HHS Public Access

Author manuscript

JAMA Ophthalmol. Author manuscript; available in PMC 2018 February 21.

Published in final edited form as:

JAMA Ophthalmol. 2016 March ; 134(3): 320–329. doi:10.1001/jamaophthalmol.2015.5842.

Factors Associated With Ocular Health Care Utilization Among Hispanics/Latinos:

Results from an Ancillary Study to the Hispanic Community Health Study/Study of Latinos (HCHS/SOL)

Laura A. McClure, MSPH,
Sylvester Comprehensive Cancer Center, MillerSchool of Medicine, University of Miami, Miami, Florida

D. Diane Zheng, MS,
Department of Public Health Sciences, Miller School of Medicine, University of Miami, Miami, Florida

Byron L. Lam, MD,
Bascom Palmer Eye Institute, Miller School of Medicine, University of Miami, Miami, Florida

Stacey L. Tannenbaum, PhD,
Sylvester Comprehensive Cancer Center, MillerSchool of Medicine, University of Miami, Miami, Florida

Charlotte E. Joslin, OD, PhD,
Sylvester Comprehensive Cancer Center, MillerSchool of Medicine, University of Miami, Miami, Florida

Sonia Davis, DrPH,
Department of Biostatistics-Collaborative Studies Coordinating Center, Gillings School of Public Health, University of North Carolina at Chapel Hill

Daniel López-Cevallos, PhD,
Center for Latino/a Studies and Engagement, Oregon State University, CorvallisSchool of Public Health, Universidad San Francisco de Quito, Quito, Ecuador

Marston E. Youngblood Jr, MPH,

Corresponding Author: Laura A. McClure, MSPH, Sylvester Comprehensive Cancer Center, Miller School of Medicine, University of Miami, 1120 NW14th St, Ninth Floor, Miami, FL 33136 (lmcclure@miami.edu).

Author Contributions: Dr Lee had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
Study concept and design: McClure, Lee. *Acquisition, analysis, or interpretation of data:* All authors.
Drafting of the manuscript: McClure, Zheng, Lam, Tannenbaum, Chambers, Lee.
Critical revision of the manuscript for important intellectual content: All authors.
Statistical analysis: McClure, Zheng, Youngblood, Chambers.
Obtained funding: Lee.
Administrative, technical, or material support: McClure, Joslin, Youngblood, Chambers, Lee. *Study supervision:* McClure, Tannenbaum, Chambers, Lee.

Additional Information: A complete list of staff and investigators for HCHS/SOL is available on the study website: https://www2.cscc.unc.edu/hchs.

Conflict of Interest Disclosures: All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

Department of Biostatistics-Collaborative Studies Coordinating Center, Gillings School of Public Health, University of North Carolina at Chapel Hill

Zhu-Ming Zhang, MD,
Epidemiological Cardiology Research Center, Division of Public Health Sciences, Department of Epidemiology and Prevention, Wake Forest School of Medicine, Winston Salem, North Carolina

Claudia Pulido Chambers, BPh, and
Department of Psychology, Miller School of Medicine, University of Miami, Miami, Florida

David J. Lee, PhD
Department of Public Health Sciences, Sylvester Comprehensive Cancer Center, Miller School of Medicine, University of Miami, Miami, Florida

Abstract

IMPORTANCE—Regular ocular care is critical to early detection and prevention of eye disease and associated morbidity and mortality; however, there have been relatively few studies of ocular health care utilization among Hispanics/Latinos of diverse backgrounds.

OBJECTIVE—To examine factors associated with ocular health care utilization among Cuban, Central American, and South American Hispanics/Latinos in a cohort study.

DESIGN, SETTING, AND PARTICIPANTS—An ancillary study to the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) evaluating ocular health, knowledge, risk factors, and health care use was conducted with 1235 HCHS/SOL participants (aged ≥40 years) at the Miami, Florida, study site. Data were collected from October 17, 2011, to September 30, 2013, and analyses were conducted from May 28, 2014, to March 18, 2015. Descriptive and multivariable logistic regression analyses were performed for 3 ocular health care outcomes. Regression models were built sequentially with variables conceptually grouped according to Andersen's Behavioral Model of Health Services Use.

MAIN OUTCOMES AND MEASURES—Ever having an eye examination, having an eye examination performed within the past 2 years, and difficulty obtaining needed eye care in the past year.

