NSCH Summary Data Report

For the Vision & Eye Health Surveillance System

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This report is currently undergoing Section 508 compliance review.

Dataset Description

Purpose

The National Survey of Children's Health (NSCH), sponsored by the Maternal and Child Health Bureau of the Health Resources and Services Administration, examines the physical and emotional health of children 0-17 years of age. The NSCH was designed to produce nationally- and state-representative estimates. NSCH was selected for inclusion in the Vision and Eye Health Surveillance System (VEHSS) in order to capture demographic and state-level variation of visual health among children, a population that may be underrepresented in other data sources selected for inclusion in VEHSS.

Sample Design

The NSCH is a nationally- and state-representative telephone survey that uses the State and Local Area Integrated Telephone Survey (SLAITS) sampling frame originally developed for the National Immunization Survey (NIS).[1] Sample sizes (a minimum of 1,700 in each state) were designed to result in efficient estimates of the health characteristics of children in each state, the District of Columbia (DC), and at the national level. The NSCH questionnaire was fielded following a completed NIS interview in households with an NIS-eligible child or following the NIS screener in households without an NIS-eligible child.

Data Collection Procedures

The NSCH was conducted by telephone (landline only) in English and Spanish for the first time in 2003-2004. A second survey was fielded in 2007-2008, and a third in 2011-2012, with these rounds of the survey using both landlines and cellphones. A random-digit-dialed sample of households with children less than 18 years of age was selected from each of the 50 states and the District of Columbia. One child was randomly selected from all children in each identified household to be the subject of the survey. The respondent was a parent or guardian who knew about the child's health and health care.

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[1] Bramlett MD, B. S. (2017, August 8). Design and operation of the National Survey of Children's Health, 2011–2012. Hyattsville, Maryland: National Center for Health. Retrieved from National Center for Health Statistics: https://www.cdc.gov/nchs/slaits/index.htm

Analysis Process and Suppression

We estimated the prevalence rate and sample size for each survey instrument selected for inclusion. We merged samples from the 2007-2008 and 2011-2012 rounds for analysis in order to maximize the available sample sizes for more detailed levels of stratification. We did not include data from the 2003-2004 round because the survey question combined both hearing and vision problems together in one question.

For binary response questions included in the analysis, 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. The result was then multiplied by 100 to obtain a percentage. For scaled responses (e.g., mild, moderate, severe, etc.), the data value was the proportion of respondents that selected one of the possible response options, and all responses should sum to 100%. We estimated upper and lower confidence intervals and the relative standard error (RSE) of the prevalence estimate using the Clopper-Pearson method.[2] The respondent sample size was reported for each response.

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

Vision-related Variables

NSCH 2007-2012 contains three questions related to VEHSS indicators and were included for analysis. These questions were fielded intermittently from 2007 through the latest available data in 2012. All questions were categorized under the 'Visual Function' Topic, including one question focusing on 'Difficulty Seeing with Glasses' and two on 'Vision Impairment.' **Table 1** presents each of these three questions and includes the VEHSS Topic and Category, the NSCH variable name, the year(s) survey data are available, the survey question, and the response options.

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[2] 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. Retrieved from https://www.cdc.gov/nchs/data/series/sr_02/sr02_175.pdf.

Table 1.   Overview of eye health variables in the NSCH

NSCH eye health questions and response options					
VEHSS Indicator Topic	**VEHSS Indicator Category**	**NSCH Variable Name**	**Years Available**	**Question**	**Response Options**
Visual Function	Difficulty Seeing with Glasses	K2Q44A	2007, 2011/2012	Has a doctor or other health care provider ever told you that [CHILD] had vision problems that cannot be corrected with glasses or contact lenses?	0 No
					1 Yes
					6 Don't Know
					7 Refused
					M Missing in error
Visual Function	Vision Impairment	K2Q44B	2007, 2011/2012	Does [CHILD] currently have vision problems?	0 No
					1 Yes
					6 Don't Know
					L Legitimate skip
					M Missing in error
Visual Function	Vision Impairment	K2Q44C	2007, 2011/2012	Would you describe [his/her] vision problems as mild, moderate, or severe?	1 Mild
					2 Moderate
					3 Severe
					6 Don't Know
					7 Refused
					L Legitimate skip
					M Missing in error
Visual Function	Difficulty Seeing with Glasses	BLINDNESS	2016 (To be included in future analyses)	Does this child have any of the following? Blindness or problems with seeing, even when wearing glasses	1 Yes
					2 No

