2015-2016
National Survey on Drug Use and Health: Other Sources of State-Level Data

Introduction

A variety of surveys and data systems other than the National Survey on Drug Use and Health (NSDUH) collect data on substance use problems and mental disorders. It is useful to consider the results of these other studies when discussing NSDUH data. This document briefly describes one of these other data systems that publish state estimates and presents selected comparisons with NSDUH results. The state-level survey that collects data on substance use discussed in this document is the Behavioral Risk Factor Surveillance System (BRFSS), sponsored by the Centers for Disease Control and Prevention (CDC). Another CDC data system that provides state-level substance use estimates for most but not all states is the Youth Risk Behavior Survey (YRBS). Differences between the YRBS and NSDUH sampling designs, as well as the wider range of age groups used in NSDUH small area estimates, imply that comparisons of estimates are not straightforward. However, ignoring these differences and examining estimates at a national level, the YRBS has been generally shown to have higher estimates than NSDUH has (Center for Behavioral Health Statistics and Quality, 2015, 2016, 2017).[1]

When considering the information presented in this document, it is important to understand the methodological differences between these surveys and the impact that these differences could have on estimates of substance use and mental health. Several studies have compared NSDUH estimates with estimates from other studies and have evaluated how differences may have been affected by differences in survey methodology (Brener et al., 2006; Gfroerer, Wright, & Kopstein, 1997; Grucza, Abbacchi, Przybeck, & Gfroerer, 2007; Hennessy & Ginsberg, 2001; Miller et al., 2004). These studies suggest that the goals and approaches of surveys are often different, making comparisons between them difficult. Some methodological differences that have been identified as affecting comparisons include populations covered, sampling methods, mode of data collection, survey setting, questionnaires, and estimation methods.

BRFSS is a state-based system of health surveys that collect information on health risk behaviors (including cigarette and alcohol use), preventive health practices, and health care access primarily related to chronic disease, injuries, and preventable infectious diseases. BRFSS is an annual, state-based telephone (landline and cellular telephone) survey of the civilian, noninstitutionalized adult population aged 18 or older and is sponsored by the CDC. In 2015 and 2016, BRFSS collected data from all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, American Samoa, Palau, and Guam using a computer-assisted telephone interviewing design. More than 400,000 adults are interviewed each year, and state estimates are presented annually.

In 2011, BRFSS introduced two methodological changes: (1) the inclusion of cellular telephone-only households in the sample, and (2) the incorporation of iterative proportional fitting (also referred to as "raking") in the production of the final BRFSS weights, replacing the use of poststratification. Cellular telephone-only households were added to improve survey coverage of the telephone population and addressed differences in characteristics found between

[1] For further details about the YRBS and the Youth Risk Behavior Surveillance System (YRBSS), see the following web page: https://www.cdc.gov/healthyyouth/data/yrbs/index.htm.

the cellular telephone-only and landline populations. Since 2014, BRFSS respondents who had a cellular telephone were eligible for participation in the cellular telephone survey. In 2013, on the other hand, to be eligible to participate in the cellular telephone survey, respondents had to be in either a cellular telephone-only household or a household where 90 percent or more of their calls were received on cellular telephones. Because state-level demographic characteristics of cellular telephone-only households are not available, weighting with the previous method of poststratification was no longer feasible. As a result of these methodological changes in 2014, the CDC reported small increases in various health risk indicators, including tobacco use and binge drinking.[2] The pooled 2015-2016 BRFSS state estimates and confidence intervals are weighted design-based estimates (i.e., each respondent is weighted in a way that accounts for the survey design).[3]

Also in 2011, the BRFSS questionnaire underwent some changes in the alcohol consumption and tobacco use sections. In 2010, BRFSS respondents were asked, "During the past 30 days, have you had at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?" The response to this question was used to route respondents to the next question regarding the frequency of alcohol use in the past 30 days. However, only the responses to the first question were used to determine past month alcohol use. In the 2011 BRFSS questionnaire, this question was dropped, and respondents were directly asked, "During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?" If a respondent answered "1" or higher to this question, he or she was considered a past month user of alcohol. In spite of the questionnaire changes, BRFSS is still producing an estimate of past month alcohol use that can be compared with the NSDUH estimate. Also, minor wording changes were made in one question in the tobacco use section, but none of these would affect current cigarette use estimates. These newly worded questions were used in the 2012 to the 2016 BRFSS surveys as well.

In both BRFSS and NSDUH, data are collected on the following four substance use and mental health measures in each of the 50 states and the District of Columbia:[4]

- past month alcohol use,
- cigarette use ("past month" use for NSDUH and "current" use for BRFSS),
- past month binge alcohol use, and
- lifetime doctor-diagnosed depression.[5]

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[2] More detailed information about these methodological changes is available online at the 2014 BRFSS web page: https://www.cdc.gov/brfss/annual_data/annual_2014.html (specifically, see CDC, 2015).

[3] For more details about BRFSS in general, along with information about the methodological changes introduced in 2011 and 2012 and their impact on BRFSS estimates, see the following two web pages: https://www.cdc.gov/brfss/ and https://www.cdc.gov/surveillancepractice/reports/brfss/brfss.html.

[4] The District of Columbia is referred to as a "state" in this document.

[5] The BRFSS doctor-diagnosed depression measure is based on a question that asks respondents if a doctor or other medical professional had ever told them they had depression. The NSDUH doctor-diagnosed depression measure is based on a similar question that is also asked directly of respondents. However, NSDUH also has a measure based on a series of questions that determines depression using diagnostic criteria defined in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1994).

Note that only estimates for the first three of these four measures are compared here because small area estimates of lifetime doctor-diagnosed depression were not produced for NSDUH. The BRFSS and NSDUH questions that were used for the first three measures are shown in the next section. Note that this is the first time that past month binge alcohol use estimates from BRFSS and NSDUH have been compared because, prior to 2015, the definitions for binge alcohol use differed in the two surveys.

Past month alcohol use is defined consistently in both BRFSS and NSDUH as having an alcoholic beverage in the past month. Similarly, past month binge alcohol use is defined consistently in the two surveys as drinking five or more drinks (for males) or four or more drinks (for females) on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days. In 2014 and prior years, NSDUH's binge alcohol use definition for males and females was having had five or more drinks of an alcoholic beverage on the same occasion (i.e., at the same time or within a couple hours of each other) on at least 1 day in the past 30 days.

In NSDUH, past month cigarette use is defined as having smoked part or all of a cigarette during the past 30 days (i.e., the 30 days prior to the interview). In BRFSS, the cigarette use measure reported is current cigarette use, which is defined as having smoked at least 100 cigarettes during the lifetime and indicating smoking every day or some days at the time of the survey. Because of these subtle but present differences in definitions, NSDUH's cigarette use estimates tend to be higher in that they cover two groups of people that the BRFSS estimates would not: (1) respondents who have not smoked 100 cigarettes in their lifetime but had smoked in the past month, and (2) respondents who had smoked a cigarette earlier in the month but were not smoking at the time of the survey.

