



## Vision Health Disparity and Reasons for no Access to Vision Care Among United States Adults Aged 40 and Above - BRFSS, 2007- 5 States

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### ABSTRACT

**Purpose:** To examine if disparities exist among US adults aged 40 and above that reported reasons for no access to eye care.

**Methods:** A secondary analysis was conducted on 14,129 US adults aged 40 and above who responded to the Vision Module of the 2007 BRFSS using cross-tabulations, logistic regression and chi square statistics.

**Results:** Respondents reporting cost/insurance as the main reason for no access to an eye doctor was greater among adults with education level < HS

than with > HS ( $p < 0.001$ ). The percentage who reported cost/insurance as the main reason was greater among adults with income < \$25,000 than with > \$50,000 ( $p < 0.001$ ). Similarly, a greater percentage of Black adults reported cost/insurance as the reason for no access to an eye doctor compared to White adults.

**Conclusion:** Given that Cost/Insurance was the most frequently cited reason, making eye health/health insurance available to most or all Americans will go a long way in narrowing the gap in vision health disparities.

**Key words:** Vision, disparity, Access to vision care

### Introduction

Vision loss has been known to be a dire public health problem and in 2004, approximately 3.3million people aged 40 years and above were visually impaired or blind in the United States [1]. The number is estimated to reach 5.5million by 2020 and at least 50% of vision impairment and blindness can be prevented by early detection and treatment [2].

According to the Centers for Disease Control, the prevalence of blindness and vision impairment increases rapidly with age across all racial and ethnic groups, most especially among those 75 years and older. Age-related macular degeneration is expected to double by 2050 from 9.1million to 17.8million for those aged 50years and over. Diabetic retinopathy is expected to quadruple by 2050 from 2.5million to 9.9million among people aged 65years and older. By 2020, the estimated number of people aged 40years and older with cataract is expected to be greater than 30million. The number of glaucoma cases among Hispanics aged 50years and over who have diabetes is expected to increase 12-fold by 2050 [3].

Healthy People 2020 contains vision objectives and one of the main aims of Healthy People 2020 is to eliminate health disparities which are differences that occur by sex, education, income, race/ethnicity, disability, geographical location and sexual orientation [4]. Vision health disparity studies have been investigated for individuals aged 40 years and over using National Health and Nutrition Examination Survey (NHANES), National Health Interview Survey (NHIS) and the Behavioral Risk Factor Surveillance System (BRFSS). Non-Hispanic whites have been reported to have a higher prevalence of Age-related Macular Degeneration (AMD) and cataract surgery than non-Hispanic blacks, but a lower prevalence of diabetic retinopathy (DR) and glaucoma. Diabetic retinopathy has been reported to be significantly higher among those with less than high school education than those with more than high school education [4].

Access to vision, eye and health care is a major problem in the United States. This problem affects people of all ages, races, ethnicities and gender. The complex nature of this problem makes

its solution difficult, especially when it is not recognized as the primary problem people have for obtaining health care [5]. Access to health care, especially status of insurance and ability to pay for health care services, has been the greatest factor that determines the quality of health amongst various racial and ethnic groups [6].

Previous literature have looked into vision health disparity, disparities in eye care utilization, vision impairment and reasons for not seeking eye care [2,4,7-10]. This report addresses an existing gap. It explores vision health disparity based on reasons given for no access to vision care by race/ethnicity, education and income. It is aimed to bring to the attention of policy makers and public health advocates that inadequate access to vision care results in widening existing vision health disparities. This study helps future vision surveillance activities and provides an informed guide to interventions and allocation of resources to eye health programs aimed at reducing health disparity.

## Materials & Methods

### Data Source

The Behavioral Risk Factor Surveillance System (BRFSS) is “a state-based system of health surveys that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury” [2]. The Centers for Disease Control (CDC) established the BRFSS in 1984 and currently data is collected on a monthly basis in all 50 states, in addition to District of Columbia, Puerto Rico, U.S Virgin Island and Guan. The BRFSS is publicly available and its data has been “de-identified”, hence its exemption from Institutional Review Board [11]. The BRFSS application presents data for vision loss, eye diseases, and access to eye care. It presents prevalence of eye conditions, vision loss, and access to eye care for the state, by racial/ethnic group, gender, education, and diabetes [12].