The three variables included in the analysis came from Section 2: Health and Functional Status-SubDomain 3: Common Chronic Conditions for both the 2007 and 2011/2012 NSCH. The questions included for the analysis were:

- K2Q44A- Has a doctor or other health care provider ever told you that [CHILD] had vision problems that cannot be corrected with glasses or contact lenses?
- K2Q44B- Does [CHILD] currently have vision problems?
- K2Q44C- Would you describe [his/her] vision problems as mild, moderate, or severe?

Those who responded Yes to K2Q44A were then asked K2Q44B, and those who responded Yes to K2Q44B were then asked K2Q44C.

The 2007 and 2011/2012 surveys used the same question wording for all three questions. Sample size and proportions of responses were compared, and it was determined that merging the two surveys would be possible. The two surveys were merged and new weights were created by dividing the original weights by 2.

Outcome variables for K2Q44A and K2Q44B were coded such that bivariate responses were coded into Yes, No, and Missing (Missing included Don't Know, Refused, Legitimate skip, and Missing in error), although only the prevalence of Yes responses are reported below. The sample population for analysis (i.e., the denominator) was also limited to those coded as Yes or No. Question, K2Q44C focused on severity of vision loss and included a scaled response option. This question was a follow-up asked of those who answered Yes to currently having a vision problem (K2Q44B). Those who responded with Mild, Moderate, Severe, Don't Know, and Refused were included in the sample for analysis. Those who had skipped the question because they answered No to the previous question or had a missing response were coded as missing and excluded from the analysis.

Table 2 presents the sample size for analysis by coded response option for the three eye health variables. As demonstrated by the table, K2Q44B is a follow-up question to those respondents who said Yes to K2Q44A and K2Q44C is a follow-up question to those respondents who said Yes to K2Q44B.

Table 2. Frequency of coded response options for K2Q44A, K2Q44B, and K2Q44C

Variable	Sample Size
K2Q44A	
Yes	1,682
No	93,882
Missing	113

Variable	Sample Size
K2Q44B	
Yes	1,238
No	429
Missing	94,010

Variable	Sample Size
K2Q44C	
Mild	493
Moderate	496
Severe	237
Don't Know	11
Refused	1
Missing	94,439

Stratification Variables

We calculated one comorbidity variable and the following demographics from the survey responses for use in stratifying vision-related prevalence rates: age, sex, race/ethnicity, state, and diabetes. All participants' ages (variable: AGEYR_CHILD) ranged from 0-17 years. Participant sex (variable: SEX) was coded as Male or Female, and those who responded Don't Know, Refused, or had missing sex were excluded. The Hispanic and race variables (variables: HISPANIC and RACER, respectively) were combined to create one race/ethnicity variable. A Yes to Hispanic took priority over any other race option. The 2007 survey had Multiple Races as another response option, but the 2011/2012 survey only had Black, White, and Other. Therefore, the Multiple Races response was coded into the Other response option. Race/ethnicity was coded into 4 categories: Hispanic, Non-Hispanic Black, Non-Hispanic White, and Non-Hispanic Other. Those who were not Hispanic and said Don't Know, Refused, or had missing

race were coded as Unknown. Data were available for all 50 states and DC (variable: STATE). Stratification variables and their frequencies are listed in **Table 3**.

Table 3.   Stratification variable frequencies

Variables	Frequency
AGE	
0 -17 years	95,677
STATE	
50 States, D.C.	95,677
SEX	
Male	46,349
Female	49,219
Unknown	109
RACE/ETHNICITY	
Black	8,918
Hispanic	12,682
Other	10,511
White	61,462
Unknown	2,104
DIABETES	
Yes	475
No	95,169
Unknown	33

Stratification Levels Included in the Full Analysis

The full analysis includes additional stratifications beyond those included here. NSCH only includes one VEHSS-defined age group. Due to sample size limitations, all results for respondents with diabetes were suppressed, and therefore were not included in the public use data. Based on the sample sizes and rates of suppression, we included 0, 1, and 2-level stratification at the national level, but only included 0-level and 1-level stratification at the state level. We found nearly all results were missing or suppressed when we attempted to analyze further levels of stratification. **Table 4** reports the stratification levels included in the data. These equate to the variables available for selection in the VEHSS data visualization application.