Beginning in 2011, the question assessing lifetime diagnosed depression was removed from the BRFSS optional anxiety and depression module and placed in the core section of the questionnaire within a group of questions inquiring about various chronic health conditions, such as coronary heart disease and diabetes. Thus, BRFSS estimates for lifetime diagnosed depression are now available for all states. In BRFSS, respondents are simply asked if a doctor, nurse, or other health professional has ever told them that they had a depressive disorder, including depression, major depression, dysthymia, or minor depression. In NSDUH, respondents are considered to have had depression in their lifetime if they answered that a doctor or medical professional has ever told them that they had depression. In the same group of questions asking about depression in both the BRFSS questionnaire and the NSDUH questionnaire, respondents are also asked about heart disease, diabetes, strokes, and asthma. However, because NSDUH's state-level small area estimates are not produced for lifetime diagnosed depression or any of these other health conditions, comparisons with BRFSS data cannot be made. Although state small area estimates have not been produced in NSDUH for these measures, direct estimates of these health measures could be generated using NSDUH data at the state level and compared with BRFSS estimates. Because the focus here is on model-based small area estimates, however, such comparisons with BRFSS data have not been made. Note that NSDUH's state small area estimates are produced for individuals having had a major depressive episode (MDE) in the past year. However, this MDE measure is unrelated to the NSDUH question about being diagnosed with lifetime depression. Instead, NSDUH includes a separate set of questions to assess

depression symptoms that are used to measure MDE. Thus, NSDUH's small area estimates for MDE would not be comparable with estimates of the BRFSS depression measure discussed here.

This document presents the findings of the combined 2015-2016 BRFSS state estimates and the combined 2015-2016 NSDUH state estimates for past month alcohol use, past month binge alcohol use, and cigarette use ("past month" use for NSDUH and "current" use for BRFSS). In Tables 1, 2, and 3 (shown after this text discussion), the pooled 2015-2016 BRFSS state estimates for adults aged 18 or older are shown alongside the pooled 2015-2016 NSDUH small area estimates for the same age group. Tables 1 and 2 also include *p* values that indicate whether the BRFSS and NSDUH alcohol use and binge alcohol use estimates are significantly different from each other for a given state using an exact test as described in the next section. Due to definitional differences in the cigarette use measure, no tests of differences between NSDUH and BRFSS estimates were produced.

NSDUH and BRFSS Questions

The 2016 NSDUH questions that were used to determine past month alcohol use and past month binge alcohol use were worded as follows:[6]

AL01 Have you **ever**, even once, had a drink of any type of alcoholic beverage? Please do not include times when you only had a sip or two from a drink.

1 Yes
2 No
DK/REF[7]

ALLAST3 [IF AL01 = 1 OR ALREF = 1] How long has it been since you **last** drank an alcoholic beverage?

1 Within the past 30 days – that is, since **[DATEFILL]**
2 More than 30 days ago but within the past 12 months
3 More than 12 months ago

DK/REF
PROGRAMMER: SHOW 12 MONTH CALENDAR

AL08 [IF ALC30DAY = 1 – 30 OR ALCEST30 = (1 – 6, DK OR REF)] During the past 30 days, that is, since **[DATEFILL]**, on how many days did you have [IF QD01=5 (MALE) THEN FILL 5, IF QD01=9 (FEMALE) THEN FILL 4] **or more drinks** on the same occasion? By 'occasion,' we mean at the same time or within a couple of hours of each other.

OF DAYS: _____ [RANGE: 0 - 30]
DK/REF
PROGRAMMER: SHOW 30 DAY CALENDAR

[6] A PDF of the complete 2016 NSDUH questionnaire is available at the following web location: https://www.samhsa.gov/data/sites/default/files/NSDUHmrbCAIquex2016v2.pdf.

[7] "DK" = "don't know," and "REF" = "refused."

The 2016 BRFSS questions that were used to determine past month alcohol use and past month binge alcohol use were worded as follows:[8]

11.1 During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?

1 _ _ Days per week
2 _ _ Days in past 30 days
8 8 8 No drinks in past 30 days
7 7 7 Don't know / Not sure
9 9 9 Refused

11.3 Considering all types of alcoholic beverages, how many times during the past 30 days did you have **X [CATI X = 5 for men, X = 4 for women]** or more drinks on an occasion?

_ _ Number of times
8 8 None
7 7 Don't know / Not sure
9 9 Refused

The 2016 NSDUH questions that were used to determine past month cigarette use were worded as follows:

CG01 Have you **ever** smoked part or all of a cigarette?

1 Yes
2 No
DK/REF

CG05 [IF CG01 = 1 OR CGREF1 = 1] Now think about the past 30 days, that is, from **[DATEFILL]** up to and including today. During the past 30 days, have you smoked part or all of a cigarette?

1 Yes
2 No
DK/REF
PROGRAMMER: SHOW 30 DAY CALENDAR

The 2016 BRFSS questions that were used to determine current cigarette use were worded as follows:

9.1 Have you smoked at least 100 cigarettes in your entire life?

NOTE: 5 packs = 100 cigarettes

[8] A PDF of the complete 2016 BRFSS questionnaire is available at the following web location: https://www.cdc.gov/brfss/questionnaires/pdf-ques/2016_brfss_questionnaire_final.pdf.

1 Yes
2 No
7 Don't know / Not sure
9 Refused

INTERVIEWER NOTE: "For cigarettes, do not include: electronic cigarettes (e-cigarettes, NJOY, Bluetip), herbal cigarettes, cigars, cigarillos, little cigars, pipes, bidis, kreteks, water pipes (hookahs), or marijuana."

9.2 Do you now smoke cigarettes every day, some days, or not at all?

1 Every day
2 Some days
3 Not at all
7 Don't know / Not sure
9 Refused

Note that these 2016 questions for both the NSDUH and BRFSS were the same as their 2015 questions.

