

ACS Summary Data Report

For the Vision & Eye Health Surveillance System

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DISCLAIMER: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of NORC at the University of Chicago or the Centers for Disease Control and Prevention.

Dataset Description

Purpose:

The American Community Survey (ACS), conducted by the United States 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 the Public Use Microdata Sample (PUMS) files for use by data users who want to create custom tables that are not available through summary ACS data products such as the American Fact Finder. ACS PUMS 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.

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 size of the HU sample selected 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

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

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. The participation rate in 2014 was 96.7% for people living in HUs and 95.9% for people living in GQs. Participation rates in 2015 were 95.8% and 95.3% for HU and GQ residents, respectively.

Analysis Process and Suppression

We estimated the prevalence rate and sample size for each survey instrument selected for inclusion. We analyzed the 2014 and 2015 PUMS files separately. The prevalence rate was defined as the number of persons who gave an affirmative 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 (RSE) of the prevalence estimate using the exact (Clopper-Pearson) method based on National Center for Health Statistics (NCHS) recommendations for calculating proportions.³ The respondent sample size was reported for each response.

All estimates were calculated using the SAS[®] SURVEYFREQ procedure. Estimates that were based on a sample size of less than 30 and/or with a RSE greater than 30% were suppressed.

Vision-related Variables:

ACS contains a single question relevant to VEHS: “Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?” This question, which was first fielded in 2008, was categorized under the VEHS ‘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					
VEHS Indicator Topic	VEHS Indicator Category	ACS Variable Name	Years Available	Question	Response Options
Visual Function	Difficulty Seeing with Glasses	DIFFEYE	2008-2017	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: AGE) 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 anyone identifying as Hispanic being placed in a single category. The race categories were coded as follows: Asian, Non-Hispanic Black, Hispanic, North

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

American Native, 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). ACS does not contain health risk factor information for smoking, diabetes, or hypertension. Frequencies for the demographic stratification variables are displayed in **Table 2**.

Table 2. ACS Stratification Variable Frequencies

Stratification factor	Sample Size (2014)	Sample Size (2015)
All respondents	3,132,610	3,147,005
Age		
0-17 years	662,930	656,389
18-39 years	825,726	831,248
40-64 years	1,077,951	1,075,985
65-84 years	491,432	507,287
85 years and older	74,571	76,096
Race/Ethnicity		
Asian	153,967	157,718
Non-Hispanic Black	323,722	318,215
Hispanic	441,267	449,024
North American Native	30,569	29,355
Other	76,519	78,534
Non-Hispanic White	2,106,566	2,114,159
Gender		
Male	1,529,229	1,536,836
Female	1,603,381	1,610,169
State		
50 States, D.C.	3,132,610	3,147,005

Stratification Levels Included in the Full Analysis:

The full analysis includes additional stratifications beyond those included in this data brief report. We stratified data using all possible combinations of age, race/ethnicity, and sex at both the national and state levels. All stratifications are displayed in **Table 3**.

Table 3. Stratification Factor Combinations Included in Full Results

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

Data Quality Assessment

We reviewed the completed analytic files to assess data quality and ensure internal validation. This process included:

- All of the tables/outputs are complete,
- Measures and variables are not missing,
- Correct identifiers are used,
- Stratification by identifiers reconcile with “All” identifiers,
- Denominators and total sample size are the same across different tables from the same source, and
- The values are within a plausible range.

We also conducted external validation of the estimates by comparing them to other published studies using ACS data, as well as our results from other surveys with similar questions. The results of the external validation process are separately documented.

Summary

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. 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.

Due to the challenges associated with validating self-reported or household-reported health question responses, VEHSS does not use survey measures to set prevalence values of eye health conditions. However, surveys do provide important information on variation and drivers of disparities in health outcomes that are not available in other data sources. Thanks to its large, nationally representative sample design, VEHSS uses the ACS PUMS data to provide information on geographic, demographic, housing type and time variation patterns of low vision prevalence.

Summary Outcome Measures

Table 4. 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
Gender		
Male	2.3 (2.2-2.3)	1,529,229
Female	2.6 (2.6-2.7)	1,603,381

Table 5. 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 6. 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
Gender		
Male	2.3 (2.2-2.3)	1,536,836
Female	2.6 (2.5-2.6)	1,610,169

Table 7. 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