Table 4.   Stratification factor combinations included in full results

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

Validation

Internal Validation

Sample Size

The 2007 NSCH survey has 91,642 completed child-level interviews, and the 2011-2012 survey has 95,677 completed child-level interviews. As mentioned above, the NSCH sampling was designed such that all 50 states and DC would have roughly 1,700 participants and thus allow for reliable state-level estimates. The weighted sample is representative of the US non-institutionalized children ages 0-17 years.

Validating Responses

Due to the skip logic of the three eye-health related questions, no other survey questions could be used to check the responses for internal consistency.

Limitations

This analysis is subject to a number of potential limitations. First, it is interesting to note that 25% of the children who had a physician-diagnosed vision problem that cannot be corrected with glasses or contact lenses, apparently no longer had vision problems according to the follow-up question. We feel this is surprisingly high. Combined with what we feel is confusing wording and structure of the follow-up questions, and the high level of uncertainty in these questions when confidence intervals were based on those who actually responded to the questions, we do not have high confidence in the accuracy of the results of the follow-up questions. With this limitation, the main vision health question (K2Q44A) was the only question included in the surveillance system. In 2016, NSCH replaced the existing vision questions with one question, with similar wording to questions that are present in ACS, BRFSS and NHIS. This question will be included when NSCH is updated.

Further, our ability to stratify the NSCH data was limited. For states, we were only able to identify prevalence estimates at a single level of stratification. We included full stratification at the national level. Unlike other data sets included in VEHSS, NSCH only includes one VEHSS-defined age group, which means that full stratification of results is at the 3rd level (race*sex*diabetes).

Finally, diabetes was the only VEHSS-defined risk factor included in the survey. We were unable to identify a sufficient number of cases of diabetes to stratify results. Therefore, NSCH data does not display risk factor options in the VEHSS data visualization application.

Summary Outcome measures

Table 5. National estimates of the prevalence rate of children ever with physician-diagnosed vision problems that cannot be corrected with glasses or contact lenses (K2Q44A)

Stratification factor	Prevalence Rate	Sample Size
All respondents	1.7 (1.6-1.9)	95,564
Race/Ethnicity		
Hispanic	1.9 (1.4-2.6)	12,659
Non-Hispanic Black	1.5 (1.1-2.1)	8,905
Non-Hispanic White	1.8 (1.6-2.0)	61,405
Non-Hispanic Other	1.7 (1.1-2.6)	10,499
Gender		
Male	1.9 (1.6-2.2)	49,163
Female	1.6 (1.3-1.8)	46,292
Race/Ethnicity		
Hispanic		
Male	2.4 (1.5-3.6)	6,608
Female	1.4 (0.9-2.0)	6,045
Non-Hispanic Black		
Male	1.8 (1.1-2.7)	4,579
Female	1.3 (0.8-2.1)	4,323
Non-Hispanic White		
Male	1.8 (1.5-2.1)	31,665
Female	1.7 (1.5-2.1)	29,669
Non-Hispanic Other		
Male	**	5,249
Female	1.6 (1.0-2.5)	5,236
Riskfactor		
Diabetes		
Yes	**	472
No	1.7 (1.5-1.9)	95,070

*suppressed due to a sample size <30; **suppressed due to a RSE >30%; ***suppressed due to a sample size<30 and a RSE >30%

Table 6. State estimates of the prevalence rate of children with physician-diagnosed vision problems that cannot be corrected with glasses or contact lenses (K2Q44A)

