 41.6\% | [34.8, 48.4] | 35,764 | 62.0\% | [56.8, 67.2] | 53,285 |
| High School | 55.6\% | [52.2, 59.0] | 134,661 | 46.4\% | [43.0, 49.8] | 112,308 |
| > High School and < College/Technical School | 66.9\% | [63.8, 70.0] | 147,696 | 43.3\% | [39.6, 47.0] | 95,649 |
| College/Technical School | 84.1\% | [82.3, 85.9] | 182,937 | 29.2\% | [25.7, 32.7] | 63,572 |
| Don't know/not sure/missing | 46.0\% | [17.8, 74.2] | 1,308 | 60.4\% | [32.7, 88.1] | 1,720 |
| HOUSEHOLD INCOME |  |  |  |  |  |  |
| Less than \$15,000 | 35.2\% | [27.4, 43.0] | 17,138 | 50.8\% | [44.4, 57.2] | 24,727 |
| \$15,000-\$24,999 | 47.2\% | [42.0, 52.4] | 51,551 | 58.0\% | [53.6, 62.4] | 63,374 |
| \$25,000-\$34,999 | 60.0\% | [54.0, 66.0] | 32,317 | 50.0\% | [43.6, 56.4] | 26,920 |
| \$35,000-\$49,999 | 58.9\% | [53.7, 64.1] | 48,871 | 47.1\% | [41.5, 52.7] | 39,126 |
| \$50,000 or more | 79.2\% | [77.3, 81.1] | 260,878 | 34.6\% | [31.1, 37.9] | 113,977 |
| Don't know/not sure/missing | 63.2\% | [59.4, 67.0] | 628 | 40.3\% | [35.7, 44.9] | 58,410 |

Notes: Same with Table 5.

### 3.4 Behavioral risk factors

The BRFS gathers respondent's health risk behaviors to better understand correlations between behaviors and health conditions. The 2018 BRFS covers ten behavioral risk factors, including tobacco use, E-cigarettes, alcohol consumption, immunization, falls, seatbelt use and drinking and driving, breast and cervical cancer screening, prostate cancer screening, colorectal cancer screening, and HIV/AIDS. CDC also identifies obesity as a health risk. Obesity is evaluated based on one's 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 be highly related to the development of certain diseases. For example, smokers are more likely than nonsmokers to develop lung cancer (CDC, 2017b). 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 one's health (e.g. exercise) or reduce injuries and death (e.g. seat belt use).

### 3.4.1 Overweight and obesity

The BRFS collects weight and height data in the "Demographics" section (Table 1) every year. The CDC then computes the ratio of height and weight into the Body Mass Index (BMI) ${ }^{6}$, which is an indicator of body fatness. BMI is an inexpensive and easy-to-perform method of weight category screening (e.g. underweight and overweight). It also appears to be as strongly associated with different metabolic and disease outcomes as those methods that directly measure body fatness (CDC, 2019k). The CDC interprets adults' (20 years old and older) BMI by standard weight status categories (Table 10). These categories are the same for men and women of all body types and ages (CDC, 2019k).

| Table 16: 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 |

Source: (CDC, 2019k)

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, 2019I). ${ }^{7}$ The 2018 BRFS indicates that 34.3 percent of Delaware adults are overweight, while 33.5 percent are obese. In other words, nearly seven in ten ( 67.8 percent) Delaware adults are overweight or obese. The overweight and obesity rate is close to the rates of the entire U.S., which is 35.0 percent overweight and 30.9 percent obese (CDC, 2019f).

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 61.4 percent for the $25-34$ age group; 68.5 percent for the $35-44$ age group; 75.1 percent for the $45-54$ age group; 76.0 percent for the $55-64$ age group; and 70.5 for those 65 and over. Also, no statistically significant differences are present among race-ethnicity and socio-economic groups, in either the overweight rate or the obesity rate.

However, there is a statistically significant difference found when looking at gender for those that are overweight. Males are more overweight ( 39.4 percent) than females (29.2 percent). However, the obesity percentages are similar between genders, indicating 33.6 percent for males and 33.5 percent for females.

[^4]| Table 17: Overweight and Obesity |  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Wt. \% | Overweight |  |  | Obese |  |
|  | $34.3 \%$ | $[32.0,36.6]$ | Est. Pop. | Wt. $\%$ | 954,365 | $33.5 \%$ |
| C.I. | Est. Pop. |  |  |  |  |  |
| Total |  |  |  |  |  |  |
| AGE | $28.0 \%$ | $[17.7,38.3]$ | 20,995 | $18.4 \%$ | $[7.1,29.7]$ | 13,778 |
| 18-24 | $31.2 \%$ | $[23.1,39.4]$ | 34,839 | $30.2 \%$ | $[22.5,37.8]$ | 33,672 |
| 25-34 | $30.6 \%$ | $[23.4,37.7]$ | 29,965 | $37.9 \%$ | $[31.2,44.6]$ | 37,157 |
| 35-44 | $35.4 \%$ | $[29.4,41.4]$ | 38,123 | $39.7 \%$ | $[34.0,45.5]$ | 42,728 |
| 45-54 | $37.7 \%$ | $[32.7,42.7]$ | 46,051 | $38.3 \%$ | $[33.6,43.1]$ | 46,785 |
| 55-64 | $38.0 \%$ | $[34.2,41.7]$ | 64,393 | $32.5 \%$ | $[28.6,36.3]$ | 55,064 |
| 65 and over |  |  |  |  |  |  |
| GENDER | $39.4 \%$ | $[36.1,42.6]$ | 133,810 | $33.6 \%$ | $[30.1,37.0]$ | 114,032 |
| Male | $29.2 \%$ | $[26.0,32.5]$ | 100,555 | $33.5 \%$ | $[30.4,36.6]$ | 115,150 |
| Female |  |  |  |  |  |  |
| RACE-ETHNICITY | $34.1 \%$ | $[31.4,36.8]$ | 159,264 | $32.0 \%$ | $[29.3,34.7]$ | 149,418 |
| White, Non-Hispanic | $35.1 \%$ | $[28.7,41.6]$ | 49,127 | $41.0 \%$ | $[35.4,46.7]$ | 57,378 |
| Black, Non-Hispanic | $31.3 \%$ | $[17.1,45.5]$ | 8,317 | $14.3 \%$ | $[0,30.5]$ | 3,807 |
| Asian, Non-Hispanic | $27.2 \%$ | $[6.6,47.8]$ | 1,125 | $46.2 \%$ | $[24.8,67.5]$ | 1,910 |
| American Indian/Alaskan | $38.4 \%$ | $[29.7,47.0]$ | 14,495 | $33.8 \%$ | $[24.9,42.7]$ | 12,761 |
| Native, Non-Hispanic | $22.7 \%$ | $[8.6,36.8]$ | 2,038 | $43.5 \%$ | $[29.3,57.7]$ | 3,908 |
| Hispanic |  |  |  |  |  |  |
| Other, Non-Hispanic | $27.6 \%$ | $[18.9,36.2]$ | 17,475 | $42.1 \%$ | $[34.1,50.0]$ | 26,657 |
| EDUCATION | $35.7 \%$ | $[31.3,40.0]$ | 77,372 | $34.2 \%$ | $[30.0,38.4]$ | 74,188 |
| < High School | $34.9 \%$ | $[30.4,39.4]$ | 71,007 | $35.8 \%$ | $[31.4,40.2]$ | 72,776 |
| High School | $34.3 \%$ | $[30.5,38.1]$ | 68,103 | $27.6 \%$ | $[23.7,31.5]$ | 54,742 |
| > High School and < | $21.2 \%$ | $[0,61.2]$ | 407 | $42.6 \%$ | $[3.0,82.1]$ | 819 |
| College/Technical School | $33.6 \%$ | $[24.1,43.1]$ | 13,229 | $37.7 \%$ | $[29.6,45.8]$ | 14,832 |
| College/Technical School | $32.6 \%$ | $[26.4,38.8]$ | 31,303 | $37.4 \%$ | $[31.5,43.3]$ | 35,874 |
| Don’t know/not sure/missing | $34.6 \%$ | $[26.7,42.5]$ | 17,485 | $34.7 \%$ | $[26.6,42.9]$ | 17,573 |
| HOUSEHOLD INCOME | $3.9 \%$ | $[31.0,44.7]$ | 29,485 | $33.5 \%$ | $[27.0,39.9]$ | 26,089 |
| Less than \$15,000 | $35.3 \%$ | $[31.8,38.7]$ | 110,836 | $32.8 \%$ | $[29.2,36.4]$ | 103,015 |
| \$15,000-\$24,999 | $30.2 \%$ | $[24.2,36.1]$ | 32,026 | $30.0 \%$ | $[23.9,36.0]$ | 31,801 |
| \$25,000-\$34,999 |  |  |  |  |  |  |

Notes: Same with Table 5.

### 3.4.2 Tobacco and e-cigarettes

Cigarette smoking is the leading preventable cause of death in the U.S., which leads to 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, 2019m).

In Delaware, 15.7 percent of adults smoke, which is slightly higher than the smoking rate of the U.S. as a whole ( 14.7 percent). Greater percentages of smokers are in the 25-34 (20.9 percent) and 35-44 (21.3 percent) age groups. Socio-economic factors are likely correlated to smoking behavior. Individuals of lower education and lower income levels present higher smoking rates. Specifically, 27.9 percent of adults without high school diplomas are smokers compared to 7.4 percent of college graduates, showing a gap of 20.5 percentage points. Individuals with lower household incomes are also more likely to smoke. Thirty percent of individuals with a household income of less than \$15,000 engage in smoking, while the percentage declines to 11.8 percent of those with household incomes of $\$ 50,000$ or more.

The 2018 BRFS includes two state-added questions related to tobacco use. The first is to survey current use of little cigars, cigarillos, or regular cigars. The second question asks if smoking is allowed in respondents' homes.

Electronic cigarettes (e-cigarette) are an alternative option to tobacco which may cause less harm. However, the usage of e-cigarettes also has brought emerging concerns. Ecigarettes 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).

About 22.2 percent of Delaware adults have used an e-cigarette or other electronic vaping product at least once in their entire life. This rate is close to the national data (22.7 percent). Young Delawareans are more likely to use e-cigarettes. Around 39.7 percent young adults within the 18-24 age group and 35.9 percent of those in the $25-34$ age group use e-cigarettes. More males ( 25.1 percent) use e-cigarette than females (19.6 percent), and more White adults ( 23.8 percent) use e-cigarettes than Black ( 21.0 percent) and Hispanic adults (16.2 percent). Socioeconomic factors present less correlation to the e-cigarette usage.

Among those who report having ever used e-cigarettes, 8.6 percent now use e-cigarettes every day; 12.7 percent use e-cigarettes some days; and 78.5 percent of respondents no longer use them.

The 2018 BRFS includes two state-added questions related to tobacco use. The first is intended to survey current use of little cigars, cigarillos, or regular cigars. The second question asks if smoking is allowed inside of respondents' homes. According to the survey results, 1.6 percent of Delaware adults currently smoke little cigars, cigarillos, or regular cigars everyday. For all Delaware adults, only 9.4 percent allow smoking in their home.