Methodology for Comparing BRFSS and NSDUH Estimates

The methodology used to compare BRFSS and NSDUH estimates is similar to what is described in Section B.7 of the "2014-2015 NSDUH: Guide to State Tables and Summary of Small Area Estimation Methodology."[9] Here, the null hypothesis of no difference is tested, that is, $\pi_b = \pi_n$ (where π_b is the expected value[10] of the BRFSS estimate and π_n is the expected value of the NSDUH estimate) or equivalently that the logs-odds ratio is zero, that is, $lor = 0$, where lor is defined as $lor = \ln\left[\frac{\pi_b/(1-\pi_b)}{\pi_n/(1-\pi_n)}\right]$, and where ln denotes the natural logarithm. An estimate of lor is given by $\hat{l}or = \ln\left[\frac{p_b/(1-p_b)}{p_n/(1-p_n)}\right]$, where p_b and p_n are the 2015-2016 BRFSS state-level design-based estimates and the 2015-2016 NSDUH state model-based estimates, respectively (as given in Tables 1 and 2). To compute the variance of $\hat{l}or$, that is, $v(\hat{l}or)$, let $\hat{\theta}_b = \frac{p_b}{1-p_b}$ and $\hat{\theta}_n = \frac{p_n}{1-p_n}$, then $v(\hat{l}or) = v[\ln(\hat{\theta}_b)] + v[\ln(\hat{\theta}_n)] - 2\,\mathrm{cov}[\ln(\hat{\theta}_b), \ln(\hat{\theta}_n)]$. The covariance term can be assumed to be zero because the BRFSS and NSDUH samples are independent.

[9] See the following website: https://www.samhsa.gov/data/.

[10] The expected value of an estimate is defined as the mean of the observed values of the estimate over repeated samples.

The quantity $v[\ln(\hat{\theta}_n)]$ can be obtained by using the 95 percent Bayesian confidence intervals in Tables 1 and 2. For this purpose, let $(lower_n, upper_n)$ denote the 95 percent Bayesian confidence interval[11] for a given state-*s*:

$$v[\ln(\hat{\theta}_n)] = \left(\frac{U_n - L_n}{2 \times 1.96}\right)^2,$$

where $U_n = \ln\frac{upper_n}{1 - upper_n}$ and $L_n = \ln\frac{lower_n}{1 - lower_n}$.

The quantity $v[\ln(\hat{\theta}_b)]$ can be obtained by using the 95 percent confidence intervals in Tables 1 and 2. For this purpose, let $(lower_b, upper_b)$ denote the 95 percent BRFSS confidence interval for a given state-*s*, then $v(p_b)$ is given by

$$v(p_b) = \left(\frac{upper_b - lower_b}{2 \times 1.96}\right)^2.$$

Now, using the first-order Taylor series approximation,[12] $v[\ln(\hat{\theta}_b)]$ can be calculated from $v(p_b)$ as follows: $v\left[\ln(\hat{\theta}_b)\right] = v\left[\ln\left(\frac{p_b}{1-p_b}\right)\right] \simeq v(p_b) \times \left(\frac{1}{p_b(1-p_b)}\right)^2$.

The *p* value that is given in Tables 1 and 2 for testing the null hypothesis of no difference ($lor = 0$) is provided by p value = 2 * $P[Z \geq abs(z)]$, where Z is a standard normal random variate, $z = \frac{\hat{lor}}{\sqrt{v[\ln(\hat{\theta}_b)] + v[\ln(\hat{\theta}_n)]}}$, and $abs(z)$ denotes the absolute value of z.

Alcohol Use

As can be seen in Table 1, for past month alcohol use, the NSDUH estimates and the BRFSS estimates for a little less than half of the states were different (i.e., at the 5 percent level of significance, 23 of 51 states had different estimates). However, these two sets of estimates were highly correlated (correlation coefficient = 0.96). Figures 1 and 2, which follow the tables,

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[11] For more information about NSDUH's small area estimation (SAE) confidence intervals, see Section B of the "2015-2016: Guide to State Tables and Summary of Small Area Estimation Methodology" at https://www.samhsa.gov/data/.

[12] The first-order Taylor series approximation is defined as $v\left[f(x)\right] \simeq v(x)\left[f'(x)\right]^2$, where $f'(x)$ is the first-order derivative of $f(x)$. If $f(x) = \ln\left(\frac{x}{1-x}\right)$, then $f'(x) = \frac{1}{x(1-x)}$.

were created by using state estimates from both BRFSS and NSDUH and categorizing the states into five quintiles similar to the process described on the title page of the "2015-2016 NSDUH National Maps of Prevalence Estimates, by State."[13]

As can be seen in Figures 1 and 2, eight states with the highest estimates of alcohol use (states shown in red) were the same in the two surveys: Connecticut, the District of Columbia, Minnesota, New Hampshire, North Dakota, Rhode Island, Vermont, and Wisconsin. Note that Colorado and Massachusetts were the other two states in the top BRFSS group and that Nebraska and South Dakota were the other two states in the top NSDUH group. Nine states with the lowest estimates of alcohol use were the same in the two surveys: Alabama, Arkansas, Kentucky, Mississippi, North Carolina, Oklahoma, Tennessee, Utah, and West Virginia. Note that Idaho rounded out the bottom BRFSS group and that Hawaii was the other state in the bottom NSDUH group. The lowest estimate of past month alcohol use was in Utah for both BRFSS and NSDUH (see Table 1 and Figures 1 and 2).

Binge Alcohol Use

As can be seen in Table 2, the NSDUH estimates of past month binge alcohol use were significantly larger than the BRFSS estimates for all states. As noted previously, both NSDUH and BRFSS used the same thresholds for binge alcohol use among males and females in 2015 and 2016. The use of audio computer-assisted self-interviewing (ACASI) in NSDUH, which is considered to be more anonymous than the use of computer-assisted telephone interviewing (CATI) in BRFSS and yields higher reporting of sensitive behaviors, may explain these findings. Although the NSDUH estimates were larger, these two sets of estimates are moderately correlated (correlation coefficient = 0.83).

Figures 3 and 4 were created using the same method used to produce Figures 1 and 2. As can be seen in Figures 3 and 4, seven states with the highest estimates of binge alcohol use (states shown in red) were the same in the two surveys: the District of Columbia, Iowa, Minnesota, Montana, Nebraska, North Dakota, and Wisconsin. Rounding out the top BRFSS group were Alaska, Illinois, and Michigan, while Massachusetts, Rhode Island, and South Dakota rounded out the top NSDUH group. Eight states with the lowest estimates of binge alcohol use were the same in the two surveys: Alabama, Arkansas, Georgia, Mississippi, North Carolina, Oklahoma, Tennessee, and Utah. Note that the other two states in the bottom BRFSS group were New Mexico and West Virginia and that the other two states in the bottom NSDUH group were Hawaii and Idaho.

Cigarette Use

As can be seen in Table 3, the NSDUH estimates of past month cigarette use were always larger than the BRFSS estimates of current cigarette use. Some of this difference is the result of the differences in definitions as discussed earlier in this document; thus, exact tests to examine significant differences between the NSDUH and BRFSS cigarette use estimates are not included.

[13] See footnote 9.