State	Prevalence Rate	Sample Size	State	Prevalence Rate	Sample Size
United States	1.7 (1.6-1.9)	95,564	Montana	1.4 (0.8-2.3)	1,823
Alabama	1.2 (0.7-2.0)	1,819	Nebraska	1.1 (0.6-1.8)	1,816
Alaska	2.0 (1.1-3.2)	1,843	Nevada	1.6 (0.9-2.7)	1,899
Arizona	2.0 (1.2-3.3)	1,840	New Hampshire	1.6 (0.9-2.6)	1,933
Arkansas	2.5 (1.6-3.9)	1,846	New Jersey	2.1 (1.3-3.3)	1,858
California	2.1 (1.2-3.3)	1,900	New Mexico	2.1 (1.3-3.4)	1,844
Colorado	1.9 (1.1-3.0)	1,819	New York	2.3 (1.5-3.5)	1,988
Connecticut	1.2 (0.7-1.8)	1,886	North Carolina	1.5 (0.8-2.7)	1,851
Delaware	1.5 (0.9-2.5)	1,820	North Dakota	**	1,833
Florida	1.3 (0.7-2.1)	1,853	Ohio	1.8 (1.0-3.1)	1,913
Georgia	1.2 (0.7-2.1)	1,848	Oklahoma	2.8 (1.8-4.2)	1,879
Hawaii	1.5 (0.8-2.6)	1,880	Oregon	1.8 (1.1-2.9)	1,839
Idaho	1.3 (0.7-2.1)	1,857	Pennsylvania	1.4 (0.7-2.3)	1,885
Illinois	1.3 (0.8-2.1)	2,068	Rhode Island	1.5 (0.8-2.5)	1,889
Indiana	2.0 (1.1-3.3)	1,827	South Carolina	1.6 (0.8-2.8)	1,928
Iowa	2.1 (1.3-3.2)	1,844	South Dakota	1.9 (1.1-3.0)	1,810
Kansas	2.2 (1.4-3.3)	1,832	Tennessee	2.4 (1.4-3.7)	1,860
Kentucky	1.5 (0.8-2.4)	1,861	Texas	1.6 (0.8-2.7)	2,194
Louisiana	2.3 (1.4-3.5)	1,842	Utah	1.8 (1.1-3.0)	1,822
Maine	1.5 (0.9-2.4)	1,821	Vermont	1.1 (0.6-1.8)	1,855
Maryland	1.7 (1.0-2.7)	2,182	Virginia	1.6 (0.8-2.7)	1,907
Massachusetts	0.8 (0.5-1.3)	1,861	Washington	2.0 (1.2-3.1)	1,843
Michigan	1.7 (1.1-2.5)	1,828	West Virginia	2.3 (1.5-3.4)	1,821
Minnesota	1.4 (0.8-2.4)	1,828	Wisconsin	1.2 (0.6-2.0)	1,837
Mississippi	1.5 (0.9-2.3)	1,880	Wyoming	2.1 (1.3-3.3)	1,836
Missouri	1.9 (1.2-3.0)	1,857	District of Columbia	**	1,860

*suppressed due to a sample size <30; **suppressed due to a RSE >30%; ***suppressed due to a sample size<30 and a RSE >30%

Table 7. National estimates of prevalence rates of children currently with vision problems among children ever with physician-diagnosed vision problems that cannot be corrected with glasses or contact lenses (K2Q44B)

Stratification factor	Prevalence Rate	Sample Size
All respondents	76.5 (71.5-81.1)	1667
Race/Ethnicity		
Hispanic	76.6 (60.5-88.6)	221
Non-Hispanic Black	80.1 (61.6-92.3)	141
Non-Hispanic White	73.8 (68.6-78.5)	1122
Non-Hispanic Other	86.2 (75.5-93.4)	171
Gender		
Male	76.9 (69.2-83.5)	948
Female	76.0 (69.5-81.7)	717
Race/Ethnicity		
Hispanic		
Male	75.8 (52.5-91.6)	119
Female	78.1 (58.0-91.7)	92
Non-Hispanic Black		
Male	73.5 (45.5-92.2)	81
Female	89.0 (77.1-96.0)	60
Non-Hispanic White		
Male	76.1 (69.7-81.7)	641
Female	71.3 (62.8-78.8)	479
Non-Hispanic Other		
Male	90.0 (78.2-96.6)	96
Female	81.8 (63.8-93.3)	75
Risk factor		
Diabetes		
Yes	*	*
No	76.2 (71.0-80.8)	1,645

*suppressed due to a sample size <30; **suppressed due to a RSE >30%; ***suppressed due to a sample size<30 and a RSE >30%

Table 8. State estimates of prevalence rates of children currently with vision problems among children ever with physician-diagnosed vision problems that cannot be corrected with glasses or contact lenses (K2Q44B)