Table 18: Tobacco Use \& E-Cigarette

|  | Current tobacco use* |  |  | Ever used an e-cigarette^ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Wt. \% | 95\% C.I. | Est. Pop. | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 15.7\% | [13.1, 18.3] | 120,928 | 22.2\% | [19.5, 24.9] | 159,754 |
| AGE |  |  |  |  |  |  |
| 18-24 | 9.8\% | [0, 20.1] | 8,643 | 39.7\% | [31.0, 48.5] | 32,095 |
| 25-34 | 20.9\% | [12.5, 29.2] | 26,620 | 35.9\% | [28.2, 43.5] | 41,334 |
| 35-44 | 21.3\% | [14.4, 28.2] | 24,313 | 27.1\% | [20.2, 34.1] | 28,879 |
| 45-54 | 18.7\% | [12.6, 24.7] | 22,716 | 17.5\% | [11.2, 23.8] | 20,336 |
| 55-64 | 17.6\% | [12.4, 22.9] | 23,817 | 18.3\% | [12.8, 23.7] | 23,380 |
| 65 and over | 8.1\% | [3.8, 12.5] | 14,819 | 7.9\% | [3.3, 12.5] | 13,730 |
| GENDER |  |  |  |  |  |  |
| Male | 17.4\% | [13.6, 21.2] | 63,977 | 25.1\% | [21.1, 29.1] | 85,859 |
| Female | 14.2\% | [10.7, 17.7] | 56,951 | 19.6\% | [15.9, 23.3] | 73,895 |
| RACE-ETHNICITY |  |  |  |  |  |  |
| White, Non-Hispanic | 16.3\% | [13.1, 19.4] | 82,177 | 23.8\% | [20.5, 27.1] | 113,358 |
| Black, Non-Hispanic | 16.4\% | [9.7, 23.0] | 25,686 | 21.0\% | [13.7, 28.3] | 30,416 |
| Asian, Non-Hispanic | 4.0\% | [0, 15.0] | 1,237 | 9.5\% | [0, 27.7] | 2,538 |
| American Indian/Alaskan Native, Non-Hispanic | 10.0\% | [0, 27.8] | 566 | 20.6\% | [0, 45.6] | 1,141 |
| Hispanic | 14.7\% | [6.4, 23.1] | 8,947 | 16.2\% | [7.7, 24.6] | 9,277 |
| Other, Non-Hispanic | 23.8\% | [8.0, 39.5] | 2,316 | 33.7\% | [17.8, 49.6] | 3,023 |
| EDUCATION |  |  |  |  |  |  |
| < High School | 27.9\% | [19.9, 35.9] | 23,986 | 25.5\% | [16.7, 34.4] | 20,975 |
| High School | 20.4\% | [15.9, 24.9] | 49,324 | 25.6\% | [20.6, 30.6] | 57,626 |
| > High School and < College/Technical School | 14.1\% | [9.3, 18.9] | 31,098 | 24.7\% | [19.7, 29.7] | 51,477 |
| College/Technical School | 7.4\% | [2.9, 11.9] | 16,122 | 14.6\% | [9.9, 19.2] | 29,394 |
| Don't know/not sure/missing | 14.0\% | [0, 44.3] | 397 | 11.1\% | [0, 41.8] | 284 |
| HOUSEHOLD INCOME |  |  |  |  |  |  |
| Less than \$15,000 | 30.0\% | [21.6, 38.4] | 14,584 | 31.6\% | [22.3, 40.9] | 14,388 |
| \$15,000-\$24,999 | 25.3\% | [18.7, 31.9] | 27,589 | 27.1\% | [20.1, 34.1] | 27,801 |
| \$25,000-\$34,999 | 17.0\% | [8.3, 25.8] | 9,183 | 20.7\% | [10.7, 30.7] | 10,706 |
| \$35,000-\$49,999 | 18.6\% | [10.7, 26.5] | 15,431 | 25.5\% | [17.8, 33.2] | 20,110 |
| \$50,000 or more | 11.8\% | [7.6, 16.1] | 38,982 | 19.6\% | [15.3, 23.9] | 61,960 |
| Don't know/not sure/missing | 10.5\% | [4.5, 16.4] | 15,160 | 19.9\% | [13.1, 26.7] | 24,789 |

[^5]
### 3.4.3 Alcohol consumption

Excessive alcohol use ${ }^{8}$ causes both short-term and long-term health risks. Short-term impacts include injuries, violent behaviors, alcohol poisoning, risky sexual behaviors, miscarriage and stillbirth or fetal alcohol spectrum disorders (FASDs) among pregnant women. Long-term impacts include 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 can lead 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 twelveounce beer, a five-ounce glass of wine, or a drink with one shot of liquor. Binge drinking is defined as having five or more drinks on one occasion for males, and having four or more drinks on one occasion for females.

The heavy drinking rate of Delaware adults is the same as the U.S. rates ( 5.9 percent). Unlike many other health behaviors, the respondents with higher household incomes are more likely to engage in heavy drinking. About 4.7 percent of respondents with a household income less than $\$ 15,000$ are heavy drinkers, but the rate increases to 7.9 percent in the top income group. Similar trends can also be seen with binge drinking. The binge drinking rate is 21.2 percent in the highest income group. The percentage is higher than that of other income groups. The strongest demographic association with binge drinking is age. Binge drinking is more common in teens and youth. About one in four ( 24.2 percent) 18 to 24 year olds in Delaware engage in binge drinking. The rate steadily falls throughout middle age and dips to only 4.5 percent among the elderly. Similar age patterns for binge drinking are shown nationwide (CDC, 2019n).

[^6]| Table 19: Alcohol Use |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Heavy drinking* |  |  | Binge drinking^ |  |  |
|  | Wt. \% | 95\% C.I. | Est. Pop. | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 5.9\% | [3.2, 8.6] | 45,588 | 15.3\% | [12.5, 18.1] | 117,341 |
| AGE |  |  |  |  |  |  |
| 18-24 | 4.8\% | [0, 15.7] | 4,283 | 24.2\% | [14.4, 34.0] | 21,383 |
| 25-34 | 8.1\% | [0,18.2] | 10,323 | 22.6\% | [14.6, 30.7] | 28,823 |
| 35-44 | 7.9\% | [0.2, 15.6] | 9,037 | 22.6\% | [15.4, 29.8] | 25,816 |
| 45-54 | 5.5\% | [0,11.9] | 6,663 | 14.8\% | [8.6, 21.1] | 18,038 |
| 55-64 | 6.1\% | [0.3, 11.9] | 8,229 | 11.1\% | [ $5.8,16.4]$ | 15,037 |
| 65 and over | 3.9\% | [0, 8.0] | 7,054 | 4.5\% | [0.2, 8.9] | 8,243 |
| GENDER |  |  |  |  |  |  |
| Male | 6.4\% | [2.3, 10.4] | 23,335 | 19.8\% | [15.8, 23.7] | 72,572 |
| Female | 5.5\% | [1.8, 9.2] | 22,253 | 11.1\% | [7.3, 15.0] | 44,769 |
| RACE-ETHNICITY |  |  |  |  |  |  |
| White, Non-Hispanic | 6.6\% | [3.4, 9.8] | 33,313 | 16.4\% | [13.1, 19.7] | 82,766 |
| Black, Non-Hispanic | 5.9\% | [0,14.9] | 9,332 | 12.4\% | [4.7, 20.1] | 19,484 |
| Asian, Non-Hispanic | 0.4\% | [0, 9.2] | 125 | 12.8\% | [0, 29.2] | 3,991 |
| American Indian/Alaskan Native, Non-Hispanic | 0.6\% | [0, 15.3] | 32 | 7.0\% | [0, 27.3] | 393 |
| Hispanic | 4.0\% | [0, 13.4] | 2,454 | 16.0\% | [7.4, 24.6] | 9,723 |
| Other, Non-Hispanic | 3.4\% | [0, 19.3] | 333 | 10.1\% | [0, 26.5] | 984 |
| EDUCATION |  |  |  |  |  |  |
| < High School | 4.4\% | [0, 13.4] | 3,779 | 10.3\% | [2.1, 18.4] | 8,825 |
| High School | 5.8\% | [0.5, 11.1] | 14,030 | 16.6\% | [11.3, 21.9] | 40,226 |
| > High School and < College/Technical School | 6.4\% | [1.1, 11.6] | 14,097 | 15.6\% | [10.2, 21.0] | 34,497 |
| College/Technical School | 6.3\% | [1.8, 10.8] | 13,682 | 15.5\% | [10.8, 20.1] | 33,599 |
| Don't know/not sure/missing | 0.0\% | -- | 0 | 6.8\% | [0,56.2] | 194 |
| HOUSEHOLD INCOME |  |  |  |  |  |  |
| Less than \$15,000 | 4.7\% | [0, 14.7] | 2,268 | 15.2\% | [5.6, 24.7] | 7,370 |
| \$15,000-\$24,999 | 4.5\% | [0,11.9] | 4,957 | 10.6\% | [3.2, 17.9] | 11,531 |
| \$25,000-\$34,999 | 3.9\% | [0,14.5] | 2,112 | 14.1\% | [3.6, 24.6] | 7,587 |
| \$35,000-\$49,999 | 5.5\% | [0, 13.1] | 4,607 | 13.5\% | [6.1, 21.0] | 11,229 |
| \$50,000 or more | 7.9\% | [3.8, 12.1] | 26,171 | 21.2\% | [16.9, 25.5] | 69,911 |
| Don't know/not sure/missing | 3.8\% | [0, 10.5] | 5,473 | 6.7\% | [0.6, 12.8] | 9,712 |

* Adult men having more than fourteen drinks per week and adult women having more than seven drinks per week.
$\wedge$ Males having five or more drinks on one occasion, females having four or more drinks on one occasion. Notes: Same with Table 5.


### 3.4.4 Falls

Falls can contribute to the morbidity and mortality of older adults (Heinle, 2017). According to the CDC, more than one out of four older people (those 65 and older) fall each year. One out of five falls causes a serious injury such as a broken bone or a head injury. In 2015, the total medical costs for falls was more than \$50 billion (CDC Injury Center, 2019).

Falls and fall-related injuries are covered by the BRFS on even years. Adults aged 45 or older are asked the frequency of falls in the past 12 months and the injury caused by falls. The definition of falls is that a person unintentionally comes to rest on the ground or another lower level. A fall-related injury means that the fall caused the respondents to limit their regular activities for at least a day or resulted in a doctor visit (Delaware Department of Health and Social Services, 2017).