Although the NSDUH estimates tended to be larger, these two sets of estimates were highly correlated (correlation coefficient = 0.94).

Figures 5 and 6 were created using the same method used to produce Figures 1 through 4. As can be seen in Figures 5 and 6, eight states with the highest estimates of cigarette use (states shown in red) were the same in the two surveys: Arkansas, Kentucky, Louisiana, Mississippi, Ohio, Oklahoma, Tennessee, and West Virginia. Rounding out the top BRFSS group were Alabama and Missouri, while Alaska and South Dakota rounded out the top NSDUH group. Eight states with the lowest estimates of cigarette use were the same in the two surveys: California, Hawaii, Idaho, Maryland, Massachusetts, New Jersey, Utah, and Washington. Note that the other two states in the bottom BRFSS group were Arizona and Connecticut and that the other two states in the bottom NSDUH group were Colorado and Florida.

Sample Size Comparisons

The BRFSS estimates are design based, while the NSDUH estimates are model based. Both sets of estimates are based on 2 years of pooled data (2015-2016). The BRFSS sample sizes for a given state were in general much larger than the sample sizes for NSDUH (both over 2 years). In the 2015-2016 NSDUH, the 18 or older sample sizes in the states ranged from 1,374 to 6,955 respondents, with a median sample size of 1,466.[14] For the 2015-2016 BRFSS, all of the states had larger sample sizes as compared with their counterparts in NSDUH. Overall, the BRFSS sample sizes over 2 years for the states varied from a low of 6,571 to a high of 46,694 respondents, with a median sample size of 13,868.[15] Sample size differences of this magnitude explain why the NSDUH Bayesian confidence intervals were generally wider than the corresponding BRFSS design-based confidence intervals.

[14] See Table C.14 in the "2015-2016 NSDUH: Guide to State Tables and Summary of Small Area Estimation Methodology" at https://www.samhsa.gov/data/.

[15] For details, see the following website: https://www.cdc.gov/brfss/annual_data/annual_2016.html.

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Table 1 *Alcohol Use in the Past Month among Adults Aged 18 or Older,* by State: Percentages, Annual Averages Based on 2015-2016 BRFSS and 2015-2016 NSDUH

State	2015-2016 BRFSS (Estimate)	2015-2016 BRFSS (95% Confidence Interval)	2015-2016 NSDUH (Estimate)	2015-2016 NSDUH (95% Confidence Interval)	*P* Value
Alabama	41.40	(40.28 - 42.51)	44.16	(41.23 - 47.13)	0.085
Alaska	56.62	(54.55 - 58.69)	57.50	(54.51 - 60.43)	0.635
Arizona	50.49	(49.30 - 51.67)	55.53	(52.46 - 58.54)	0.003
Arkansas	41.65	(39.90 - 43.40)	43.45	(40.41 - 46.53)	0.317
California	53.85	(52.98 - 54.72)	53.91	(52.47 - 55.35)	0.939
Colorado	61.73	(60.86 - 62.60)	62.33	(59.17 - 65.40)	0.714
Connecticut	61.80	(60.85 - 62.74)	63.91	(60.57 - 67.12)	0.230
Delaware	54.63	(53.06 - 56.20)	56.11	(52.93 - 59.24)	0.412
District of Columbia	66.33	(64.56 - 68.10)	71.98	(69.30 - 74.50)	0.001
Florida	53.15	(52.22 - 54.08)	57.33	(55.57 - 59.06)	0.000
Georgia	48.00	(46.63 - 49.37)	50.30	(47.84 - 52.75)	0.110
Hawaii	50.69	(49.54 - 51.85)	47.15	(44.08 - 50.24)	0.035
Idaho	47.81	(46.40 - 49.22)	48.95	(45.97 - 51.94)	0.499
Illinois	58.30	(57.04 - 59.56)	57.99	(56.02 - 59.94)	0.793
Indiana	50.69	(49.50 - 51.88)	54.97	(51.84 - 58.06)	0.012
Iowa	58.56	(57.44 - 59.69)	62.36	(59.33 - 65.30)	0.021
Kansas	53.18	(52.45 - 53.90)	60.50	(57.57 - 63.36)	0.000
Kentucky	40.81	(39.65 - 41.97)	44.16	(41.24 - 47.11)	0.037
Louisiana	50.24	(48.74 - 51.73)	54.59	(51.54 - 57.61)	0.012
Maine	59.85	(58.80 - 60.91)	60.89	(57.79 - 63.90)	0.534
Maryland	55.18	(54.04 - 56.31)	60.47	(57.55 - 63.32)	0.001
Massachusetts	61.26	(60.20 - 62.31)	63.53	(60.61 - 66.36)	0.150
Michigan	57.07	(56.19 - 57.95)	57.63	(55.73 - 59.51)	0.601
Minnesota	62.64	(61.97 - 63.31)	64.71	(61.74 - 67.56)	0.180
Mississippi	38.86	(37.51 - 40.22)	40.18	(37.30 - 43.13)	0.421
Missouri	52.36	(51.13 - 53.59)	55.63	(52.68 - 58.55)	0.045
Montana	57.95	(56.65 - 59.26)	61.84	(58.84 - 64.77)	0.020
Nebraska	58.69	(57.81 - 59.56)	64.36	(61.30 - 67.31)	0.001
Nevada	51.65	(49.81 - 53.49)	54.85	(51.49 - 58.17)	0.101
New Hampshire	64.04	(62.82 - 65.26)	68.31	(65.35 - 71.13)	0.009
New Jersey	56.58	(55.40 - 57.76)	57.91	(55.30 - 60.48)	0.362
New Mexico	48.18	(46.81 - 49.54)	52.59	(49.34 - 55.82)	0.014
New York	56.31	(55.46 - 57.16)	58.65	(56.91 - 60.37)	0.018
North Carolina	47.66	(46.59 - 48.73)	48.17	(45.78 - 50.58)	0.703
North Dakota	62.23	(60.99 - 63.48)	64.37	(61.50 - 67.13)	0.178
Ohio	53.05	(52.01 - 54.09)	56.33	(54.35 - 58.29)	0.004
Oklahoma	41.35	(40.13 - 42.57)	46.02	(42.90 - 49.18)	0.006
Oregon	59.76	(58.55 - 60.97)	63.22	(60.34 - 66.02)	0.030
Pennsylvania	56.79	(55.60 - 57.99)	60.07	(58.14 - 61.96)	0.005
Rhode Island	61.08	(59.71 - 62.46)	65.40	(62.19 - 68.48)	0.016
South Carolina	49.55	(48.60 - 50.49)	48.99	(46.01 - 51.97)	0.726
South Dakota	57.66	(56.13 - 59.19)	63.90	(60.86 - 66.83)	0.000
Tennessee	43.26	(41.90 - 44.62)	46.36	(43.41 - 49.33)	0.062
Texas	50.09	(48.88 - 51.29)	51.74	(50.17 - 53.31)	0.101
Utah	31.08	(30.24 - 31.92)	33.29	(30.53 - 36.18)	0.135
Vermont	62.37	(61.21 - 63.53)	64.22	(60.89 - 67.43)	0.300
Virginia	53.85	(52.83 - 54.86)	56.17	(53.78 - 58.53)	0.079
Washington	58.52	(57.74 - 59.30)	60.34	(57.13 - 63.45)	0.278
West Virginia	34.98	(33.99 - 35.96)	43.39	(40.22 - 46.62)	0.000
Wisconsin	66.05	(64.80 - 67.30)	65.90	(62.94 - 68.74)	0.926
Wyoming	54.11	(52.53 - 55.68)	56.28	(52.94 - 59.56)	0.248