### Measurements

Five states (Alabama, Georgia, Iowa, New York, and West Virginia) that utilized the Visual Impairment and Access to Eye Care Module of the Behavioral Risk Factor Surveillance System, 2007 were included. The Vision Module contains nine questions about visual function, eye diseases, frequency of eye examinations, and reasons for not seeking eye care.

A total of 14,129 respondents were used for the study. The selected demographic characteristics were: age, sex, level of education, level of income and race/ethnicity. The respondents were adults aged  $\geq 40$  years who have reported no visit to the eye doctor in the previous year and with or without eye health insurance. Variables which were used to evaluate access/no access to eye care were based on the outlined responses given by respondents who had not visited an eye doctor in the previous year. The responses given were categorized into: “Cost/lack of Insurance”, “Clinic too far away/No transportation”, “could not get an appointment”, “No reason” and “Other” [12].

### Data Analysis

A secondary analysis of the data from the Visual Impairment and Access to Eye Care Model of the CDC Behavioral Risk Factor Surveillance System (BRFSS) was used for this study. Estimates were age-standardized to the year 2000 U.S Census Population using two age groups: 40-64 and  $\geq 65$  years. Data were analyzed using IBM SPSS statistical software 21.0, which was used to account for complex sampling design. All estimates were weighted to represent the sampled population. Logistic regression and Chi square were used to examine the association and test for statistically significant differences ( $p < 0.05$ ) in proportions between groups [2,12,13].

### Results

Percentages of selected demographic characteristics by age, sex, race/ethnicity, education and income of respondents used in this study, can be seen in Table 1. Adults aged 40-64 years, females, white (non-Hispanic) and adults with education greater than high school and with income of \$50,000 and higher had a greater representation.

The percentage of those reporting cost/insurance as the main reason for not seeing an eye doctor in the past year was greater among adults aged 40-64 years than adults aged  $\geq 65$  yrs (47.5% versus 5.2%,  $p < 0.001$ ). On the other hand, the percentage of adults that reported no reason to go was higher among adults aged  $\geq 65$  years than adults aged 40-64 years (82.4% versus 24.3%) [Table 2]. The percentage of adults reporting cost/insurance as the main reason for no access to an eye doctor was greater among men than women (64.4% versus 18.0%,  $p < 0.001$ ). However, 52.4% of females reported no reason to go compared to

19.4% of men as the main reason ( $p < 0.001$ ), [Table 2].

The percentage of those reporting cost/insurance as the main reason for not seeking the eye doctor was greater among adults with less than high school (HS) than among adults with HS (71.8% versus 19.9%,  $p < 0.05$ ) and also among adults with  $> HS$  (71.8% versus 28.5%,  $p < 0.001$ ). For those who gave the reason of clinic too far away/no transportation, adults with  $< HS$  were 1.0% compared to HS with 3.5% ( $p = 0.008$ ). Among the respondents in the HS and  $> HS$  (59.0% and 32.6%) category, "no reason to go" was the main reason given for no access to an eye doctor the previous year [Table 2].

Within race/ethnicity, a greater percentage of non-Hispanic black adults reported cost/insurance as the reason for not seeking the eye doctor compared to non-Hispanic white adults (39.8% versus 37.2%). The percentage of adults that reported no reason as the main reason for not seeking an eye doctor was 38.3% for non-Hispanic white and 31.4% for non-Hispanic blacks ( $p < 0.05$ ), [Table 2].

The percentage of those who reported cost/insurance as the main reason was greater among adults that made  $< \$25,000$  than adults that made between  $\$25,000$  and  $< \$50,000$  (53.8% versus 29.5%,  $p < 0.001$ ), and  $> \$50,000$  (58.3% versus 13.8%,  $p < 0.001$ ), [Table 2]. Among states, eye care insurance and access to eye care varied. The percentage of adults among states that reported no eye health insurance ranged from 41.7% in Alabama to 54.2% in Georgia. The percentage giving cost/insurance as the reason for not seeking an eye doctor in the previous year ranged from 30.8% in Alabama to 84.3% in New York ( $p < 0.001$ ), 30.1% in Georgia, 15.7% in Iowa [Table 2].

## Discussion

In this analysis, using the vision impairment and access to eye care model of the 2007 BRFSS, the prevalence of reasons given by adults aged 40 and over for not seeking an eye doctor within the previous year varied by the level of education, race/ethnicity and level of income.