Table 20 shows the rate of falls among three age groups in Delaware. Overall, the rate of falls increases with age. About 17.4 percent of respondents aged 45-54 reported that they have fallen in the past 12 months; 20.3 percent for the $55-64$ age group; and 24.5 percent for those aged 65 and older.

| Table 20: Falls in Delaware |  |  |  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Age 45 to 54 |  | Age 55 to 64 |  | Age 65 and above |  |  |  |
|  | $\%$ | $\mathrm{Wt} \%$. | $\%$ | $\mathrm{Wt} \%$. | $\%$ | $\mathrm{Wt} \%$. |  |  |
| Yes | 19.7 | 17.4 | 22.0 | 20.3 | 24.4 | 24.5 |  |  |
| No | 73.2 | 76.1 | 72.0 | 74.6 | 69.4 | 69.5 |  |  |
| Don't know/Not sure/ | 7.1 | 6.5 | 6 | 5.1 | 6.2 | 6 |  |  |
| Refused/Missing |  |  |  |  |  |  |  |  |

Source: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

Regarding the frequency, for those who reported to have fallen in the past 12 months, 49.8 percent fell once, 23.6 percent fell twice, and 10.9 percent fell three times. About 35.4 percent of respondents report that at least one fall caused an injury that limited their regular activities for at least a day

### 3.4.5 Seatbelt use and drinking and driving

Using a 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, 2019o). In Delaware, 85.3 percent of adults report that they always wear their seatbelt when riding in a car. Delawarean's seat belt use rate is slightly under the national average (87.0 percent) (CDC, 2019f).

The use of seat belts has significant differences across age and gender. While 78.6 percent of 18 to 24 year-olds always wear their seat belts, the percentage rises as age increases and reaches 88.6 percent among individuals who are 65 and over. Females ( 88.3 percent) are more likely than males ( 81.9 percent) to always wear seat belts and the difference is statistically significant. A larger share of White adults ( 86.4 percent) than Black adults ( 81.6 percent) always buckle up. Education and income levels show less correlation to seatbelt use in the 2018 BRFS.

| Table 21: Seatbelt Use in Delaware |  |  |
| :--- | :---: | :---: |
|  | Wt. Frequency | Wt. $\%$ |
| Always wear seat belt | 655,727 | 85.3 |
| Don't always wear seat belt | 65,641 | 8.5 |
| Don't know/not sure or refused/missing | 47,756 | 6.2 |
| Total | 769,124 | 100.0 |

Source: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

In addition to seatbelt use, avoiding drinking and driving (DUI) can also prevent injuries and deaths from motor vehicle crashes. Alcohol-impaired driving fatalities accounted for 28 percent of all motor vehicle traffic fatalities in the U.S. in 2016 (National Highway Traffic Safety Administration, U.S. Department of Transportation, 2017).

Drinking and driving behavior is surveyed by the even-year BRFS. The question is: During the past 30 days, how many times have you driven when you've had perhaps too much to drink? Respondents can answer the number of times, none, don't know/not sure, or refuse to answer. In 2018, about half of the respondents (49.1 percent) report that they have not driven after having too much to drink in the past 30 days. It is noteworthy that another half ( 49.3 percent) respondents report that they don't know, are not sure, or refuse to answer, which leads only 1.5 percent of respondents to admit that they have driven after drinking too much (Table 22).

Table 22: Drinking and Driving in Delaware

|  | Wt. Frequency | Wt. \% |
| :--- | :---: | :---: |
| Have driven after having too much to drink | 11,880 | 1.5 |
| Have not driven after having too much to drink | 377,829 | 49.1 |
| Don't know/not sure or refused/missing | 379,415 | 49.3 |
| Total | 769,124 | 100.0 |

Source: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

Drinking and driving behavior shows statistically significant differences between genders, as well as among race and various socio-economic groups. More males ( 53.8 percent) report not drinking and driving than females (44.9 percent). More White adults ( 53.3 percent) do not drink and drive than Black adults ( 40.0 percent) and Hispanics ( 41.0 percent). About one in four ( 26.5 percent) respondents without a high school diploma have not driven while intoxicated. The rate increases to 62.2 percent of respondents with a college or technical school degree. The rate of not driving after drinking too much increases along with the household income growth.

Table 23: Seat Belt Use and Drinking and Driving

|  | Always wears seatbelt* |  |  | Have not driven after having too much to drink |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Wt. \% | 95\% C.I. | Est. Pop. | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 85.3\% | [84.3, 86.3] | 655,727 | 49.1\% | [47.1, 51.1] | 377,829 |
| AGE |  |  |  |  |  |  |
| 18-24 | 78.6\% | [73.6, 83.7] | 69,524 | 47.2\% | [39.2, 55.2] | 41,766 |
| 25-34 | 80.4\% | [76.7, 84.2] | 102,482 | 53.9\% | [47.9, 60.0] | 68,691 |
| 35-44 | 84.9\% | [81.9, 87.9] | 96,961 | 52.0\% | [46.5, 57.5] | 59,342 |
| 45-54 | 88.0\% | [85.6, 90.4] | 107,177 | 51.8\% | [47.0, 56.6] | 63,041 |
| 55-64 | 87.5\% | [85.4, 89.6] | 118,092 | 46.6\% | [42.3, 51.0] | 62,929 |
| 65 and over | 88.6\% | [87.0, 90.1] | 161,491 | 45.0\% | [41.6, 48.4] | 82,060 |
| GENDER |  |  |  |  |  |  |
| Male | 81.9\% | [80.2, 83.7] | 301,056 | 53.8\% | [51.0, 56.6] | 197,624 |
| Female | 88.3\% | [87.1, 89.5] | 354,670 | 44.9\% | [42.1, 48.4] | 180,205 |
| RACE-ETHNICITY |  |  |  |  |  |  |
| White, Non-Hispanic | 86.4\% | [85.2, 87.6] | 436,317 | 53.3\% | [51.1, 55.5] | 269,207 |
| Black, Non-Hispanic | 81.6\% | [78.5, 84.8] | 128,016 | 40.0\% | [34.1, 46.0] | 62,762 |
| Asian, Non-Hispanic | 84.9\% | [78.5, 91.4] | 26,462 | 45.1\% | [32.8, 57.4] | 14,055 |
| American Indian/Alaskan Native, Non-Hispanic | 88.1\% | [80.0, 96.3] | 4,975 | 39.6\% | [21.1, 58.0] | 2,234 |
| Hispanic | 84.8\% | [81.5, 88.0] | 51,410 | 41.0\% | [34.2, 47.9] | 24,895 |
| Other, Non-Hispanic | 87.8\% | [81.8, 93.7] | 8,547 | 48.0\% | [34.3, 61.7] | 4,678 |
| EDUCATION |  |  |  |  |  |  |
| < High School | 85.8\% | [82.6, 89.0] | 73,701 | 26.5\% | [18.8, 34.2] | 22,770 |
| High School | 82.2\% | [80.0, 84.3] | 198,856 | 42.6\% | [38.6, 46.6] | 103,216 |
| > High School and < College/Technical School | 84.8\% | [82.8, 86.9] | 187,341 | 52.3\% | [48.5, 56.1] | 115,449 |
| College/Technical School | 88.9\% | [87.4, 90.4] | 193,266 | 62.2\% | [59.3, 65.0] | 135,173 |
| Don't know/not sure/missing | 90.0\% | [77.8, 100] | 2,563 | 42.9\% | [12.2, 73.6] | 1,222 |
| HOUSEHOLD INCOME |  |  |  |  |  |  |
| Less than \$15,000 | 81.2\% | [77.1, 85.4] | 39,494 | 29.5\% | [20.7, 38.3] | 14,340 |
| \$15,000-\$24,999 | 87.0\% | [84.5, 89.5] | 95,034 | 38.4\% | [32.6, 44.1] | 41,890 |
| \$25,000-\$34,999 | 90.1\% | [87.0, 93.2] | 48,525 | 43.0\% | [35.3, 50.8] | 23,168 |
| \$35,000-\$49,999 | 84.0\% | [80.7, 87.2] | 69,716 | 48.7\% | [42.9, 54.6] | 40,460 |
| \$50,000 or more | 89.1\% | [87.7, 90.5] | 293,435 | 63.0\% | [60.3, 65.6] | 207,342 |
| Don't know/not sure/missing | 75.5\% | [72.5, 78.5] | 109,522 | 34.9\% | [30.0, 39.8] | 50,630 |

*Respondents who reported they always use a seatbelt when they ride or drive in a car or they never drive or ride in a car.
Notes: Same with Table 5.

### 3.4.6 Exercise (physical activity)

Exercise (physical activity) in the BRFS refers to exercise, recreation, or physical activities other than regular job duties. Examples include running, calisthenics, golf, gardening, or walking for exercise. In general, physically active people live longer and face lower risks for heart disease, stroke, type 2 diabetes, depression, and some cancers (CDC, 2017c). The 2018 BRFS surveys respondents' physical activities or exercise habits during the past month of interviewing.

More than seven in ten Delaware adults (73.1 percent) report that they have participated in physical activities in the past month. Nationally, 75.4 percent of individuals participated in physical activities or exercise other than what is required of their regular job in the past month (CDC, 2019f).

Physical activity has different patterns among demographic characteristics as well as social-economic status. Young adults are more active than senior adults. More than eight in ten (83.2 percent) young adults exercised in the past month of interviewing, while the percentage decreases to 64.8 percent in the age group of 65 and older. More males ( 76.6 percent) engage in physical activity than females ( 69.9 percent). A statistically significant difference exists between the two genders. Regarding race, Whites ( 75.3 percent) are more physically active than Blacks ( 68.0 percent) and Hispanics ( 64.3 percent). For socio-economic status, high education level ( 85.1 percent in the group of college/technical school degree), and high income ( 84.6 percent in the group of $\$ 50,000$ or more household income) individuals report having engaged in physical exercise.

It is noteworthy that the 2018 BRFS focuses on whether or not the respondents exercise. The 2017 BRFS also surveys the time and frequency of physical activity and compares respondents' reports to the recommended guidelines for aerobic activity and muscle strengthening. ${ }^{9}$ In 2017, only one in four Delaware adults met the recommended guidelines for aerobic conditioning and muscle strengthening.

[^7]| Table 24: Exercise |  |  |  |
| :---: | :---: | :---: | :---: |
|  | Engaged in physical activity other than job in past month |  |  |
|  | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 73.1\% | [71.7, 74.5] | 562, 093 |
| AGE |  |  |  |
| 18-24 | 83.2\% | [78.6, 87.9] | 73,598 |
| 25-34 | 78.2\% | [74.2, 82.3] | 99,663 |
| 35-44 | 73.9\% | [69.8, 77.9] | 84,367 |
| 45-54 | 76.2\% | [72.8, 79.6] | 92,844 |
| 55-64 | 69.2\% | [66.0, 72.5] | 93,482 |
| 65 and over | 64.8\% | [62.1, 67.5] | 118,139 |
| GENDER |  |  |  |
| Male | 76.6\% | [74.6, 78.6] | 281,291 |
| Female | 69.9\% | [67.9, 71.9] | 280,801 |
| RACE-ETHNICITY |  |  |  |
| White, Non-Hispanic | 75.3\% | [73.6, 76.9] | 380,204 |
| Black, Non-Hispanic | 68.0\% | [63.8, 72.3] | 106,721 |
| Asian, Non-Hispanic | 79.5\% | [71.9, 87.1] | 24,773 |
| American Indian/Alaskan Native, Non-Hispanic | 79.4\% | [68.2, 90.6] | 4,484 |
| Hispanic | 64.3\% | [59.2, 69.5] | 39,026 |
| Other, Non-Hispanic | 70.7\% | [61.6, 79.8] | 6,885 |
| EDUCATION |  |  |  |
| < High School | 59.4\% | [53.7, 65.2] | 51,064 |
| High School | 65.3\% | [62.2, 68.4] | 158,108 |
| > High School and < College/Technical School | 75.4\% | [72.7, 78.1] | 166,462 |
| College/Technical School | 85.1\% | [83.3, 86.9] | 185,016 |
| Don't know/not sure/missing | 50.7\% | [25.4, 76.0] | 1,443 |
| HOUSEHOLD INCOME |  |  |  |
| Less than \$15,000 | 58.7\% | [52.2, 65.3] | 28,563 |
| \$15,000-\$24,999 | 58.3\% | [53.8, 62.9] | 63,679 |
| \$25,000-\$34,999 | 65.8\% | [60.0, 71.6] | 35,444 |
| \$35,000-\$49,999 | 70.7\% | [66.1, 75.2] | 58,668 |
| \$50,000 or more | 84.6\% | [82.9, 86.3] | 278,569 |
| Don't know/not sure/missing | 67.0\% | [63.4, 70.6] | 97,170 |

Notes: Same with Table 5.

