ACS Summary Data Report

For the Vision & Eye Health Surveillance System

DATE	PRESENTED TO:	PRESENTED BY:
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Overview

This Data Brief Report presents the analysis of the American Community Survey (ACS) for the Vision and Eye Health Surveillance System (VEHSS). This document describes the methods used to construct the estimates. For VEHSS, we analyzed Public Use Microdata Sample (PUMS) to estimate the prevalence of self-reported vision difficulty at the national and state level by detailed demographic, risk factor and social determinant of health (SDOH) characteristics. Because PUMS data is not available at the county level, we report county-level estimates from 5-year merged ACS samples as reported through disability subject tables on data.census.gov.

Dataset Description

Purpose:

The American Community Survey (ACS), conducted by the United States (US) Census Bureau, is an annual nationwide survey that collects and produces information on demographic, social, economic, and housing characteristics of the US population. The ACS serves the nation by providing a consistent and cohesive collection of characteristics that are comparable across all US geographies.

The Census Bureau releases summary tables with limited stratification factors through data.census.gov. Census provides access to the PUMS for users who want to create custom tables that are not available through summary ACS data products. However, to protect respondent privacy, PUMS data includes only a subsample of the ACS with limited geographic detail. ACS was selected for inclusion in the VEHSS system due to its representative and robust national and state sample, and because information contained in the ACS supports stratification by the key demographic and geographic variables of interest to the VEHSS system.

ACS self-reported vision difficulty prevalence is utilized as a data source for the VEHSS composite estimates on the prevalence of vision loss and blindness. Specifically, these estimates use variation in ACS self-reported vision to predict variation in acuity-based vision loss among population groups not represented by available examination-based data, including persons living in group quarters and those at oldest ages, as well as geographic variation by state and county. More details on the VEHSS composite estimates of the prevalence of vision loss is available at https://www.cdc.gov/visionhealth/vehss/estimates/index.html

Sample Design:

The Census Bureau selects a random sample of addresses to be included in two separate samples that together constitute the ACS: housing unit (HU) addresses and residents of group quarters (GQ) facilities (e.g., college residence halls, residential treatment centers, skilled nursing facilities, group homes, military barracks, correctional facilities, workers' dormitories, and facilities for people experiencing homelessness). These samples are drawn from the Census Bureau's Master Address File (MAF), an inventory of living quarters and nonresidential units in the US and Puerto Rico. Independent HU address samples are selected for each of the counties and county equivalents in the US, as well as for each of the municipalities in Puerto Rico. GQ resident samples are independent state-level samples.

As of 2011, the targeted sample size of the HU sample is approximately 3.54 million. Interviews are conducted monthly, and no HU address or small GQ facility residents are eligible to be in the sample more than once in a five-year period. Residents of large GQ facilities are eligible to be sampled every year.[1]

ACS PUMS files consist of sub-samples of ACS HU and GQ respondents. These files are designed to include one percent of both the HU and GQ populations estimated by the full ACS. HU and GQ PUMS samples were constructed separately, and sampling intervals for each are calculated to yield target sample sizes at the state level.[2]

Data Collection Procedures:

ACS data are collected in one of four modes: Internet, mail, telephone, and personal visit. For most HUs, mailed invitations to participate via internet are extended initially. If no response is received, this is followed by invitations to participate via mail, telephone, or personal visit, in that order, based on participant response or non-response to each previous option. Data are collected from GQ residents via personal interview only. For sampled HUs, information is collected for all residents living in the household.

PUMS Analysis Process and Suppression

We estimated the prevalence rate and sample size for each survey instrument selected for inclusion. We analyzed data from the PUMS files starting with 2014, each year was analyzed separately. The prevalence rate was defined as the number of persons who gave an affirmative

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[1] US Census Bureau. (2014). Design and Methodology Report: Chapter 4. Sample Design and Selection. Retrieved from: https://www2.census.gov/programs-surveys/acs/methodology/design_and_methodology/acs_design_methodology_ch04_2014.pdf.

[2] US Census Bureau. (2017). PUMS Accuracy of the Data (2015). Retrieved from: https://www2.census.gov/programs-surveys/acs/tech_docs/pums/accuracy/2015AccuracyPUMS.pdf

response to the question divided by the total number of respondents who gave an affirmative or negative response and multiplied by 100 for presentation in percentage format. We estimated upper and lower confidence intervals and the relative standard error of the prevalence estimate using the Clopper-Pearson method with the smaller of the effective sample size and the sample size. The respondent sample size was reported for each response.

All estimates were calculated using SAS® PROC SURVEY FREQ procedure. Suppression was determined using the National Center for Health Statistics Data Presentation Standards for Proportions released in August 2017[3].

Vision-related Variables

ACS contains a single question relevant to VEHSS: "Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?" This question, which was first fielded in 2008, is categorized under the VEHSS 'Visual Function' topic and 'Difficulty Seeing with Glasses' category. **Table 1** presents additional details about the question, including the ACS variable name, the year(s) survey data are available, the survey question, and the response options.

Table 1. Overview of Eye Health Variable in the ACS

ACS eye health questions and response options					
VEHSS Indicator Topic	**VEHSS Indicator Category**	**ACS Variable Name**	**Years Available**	**Question**	**Response Options**
Visual Function	Difficulty Seeing with Glasses	DEYE	2008-2019	Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?	1 Yes
					2 No

Stratification Variables:

We stratified the vision-related prevalence rates by age, sex, race/ethnicity, and state. Participant ages (variable: AGEP) ranged from zero to 96 and were recoded into the following categories: 0-17 years, 18-39 years, 40-64 years, 65-84 years, and 85 years and older. Participant sex (variable: SEX) was coded as Male or Female. The Hispanic and race variables (variables: HISPFLG and RAC1P) were combined to create a single race/ethnicity variable, with

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[3] Parker JD, Talih M, Malec DJ, et al. National Center for Health Statistics Data Presentation Standards for Proportions. National Center for Health Statistics. Vital Health Stat 2(175). 2017.

anyone identifying as Hispanic being placed in a single category. The race categories were coded as follows: Non-Hispanic Asian, Non-Hispanic Black, Hispanic, Non-Hispanic North American Native, Non-Hispanic Other, and Non-Hispanic White. The "Other" category consists of those who identified as Native Hawaiian and Other Pacific Islander Alone, Some Other Race Alone, or Two or More Races. Data were available for all 50 States and DC (variable: ST).