NOTE: NSDUH estimates along with 95 percent Bayesian confidence (credible) intervals are based on a survey-weighted hierarchical Bayes estimation approach and are generated by Markov Chain Monte Carlo techniques. BRFSS estimates are based on a survey-weighted direct estimation approach.

NOTE: The *p* value is the probability of more extreme values than the observed difference between the BRFSS and NSDUH estimates under the null hypothesis of no difference.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2015-2016; Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System, 2015-2016.

Table 2 *Binge Alcohol Use in the Past Month among Adults Aged 18 or Older*, by State: Percentages, Annual Averages Based on 2015-2016 BRFSS and 2015-2016 NSDUH

State	2015-2016 BRFSS (Estimate)	2015-2016 BRFSS (95% Confidence Interval)	2015-2016 NSDUH (Estimate)	2015-2016 NSDUH (95% Confidence Interval)	*P* Value
Alabama	12.27	(11.49 - 13.05)	22.93	(20.71 - 25.32)	0.000
Alaska	19.26	(17.62 - 20.90)	27.14	(24.80 - 29.62)	0.000
Arizona	14.90	(13.97 - 15.82)	24.49	(22.21 - 26.93)	0.000
Arkansas	14.56	(13.13 - 16.00)	21.91	(19.61 - 24.39)	0.000
California	16.37	(15.75 - 17.00)	25.91	(24.77 - 27.09)	0.000
Colorado	18.34	(17.58 - 19.09)	28.62	(26.18 - 31.20)	0.000
Connecticut	16.81	(16.03 - 17.60)	29.14	(26.56 - 31.86)	0.000
Delaware	15.96	(14.63 - 17.29)	24.34	(21.98 - 26.87)	0.000
District of Columbia	26.37	(24.45 - 28.28)	39.72	(37.09 - 42.41)	0.000
Florida	15.55	(14.83 - 16.27)	27.14	(25.56 - 28.76)	0.000
Georgia	14.30	(13.27 - 15.33)	23.55	(21.69 - 25.51)	0.000
Hawaii	18.73	(17.78 - 19.68)	22.04	(19.89 - 24.34)	0.005
Idaho	15.13	(14.00 - 16.27)	22.81	(20.50 - 25.30)	0.000
Illinois	20.05	(19.00 - 21.10)	28.38	(26.72 - 30.10)	0.000
Indiana	16.62	(15.66 - 17.58)	25.37	(22.95 - 27.95)	0.000
Iowa	20.48	(19.48 - 21.47)	31.51	(29.03 - 34.10)	0.000
Kansas	15.84	(15.27 - 16.42)	27.91	(25.58 - 30.38)	0.000
Kentucky	14.97	(14.05 - 15.89)	23.78	(21.44 - 26.29)	0.000
Louisiana	17.06	(15.85 - 18.27)	28.51	(26.07 - 31.07)	0.000
Maine	17.96	(17.01 - 18.91)	26.37	(23.95 - 28.95)	0.000
Maryland	14.71	(13.83 - 15.59)	27.77	(25.51 - 30.16)	0.000
Massachusetts	17.74	(16.89 - 18.58)	30.52	(28.03 - 33.13)	0.000
Michigan	18.76	(18.04 - 19.49)	27.36	(25.71 - 29.08)	0.000
Minnesota	20.37	(19.81 - 20.94)	30.29	(27.81 - 32.88)	0.000
Mississippi	12.07	(11.05 - 13.09)	20.89	(18.72 - 23.23)	0.000
Missouri	17.50	(16.46 - 18.53)	27.04	(24.67 - 29.55)	0.000
Montana	19.36	(18.22 - 20.49)	30.13	(27.61 - 32.79)	0.000
Nebraska	19.74	(18.99 - 20.49)	31.28	(28.60 - 34.09)	0.000
Nevada	15.03	(13.65 - 16.41)	26.48	(23.82 - 29.31)	0.000
New Hampshire	17.27	(16.20 - 18.34)	30.04	(27.52 - 32.69)	0.000
New Jersey	16.00	(15.05 - 16.95)	25.06	(23.02 - 27.23)	0.000
New Mexico	13.93	(12.88 - 14.99)	27.68	(25.15 - 30.37)	0.000
New York	17.12	(16.47 - 17.78)	27.35	(25.92 - 28.83)	0.000
North Carolina	14.22	(13.44 - 15.00)	23.09	(21.25 - 25.05)	0.000
North Dakota	24.43	(23.23 - 25.63)	34.15	(31.58 - 36.82)	0.000
Ohio	18.06	(17.16 - 18.95)	28.30	(26.64 - 30.01)	0.000
Oklahoma	12.50	(11.58 - 13.42)	22.82	(20.52 - 25.30)	0.000
Oregon	16.45	(15.53 - 17.37)	25.05	(22.79 - 27.45)	0.000
Pennsylvania	18.18	(17.25 - 19.10)	29.88	(28.17 - 31.65)	0.000
Rhode Island	15.86	(14.76 - 16.96)	30.29	(27.68 - 33.04)	0.000
South Carolina	16.04	(15.27 - 16.81)	24.43	(22.19 - 26.82)	0.000
South Dakota	18.07	(16.85 - 19.30)	31.73	(29.05 - 34.54)	0.000
Tennessee	11.73	(10.78 - 12.67)	22.00	(19.81 - 24.36)	0.000
Texas	16.92	(15.97 - 17.87)	25.94	(24.60 - 27.32)	0.000
Utah	12.07	(11.44 - 12.70)	18.32	(16.29 - 20.55)	0.000
Vermont	17.80	(16.79 - 18.81)	28.53	(26.05 - 31.15)	0.000
Virginia	16.09	(15.30 - 16.87)	26.44	(24.47 - 28.51)	0.000
Washington	16.25	(15.64 - 16.86)	25.28	(22.85 - 27.89)	0.000
West Virginia	10.97	(10.26 - 11.68)	24.06	(21.68 - 26.61)	0.000
Wisconsin	23.70	(22.52 - 24.89)	32.57	(29.88 - 35.38)	0.000
Wyoming	17.19	(15.85 - 18.54)	26.92	(24.36 - 29.65)	0.000

NOTE: Binge Alcohol Use is defined as drinking five or more drinks (for males) or four or more drinks (for females) on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days.