The results of this analysis show that a greater percentage of adults aged 65 and above reported "no reason to go" as why they have not had access to an eye doctor in the previous year. Adults aged 65 and above tend to visit their primary

care physician (PCP) more often than they visit their eye doctor despite having more eye health insurance coverage than adults aged 40-64 years. PCPs should be involved in recommending that older patients see an eye care professional regularly and immediately report any signs of vision impairment [8, 14, and 15]. "No reason to go" reveals the poor health attitude and neglect towards vision care by adults. Most adults are not properly informed on the importance of having routine visits to the eye doctor. Many adults only visit the eye doctor when they have an eye problem and sometimes a long lasting one. This attitude adds to the increasing prevalence of vision impairment among adults in the population.

There was a strong association between the level of education and cost/insurance given as a reason for not seeking an eye doctor in the previous year. Adults with  $< HS$  reported cost/insurance as the main reason for no access to eye doctor. This is consistent with a report from a previous study which showed that those with less than high school education were least likely to use eye care services [8]. Low level of education can also make people less involved in the community. Some may not know that they are eligible for health insurance even when they are. There may also be difficulties navigating the health care system. Even some people with insurance coverage are unaware of the level of coverage that they refuse to visit an eye or medical professional for fear of accruing large medical bills. Lower education often translated to lower earning potential and the ever rising cost of health insurance makes this more difficult [16,17]. An important factor to consider is that most people with a lower education work where comprehensive health insurance (including eye health insurance) is not being offered as a benefit. A similar study found that those with higher education are more likely to see an eye care doctor compared to the less educated [9].

Further, this analysis shows that non-Hispanic blacks were less likely to access an eye doctor than non-Hispanic White because of cost/insurance. This is in line with results from previous studies [8,10]. As was mentioned previously with education, majority of non-Hispanic white adults have "employee-sponsored coverage" [18]. This is not seen with minorities like Blacks and Hispanics because the majority of them are employed in low paying jobs that do not offer such packages. Another factor to consider is that most

government programs like Medicare and Medicaid have a requirement that one has to be a citizen or a permanent resident in order to be eligible and this reduces the rate of insurance among minorities, both legal and undocumented [18].

A significant association was found between levels of income and cost/insurance in accessing eye care. Adults in low-paying jobs cannot afford to pay for health insurance and small businesses that employ them do not provide employee-based insurance. These small businesses offer salaries that leave their employees ineligible for public sponsored health insurances like Medicaid and inadequate to be able to afford private health insurance coverage. The Majority of the uninsured tend to be low-income Americans with family incomes below 200 percent of the poverty level [19].

Limitations in this study are: the BRFSS contains self-reported data and is subject to recall bias. Also the study involved only five states that utilized the BRFSS in 2007 and hence it is not a valid representation of adults aged 40 and over in the entire United States populace. Further studies should be focused on the younger children and adults 40years and less. Hopefully it would help throw more light on reasons why they are not receiving the adequate eye care they deserve and on the future public health implications that might arise.

Results of this study show that disparity does exist among adults aged 40 and above who responded to reasons for no visit to an eye doctor. These existing disparities affecting access to eye care or an eye doctor are mainly due to differences in race/ethnicity, education and income levels. "Cost/insurance" followed by "no reason to go" are the two main reasons given for no visit to an eye doctor in the past 12 months. Making health insurance available to all Americans will significantly contribute towards narrowing the gap in health disparity. With the Affordable care act passed into law, more and affordable coverage options will be made available to the public and it is expected this will reduce the number of uninsured adults and further increase their access to not just health care but eye care services and doctors. It is expected that this study and many similar others will help public health advisers and policy makers in tailoring interventions specific to the communities and demographics most affected by vision health disparity.

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## Human Participant Protection

Because this study employed only the analysis of de-identified secondary data, the Institutional Review Board of Mount Sinai School of Medicine deemed the protocol exempt from review. Therefore no ethical clearance or consent was needed.

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**Table 1:** Selected demographic characteristics of US adults aged 40 and older with reported reasons for no access to eye care, Behavioral Risk Factor Surveillance System, 2007