Starting in 2019, we added nine stratification variables to the national and state level PUMS analysis, including five additional disability variables and four social determinants of health (SDOH) variables. Poverty (variable: POVPIP) was coded less than or equal to poverty level and above poverty level. Educational attainment (variable: SCHL) was coded as less than High School; High School degree, GED, or some college; Associates or Bachelor's degree; and Advanced degree. Employment status (variable: ESR) was coded as employed or unemployed. Self-care disability (variable: DDRS) was coded as Yes or No and was not applicable for people less than 5 years old. Hearing disability (variable: DEAR) was coded as Yes or No. Go-outside-home disability/independent living disability (variable: DOUT) was coded as Yes or No and not applicable for people less than 15 years old. Ambulatory disability (variable: DPHY) was coded as Yes or No and was not applicable for people less than 5 years old. Mental/Cognitive disability (variable: DREM) was coded as Yes or No. Due to the need to limit the number of stratification variables, state-level prevalence rates were stratified by a combination of age*sex, age*race/ethnicity, or sex*race/ethnicity and one of the new stratification variables. The ACS does not contain health risk factor information, such as for smoking, diabetes, or hypertension.

Stratification variables for the PUMS analysis are displayed in **Table 2.**

The county-level results are reproduced as reported by the Census Bureau based on 5-year ACS estimates by age and sex. No other stratification variables are included in the county-level results. County level stratification variables are listed in **Table 3**.

Table 2. Stratification Variables for National and State Estimates

Stratification factor	
Years	2014, 2015, 2016, 2017, 2018, 2019
Age	0-17 years
	18-39 years
	40-64 years
	65-84 years
	85 years and older
Race/Ethnicity	Non-Hispanic Asian
	Non-Hispanic Black
	Hispanic
	Non-Hispanic North American Native
	Non-Hispanic Other
	Non-Hispanic White
Sex	Male
	Female
Poverty	Yes
	No
Education	Less than high school
	HS degree, GED, some college
	Associates/bachelors degree
	Advanced degree
Insurance	Medicare
	Medicaid
	Other government
	Private insurance
	Uninsured
Unemployed	Yes
	No
Self-care difficulty	Yes
	No
Hearing difficulty	Yes
	No
Independent living difficulty	Yes
	No
Ambulatory difficulty	Yes
	No
Cognitive difficulty	Yes
	No
Geographies	National
	State, DC

Table 3. Stratification Variables for County Estimates

Stratification factor	
Years	2011-15, 2012-16, 2013-17, 2014-18, 2015-2019
Age	0-4 years
	18-34 years
	35-64 years
	65-74 years
	75 years and older
Sex	Male
	Female
Geographies	Counties

Stratification Combinations

All stratification combinations for the PUMS analysis are displayed in **Table 4**. We stratified data using all possible combinations of age, race/ethnicity, and sex at both the national and state levels. For the county-level results, estimates are stratified by age group for 2015-2018 estimates, and sex*age group for 2019 estimates.

Table 4. Stratification Factor Combinations Included in PUMS Analysis

	National	**State**
0-level	All participants	All participants
1-level	Age	Age
	Race/ethnicity	Race/ethnicity
	Sex	Sex
2-level	Age*Race/ethnicity	Age*Race/ethnicity
	Age*Sex	Age*Sex
	Race/ethnicity *Sex	Race/ethnicity *Sex
3-level	Age*Race/ethnicity *Sex	Age*Race/ethnicity *Sex

	Age*Race/ethnicity*poverty	Age*Race/ethnicity*poverty
	Race/ethnicity*Sex*poverty	Race/ethnicity*Sex*poverty
	Age*Sex*poverty	Age*Sex*poverty
	Age*Race/ethnicity*employment	Age*Race/ethnicity*employment
	Race/ethnicity*Sex*employment	Race/ethnicity*Sex*employment
	Age*Sex*employment	Age*Sex*employment
	Age*Race/ethnicity*self-care	Age*Race/ethnicity*self-care
	Race/ethnicity*Sex*self-care	Race/ethnicity*Sex*self-care
	Age*Sex*self-care	Age*Sex*self-care
	Age*Race/ethnicity*hearing difficulty	Age*Race/ethnicity*hearing difficulty
	Race/ethnicity*Sex*hearing difficulty	Race/ethnicity*Sex*hearing difficulty
	Age*Sex*hearing difficulty	Age*Sex*hearing difficulty
	Age*Race/ethnicity*independent living	Age*Race/ethnicity*independent living
	Race/ethnicity*Sex*independent living	Race/ethnicity*Sex*independent living
	Age*Sex*independent living	Age*Sex*independent living
	Age*Race/ethnicity*ambulatory difficulty	Age*Race/ethnicity*ambulatory difficulty
	Race/ethnicity*Sex* ambulatory difficulty	Race/ethnicity*Sex* ambulatory difficulty
	Age*Sex*ambulatory difficulty	Age*Sex*ambulatory difficulty
	Age*Race/ethnicity*cognitive difficulty	Age*Race/ethnicity*cognitive difficulty
	Race/ethnicity*Sex*cognitive difficulty	Race/ethnicity*Sex*cognitive difficulty
	Age*Sex*cognitive difficulty	Age*Sex*cognitive difficulty
	Age*Race/ethnicity*insurance type	Age*Race/ethnicity*insurance type
	Race/ethnicity*Sex*insurance type	Race/ethnicity*Sex*insurance type
	Age*Sex*insurance type	Age*Sex*insurance type
	Age*Race/ethnicity*education	Age*Race/ethnicity*education
	Race/ethnicity*Sex*education	Race/ethnicity*Sex*education
	Age*Sex*education	Age*Sex*education

County-level Estimates

ACS PUMS does not include county-level geographies. We therefore include county-level estimates of vision difficulty from 5-year ACS samples as reported directly by the Census Bureau in subject table "B18103 - SEX BY AGE BY VISION DIFFICULTY", available at data.census.gov. This table uses merged samples of 5 years of the full ACS sample to report person count, denominators and margin of error estimates of vision difficulty by age group and sex for all US counties. Because these data are from 5-year samples they are not subject to any suppression.

Validation

Internal Validation

Sample Size

ACS is the largest survey included in the VEHSS system. The ACS PUMS for 2014 - 2019 provide a sample size totaling more than three million for each of the data years.

Due to its data collection design that includes sequential internet, mail, telephone, and in-person interviews, ACS achieves exceptionally high response rates (Table 5).