### 3.4.7 Immunization

Immunizations can prevent infectious diseases. The 2018 BRFS includes two types of immunizations: the flu shot (or nose sprayed flu vaccine and Fluzone Intradermal vaccine) and the pneumococcal vaccine. Questions about time and place of flu shot taking were added in the 2018 BRFS.

The rates of Delaware adults receiving flu shots ( 38.0 percent) is greater than the national rates (33.1 percent), and the rate of pneumonia vaccination in Delaware (30.8 percent) is slightly higher than the national rate ( 29.2 percent).

Table 25: Immunization in Delaware and the U.S.

|  | Delaware | U. S. |
| :--- | :---: | :---: |
|  | $\mathrm{Wt} \%$. | $\mathrm{Wt} \%$. |
| Flu shot/spray | 38.0 | 33.1 |
| Pneumonia vaccine | 30.8 | 29.2 |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

Thirty-eight percent of Delaware adults received the flu vaccine in 2018. Although flu vaccination rates are similar (around 25 percent) among the three age groups under 45, the rate increases to 36.8 percent of the 45-54 age group, 42.5 percent of the $55-64$ age group, and is statistically significantly higher in the age group of 65 and over ( 57.9 percent). More females ( 42.3 percent) get the flu shot than males ( 33.3 percent), and more White adults ( 40.6 percent) than Black adults ( 32.2 percent) report receiving the shot. Flu vaccination also varies by socioeconomic status. Respondents with higher educational achievement and higher household income are more likely to get the flu vaccine.

Although the vaccination rate of pneumonia varies by gender, race, and socio-economic status, the most noticeable difference occurs among the elderly population. The pneumonia vaccine rate is 70.2 percent in the 65 and over group. It is also noteworthy that Hispanic respondents have lower pneumonia vaccination rates (16.7 percent) than White ( 34.6 percent) and Black respondents ( 26.2 percent).

The top five places for Delaware adults to receive their flu shots in 2018 are: a doctor's office or health maintenance organization (HMO) (37.3 percent), a store (supermarket, drug store) ( 31.9 percent), workplace ( 11.4 percent), a hospital (inpatient) ( 5.1 percent), and another type of clinic or health center (e.g. a community center)(4.3 percent). The places Delaware adults choose to receive vaccines is similar to the choices of respondents in the entire U.S. (Table 26).

In addition to the location, 2018 BRFS also surveys the time of receiving flu shots. The majority of respondents received their flu shot in September (11.7 percent), October (28.1 percent), and November ( 13.9 percent), ${ }^{10}$ before the flu activity peaks between December and February (CDC, 2019p).

| Table 26: Place for Flu Shot |  |  |
| :--- | :---: | :---: |
|  | Delaware | U.S. |
|  | Wt. $\%$ | Wt. $\%$ |
| A doctor's office or health maintenance organization | 37.3 | 38.8 |
| A store (supermarket, drug store) | 31.9 | 26.0 |
| Workplace | 11.4 | 12.5 |
| Another type of clinic or health center | 4.3 | 8.4 |
| A hospital (inpatient) | 5.1 | 7.7 |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

[^8]Table 27: Immunizations

|  | Flu shot/spray |  |  | Pneumonia vaccine |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Wt. \% | 95\% C.I. | Est. Pop. | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 38.0\% | [35.9, 40.1] | 276,199 | 30.8\% | [28.7, 32.9] | 223,056 |
| AGE |  |  |  |  |  |  |
| 18-24 | 25.4\% | [14.5, 36.3] | 20,723 | 19.0\% | [7.8, 30.2] | 15,508 |
| 25-34 | 24.6\% | [17.0, 32.2] | 29,426 | 8.8\% | [1.3, 16.4] | 10,566 |
| 35-44 | 26.0\% | [19.0, 33.0] | 27,598 | 13.5\% | [6.2, 20.8] | 14,258 |
| 45-54 | 36.8\% | [31.0, 42.5] | 42,561 | 19.2\% | [13.0, 25.5] | 22,197 |
| 55-64 | 42.5\% | [37.9, 47.2] | 54,995 | 30.0\% | [25.0, 34.9] | 38,660 |
| 65 and over | 57.9\% | [54.9, 61.0] | 100,896 | 70.2\% | [67.6, 72.7] | 121,867 |
| GENDER |  |  |  |  |  |  |
| Male | 33.3\% | [30.1, 36.5] | 115,957 | 27.1\% | [23.9, 30.2] | 94,009 |
| Female | 42.3\% | [39.6, 45.1] | 160,242 | 34.2\% | [31.4, 36.9] | 129,047 |
| RACE-ETHNICITY |  |  |  |  |  |  |
| White, Non-Hispanic | 40.6\% | [38.2, 43.0] | 196,179 | 34.6\% | [32.2, 37.0] | 166,680 |
| Black, Non-Hispanic | 32.2\% | [25.9, 38.5] | 46,475 | 26.2\% | [20.4, 32.0] | 37,779 |
| Asian, Non-Hispanic | 38.5\% | [24.8, 52.3] | 10,523 | 14.8\% | [1.7, 28.0] | 4,046 |
| American Indian/Alaskan Native, Non-Hispanic | 46.1\% | [28.0, 64.2] | 2,530 | 48.3\% | [30.7, 65.9] | 2,649 |
| Hispanic | 31.2\% | [23.6, 38.8] | 17,841 | 16.7\% | [9.0, 24.4] | 9,504 |
| Other, Non-Hispanic | 29.2\% | [15.6, 42.8] | 2,651 | 26.5\% | [13.2, 39.9] | 2,397 |
| EDUCATION |  |  |  |  |  |  |
| < High School | 29.6\% | [22.2, 37.0] | 24,224 | 26.2\% | [19.0, 33.5] | 21,461 |
| High School | 35.3\% | [31.2, 39.5] | 79,497 | 32.0\% | [28.1, 36.0] | 71,832 |
| > High School and < College/Technical School | 37.9\% | [33.8, 42.0] | 79,733 | 31.5\% | [27.6, 35.5] | 66,201 |
| College/Technical School | 44.2\% | [40.8, 47.5] | 91,436 | 30.3\% | [26.9, 33.7] | 62,537 |
| Don't know/not sure/missing | 51.1\% | [18.4, 83.8] | 1,309 | 40.0\% | [6.0, 73.9] | 1,025 |
| HOUSEHOLD INCOME |  |  |  |  |  |  |
| Less than \$15,000 | 33.9\% | [25.8, 42.0] | 15,554 | 35.8\% | [28.2, 43.5] | 16,389 |
| \$15,000-\$24,999 | 33.5\% | [28.0, 39.1] | 34,926 | 33.0\% | [27.6, 38.3] | 34,253 |
| \$25,000-\$34,999 | 43.0\% | [35.7, 50.3] | 22,265 | 42.2\% | [35.0, 49.5] | 21,781 |
| \$35,000-\$49,999 | 38.5\% | [32.1, 44.9] | 30,553 | 30.8\% | [24.8, 36.8] | 24,440 |
| \$50,000 or more | 40.3\% | [37.1, 43.5] | 129,613 | 27.5\% | [24.3, 30.7] | 88,364 |
| Don't know/no sure/missing | 35.0\% | [29.9, 40.0] | 43,288 | 30.7\% | [25.8, 35.7] | 37,829 |

Notes: Same with Table 5.

### 3.4.8 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, 2019q). 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, 2019r). The 2018 BRFS surveys the incidence of HIV testing, which includes testing fluid from one's mouth, but does not count tests as part of a blood donation.

Around 40.8 percent of Delaware adults have been tested for HIV, which is better than the national rate ( 38.8 percent). Regarding age, the youngest and oldest age groups report the lowest testing rates. It is 26.2 percent for the $18-24$ age group and 18.2 percent for age group of 65 and older. With race-ethnicity, Black adults report a statistically significant greater testing rate ( 56.3 percent) than White ( 36.1 percent) and Hispanic adults ( 42.8 percent). Gender and socioeconomic conditions make no statistically significant difference for HIV test rate.

In addition to the HIV testing behavior, 2018 BRFS also lists five "high risk situations". If any of the following situations applied to the respondent, the respondent should answer "yes", but do not need to indicate which one. The situations include:

- You have injected any drug other than those prescribed for you in the past year.
- You have been treated for a sexually transmitted disease or STD in the past year.
- You have given or received money or drugs in exchange for sex in the past year.
- You had anal sex without a condom in the past year.
- You had four or more sex partners in the past year.

Around 6.6 percent of respondents report that at least one of these situations apply to them. The U.S. percentage is also 6.3 percent (CDC, 2019f).

| Table 28: HIV Testing | Have ever been tested for HIV |  |  |
| :--- | :---: | :---: | :---: |
|  | Do not count tests as part of a blood donation |  |  |
|  | Wt. $\%$ | 95\% C.I. | Est. Pop. |
| Total | $40.8 \%$ | $[38.5,43.1]$ | 287,358 |
| AGE |  |  |  |
| 18-24 | $26.2 \%$ | $[16.5,35.8]$ | 20,819 |
| 25-34 | $59.4 \%$ | $[53.6,65.2]$ | 69,852 |
| $35-44$ | $57.9 \%$ | $[52.7,63.1]$ | 59,656 |
| 45-54 | $53.9 \%$ | $[49.0,58.8]$ | 59,265 |
| 55-64 | $37.4 \%$ | $[32.6,42.1]$ | 47,178 |
| 65 and over | $18.2 \%$ | $[13.9,22.5]$ | 30,587 |
| GENDER |  |  |  |
| Male | $40.2 \%$ | $[36.8,43.6]$ | 134,362 |
| Female | $41.3 \%$ | $[38.3,44.4]$ | 152,996 |
| RACE-ETHNICITY |  |  |  |
| White, Non-Hispanic | $36.1 \%$ | $[33.3,38.9]$ | 169,719 |
| Black, Non-Hispanic | $56.3 \%$ | $[51.2,61.4]$ | 78,620 |
| Asian, Non-Hispanic | $36.7 \%$ | $[21.8,51.7]$ | 9,254 |
| American Indian/Alaskan Native, Non-Hispanic | $31.1 \%$ | $[11.3,50.9]$ | 1,690 |
| Hispanic | $42.8 \%$ | $[36.4,49.3]$ | 23,730 |
| Other, Non-Hispanic | $49.4 \%$ | $[35.9,62.9]$ | 4,345 |
| EDUCATION |  |  |  |
| < High School | $39.1 \%$ | $[32.0,46.1]$ | 31,164 |
| High School | $37.3 \%$ | $[32.9,41.7]$ | 81,387 |
| > High School and < College/Technical School | $43.9 \%$ | $[39.6,48.3]$ | 88,816 |
| College/Technical School | $42.3 \%$ | $[38.6,46.1]$ | 85,546 |
| Don't know/not sure/missing | $19.0 \%$ | $[0,57.4]$ | 445 |
| HOUSEHOLD INCOME |  |  |  |
| Less than \$15,000 | $52.8 \%$ | $[45.4,60.2]$ | 22,960 |
| \$15,000-\$24,999 | $43.3 \%$ | $[37.7,48.8]$ | 44,158 |
| \$25,000-\$34,999 | $38.3 \%$ | $[30.0,46.6]$ | 18,865 |
| \$35,000-\$49,999 | $43.0 \%$ | $[36.4,49.7]$ | 33,034 |
| \$50,000 or more | $42.1 \%$ | $[38.6,45.6]$ | 132,457 |
| Don't know/not sure/missing | $30.3 \%$ | $[24.3,36.3]$ | 35,883 |
|  |  |  |  |

Notes: Same with Table 5.