NOTE: NSDUH estimates along with 95 percent Bayesian confidence (credible) intervals are based on a survey-weighted hierarchical Bayes estimation approach and are generated by Markov Chain Monte Carlo techniques. BRFSS estimates are based on a survey-weighted direct estimation approach.

NOTE: The *p* value is the probability of more extreme values than the observed difference between the BRFSS and NSDUH estimates under the null hypothesis of no difference.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2015-2016; Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System, 2015-2016.

Table 3 *Cigarette Use among Adults Aged 18 or Older,* by State: Percentages, Annual Averages Based on 2015-2016 BRFSS and 2015-2016 NSDUH

State	2015-2016 BRFSS[1] (Estimate)	2015-2016 BRFSS[1] (95% Confidence Interval)	2015-2016 NSDUH[2] (Estimate)	2015-2016 NSDUH[2] (95% Confidence Interval)
Alabama	21.47	(20.49 - 22.45)	24.48	(22.23 - 26.89)
Alaska	19.07	(17.51 - 20.63)	25.16	(22.81 - 27.66)
Arizona	14.38	(13.53 - 15.24)	19.59	(17.53 - 21.82)
Arkansas	24.23	(22.62 - 25.84)	28.09	(25.73 - 30.58)
California	11.32	(10.79 - 11.85)	15.50	(14.54 - 16.51)
Colorado	15.62	(14.94 - 16.30)	18.12	(16.14 - 20.28)
Connecticut	13.41	(12.73 - 14.10)	19.40	(17.23 - 21.78)
Delaware	17.51	(16.28 - 18.74)	20.53	(18.39 - 22.86)
District of Columbia	15.33	(13.92 - 16.74)	19.28	(17.34 - 21.38)
Florida	15.64	(14.95 - 16.32)	17.82	(16.56 - 19.16)
Georgia	17.78	(16.71 - 18.86)	21.53	(19.68 - 23.50)
Hawaii	13.57	(12.73 - 14.41)	15.93	(14.06 - 18.01)
Idaho	14.16	(13.17 - 15.16)	18.71	(16.65 - 20.98)
Illinois	15.46	(14.50 - 16.43)	20.29	(18.86 - 21.81)
Indiana	20.85	(19.83 - 21.87)	24.70	(22.43 - 27.12)
Iowa	17.40	(16.47 - 18.33)	23.28	(21.13 - 25.57)
Kansas	17.47	(16.90 - 18.03)	20.49	(18.40 - 22.75)
Kentucky	25.21	(24.13 - 26.28)	30.49	(28.01 - 33.10)
Louisiana	22.33	(21.01 - 23.65)	27.98	(25.58 - 30.52)
Maine	19.61	(18.66 - 20.56)	21.15	(18.97 - 23.51)
Maryland	14.40	(13.56 - 15.25)	19.20	(17.29 - 21.27)
Massachusetts	13.80	(13.07 - 14.54)	17.95	(16.03 - 20.05)
Michigan	20.57	(19.80 - 21.33)	23.88	(22.39 - 25.43)
Minnesota	15.71	(15.18 - 16.23)	20.07	(18.04 - 22.27)
Mississippi	22.64	(21.45 - 23.83)	26.23	(23.90 - 28.70)
Missouri	22.20	(21.10 - 23.30)	24.71	(22.49 - 27.08)
Montana	18.72	(17.63 - 19.81)	22.25	(20.05 - 24.61)
Nebraska	17.04	(16.34 - 17.75)	23.09	(20.85 - 25.49)
Nevada	17.01	(15.58 - 18.43)	21.42	(19.17 - 23.85)
New Hampshire	16.97	(15.92 - 18.01)	20.45	(18.24 - 22.86)
New Jersey	13.75	(12.90 - 14.60)	17.12	(15.50 - 18.88)
New Mexico	17.07	(15.99 - 18.15)	22.13	(19.84 - 24.60)
New York	14.70	(14.10 - 15.31)	19.46	(18.23 - 20.76)
North Carolina	18.43	(17.57 - 19.30)	23.12	(21.25 - 25.11)
North Dakota	19.24	(18.17 - 20.32)	23.33	(21.14 - 25.68)
Ohio	22.03	(21.10 - 22.97)	25.74	(24.16 - 27.38)
Oklahoma	20.87	(19.81 - 21.94)	26.78	(24.38 - 29.32)
Oregon	16.66	(15.71 - 17.62)	19.49	(17.55 - 21.58)
Pennsylvania	18.04	(17.11 - 18.98)	23.11	(21.58 - 24.73)
Rhode Island	14.97	(13.94 - 16.00)	20.58	(18.34 - 23.01)
South Carolina	19.84	(19.03 - 20.64)	24.33	(22.02 - 26.80)
South Dakota	19.10	(17.81 - 20.39)	25.25	(22.97 - 27.68)
Tennessee	22.00	(20.85 - 23.15)	26.78	(24.37 - 29.33)
Texas	14.73	(13.90 - 15.55)	20.49	(19.23 - 21.80)
Utah	8.93	(8.39 - 9.48)	14.92	(13.07 - 16.98)
Vermont	16.50	(15.56 - 17.44)	23.70	(21.35 - 26.23)
Virginia	15.92	(15.18 - 16.66)	21.08	(19.35 - 22.92)
Washington	14.45	(13.87 - 15.03)	17.07	(15.14 - 19.20)
West Virginia	25.25	(24.32 - 26.18)	31.75	(29.06 - 34.56)
Wisconsin	17.19	(16.15 - 18.23)	22.15	(19.88 - 24.59)
Wyoming	19.00	(17.66 - 20.34)	23.34	(21.12 - 25.71)