Table 5. ACS Response Rates

Response Rates	Household Units	Group Quarters
2014	96.7%	95.9%
2015	95.8%	95.3%
2016	94.7%	95.7%
2017	93.7%	94.7%
2018	92.0%	91.4%
2019	86.0%	90.9%
2020	71.2%	47.2%

Validating Responses

There were no other survey questions that could be used to check the internal consistency responses.

External Validation

We compared our findings to other analyses of the ACS vision-related question and found comparable results, as shown in **Figure 1**. For participants ages 0 to 17, American Fact Finder (AFF) data (now census.data.gov as of July 1, 2019), based on ACS 5-year estimates between 2013 and 2017, show similar results to our yearly findings. Our estimates for the 18+, 65+, and all age groups were slightly higher than AFF results, and our estimates for the <17 age group were the same or slightly lower . A Morbidity and Mortality Weekly Report (MMWR), based on ACS 5-year estimates between 2009 and 2013, presented prevalence results for participants 18 years and older that are slightly lower than our findings.[4] These differences across age groups may be attributable primarily to the different years of data on which the analyses are based. However, it is also important to note that estimates may differ because PUMS is comprised of a sub-sample of the full ACS sample (on which the AFF and MMWR analyses were based) and therefore is subject to additional sampling error.[5,6] As previously stated, we opted to base our analyses on PUMS files due to the flexibility it allows with regards to stratification (e.g., stratifying by various combinations of age, race, sex, and geography) when compared to AFF.

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[4] Centers for Disease Control and Prevention. (2015). Geographic Disparity of Severe Vision Loss — United States, 2009–2013. MMWR; 64(19), 513-517.

[5] United States Census Bureau. (2017). PUMS FAQs. Retrieved from: https://ask.census.gov/prweb/PRServletCustom/YACFBFye-rFIz_FoGtyvDRUGg1Uzu5Mn*/!STANDARD?pyActivity=pyMobileSnapStart&ArticleID=KCP-2951

[6] US Census Bureau. (2017). PUMS Accuracy of the Data (2015). Retrieved from: https://www2.census.gov/programs-surveys/acs/tech_docs/pums/accuracy/2015AccuracyPUMS.pdf

Figure 1. ACS Prevalence of Difficulty Seeing by Age Group, AFF and MMWR
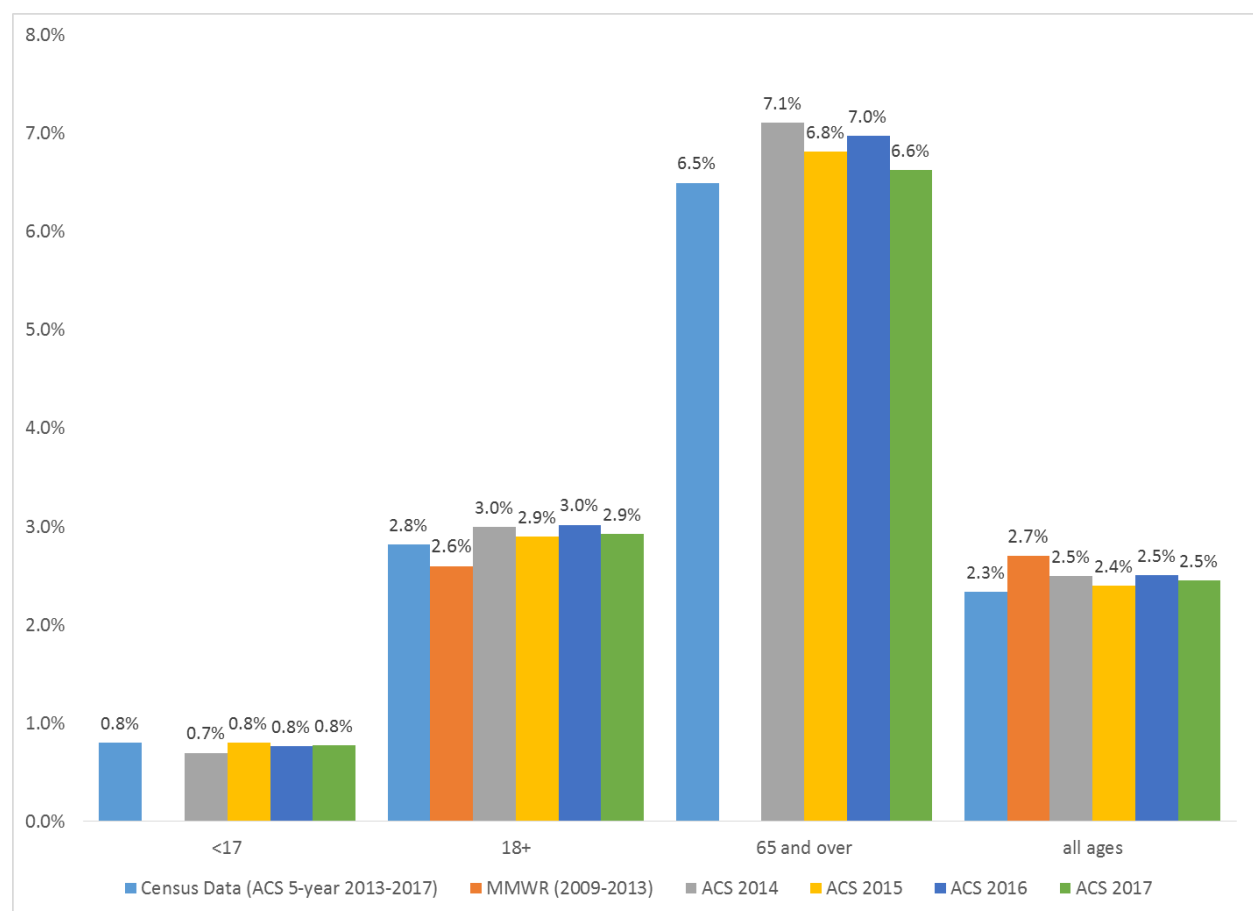
Additionally, we compared our findings to results from other surveys. Both the Behavioral Risk Factor Surveillance System (BRFSS) survey and the National Health Interview Survey (NHIS) include questions that are worded similarly to the vision question in ACS:

ACS: "Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?"
**BRFSS:**   "Are you blind or do you have serious difficulty seeing, even when wearing glasses?"
NHIS Adults: "Do you have any trouble seeing, even when wearing glasses or contact lenses?"
NHIS Children: "Does [name] have any trouble seeing, even when wearing glasses or contact lenses?"