### 3.4.9 Cancer screening

Cancer screening means checking body conditions before having signs or symptoms (CDC, 2019s). The United States Preventive Services Task Force (USPSTF) ${ }^{11}$ recommends screening for breast, cervical, colorectal (colon), and lung cancer (CDC, 2019s). In addition to the aforementioned cancers, the 2018 BRFS also reports cancer screening behaviors for prostate cancer. Questions of cancer screening are designed for certain age and gender groups. Specifically, the colorectal cancer screening questions are for respondents above 49 years old; prostate cancer questions are for males above 39 years old; breast and cervical cancer questions are for females.

Table 29 lists the cancer screening tests and the screening rates in Delaware and the U.S. Most cancer screening rates in Delaware are higher than those in the U.S., excluding the blood stool test for colorectal cancer.

| Table 29: Cancer Screening Rates in Delaware and the U.S. |  |  |
| :--- | :---: | :---: |
|  | Delaware | U.S. |
|  | Wt. $\%$ | Wt. $\%$ |
| Breast cancer: mammogram | 71.2 | 66.6 |
| Cervical cancer: Pap test | 89.0 | 89.0 |
| Cervical cancer: HPV test | 41.6 | 38.0 |
| Prostate cancer: PSA test | 44.6 | 42.7 |
| Colorectal cancer: blood stool test | 21.2 | 30.5 |
| Colorectal cancer: sigmoidoscopy or colonoscopy | 75.3 | 69.3 |
| Lung cancer: CT or CAT scans | 6.4 | 5.8 |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral
Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

A mammogram is an X-ray of the breast. Mammograms are the best way to find breast cancer early (CDC, 2020g). The USPSTF recommends women who are 50 to 74 years old and are at average risk of breast cancer to have a mammogram every two years. Table X presents the percentage of Delaware adult women who have ever had a mammogram. Age is the key factor that correlates to the screening rate. Nearly half ( 51.7 percent) of 35 to 44 year old females have had a mammogram, and the rate significantly increases to 93.3 percent for those in the 45-54 age group, 97.6 percent of the 55-64 age group, and 97.5 percent of respondents aged 65 and over. The rate of having mammograms is significantly different among racial groups. Hispanic

[^9]females have the lowest screening rate (47.3 percent); while black females report 66.5 percent; and white females report 76.2 percent. Social economic status does not show statistically significant differences among various groups.

For cervical cancer, the Pap test and the HPV test are used to find the cancer early and prevent it. The Pap test examines the cell changes on the cervix that could potentially become cervical cancer. The HPV test checks for the human papillomavirus which can cause the cell changes. According to the CDC, females should start getting Pap tests at age 21. Females aged above 30 should discuss with doctors and choose from three options: a Pap test only, an HPV test only, and an HPV test along with the Pap test (CDC, 2019t). In Delaware, 89.0 percent of adult females have had the Pap test and 41.6 percent have had the HPV test. The rate of the Pap test is 45.2 percent in the $18-24$ age group, and increases to 87.4 percent in the $25-34$ age group. The rates for other age groups are all above 90 percent. The Pap test rate for White females is 91.0 percent, 88.4 percent for Black females, and83.9 percent for Hispanic females. Educational attainment shows a statistically significant difference. Around 95 percent of respondents with a college/technical school degree have had a Pap test, while the rate is only 78.7 percent for those without a high school diploma. The Pap test rate is similar among respondents in various household income groups. For the HPV test, screening rates are high in the 35-44 age group (63.1 percent) and the $25-34$ age group ( 62.2 percent). More Black ( 46.9 percent) respondents have had an HPV test than White ( 40.5 percent) and Hispanic respondents ( 43.8 percent). No significant difference in testing rate exists for respondents with various educational attainment and household income.

Prostate cancer is the most common cancer in American men, excluding skin cancer (CDC, 2019u). Prostate specific antigen (PSA) test is commonly used to screen for prostate cancer (CDC, 2019v). The 2018 BRFS asks male respondents above (include) 39 years old about their PSA test behavior. In the 2018 survey, 42.6 percent of Delaware male above 39 -year-old have had a PSA test. The test rate increases by age. Only 9.6 percent of respondents in the 35 to 44 age group have had a test, while the rate is 65.6 percent in the age group of 65 and over. Since age is the most common risk factor of prostate cancer (CDC, 2019w), it is positive to have more aged male take the test. According to CDC, African-Americans are at an increased risk for having or dying from prostate cancer (CDC, 2019w). However, in Delaware, the PSA test rate for Black adults is only 38.8 percent, showing a 10 percent difference from the White population ( 48.0 percent). The test rate for Hispanic adults is only 18.0 percent. Additionally, respondents with higher education levels and income have higher screening rates for prostate cancer.

Colorectal cancer is a common cancer in both men and women in the United States. It is mostly found in people aged above 50 (CDC, 2020h). Screening can check abnormal growths in the colon or rectum (i.e., precancerous polyps) and remove them before turning into cancer (CDC,

2020h). The USPSTF recommends that adults above 50 be screened for colorectal cancer and continue getting screened at regular intervals. Screening strategies include stool tests, flexible sigmoidoscopy, colonoscopy, and CT colonography (virtual colonoscopy) (CDC, 2020i). The 2018 BRFS asks respondents aged 50 and above for their colorectal cancer screening behavior. Among all respondents, 21.2 percent of them have had a blood stool test and 75.3 percent have had sigmoidoscopy or colonoscopy. For both tests, the screening rate increases as the respondents get older. For the age group 65 and over, more than a quarter ( 27.4 percent) of respondents have had a blood stool test and 82.2 percent have had a sigmoidoscopy or colonoscopy. For both screening strategies, there are no statistically significant differences among gender, racial, and socioeconomic status.

Lung cancer screening is recommended for people who have a heavy smoking history, currently smoke, or have quit within the past 15 years, as well as those who are between 55 and 80 years old (CDC, 2019x). Low-dose computed tomography (also called a low-dose CT scan) is the recommended lung cancer screening test by USPSTF (CDC, 2019x). The 2018 BRFS asks lung cancer screening questions to respondents who have smoked in the past or are currently smoking. Among them, 6.4 percent checked for lung cancer in the last 12 months. The screening rate is highest in the 55-64 age group, which is 10.1 percent. Screening behavior shows no statistically significant difference between genders. White ( 6.9 percent) and Black respondents ( 7.3 percent) share similar screening rates. However, the rate for Hispanic adults is comparably low (2.8 percent). There is also no statistically significant difference among groups with various educational attainment and household income.

| Table 30: Breast Cancer Screening | Have ever had a mammogram |  |  |
| :--- | :---: | :---: | :---: |
|  | Wt. $\%$ | $95 \%$ C.I. | Est. Pop. |
| Total | $71.2 \%$ | $[69.3,73.1]$ | 266,706 |
| AGE |  |  |  |
| 18-24 | $9.7 \%$ | $[0,23.8]$ | 3,687 |
| $25-34$ | $33.6 \%$ | $[22.8,44.4]$ | 19,833 |
| $35-44$ | $51.7 \%$ | $[43.9,59.5]$ | 28,269 |
| 45-54 | $93.3 \%$ | $[90.8,95.8]$ | 54,604 |
| 55-64 | $97.6 \%$ | $[96.3,98.9]$ | 66,822 |
| 65 and over | $97.5 \%$ | $[96.5,98.5]$ | 93,492 |
| GENDER |  |  |  |
| Male | -- | -- | -- |
| Female | $71.2 \%$ | $[69.3,73.1]$ | 266,706 |
| RACE-ETHNICITY |  |  |  |
| White, Non-Hispanic | $76.2 \%$ | $[74.1,78.3]$ | 188,573 |
| Black, Non-Hispanic | $66.5 \%$ | $[61.2,71.8]$ | 52,216 |
| Asian, Non-Hispanic | $58.9 \%$ | $[41.3,76.5]$ | 6,494 |
| American Indian/Alaskan Native, Non-Hispanic | $62.0 \%$ | $[44.3,79.7]$ | 2,095 |
| Hispanic | $47.3 \%$ | $[39.0,55.6]$ | 14,019 |
| Other, Non-Hispanic | $71.8 \%$ | $[59.1,84.5]$ | 3,309 |
| EDUCATION |  |  |  |
| < High School | $62.7 \%$ | $[55.6,69.8]$ | 27,488 |
| High School | $75.6 \%$ | $[72.2,79.0]$ | 82,674 |
| > High School and < College/Technical School | $68.3 \%$ | $[64.5,72.1]$ | 74,948 |
| College/Technical School | $73.1 \%$ | $[70.1,76.1]$ | 80,822 |
| Don’t know/not sure/missing | $59.0 \%$ | $[24.9,93.1]$ | 773 |
| HOUSEHOLD INCOME |  |  |  |
| Less than \$15,000 | $66.1 \%$ | $[59.1,73.1]$ | 17,350 |
| \$15,000-\$24,999 | $70.1 \%$ | $[65.3,74.9]$ | 43,482 |
| \$25,000-\$34,999 | $69.9 \%$ | $[63.3,76.5]$ | 21,113 |
| \$35,000-\$49,999 | $68.8 \%$ | $[62.9,74.7]$ | 26,434 |
| \$50,000 or more | $74.3 \%$ | $[71.4,77.2]$ | 110,386 |
| Don’t know/not sure/missing | $69.2 \%$ | $[64.7,73.7]$ | 47,941 |
|  |  |  |  |

Notes: Same with Table 5.