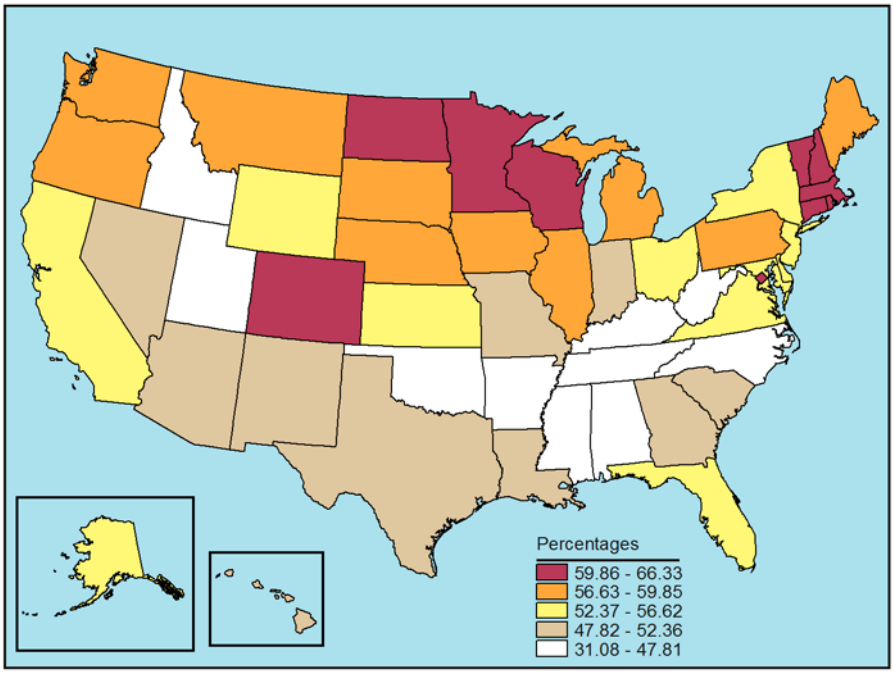
NOTE: NSDUH estimates along with 95 percent Bayesian confidence (credible) intervals are based on a survey-weighted hierarchical Bayes estimation approach and are generated by Markov Chain Monte Carlo techniques. BRFSS estimates are based on a survey-weighted direct estimation approach.

[1] BRFSS respondents were classified as current smokers if they reported having smoked at least 100 cigarettes during their lifetime and indicated that they smoked every day or some days at the time of the survey.

[2] NSDUH respondents were classified as past month cigarette users if they smoked all or part of a cigarette during the past 30 days.

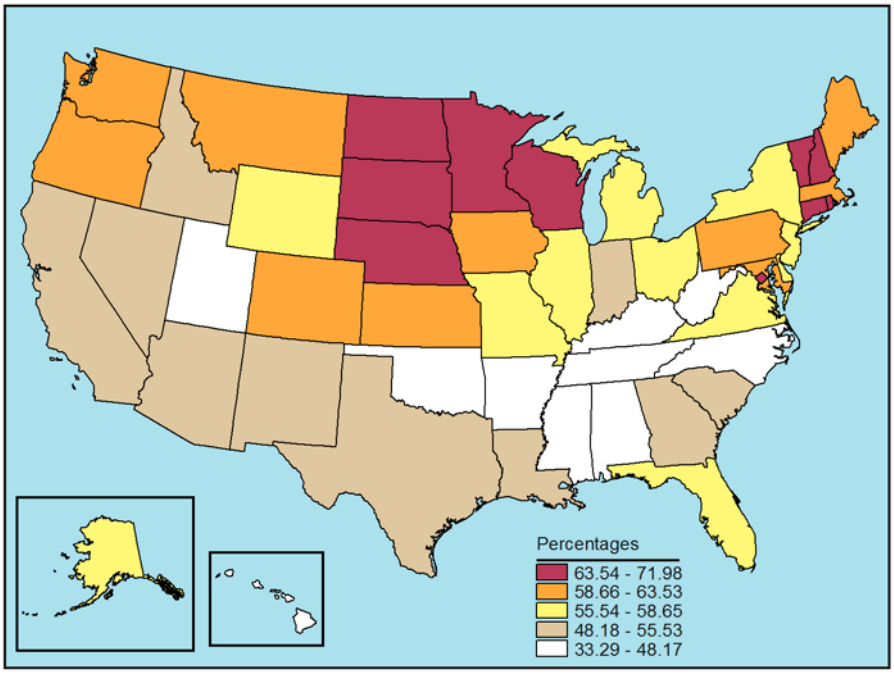
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2015-2016; Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System, 2015-2016.

Figure 1 ***Alcohol Use in the Past Month among Adults Aged 18 or Older,*** **by State: Percentages, Annual Averages Based on 2015 and 2016 BRFSS**



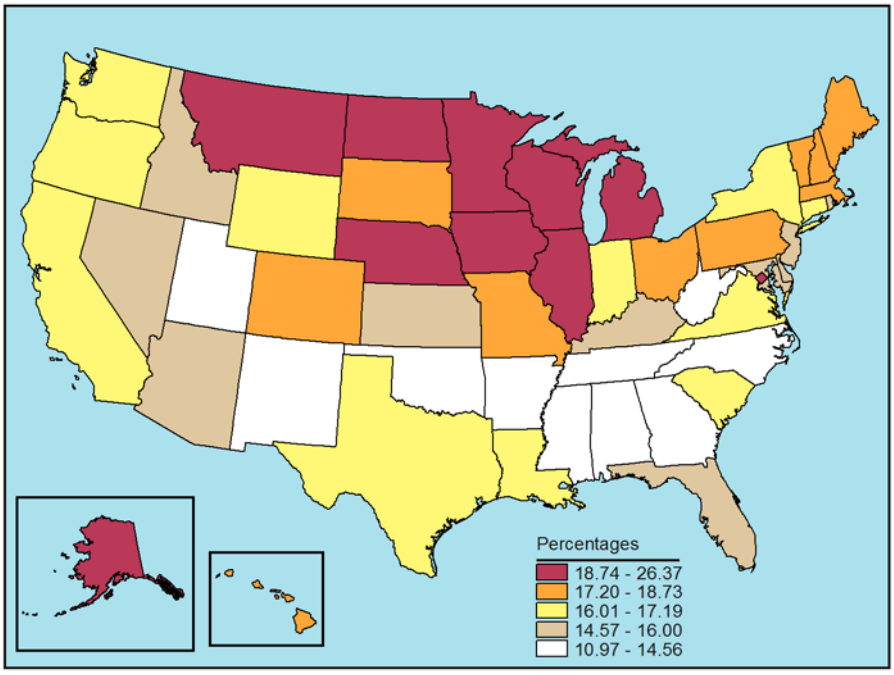
Source: Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey, 2015 and 2016.