CDC VHI analysis of 2014, 2015, 2016, and 2017[7] BRFSS data, shows prevalence rates of 'difficulty seeing' that were notably higher than that observed in the same years of ACS. Of note, BRFSS only fields the 'difficulty seeing' for adults ages 18 and older. **Figure 2** compares the prevalence estimates for this question in BRFSS and ACS, restricted to respondents ages 18 and older.

Figure 2: Prevalence of Difficulty Seeing, Ages 18 Years and Older, BRFSS vs. ACS
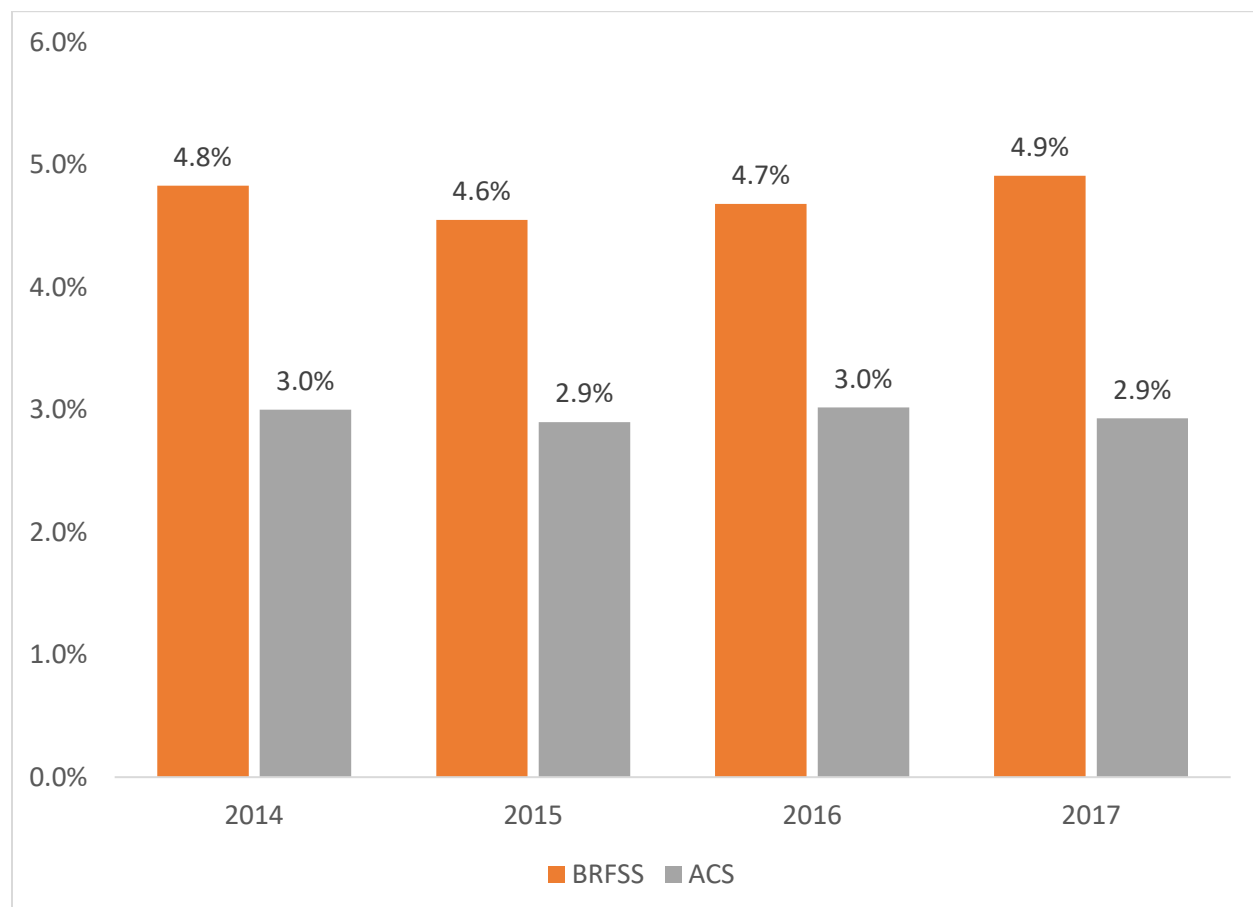
BRFSS data analyzed by CDC VHI found that prevalence rates in BRFSS continue to be higher than were observed in ACS for every age group except for the 65 and older age group where ACS is higher in 2014, 2015, and 2016 but BRFSS reports higher prevalence rates in 2017. (**Figure 3**). [8]

[7] 2014 and 2015 were analyzed for the CDC VHI data portal and 2016 and 2017 were analyzed for VEHSS

[8] Centers for Disease Control and Prevention. BRFSS Prevalence & Trends Data. Retrieved from: https://www.cdc.gov/brfss/brfssprevalence/index.html