|  | Have ever had a Pap test |  |  | Have ever had an HPV test |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Wt. \% | 95\% C.I. | Est. Pop. | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 89.0\% | [87.8, 90.2] | 332,518 | 41.6\% | [38.5, 44.7] | 155,302 |
| AGE |  |  |  |  |  |  |
| 18-24 | 45.2\% | [32.5, 57.9] | 17,213 | 38.1\% | [23.9, 52.3] | 14,536 |
| 25-34 | 87.4\% | [83.2, 91.6] | 51,382 | 62.2\% | [55.1, 70.1] | 36,813 |
| 35-44 | 95.1\% | [92.6,97.6] | 51,999 | 63.1\% | [56.1, 70.1] | 34,510 |
| 45-54 | 97.9\% | [96.5, 99.3] | 56,852 | 47.6\% | [40.8, 54.4] | 27,673 |
| 55-64 | 98.0\% | [96.8, 99.2] | 66,956 | 33.5\% | [27.0, 40.0] | 22,779 |
| 65 and over | 92.2\% | [90.5, 93.9] | 88,116 | 19.9\% | [14.1, 25.7] | 18,991 |
| GENDER |  |  |  |  |  |  |
| Male | -- | -- | -- | -- | -- | -- |
| Female | 89.0\% | [87.8, 90.2] | 332,518 | 41.6\% | [38.5, 44.7] | 155,302 |
| RACE-ETHNICITY |  |  |  |  |  |  |
| White, Non-Hispanic | 91.0\% | [89.7, 92.3] | 224,112 | 40.5\% | [36.7, 44.3] | 99,652 |
| Black, Non-Hispanic | 88.4\% | [85.1, 91.7] | 69,478 | 46.9\% | [39.4, 54.4] | 36,765 |
| Asian, Non-Hispanic | 65.9\% | [49.5, 82.3] | 7,210 | 17.4\% | [0, 39.8] | 1,898 |
| American Indian/Alaskan Native, Non-Hispanic | 81.3\% | [68.0, 94.6] | 2,747 | 25.6\% | [0, 51.4] | 865 |
| Hispanic | 83.9\% | [79.1, 88.7] | 24,865 | 43.8\% | [34.4, 53.2] | 12,977 |
| Other, Non-Hispanic | 89.1\% | [80.8, 97.4] | 4,106 | 68.2\% | [52.1, 84.3] | 3,145 |
| EDUCATION |  |  |  |  |  |  |
| < High School | 78.7\% | [73.4, 84.0] | 34,476 | 36.1\% | [25.9, 46.3] | 15,812 |
| High School | 83.5\% | [80.7, 86.3] | 91,318 | 39.1\% | [33.1,45.1] | 42,572 |
| > High School and < College/Technical School | 92.7\% | [90.7, 94.7] | 100,841 | 47.0\% | [41.2, 52.8] | 51,158 |
| College/Technical School | 94.9\% | [93.5, 96.3] | 104,665 | 41.5\% | [36.4, 46.6] | 45,760 |
| Don't know/not sure/missing | 93.0\% | [77.2, 100] | 1,218 | 0\% | 0 | 0 |
| HOUSEHOLD INCOME |  |  |  |  |  |  |
| Less than \$15,000 | 86.7\% | [82.0, 91.4] | 22,769 | 37.9\% | [27.0, 48.8] | 9,905 |
| \$15,000-\$24,999 | 91.6\% | [88.9, 94.3] | 56,828 | 44.2\% | [36.5, 51.9] | 27,422 |
| \$25,000-\$34,999 | 86.8\% | [82.3, 91.3] | 25,731 | 42.2\% | [31.6, 52.8] | 12,445 |
| \$35,000-\$49,999 | 90.4\% | [86.9, 93.9] | 34,747 | 39.8\% | [30.3, 49.3] | 15,242 |
| \$50,000 or more | 93.0\% | [91.4, 94.6] | 137,871 | 46.3\% | [41.5, 51.1] | 68,635 |
| Don't know/not sure/missing | 79.1\% | [75.3, 82.9] | 54,573 | 31.5\% | [23.9, 39.1] | 21,653 |

Notes: Same with Table 5.

| Table 32: Prostate Cancer Screening |  |  |  |
| :---: | :---: | :---: | :---: |
|  | Have ever had a PSA test |  |  |
|  | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 42.6 | [39.2,46.0] | 96,359 |
| AGE |  |  |  |
| 18-24 | -- | -- | -- |
| 25-34 | -- | -- | -- |
| 35-44 | 9.6\% | [0, 27.9] | 2,523 |
| 45-54 | 23.5\% | [13.6, 33.4] | 12,695 |
| 55-64 | 52.2\% | [45.9, 58.5] | 30,956 |
| 65 and over | 65.6\% | [61.4, 69.8] | 50,184 |
| GENDER |  |  |  |
| Male | 44.6\% | [41.2, 48.0] | 96,359 |
| Female | -- | -- | -- |
| RACE-ETHNICITY |  |  |  |
| White, Non-Hispanic | 48.0\% | [44.2, 51.8] | 75,023 |
| Black, Non-Hispanic | 38.8\% | [28.3,49.3] | 15,937 |
| Asian, Non-Hispanic | 36.9\% | [15.8, 58.0] | 2,149 |
| American Indian/Alaskan Native, Non-Hispanic | 68.0\% | [43.6, 92.4] | 858 |
| Hispanic | 18.0\% | [1.9, 34.1] | 1,719 |
| Other, Non-Hispanic | 32.5\% | [8.8, 56.2] | 674 |
| EDUCATION |  |  |  |
| < High School | 18.3\% | [4.7, 31.9] | 400 |
| High School | 40.2\% | [33.1, 47.3] | 27,514 |
| > High School and < College/Technical School | 47.1\% | [40.4, 53.8] | 28,562 |
| College/Technical School | 55.8\% | [50.9, 60.7] | 35,636 |
| Don't know/not sure/missing | 51.6\% | [0, 100] | 577 |
| HOUSEHOLD INCOME |  |  |  |
| Less than \$15,000 | 21.1\% | [4.8, 37.4] | 2,390 |
| \$15,000-\$24,999 | 32.6\% | [22.0, 43.2] | 8,498 |
| \$25,000-\$34,999 | 34.4\% | [20.8, 48.0] | 4,543 |
| \$35,000-\$49,999 | 43.3\% | [33.2, 53.4] | 11,193 |
| \$50,000 or more | 50.3\% | [45.7, 54.9] | 54,565 |
| Don't know/not sure/missing | 48.5\% | [39.7, 57.3] | 15,170 |

Notes: Same with Table 5.

| Table 33: Colorectal Cancer Screening |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Have ever had blood stool test |  |  | Have ever had sigmoidoscopy/colonoscopy |  |  |
|  | Wt. \% | 95\% C.I. | Est. Pop. | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 21.2 \% | [18.2, 24.2] | 77,336 | 75.3 \% | [73.6, 77.0] | 274,835 |
| AGE |  |  |  |  |  |  |
| 18-24 | -- | -- | -- | -- | -- | -- |
| 25-34 | -- | -- | -- | -- | -- | -- |
| 35-44 | 10.9 \% | [0, 54.1] | 159 | 32.3 \% | [0,78.1] | 469 |
| 45-54 | 10.6 \% | [1.7, 19.5] | 6,955 | 56.8\% | [50.3, 63.3] | 37,112 |
| 55-64 | 18.4 \% | [12.9, 23.9] | 23,358 | 75.9 \% | [72.9, 78.9] | 96,618 |
| 65 and over | 27.4 \% | [23.4, 31.4] | 46,864 | 82.2 \% | [80.2, 84.2] | 140,637 |
| GENDER |  |  |  |  |  |  |
| Male | 22.3 \% | [17.7, 26.9] | 37,381 | 75.1\% | [72.5, 77.7] | 125,588 |
| Female | 20.2 \% | [16.3, 24.1] | 39,955 | 75.4 \% | [73.1, 77.7] | 149,247 |
| RACE-ETHNICITY |  |  |  |  |  |  |
| White, Non-Hispanic | 22.2 \% | [18.8, 25.6] | 61,590 | 77.6\% | [75.8, 79.4] | 214,673 |
| Black, Non-Hispanic | 18.4 \% | [9.8, 27.0] | 11,725 | 71.5 \% | [66.2, 76.8] | 45,643 |
| Asian, Non-Hispanic | 10.9 \% | [0, 30.2] | 890 | 59.4 \% | [44.0, 74.8] | 4,708 |
| American Indian/Alaskan Native, Non-Hispanic | 26.7 \% | [0.6, 52.8] | 822 | 67.0 \% | [51.0, 83.0] | 2,063 |
| Hispanic | 16.8 \% | [1.8, 31.8] | 1,734 | 51.9 \% | [39.9, 63.9] | 5,348 |
| Other, Non-Hispanic | 18.5 \% | [0, 41.4] | 575 | 77.3 \% | [65.3, 89.3] | 2,399 |
| EDUCATION |  |  |  |  |  |  |
| < High School | 25.0 \% | [13.5, 36.5] | 8,038 | 56.0\% | [47.5, 64.5] | 17,876 |
| High School | 20.5 \% | [14.8, 26.2] | 23,736 | 73.8\% | [70.4, 77.2] | 85,604 |
| > High School and < College/Technical School | 10.7 \% | [14.9, 26.5] | 21,960 | 78.9 \% | [75.8, 82.0] | 83,387 |
| College/Technical School | 21.4 \% | [16.6, 26.2] | 23,494 | 79.3 \% | [76.8, 81.8] | 86,965 |
| Don't know/missing | 6.6 \% | [0, 41.0] | 108 | 61.0\% | [29.1, 92.9] | 1,004 |
| HOUSEHOLD INCOME |  |  |  |  |  |  |
| Less than \$15,000 | 23.0 \% | [10.8, 35.2] | 4,438 | 59.2 \% | [51.0, 67.4] | 11,356 |
| \$15,000-\$24,999 | 22.6 \% | [14.6, 30.6] | 11,720 | 71.2 \% | [66.3, 76.1] | 36,704 |
| \$25,000-\$34,999 | 22.2 \% | [11.5, 32.9] | 5,841 | 70.9 \% | [64.2, 77.6] | 18,680 |
| \$35,000-\$49,999 | 22.2 \% | [13.6, 30.8] | 9,456 | 76.5 \% | [71.7, 81.3] | 32,394 |
| \$50,000 or more | 20.1 \% | [15.6, 24.6] | 31,707 | 81.1 \% | [78.8, 83.4] | 128,080 |
| Don't know/missing | 20.9 \% | [13.8, 28.0] | 14,174 | 70.4 \% | [66.0, 74.8] | 447,622 |

Notes: Same with Table 5.