Figure 2 ***Alcohol Use in the Past Month among Adults Aged 18 or Older,*** **by State: Percentages, Annual Averages Based on 2015 and 2016 NSDUHs**



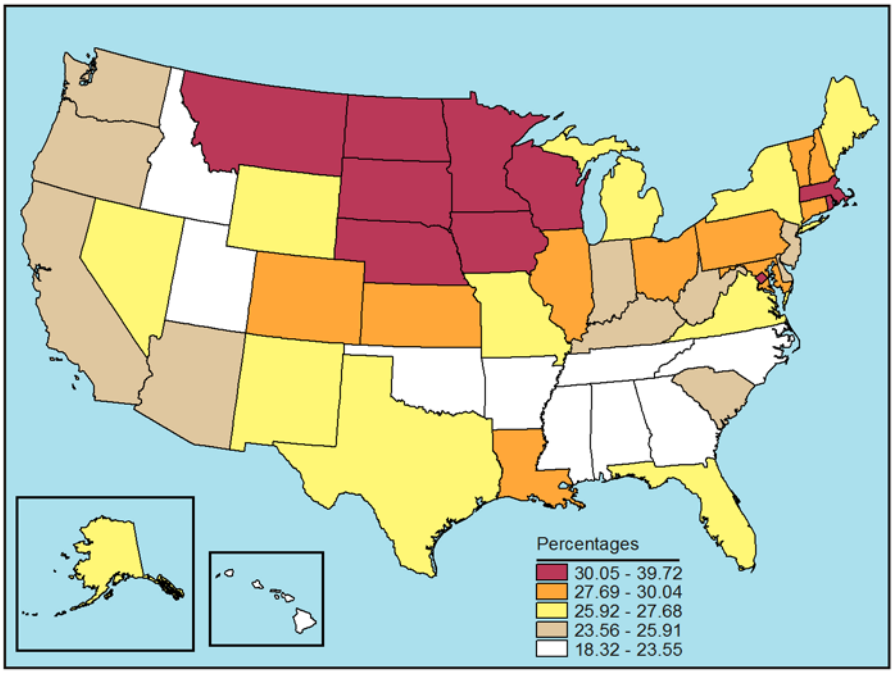
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, NSDUH, 2015 and 2016.

Figure 3 ***Binge Alcohol Use in the Past Month among Adults Aged 18 or Older,*** **by State: Percentages, Annual Averages Based on 2015 and 2016 BRFSS**



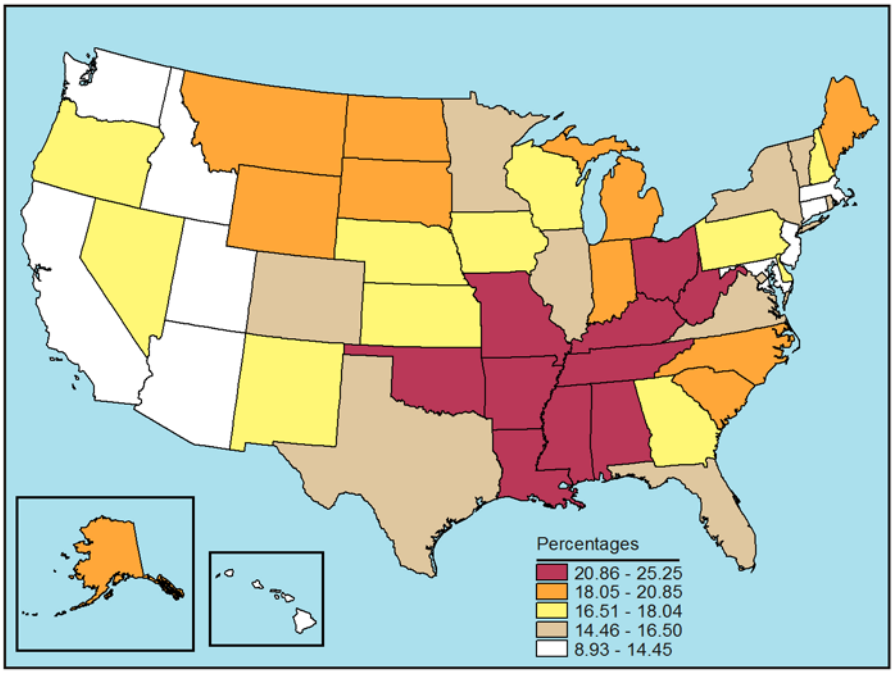
Source: Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey, 2015 and 2016.

Figure 4 ***Binge Alcohol Use in the Past Month among Adults Aged 18 or Older,*** **by State: Percentages, Annual Averages Based on 2015 and 2016 NSDUHs**



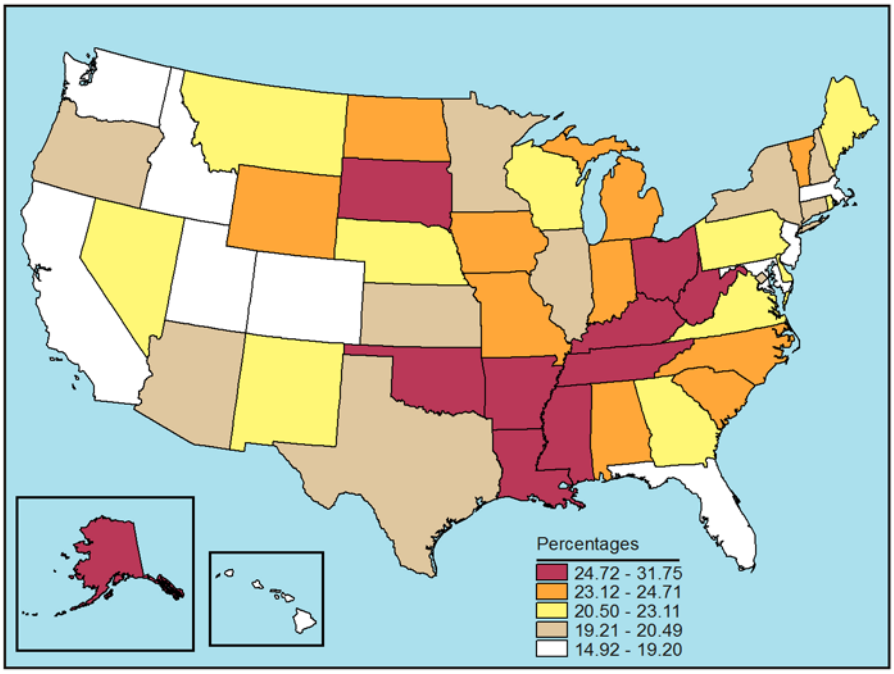
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, NSDUH, 2015 and 2016.

Figure 5 ***Current Cigarette Use among Adults Aged 18 or Older,*** **by State: Percentages, Annual Averages Based on 2015 and 2016 BRFSS**



Source: Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey, 2015 and 2016.

Figure 6 ***Cigarette Use in the Past Month among Adults Aged 18 or Older,*** **by State: Percentages, Annual Averages Based on 2015 and 2016 NSDUHs**



Source: SAMHSA, Center for Behavioral Health Statistics and Quality, NSDUH, 2015 and 2016.