Figure 3: Prevalence of Difficulty Seeing by Age Group, BRFSS vs. ACS
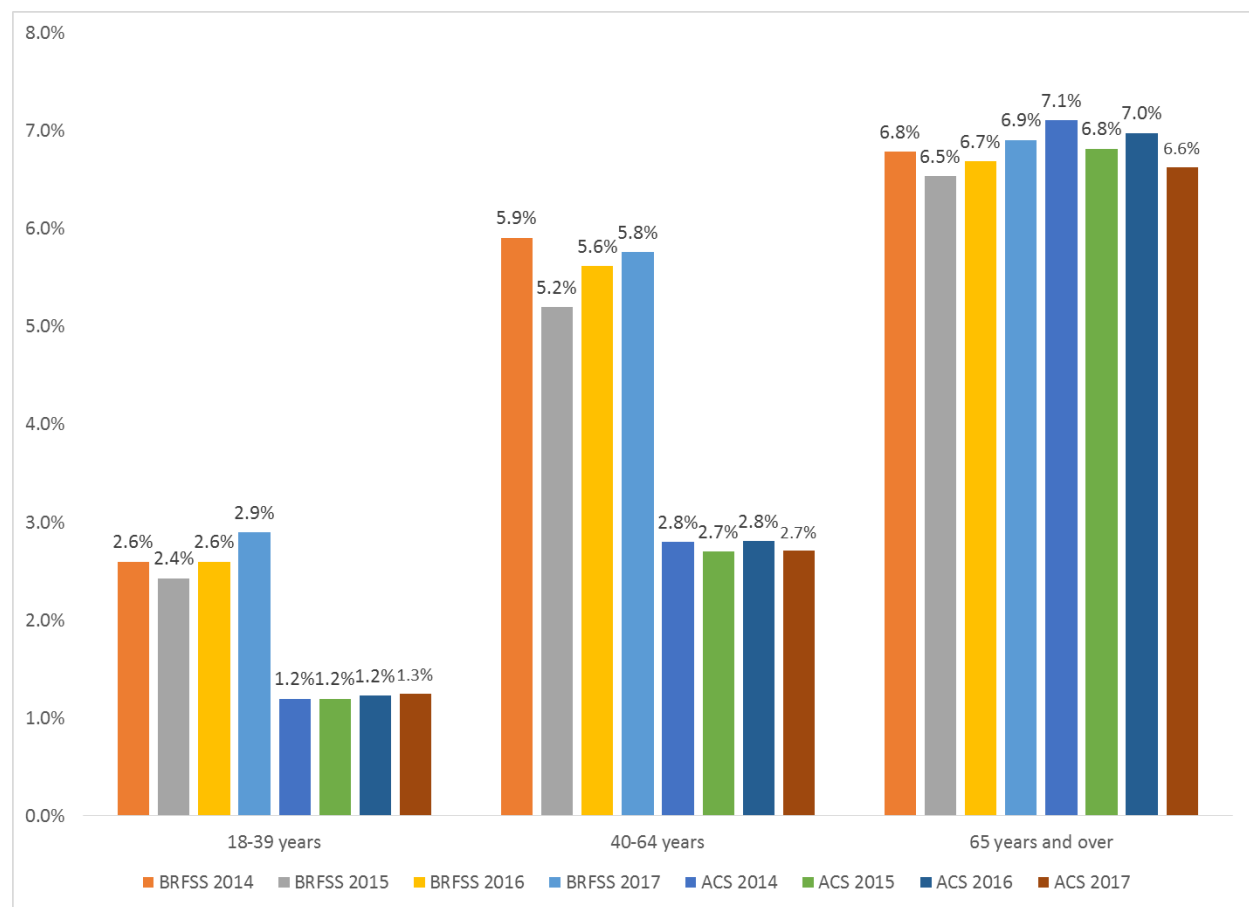
NORC also analyzed the prevalence rate for the 'difficulty seeing' question in merged 2014-2015 and 2016-2017 NHIS data. Like BRFSS, the NHIS estimates are much higher than observed in ACS for all age groups (**Figure 4**).[9] The NHIS question, however, differs from the ACS question, which may explain the notable discrepancy.

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[9] These analyses were conducted by NORC and have not been published.

Figure 4: Prevalence of Difficulty Seeing by Age Group, NHIS vs. ACS

Legend: NHIS 2014-2015, NHIS 2016-2017, ACS 2014, ACS 2015, ACS 2016, ACS 2017

Age Group	NHIS 2014-2015	NHIS 2016-2017	ACS 2014	ACS 2015	ACS 2016	ACS 2017
<17	2.6%	3.3%	0.7%	0.8%	0.8%	0.8%
18-39	5.2%	6.8%	1.2%	1.2%	1.2%	1.3%
40-64	10.6%	12.0%	2.8%	2.7%	2.8%	2.7%
65-84	13.0%	14.4%	5.6%	5.4%	5.6%	5.3%
85 and over	23.5%	23.1%	17.2%	16.4%	16.6%	16.1%
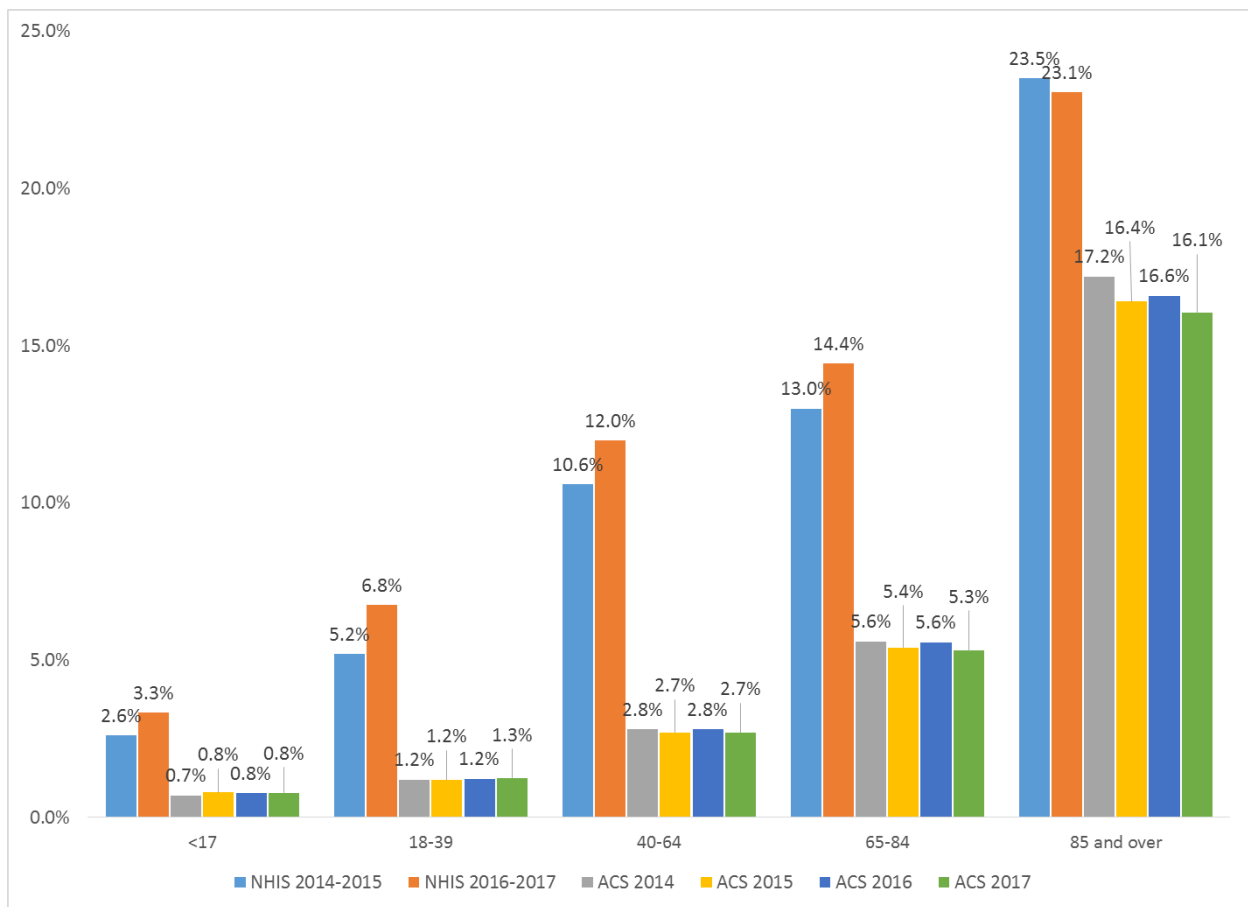
Limitations