| Table 34: Lung Cancer Screening |  |  |  |
| :---: | :---: | :---: | :---: |
|  | Have a CT or CAT scan in the last 12 months |  |  |
|  | Wt. \% | 95\% C.I. | Est. Pop. |
| Total | 6.4 \% | [3.8, 9.0] | 43,349 |
| AGE |  |  |  |
| 18-24 | 1.2 \% | [0, 13.5] | 900 |
| 25-34 | 3.44 \% | [0,12.6] | 3,807 |
| 35-44 | 4.1 \% | [0,12.6] | 3,973 |
| 45-54 | $6.0 \%$ | [0, 13.4] | 6,381 |
| 55-64 | 10.1 \% | [4.2, 16.0] | 12,457 |
| 65 and over | 9.7\% | [5.2, 14.2] | 15,830 |
| GENDER |  |  |  |
| Male | 6.3 \% | [2.4, 10.2] | 20,077 |
| Female | 6.5 \% | [3.0, 10.0] | 23,272 |
| RACE-ETHNICITY |  |  |  |
| White, Non-Hispanic | 6.9 \% | [3.8, 10.0] | 31,075 |
| Black, Non-Hispanic | 7.3 \% | [0.2, 14.4] | 9,663 |
| Asian, Non-Hispanic | 1.4 \% | [0, 12.9] | 338 |
| American Indian/Alaskan Native, Non-Hispanic | 5.4 \% | [0,31.0] | 291 |
| Hispanic | 2.8 \% | [0, 11.4] | 1,492 |
| Other, Non-Hispanic | 5.8\% | [0, 22.0] | 489 |
| EDUCATION |  |  |  |
| < High School | 8.2 \% | [0, 17.4] | 6,224 |
| High School | 6.2 \% | [1.5, 10.9] | 12,943 |
| > High School and < College/Technical School | 7.3 \% | [2.2, 12.4] | 14,288 |
| College/Technical School | 5.0 \% | [0.8, 9.2] | 9,675 |
| Don't know/not sure/missing | 9.3\% | [0, 49.6] | 219 |
| HOUSEHOLD INCOME |  |  |  |
| Less than \$15,000 | 8.0\% | [0, 17.7] | 3,399 |
| \$15,000-\$24,999 | 8.3 \% | [1.1, 15.5] | 8,095 |
| \$25,000-\$34,999 | 6.0 \% | [0, 15.5] | 2,762 |
| \$35,000-\$49,999 | 7.0 \% | [0,14.8] | 5,104 |
| \$50,000 or more | 5.9 \% | [1.9, 9.9] | 17,837 |
| Don't know/not sure/missing | 5.4 \% | [0, 11.4] | 6,152 |

Notes: Same with Table 5.

### 3.4.10 Sexual orientation and gender identity

The 2018 BRFS collects data regarding sexual orientation and gender identity for the purpose of better understanding the health and health care needs of the lesbian, gay, bisexual, and transgender communities (LGBT+). Two questions are asked: first, do you consider yourself to be 1-Straight, 2-Lesbian or Gay, 3-Bisexual or 4-Other Orientation? The second question is: Do you consider yourself to be transgender?

Table 35 shows the percentages of LGBT populations in Delaware and in the United States. Delaware has a greater percentage of respondents who identify as LGBT+ than the percentage in the nation. In detail, 2.4 percent of Delaware adults consider themselves as lesbian or gay; 6.2 percent as bisexual; 1.3 percent as "something else"; while 1.3 percent don't know the answer. The transgender percentage is 1 percent in Delaware and 0.5 percent in the nation (Table 35).

Table 35: Sexual Orientation in Delaware and the U.S.

|  | Delaware | U.S. |
| :--- | :---: | :---: |
|  | Wt. $\%$ | $\mathrm{Wt} \%$. |
| Lesbian or Gay | 2.4 | 1.4 |
| Straight or Heterosexual | 86.3 | 90.0 |
| Bisexual | 6.2 | 3.5 |
| Something else | 1.3 | 1.5 |
| I don't know the answer | 1.3 | 1.9 |
| Refused | 2.4 | 1.7 |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

## Table 36: Self-considered Transgender in Delaware and the U.S.

|  | Delaware <br> Wt. \% | U.S. <br> Wt. $\%$ |
| :--- | :---: | :---: |
| Yes, Transgender, male to female | 0.3 | 0.2 |
| Yes, Transgender, female to male | 0.5 | 0.2 |
| Yes, Transgender, gender nonconforming | 0.2 | 0.1 |
| No | 97.2 | 98.4 |
| Don't know/Not Sure | 0.9 | 0.5 |
| Refused | 0.9 | 0.6 |

Source: 1. Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e). 2. U.S. data: (CDC, 2019f).

### 3.4.11 Preconception health/family planning

Preconception health and family planning is a state-added module of the 2018 BRFS. A set of four questions are asked to collect respondents' thoughts and experiences with family planning. If the respondent is female and greater than 49 years of age, is pregnant, or if the respondent is male, they do not need to answer these questions.

For the first question, 21.4 percent of respondents answered, revealing that 10.4 percent of Delaware respondents took action to avoid getting pregnant the last time that they had sex. The main methods of contraception are birth control pills (used by 2.8 percent of respondents) and male condoms (used by 2.2 percent of respondents). "Wanting a pregnancy" is the main reason reported for not adopting contraceptive methods. When asked about the prospect of having a child, 9.2 percent of respondents don't want to have children; while 2.5 percent of respondents do want to have children but are not sure when.

| Table 37: Question 1: Did You or Your Partner Do Anything the Last Time You Had |  |
| :--- | :---: |
| Sex to Keep You from Getting Pregnant? |  |
|  | Delaware |
|  | Wt. $\%$ |
| No response | 78.6 |
| Yes | 10.4 |
| No | 8.0 |
| No partner/not sextually active | 1.4 |
| Same sex partner | 0.1 |
| Has had a hysterectomy | 0.6 |
| Don't know/Not sure/Refused | 0.9 |
| Total | 100 |

Source: Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

Table 38: Question 2: What Did You or Your Partner Do the Last Time You Had Sex to Keep You from Getting Pregnant?

|  | Delaware |
| :--- | :---: |
| No response | Wt. $\%$ |
| Birth control pills, any kind | 89.6 |
| Male condoms | 2.8 |
| Contraceptive implant | 2.2 |
| IUD, type unknown | 0.9 |
| Other (eg. male sterilization, shots, and contraceptive ring) | 0.9 |
| Don't know/Not sure/Refused | 3.0 |
| Total | 0.6 |

Source: Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

Table 39: Question 3: What was the Main Reason for Not Doing Anything the LAST TIME YOU HAD SEX to Keep You from Getting Pregnant?

|  | Delaware <br> Wt. $\%$ |
| :--- | :---: |
| No response | 90.6 |
| Other reasons | 2.1 |
| You want a pregnancy | 1.0 |
| You just didn't think about it | 0.7 |
| Don't think you and your partner can get pegnant (infertile or too old) | 0.7 |
| You had tubes tied (sterilization) | 0.7 |
| Other (eg. religious reason, you just had a baby) | 2.8 |
| Don't know/Not sure/Refused | 1.4 |
| Total | 100 |

Source: Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

| Table 40: Question 4: How do You Feel about Having a Child Now or Sometime in the |  |
| :--- | :---: |
| Future? | Delaware |
|  | Wt. $\%$ |
| No response | 78.9 |
| You don't want to have one | 9.2 |
| You do want to have one, but you are not sure when | 2.5 |
| You do want to have one, between 2 years to less than 5 years from | 2.3 |
| now | 2.2 |
| Unable to have children/hysterectomy | 1.4 |
| You do want to have one, between 12 months \& less than 2 years | 1.1 |
| from now | 1.0 |
| You do want to have one, less than 12 months from now | 1.4 |
| You do want to have one, five or more years from now | 100 |
| Don't know/Not sure/Refused |  |
| Total |  |

Source: Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

### 3.4.12 Heroin and Opioids

The use of heroin and other opioids has become a major epidemic in Delaware and the nation. This state-added module asks two questions to determine how widespread the impact of heroin and opiate use is in Delaware.

Based on the survey results, 10.8 percent of respondents know a family member or a friend of the family that currently uses heroin or other opiates. About 7.8 percent of respondents have a family member or friend of the family currently in treatment for a heroin or other opiate/opioid addiction.

| Table 41: Question 1: Does Any Family Member or Friend of Your Family <br> Currently Use Heroin or Other Opiates? |  |
| :--- | :---: |
|  | Delaware |
|  | Wt. \% |
| No response | 13.4 |
| Yes | 10.8 |
| No | 72.5 |
| Don't know/Not sure | 2.8 |
| Refused | 0.5 |
| Total | 100 |

Source: Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

Table 42: Question 2: Is Any Family Member or Friend of Your Family Currently in Treatment for a Heroin or Other Opiate/Opioid Addiction?

|  | Delaware <br> Wt. $\%$ |
| :--- | :---: |
| No response | 13.4 |
| Yes | 7.8 |
| No | 76.1 |
| Don't know/Not sure | 2.2 |
| Refused | 0.6 |
| Total | 100 |

Source: Delaware data: This study compiles data from the 2018 Behavioral Risk Factor Survey (BRFS) (CDC, 2019e).

## 4. Conclusion

The Behavioral Risk Analysis Survey (BRFS) offers means of gathering empirical data and meaningful insights into the public health of Delaware's adult population. By understanding Delawareans' health conditions, health habits, and behavioral risks in relation to that of the general U.S. population, policymakers and health professionals can make better informed decisions about the specific health care needs of the state. Additionally, information gathered through Delaware's BRFS is utilized by several national health organizations, such as the U.S. Centers for Disease Control and Prevention (CDC), which provides valuable long-term data.

Healthcare access proves to be a key finding and significant issue in Delaware, relatively consistent with nationwide results, and is often affected by race, socioeconomic status, and educational attainment. This study found that Hispanic adults, adults without a high school diploma, and adults with household earnings below $\$ 15,000$ are the groups with the least amount of healthcare coverage. Access to healthcare can greatly influence one's health condition, making it a crucial topic to study and improve through public policy and government attention and assistance. Medicare ${ }^{12}$ might play a significant role in health care access, with 97.5 percent of those 65 and over having healthcare. The coverage rate drops to 64.3 percent when only considering adults aged 18 to 64 years old. As expected, many chronic diseases and health conditions affect senior groups significantly more than younger populations. While this information may seem overt, it is useful in adjusting screening recommendations for certain diseases. Most importantly, rates of prevalence must be considered when assessing needs of retirement healthcare, social security benefits, senior center health providers, and other groups or associations that provide for the elderly.

The BRFS shows that age is the key factor that correlates to the immunization and screening rate of most diseases. On the other hand, these categories also vary based on race and socio-economic status. Respondents with higher household income, higher educational attainment, or White respondents are most likely to receive vaccines compared to Hispanics. Delaware's results from Hispanic respondents reveal the significant influence of race upon health conditions and health care. For example, the Hispanic population shows unusually low rates of diabetes and high blood pressure, despite being found most likely to develop diabetes. These significant racial differences are generally consistent with disproportionate findings from the American Medical Group Foundation. It is hypothesized that perhaps Hispanics are more unaware of their conditions, which may be a result of other confounding variables reported in the BRFS, such as their lower rates of healthcare coverage, as well as the fact that health data of Hispanics is generally lacking compared to other races. These findings highlight a need for more

[^10]public health outreach and education to these particular Hispanic communities. Fortunately, the BRFS surveys risk behaviors related to HBP, which offers further insight regarding susceptibility to HBP and similar health conditions. However, it would be helpful in future BRFS questionnaires to include questions about HBP checking behavior or general awareness, similar to those included in the diabetes section, as this data provides useful contextual information about how and where populations get checked for health conditions. This information could be used to revise the checking process, as well as educating the public about diseases. Multiple regression analysis would also be beneficial in future BRFS reports as a means to compare the coinciding effects of the relationship between multiple variables, especially race.