<b>Characteristics</b>	<b>%</b>	<b>95% CI</b>	<b>Unweighted N</b>
<b>Age</b>			
40 - 64	59.4	{55.9 ,62.8}	1939
65 or older	40.6	{37.2,44.1}	1006
<b>Sex</b>			
Male	37.5	{33.8,41.3}	1096
Female	62.5	{58.7,66.2}	1849
<b>Race/Ethnicity</b>			
Non- Hispanic White	85.8	{83.9,87.5}	2298
Non-Hispanic Black	8.3	{7.0,9.9}	286
Hispanic	5.3	{4.1,6.9}	161
Other	0.5	{0.2,1.1}	17
<b>Education</b>			
< High School	9.7	{8.0,11.6}	376
High School	33.5	{30.5,36.6}	1005
> High School	56.9	{53.5,60.2}	1554
<b>Income</b>			
< \$20,000	30.9	{27.5,34.5}	841
\$20,000 - < \$50,000	28.0	{24.9,31.2}	775
> \$50,000	41.2	{37.5,44.9}	926
Total			14129

CI = Confidence Interval

% = Percentage

**Table 2:** Prevalence of reasons for no eye care visit in the past 12 months among adults aged 40 and above by selected demographic characteristics, BRFSS 2007.

Characteristic	Reasons for no eye care visit													
	No Insurance			Cost/insurance		No eye doc		Clinic far		No reason		Other		
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI		
<b>Age</b>														
40-64 (Ref)	57.9	44.6	70.2	47.5	23.9	0.2	0.0	1.9	0.3	9.5	24.3	12.6	25.6	12.0
65 and higher	54.1*	37.9	69.6	72.3		1.6		1.9	0.3	9.5	41.6	12.6	46.4	
	54.1*	37.9	69.6	5.2*	0.7	28.6	N/A	N/A			95.8	48.9	12.4	2.4
													44.6	
<b>State</b>														
Alabama (Ref)	41.7	28.2	56.6	30.8	12.9			1.3	0.2	8.4	35.4	16.3	32.5	13.8
Georgia	54.2	41.1	66.7	57.2	15.4	0.7	0.1	4.5	0.6		60.7		59.1	
Iowa	46.2	28.7	64.7	28.7		15.4		4.4			31.5*		28.5	14.4
New York	42.2	6.7	88.2	47.3		4.4		26.0			51.7		48.6	
West Virginia	N/A			N/A		N/A		N/A			57.2*		27.1	7.5
				15.7	5.2	38.8		N/A			81.2		63.1	
													15.7	1.3
				84.3*	27.6	98.7		N/A			N/A	7.24		
				N/A				N/A			N/A		N/A	
<b>Sex</b>														
Male (Ref)	54.1	26.4	79.4	62.7	28.8						18.8	6.2	15.8	4.0
Female	57.2*	45.3	68.4	87.5		N/A		N/A			44.7		45.6	
				18.0*	8.6	0.3		2.3	0.4		52.4*		26.4	12.7
				33.9		0.0	1.9	11.7			73.5		46.8	
<b>Education</b>														
< HS (Ref)	67.8	34.1	89.5	71.8	26.1			1.0	0.1		23.7	4.3		
HS	76.4*	68.0	83.2	94.8		N/A		9.3			68.3		3.5	0.3
> HS	37.7*	26.6	50.2	19.9*	6.8			3.5*	0.4		59.0	26.4		27.8
				45.8		N/A		23.1			85.3		17.1	5.2
				27.7*	12.6	50.5		0.4			31.7		36.9	43.9
				0.1	2.6			N/A			18.3	49.2	19.1	59.2
<b>Race/Ethnicity</b>														
White, NH (Ref)	59.6	45.3	72.3	37.2	14.6	0.2	0.0	1.4	0.2	9.4	37.8	17.4		
Black, NH	34.8*	20.5	52.6	67.1		1.4					63.7		21.6	9.5
Other	N/A			39.8	18.4						31.4*		28.8	12.3
Hispanic	N/A			66.0		N/A		N/A			56.4		53.9	
						N/A		N/A			N/A		N/A	
						N/A		N/A			N/A		N/A	

**Annual Income**

< \$25,000				53.8	19.6			36.6	10.3			
(Ref)	71.8	55.6	83.8	84.7		N/A	N/A	74.4		9.4	2.7	27.9
\$25,000-				29.5*	6.9			41.2	16.6	29.3		10.3
\$50,000	52.3*	25.0	78.3	70.2		N/A	N/A	71.1		59.8		
				13.8*	4.2	36.8	0.7	39.8	19.8	44.7		21.4
>=\$50,000	30.2*	15.5	50.5	4.5				64.0		70.6		

CI= Confidence Interval

\* = Statistical significance( $p < 0.05$ ) from the first reference group

N/A= Estimate was not available due to small sample size

Ref= Reference group

NH= Non-Hispanic

HS= High School

Doc = Doctor

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