This analysis is limited in a number of ways. ACS is a household response survey that contains only one self-reported measure of visual function. The prevalence of this measure cannot be directly translated into the prevalence of defined visual impairment or blindness. ACS also does not include health risk factors such as smoking, hypertension, or diabetes. In addition, external validation shows that ACS yields much lower estimates than BRFSS or NHIS, even while using the same or similarly worded questions. The NHIS question does not include the word "blind", which could potentially contribute to the differences in the response values. Additionally, ACS is not intended to be a health survey. It is possible that persons responding to a health survey may be somehow primed to be more likely to answer in the affirmative to health questions. Finally, ACS has a unique sampling frame; it is a household response survey with multiple modes of deployment. Any of these differences may have affected the difference in outcomes between the surveys.

In addition, the accuracy and validity of self-reported difficulty seeing is unknown and is not directly analogous with objectively measured visual function, such as best corrected visual acuity. However, surveys do provide important information on variation and drivers of disparities in health outcomes that are not available in other data sources.

Summary Outcome measures

Table 6. National Estimates of Prevalence of Difficulty Seeing (2014)

Stratification factor	Prevalence Rate	Sample Size
All respondents	2.5 (2.4-2.5)	3,132,610
Age		
0-17 years	0.7 (0.7-0.8)	662,930
18-39 years	1.2 (1.1-1.2)	825,726
40-64 years	2.8 (2.7-2.8)	1,077,951
65-84 years	5.6 (5.5-5.7)	491,432
85 years and older	17.2 (16.8-17.6)	74,571
Race/Ethnicity		
Asian	1.4 (1.3-1.5)	153,967
Non-Hispanic Black	3.1 (3.0-3.2)	323,722
Hispanic	2.2 (2.2-2.3)	441,267
North American Native	4.2 (3.9-4.5)	30,569
Other	2.2 (2.0-2.3)	76,519
Non-Hispanic White	2.5 (2.4-2.5)	2,106,566
Sex		
Male	2.3 (2.2-2.3)	1,529,229
Female	2.6 (2.6-2.7)	1,603,381

Table 7. State Estimates of Difficulty Seeing (2014)

State	Prevalence Rate	Sample Size		State	Prevalence Rate	Sample Size
United States	2.5 (2.4-2.5)	3,132,610		**Montana**	2.2 (1.8-2.6)	9,878
Alabama	3.0 (2.8-3.2)	47,793		**Nebraska**	1.9 (1.7-2.2)	19,181
Alaska	1.9 (1.5-2.5)	6,787		**Nevada**	3.3 (3.0-3.5)	26,812
Arizona	2.6 (2.4-2.7)	66,177		**New Hampshire**	1.7 (1.4-2.0)	13,426
Arkansas	3.4 (3.1-3.6)	29,369		**New Jersey**	2.1 (2.0-2.2)	88,152
California	2.1 (2.0-2.1)	372,553		**New Mexico**	3.6 (3.2-3.9)	19,283
Colorado	2.0 (1.9-2.2)	52,929		**New York**	2.3 (2.2-2.3)	196,276
Connecticut	1.8 (1.6-2.0)	35,985		**North Carolina**	2.7 (2.6-2.9)	97,830
Delaware	2.1 (1.7-2.6)	9,014		**North Dakota**	2.2 (1.7-2.7)	7,625
Florida	2.5 (2.4-2.6)	192,673		**Ohio**	2.5 (2.3-2.6)	117,468
Georgia	2.7 (2.6-2.9)	97,519		**Oklahoma**	3.7 (3.4-3.9)	37,293
Hawaii	1.8 (1.5-2.2)	14,322		**Oregon**	2.7 (2.5-3.0)	39,336
Idaho	2.3 (2.0-2.6)	15,602		**Pennsylvania**	2.4 (2.3-2.5)	127,859
Illinois	2.2 (2.0-2.3)	126,650		**Rhode Island**	2.5 (2.1-3.0)	10,803
Indiana	2.7 (2.6-2.9)	66,555		**South Carolina**	3.1 (2.9-3.3)	47,361
Iowa	1.8 (1.6-1.9)	31,819		**South Dakota**	2.7 (2.2-3.2)	8,626
Kansas	2.3 (2.1-2.6)	28,802		**Tennessee**	3.3 (3.1-3.4)	65,554
Kentucky	3.5 (3.2-3.7)	44,868		**Texas**	2.6 (2.5-2.7)	254,883
Louisiana	3.1 (2.9-3.3)	43,908		**Utah**	1.8 (1.6-1.9)	28,666
Maine	2.7 (2.3-3.2)	12,962		**Vermont**	2.6 (2.1-3.3)	6,370
Maryland	2.1 (1.9-2.2)	58,876		**Virginia**	2.1 (1.9-2.2)	83,393
Massachusetts	2.1 (2.0-2.2)	68,544		**Washington**	2.3 (2.2-2.5)	70,600
Michigan	2.4 (2.3-2.6)	98,180		**West Virginia**	4.6 (4.2-4.9)	18,216
Minnesota	1.7 (1.5-1.9)	54,297		**Wisconsin**	1.9 (1.8-2.1)	58,549
Mississippi	3.6 (3.3-3.8)	29,255		**Wyoming**	2.9 (2.4-3.4)	5,820
Missouri	2.8 (2.7-3.0)	61,394		**District of Columbia**	2.9 (2.5-3.3)	6,517

Table 8. National Estimates of Prevalence of Difficulty Seeing (2015)