Chronic disease is a core component of the Delaware BRFS, with eleven types of chronic disease being surveyed in 2018. The results are similar to that of the national data, with arthritis being the most prevalent listed condition with 25.9 percent, depressive disorder with 16.9 percent, and asthma with 14.3 percent. The 2018 BRFS does not survey hypertension and cholesterol, which had the greatest prevalence in Delaware in 2017. Although it is common to survey certain topics on alternating years, considering that hypertension and high cholesterol had the greatest prevalence of chronic disease in Delaware's 2017 BRFS, it is beneficial to include this section consistently in upcoming years.

The BRFS includes opportunities to incorporate optional survey modules deemed relevant to Delaware's population. This method is important in that it allows room to explore and expand upon distinct areas that are particularly of greater concern in Delaware compared to other participating states. This report analyzes the optional module of sexual orientation and gender identity. Delaware has a slightly higher rate of individuals identifying with the LGBT+ community compared to the national average. While it is important to measure the prevalence of different sexualities and gender identities, the purpose of the BRFS is to apply these demographic statistics to health care considerations. In future BRFS modules, expanding upon specific questions relating to LGBT+ health, such as HIV/AIDS, gender transition operations, etc., would be beneficial in gaining a more detailed understanding of the LGBT+ health experience.

The BRFS also reports findings where Delaware has differing rates of prevalence of behavioral risks or conditions compared to national data points, such as lower rates of physical exercise, seatbelt use, and higher rates of obesity. Physical exercise is defined as recreational activity outside of regular job duties, with 73.1 percent of Delaware adults reporting having engaged in physical activities in the past month. This rate is lower than the national average of 75.4 percent. Reports also indicate that White adults, adults with higher incomes, and adults with higher education levels have higher rates of exercise. On the other hand, Delaware's obesity rate of 33.5 percent is higher than the national rate of 30.9 percent. There are no significant differences in obesity or rates found between racial, age, or socio-economic groups, however, gender does show a statistically significant difference in overweight rates, with 39.4 percent of males being overweight compared to 29.2 percent of females. Delaware's seat belt usage rate of
85.3 percent is also below the national average of 87.0 percent. Seat belt use positively correlates with age, with more individuals wearing their seatbelt as they get older. Further, it is found that females ( 88.3 percent) and White adults ( 86.4 percent) are most likely to use their seat belt, with socio-economic factors not having an impact on this rate.

The third area of questions asked in the BRFS are composed of state-added questions that are unique to the experiences of Delaware adults. The 2018 BRFS included unique modules related to tobacco use, preconception health/family planning, and heroin and opioids. This section is compelling due to its relevance to Delaware's population, especially when Delaware results differ from national averages. For example, 15.7 percent of Delaware adults report smoking, which is higher than the national average of 14.7 percent. This difference creates an incentive to examine the reason behind it in efforts to decrease the smoking rates, as this behavioral risk may determine future health risks of Delawareans. Another state-added question is the preconception health/family planning section that directs questions towards women younger than 49 years of age, who are not currently pregnant. While this is a logical manner of narrowing down the target population, pregnant women can also offer useful information about the nature of their pregnancy, for example, if contraception was used, if the pregnancy was planned, behavioral risks or health conditions of the mother, etc. The BRFS may consider adding additional questions in future surveys targeted specifically to pregnant women or those who have recently given birth in order to gather information about prenatal and postnatal healthcare. Heroin and opioid use is a current epidemic in Delaware, with a small set of questions determining general prevalence rather than distinct details. Expanding upon these state-added modules by asking more specific questions will offer more conclusive routes of solving these issues. It is important to continue adjusting the BRFS and developing new questions in areas of concern in accordance with the patterns seen in the 2018 data.

It is also critical to ensure that each demographic is represented accordingly. While the main three racial groups discussed in the BRFS report include Whites, Blacks, and Hispanics, it is important to acknowledge that there are many more races and ethnicities that make up Delaware's population. For example, it is made clear that Asian and American Indian/Alaskan data is listed in a number of tables, but not discussed due to limited sample sizes. While it is important to maintain accuracy and not speculate upon data when the samples are limited, it is imperative that efforts are made to expand upon these sample sizes by organizing strategies to collect information from these groups.

It is noteworthy to include that some 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 BRFS. 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, abuse, or neglect. ACEs have been linked to risky health behaviors, chronic health conditions, low life potential, and early death (CDC, 2019y). 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, 2019z). Considering the prevalence of violence in areas such as Wilmington, this module may be useful in studying how childhood experiences vary between states, and even within Delaware. Because emotional and social health are a major component of one's overall health, it may be beneficial for the BRFS to incorporate the ACE modules in future reports.

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## Appendix A

## 1. High blood pressure (based on 2017 BRFS)

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 professionals. In other words, more than 1 in 3 Delaware adults have been diagnosed with HBP. Among them, 77.1 percent take 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).

The hypertension prevalence rate kept high according to previous surveys ${ }^{13}-34.8$ 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, 2019d). 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 (such as salt intake reduction), which could be included in future BRFS.

Figure A. 1
High blood pressure prevalence in Delaware, 2011-2017

High Blood Pressure Prevalence


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).
[^11]Table A. 1 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 report being diagnosed with HBP.

More males ( 36.9 percent) than females ( 32.9 percent) are told by a doctor or a health professional that they have HBP. However, the difference in prevalence rates between gender are not statistically significant.

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 incomes of $\$ 50,000$ or more.

A statistically significant difference is presented among Hispanics compared to other racial and ethnic groups. While White ( 35.9 percent) and Black ( 39.3 percent) adults have similar prevalence rates, Hispanic adults report nearly half of that 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 the Delaware BRFS has not covered questions related to HBP checking behavior, it is unclear that the low prevalence rate is because of not checking.

Figure A. 2
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 A.1: Hypertension Awareness | (Ever been told) have high blood pressure |  |  |
| :--- | :---: | :---: | :---: |
|  | Weighted \% | $95 \%$ Cl | Est. Pop. |
| Total | 34.8 | $[32.6,37.2]$ | 263,971 |
| AGE |  |  |  |
| 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 |
| GENDER |  |  |  |
| Male | 36.9 | $[33.6,40.3]$ | 133,666 |
| Female | 32.9 | $[29.9,35.9]$ | 130,305 |
| RACE-ETHNICITY |  |  |  |
| 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 |
| EDUCATION |  |  |  |
| < 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 |
| HOUSEHOLD INCOME |  |  |  |
| 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 are negative due to a 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.

## 2. Cholesterol (based on 2017 BRFS)

High blood cholesterol (HBC) is the second-highest chronic disease that Delaware adults are aware of. Nearly 30 percent ( 30.1 percent, estimated 228,116 population) of adults have been told they have HBC (Table A.2), and 62.5 percent of them currently take high cholesterol medicine. The U.S. aggregated prevalence rate is 31.5 percent. HBC is a major risk factor for heart disease, the leading cause of death in the U.S., and the fifth leading cause of strokes (CDC, 2019aa). However, high cholesterol presents no symptoms, so many people are unaware of their HBC (CDC, 2019aa).

HBC incidence is most closely associated with age. Nearly half (49.4 percent) of Delaware adults above 65 years old have ever been identified 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 a 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, neither for education nor household income.

There is a racial/ethnic gap in the prevalence of HBC between Hispanics and other groups. The prevalence rate of HBC is 22.6 percent for Hispanics, 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 BRFS 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 one's blood cholesterol checked. About six in ten ( 62.4 percent) 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 aged 65 years and older. Unsurprisingly, the percentage of individuals diagnosed with HBC after cholesterol checking also increases with age. Nearly half ( 51.2 percent) of respondents 65 years and older are diagnosed with HBC.

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

Table A.2: Cholesterol Awareness

|  | (Ever been told) blood cholesterol is high |  |  |
| :---: | :---: | :---: | :---: |
|  | Weighted \% | 95\% CI | Est. Pop. |
| Total | 30.1 | [27.7, 32.5] | 228,116 |
| AGE |  |  |  |
| 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 |
| GENDER |  |  |  |
| Male | 34.6 | [30.9, 38.3] | 117,220 |
| Female | 29.8 | [26.6, 33.0] | 110,896 |
| RACE-ETHNICITY |  |  |  |
| 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 |
| EDUCATION |  |  |  |
| < 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 |
| HOUSEHOLD INCOME |  |  |  |
| 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 are negative due to a 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 not discussed due to limited sample size.

Table A.3: Cholesterol Check

|  | Cholesterol checked within past five years |  |  | Diagnosed with high blood cholesterol* |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Wt. \% | 95\% Cl | Est. Pop. | Wt. \% | 95\% CI | Est. Pop. |
| Total | 83.8 | [82.6, 85.0] | 636,004 | 34.6 | [32.1, 37.1] | 225,335 |
| AGE |  |  |  |  |  |  |
| 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 |
| GENDER |  |  |  |  |  |  |
| 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 |
| RACE-ETHNICITY |  |  |  |  |  |  |
| 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 |
| EDUCATION |  |  |  |  |  |  |
| < 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 |
| HOUSEHOLD INCOME |  |  |  |  |  |  |
| 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.


[^0]:    ${ }^{1}$ For detailed information, see https://www.cdc.gov/brfss/annual data/2017/pdf/weighting-2017-508.pdf

[^1]:    ${ }^{2}$ Because CDC changed BRFSS weighting methodology in 2011, this table shows data after 2011.

[^2]:    ${ }^{3}$ Including type 1 and type 2 diabetes but excluding gestational diabetes.

[^3]:    4 Including a doctor, nurse, or other health professional.
    5 "A-one-C" is a test which measures the average level of blood sugar over the past three months.

[^4]:    ${ }^{6}$ BMI formula: weight (kg) / [height (m) ${ }^{2}$
    ${ }^{7}$ For more information, see https://www.cdc.gov/healthyweight/effects/index.html

[^5]:    * Respondents who reported having smoked at least 100 cigarettes in their lifetime and currently smoke (i.e., smokes every day or smokes some days).
    $\wedge$ Respondents who reported having used an e-cigarette or other electronic vaping product, even just one time in their entire life.
    Notes: Same with Table 5.

[^6]:    ${ }^{8}$ Excessive drinking includes binge drinking, heavy drinking, and any drinking by pregnant women or people younger than age 21.

[^7]:    ${ }^{9}$ 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 >= 2 ).

[^8]:    ${ }^{10}$ Approximately 35.8 percent (weighted) of respondents answer the question. The information present here is the valid percent, i.e., among the 35.8 percent respondent, 28.1 percent of them received their most recent flu shot in October 2017.

[^9]:    ${ }^{11}$ The USPSTF is an organization made up with doctors and disease experts. The USPSTF searches for the best way to prevent diseases and provide commendations for doctors on how to help patients avoid disease or detect them in the early stage.

[^10]:    ${ }^{12}$ Medicare is a federal insurance program that provides healthcare coverage for Americans 65 and older or under 65 and have a disability.

[^11]:    ${ }^{13}$ The BRFS includes hypertension awareness modules in odd-numbered years.