State	Prevalence Rate	Sample Size	State	Prevalence Rate	Sample Size
United States	76.5 (71.5-81.1)	1667	**Montana**	*	*
Alabama	*	*	**Nebraska**	*	*
Alaska	*	*	**Nevada**	43.9 (20.3-69.7)	31
Arizona	67.1 (42.0-86.6)	38	**New Hampshire**	*	*
Arkansas	89.0 (67.3-98.4)	45	**New Jersey**	77.1 (50.5-93.6)	36
California	77.8 (51.1-94.1)	32	**New Mexico**	65.9 (39.7-86.4)	40
Colorado	73.7 (45.9-92.2)	37	**New York**	74.1 (50.9-90.3)	35
Connecticut	65.5 (44.5-82.9)	31	**North Carolina**	82.1 (62.3-94.2)	30
Delaware	58.7 (34.6-80.1)	34	**North Dakota**	*	*
Florida	*	*	**Ohio**	85.7 (69.7-95.2)	35
Georgia	*	*	**Oklahoma**	80.4 (62.4-92.4)	52
Hawaii	*	*	**Oregon**	78.4 (58.9-91.5)	33
Idaho	63.5 (35.0-86.3)	37	**Pennsylvania**	76.5 (50.3-93.1)	36
Illinois	65.6 (42.8-84.0)	36	**Rhode Island**	*	*
Indiana	93.2 (78.8-99.0)	33	**South Carolina**	*	*
Iowa	86.2 (70.5-95.4)	36	**South Dakota**	*	*
Kansas	68.7 (48.0-85.0)	40	**Tennessee**	67.4 (42.3-86.8)	41
Kentucky	*	*	**Texas**	78.2 (52.5-94.0)	31
Louisiana	74.5 (46.1-92.9)	46	**Utah**	85.1 (69.0-94.8)	35
Maine	79.1 (60.4-91.7)	30	**Vermont**	*	*
Maryland	86.4 (68.0-96.4)	38	**Virginia**	56.2 (28.2-81.5)	30
Massachusetts	*	*	**Washington**	82.8 (67.1-93.1)	45
Michigan	72.0 (52.7-86.8)	37	**West Virginia**	75.3 (52.7-90.8)	35
Minnesota	*	*	**Wisconsin**	*	*
Mississippi	74.7 (41.8-94.6)	37	**Wyoming**	88.1 (72.9-96.4)	36
Missouri	75.1 (58.2-87.9)	41	**District of Columbia**	*	*

*suppressed due to a sample size <30; **suppressed due to a RSE >30%; ***suppressed due to a sample size<30 and a RSE >30%

Table 9. National estimates of prevalence rates1 of mild, moderate, or severe vision problems among children who currently have vision problems that ever had physician-diagnosed vision problems that cannot be corrected with glasses or contact lenses (K2Q44C)

Stratification factor	Prevalence Rate	Sample Size
All respondents		
Mild	34.4 (28.5-40.7)	1,238
Moderate	37.6 (31.6-44.0)	1,238
Severe	26.1 (20.1-33.0)	1,238
Race/Ethnicity		
Hispanic		
Mild	36.5 (21.0-54.4)	163
Moderate	37.1 (20.7-56.0)	163
Severe	**	163
Non-Hispanic Black		
Mild	18.9 (11.0-29.2)	117
Moderate	37.2 (21.9-54.7)	117
Severe	35.7 (19.7-54.4)	117
Non-Hispanic White		
Mild	38.8 (31.8-46.1)	808
Moderate	37.9 (31.7-44.4)	808
Severe	22.9 (17.3-29.2)	808
Non-Hispanic Other		
Mild	28.1 (14.0-46.2)	135
Moderate	37.3 (17.6-60.6)	135
Severe	**	135
Gender		
Male		
Mild	35.3 (26.7-44.7)	718
Moderate	34.5 (25.7-44.2)	718
Severe	29.7 (20.6-40.1)	718
Female		
Mild	33.3 (25.6-41.7)	518
Moderate	41.7 (33.7-50.0)	518
Severe	21.5 (14.6-29.9)	518

*suppressed due to a sample size <30; **suppressed due to a RSE >30%; ***suppressed due to a sample size<30 and a RSE >30%

1A risk factor table was not included because all relative errors and sample sizes were suppressed for participants with Diabetes. Variable K2Q44C is a follow-up question, and was not analyzed by state due to sample size limitations.