Stratification factor	Prevalence Rate	Sample Size
All respondents	2.4 (2.4-2.4)	3,147,005
Age		
0-17 years	0.8 (0.7-0.8)	656,389
18-39 years	1.2 (1.1-1.2)	831,248
40-64 years	2.7 (2.7-2.7)	1,075,985
65-84 years	5.4 (5.3-5.5)	507,287
85 years and older	16.4(16.1-16.8)	76,096
Race/Ethnicity		
Asian	1.4 (1.3-1.4)	157,718
Non-Hispanic Black	3.1 (3.0-3.1)	318,215
Hispanic	2.2 (2.1-2.2)	449,024
North American Native	4.3 (4.0-4.6)	29,355
Other	2.1 (2.0-2.2)	78,534
Non-Hispanic White	2.4 (2.4-2.5)	2,114,159
Sex		
Male	2.3 (2.2-2.3)	1,536,836
Female	2.6 (2.5-2.6)	1,610,169

Table 9. State Estimates of Difficulty Seeing (2015)

State	Prevalence Rate	Sample Size	State	Prevalence Rate	Sample Size
United States	2.4 (2.4-2.4)	3,147,005	Montana	2.1 (1.7-2.5)	9,841
Alabama	3.2 (3.0-3.4)	47,476	Nebraska	2.2 (2.0-2.5)	19,089
Alaska	2.0 (1.6-2.4)	6,619	Nevada	3.9 (3.5-4.2)	26,988
Arizona	2.5 (2.3-2.6)	67,014	New Hampshire	2.1 (1.7-2.5)	13,378
Arkansas	3.7 (3.4-4.0)	29,605	New Jersey	1.9 (1.8-2.1)	87,815
California	2.0 (2.0-2.1)	374,943	New Mexico	3.2 (2.9-3.5)	19,072
Colorado	2.0 (1.8-2.1)	53,570	New York	2.1 (2.0-2.2)	195,742
Connecticut	1.8 (1.7-2.0)	35,787	North Carolina	2.8 (2.7-2.9)	98,184
Delaware	2.0 (1.7-2.4)	9,017	North Dakota	1.9 (1.5-2.3)	7,869
Florida	2.6 (2.5-2.7)	194,548	Ohio	2.5 (2.4-2.6)	118,123
Georgia	2.7 (2.6-2.9)	97,854	Oklahoma	3.3 (3.1-3.6)	37,251
Hawaii	1.6 (1.4-1.9)	14,124	Oregon	2.5 (2.3-2.7)	39,992
Idaho	2.4 (2.1-2.7)	15,725	Pennsylvania	2.5 (2.4-2.6)	128,145
Illinois	2.0 (1.9-2.1)	126,642	Rhode Island	2.0 (1.7-2.4)	10,563
Indiana	2.6 (2.5-2.7)	66,045	South Carolina	3.1 (2.9-3.4)	48,023
Iowa	2.0 (1.8-2.3)	31,900	South Dakota	2.1 (1.7-2.5)	8,742
Kansas	2.2 (2.0-2.4)	28,774	Tennessee	3.2 (3.1-3.4)	65,549
Kentucky	3.3 (3.1-3.6)	44,749	Texas	2.6 (2.5-2.6)	259,224
Louisiana	3.0 (2.8-3.2)	43,892	Utah	1.8 (1.6-2.0)	29,290
Maine	2.2 (1.8-2.7)	13,059	Vermont	2.5 (2.1-3.1)	6,326
Maryland	1.9 (1.8-2.0)	59,332	Virginia	2.1 (2.0-2.2)	83,472
Massachusetts	2.0 (1.9-2.1)	68,785	Washington	2.3 (2.2-2.5)	71,804
Michigan	2.3 (2.2-2.5)	98,008	West Virginia	4.1 (3.7-4.4)	18,051
Minnesota	1.7 (1.5-1.9)	54,811	Wisconsin	1.8 (1.6-1.9)	58,578
Mississippi	3.3 (3.0-3.5)	29,600	Wyoming	2.5 (2.0-3.1)	5,819
Missouri	2.6 (2.4-2.8)	61,586	District of Columbia	2.6 (2.2-3.1)	6,610

Table 10. National Estimates of Prevalence of Difficulty Seeing (2016)

Stratification factor	Prevalence Rate	Sample Size
All respondents	2.5 (2.5-2.5)	3,156,487
Age		
0-17 years	0.8 (0.7- 0.8)	652,737
18-39 years	1.2 (1.2- 1.3)	834,190
40-64 years	2.8 (2.2- 2.9)	1,068,742
65-84 years	5.6 (5.5- 5.7)	523,357
85 years and older	16.6 (16.2- 17.0)	77,461
Race/Ethnicity		
Asian	1.4 (1.4- 1.5)	162,057
Non-Hispanic Black	3.2 (3.1- 3.3)	313,748
Hispanic	2.3 (2.2- 2.3)	455,012
North American Native	4.1 (3.8- 4.4)	30,300
Other	2.2 (2.0- 2.3)	81,691
Non-Hispanic White	2.5 (2.5- 2.6)	2,113,679
Sex		
Male	2.4 (2.3- 2.4)	1,544,141
Female	2.7 (2.6- 2.7)	1,612,346

Table 11. State Estimates of Difficulty Seeing (2016)

State	Prevalence Rate	Sample Size	State	Prevalence Rate	Sample Size
United States	2.5 (2.5 - 2.5)	3,156,487	Montana	2.2 (1.8 - 2.6)	10,161
Alabama	3.3 (3.0 - 3.5)	47,659	Nebraska	2.3 (2.0 - 2.6)	19,017
Alaska	2.5 (2.0 – 3.0)	6,815	Nevada	3.6 (3.2 – 4.0)	27,285
Arizona	2.7 (2.5 - 2.8)	68,398	New Hampshire	2.3 (2.0 - 2.7)	13,428
Arkansas	3.5 (3.2 - 3.7)	29,599	New Jersey	2.0 (1.8 - 2.1)	87,279
California	2.1 (2.0 - 2.2)	376,035	New Mexico	3.3 (2.9 - 3.6)	19,060
Colorado	2 (1.9 - 2.2)	54,571	New York	2.2 (2.1 - 2.3)	196,104
Connecticut	1.8 (1.6 – 2.0)	35,657	North Carolina	3.0 (2.9 - 3.1)	99,596
Delaware	2.1 (1.7 - 2.6)	8,873	North Dakota	2.2 (1.8 - 2.6)	7,864
Florida	2.8 (2.7 - 2.9)	196,828	Ohio	2.6 (2.4 - 2.7)	117,426
Georgia	2.8 (2.6 - 2.9)	98,064	Oklahoma	3.7 (3.4 - 3.9)	37,022
Hawaii	1.8 (1.5 - 2.1)	14,247	Oregon	2.6 (2.4 - 2.9)	40,269
Idaho	2.7 (2.4 – 3.0)	15,955	Pennsylvania	2.5 (2.4 - 2.6)	127,270
Illinois	2.2 (2.1 - 2.3)	126,334	Rhode Island	2.2 (1.8 - 2.6)	10,338
Indiana	2.6 (2.4 - 2.8)	66,262	South Carolina	3.2 (3.0 - 3.4)	48,405
Iowa	2.1 (1.9 - 2.3)	32,106	South Dakota	2.2 (1.8 - 2.7)	8,725
Kansas	2.5 (2.3 - 2.7)	28,590	Tennessee	3.3 (3.1 - 3.4)	65,757
Kentucky	3.6 (3.4 - 3.9)	44,739	Texas	2.7 (2.6 - 2.8)	261,896
Louisiana	3.5 (3.3 - 3.7)	43,598	Utah	1.9 (1.7 - 2.1)	29,828
Maine	2.5 (2.1 - 2.8)	12,460	Vermont	2.3 (1.8 - 2.9)	6,411
Maryland	2.0 (1.8 - 2.1)	59,408	Virginia	2.3 (2.1 - 2.4)	83,546
Massachusetts	2.1 (1.9 - 2.2)	69,126	Washington	2.3 (2.2 - 2.4)	72,383
Michigan	2.4 (2.2 - 2.5)	98,145	West Virginia	4.1 (3.7 - 4.5)	17,909
Minnesota	1.7 (1.6 - 1.8)	54,115	Wisconsin	2.0 (1.8 - 2.1)	58,569
Mississippi	3.4 (3.2 - 3.7)	28,986	Wyoming	2.6 (2.0 - 3.3)	5,800
Missouri	2.7 (2.5 - 2.9)	61,923	District of Columbia	2.5 (2.1 - 3)	6,646

Table 12. National Estimates of Prevalence of Difficulty Seeing (2017)

Stratification factor	Prevalence Rate	Sample Size
All respondents	2.5 (2.4 - 2.5)	3,190,040
Age		
0-17 years	0.8 (0.8 - 0.8)	659,314
18-39 years	1.3 (1.2 - 1.3)	851,022
40-64 years	2.7 (2.7 - 2.8)	1,069,376
65-84 years	5.3 (5.2 - 5.4)	534,499
85 years and older	16.1 (15.7 - 16.4)	75,829
Race/Ethnicity		
Asian	1.4 (1.3 - 1.5)	170,522
Non-Hispanic Black	3.2 (3.1 - 3.3)	306,940
Hispanic	2.2 (2.1 - 2.3)	463,589
North American Native	4.3 (4.0 - 4.7)	30,643
Other	2.2 (2.1 - 2.4)	85,496
Non-Hispanic White	2.5 (2.4 - 2.5)	2,132,850
Sex		
Male	2.6 (2.6 - 2.6)	1,628,854
Female	2.3 (2.3 - 2.3)	1,561,186

Table 13. State Estimates of Difficulty Seeing (2017)

State	Prevalence Rate	Sample Size	State	Prevalence Rate	Sample Size
United States	2.5 (2.4 - 2.5)	3,190,040	Montana	2.4 (2.0 - 2.8)	10,221
Alabama	3.2 (3.0 - 3.5)	47,645	Nebraska	2.2 (1.9 - 2.4)	19,545
Alaska	2.5 (1.9 - 3.2)	6,746	Nevada	3.0 (2.7 - 3.2)	28,413
Arizona	2.5 (2.4 - 2.7)	68,863	New Hampshire	2.1 (1.8 - 2.4)	13,708
Arkansas	3.7 (3.4 − 4.0)	30,021	New Jersey	2..0 (1.9 - 2.1)	88,114
California	2.1 (2.0 - 2.1)	377,575	New Mexico	3.5 (3.1 - 3.8)	19,021
Colorado	2.0 (1.8 - 2.1)	55,600	New York	2.2 (2.1 - 2.2)	196,585
Connecticut	1.9 (1.7 − 2.0)	35,978	North Carolina	2.6 (2.5 - 2.8)	101,233
Delaware	2.1 (1.7 - 2.5)	8,943	North Dakota	2.2 (1.8 - 2.6)	7,892
Florida	2.7 (2.6 - 2.8)	199,644	Ohio	2.5 (2.3 - 2.6)	118,842
Georgia	2.5 (2.4 - 2.7)	99,799	Oklahoma	3.7 (3.5 − 4.0)	37,105
Hawaii	2.0 (1.7 - 2.4)	14,433	Oregon	2.3 (2.2 - 2.5)	41,219
Idaho	2.9 (2.5 - 3.3)	16,536	Pennsylvania	2.5 (2.4 - 2.6)	127,433
Illinois	2.1 (2.0 - 2.2)	126,482	Rhode Island	2.2 (1.9 - 2.6)	10,516
Indiana	2.6 (2.4 - 2.7)	67,004	South Carolina	3.0 (2.8 - 3.2)	49,438
Iowa	1.7 (1.5 - 1.9)	32,456	South Dakota	2.3 (1.9 - 2.8)	8,881
Kansas	2.6 (2.4 - 2.8)	29,374	Tennessee	3.2 (3.0 - 3.4)	66,575
Kentucky	3.8 (3.5 - 4.1)	45,209	Texas	2.6 (2.5 - 2.6)	265,842
Louisiana	3.4 (3.1 - 3.6)	44,024	Utah	1.7 (1.5 - 1.8)	30,904
Maine	2.0 (1.7 - 2.4)	12,583	Vermont	2.1 (1.5 - 2.7)	6,340
Maryland	1.9 (1.8 - 2.1)	59,463	Virginia	2.4 (2.3 - 2.5)	84,422
Massachusetts	2.0 (1.8 - 2.1)	69,635	Washington	2.2 (2.1 - 2.3)	74,695
Michigan	2.3 (2.2 - 2.4)	99,459	West Virginia	4.5 (4.0 − 5.0)	17,758
Minnesota	1.8 (1.6 − 2.0)	55,161	Wisconsin	1.8 (1.6 - 1.9)	59,059
Mississippi	3.9 (3.6 - 4.3)	29,096	Wyoming	2.6 (2.1 - 3.1)	5,912
Missouri	2.7 (2.5 - 2.8)	62,073	District of Columbia	4.1 (3.3 - 4.9)	6,565