RESULTS—Of the 1235 participants, 478 were men and 757 were women, and they had a mean (SD) age of 53.6 (8.1) years. Those who never had insurance were less likely to have had an eye examination (with data reported as odds ratios [95% CIs]) ever, 0.19 (0.07–0.53) and in the past 2 years, 0.22 (0.15–0.33) and were more likely to have had difficulty obtaining needed eye care in the past year (3.72 [1.75–7.93]). Those with less than excellent or good self-rated eyesight were less likely to ever have had an eye examination (0.26 [0.12–0.56]) and more likely to have had difficulty obtaining care (3.00 [1.48–6.11]). Men were less likely to ever have had an eye examination (0.31 [0.18–0.53]). Older (55–64 years) Hispanics/Latinos (3.04 [1.47–6.31]) and those with a high school degree or general educational development certification (2.06 [1.02–4.13]) or higher levels of education (4.20 [2.12–8.30]) were more likely to ever have had an eye examination. Finally, those living in the United States for more than 15 years (0.42 [0.21–0.82]) were less likely to have had difficulty obtaining care.

CONCLUSIONS AND RELEVANCE—Our findings suggest that increasing insurance coverage, decreasing the costs of care, and increasing the availability of care for Hispanics/Latinos with poor self-rated eyesight are relevant issues to address to improve ocular health care use among Hispanics/Latinos of diverse backgrounds.

Visual impairment and blindness affect more than 3 million people in the United States aged 40 years or older.[1] Regular vision and eye care is critical to early detection and prevention of eye disease, associated morbidity, and even mortality.[2–11] Hispanics/Latinos have been shown[12] to have poor access to and utilization of health care in general, but there are few studies[13,14] of vision and eye care utilization in this group. This is of particular concern since, compared with other ethnic groups, Hispanics/Latinos bear a disproportionate burden of ocular disease.[15–21]

The few studies available on vision and eye care among Hispanics/Latinos have found low levels of self-reported use, with 36% having had an eye examination in the past year, 19% having had a dilated eye examination in the past year, and 57% ever having had a dilated eye examination.[13] Vision and eye care has been associated with age, sex, educational level, health insurance, acculturation, and vision-specific factors.[13,14] These results come from large and small epidemiologic studies[13,14,20,22] of ocular health conducted in mostly Mexican-origin populations. However, to our knowledge, vision health issues have not been systematically evaluated among other Hispanic/Latino populations. Research in this area is greatly needed since Hispanics/Latinos constitute the largest and most diverse ethnic minority in the United States.[23,24] Because Hispanics/Latinos are a heterogeneous population of vastly different ethnicities, the influence of their diverse cultures and socioeconomic backgrounds on their use of vision and eye care merits further study.

We determined the prevalence of vision and eye care utilization among a subset of the Hispanics/Latinos in the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) and assessed the influence of sociodemographic, acculturation, and vision health factors. The HCHS/SOL and, in particular, the Miami site, offers unique access to large numbers of individuals with previously unstudied Hispanic backgrounds, including Cubans and Central and South Americans.

Methods

Data Source

Data were obtained through an ancillary study of the HCHS/SOL, a population-based, multisite, epidemiologic cohort study of the prevalence and development of disease among Hispanics/Latinos (http://www.cscc.unc.edu/hchs). The HCHS/SOL participants include Hispanics/Latinos aged 18 to 74 years who underwent a baseline clinical examination and risk factors assessment from March 4, 2008, to June 30, 2011. Four sites were selected to gain representation of Mexican, Puerto Rican, Dominican, Cuban, Central American, and South American ancestry backgrounds. Detailed descriptions of the HCHS/SOL design and sampling plan have been published previously.[25,26] Our ancillary study, hereinafter referred to as the Ocular Study of Latinos (Ocular SOL), included participants at the HCHS/SOL Miami site aged 40 or older who were surveyed on vision health, knowledge of ocular

disease, and vision and eye care utilization. This study was conducted between October 17, 2011, and September 30, 2013, and represents a convenience sample of HCHS/SOL participants. Ocular SOL survey data were merged with HCHS/SOL baseline data to obtain additional health-related variables. The analyses for the present study were conceived in 2013 and conducted from May 28, 2014, to March 18, 2015. This study was approved by the HCHS/SOL publications committee and by the institutional review board of the University of Miami. Participants granted oral informed consent prior to participation and received financial compensation.

Variables

The outcomes of interest were (1) ever had an eye examination, (2) eye examination within the past 2 years, and (3) difficulty obtaining needed eye care in the past year. Andersen's Behavioral Model of Health Services Use[27] and Vulnerable Populations[28] were used to group relevant covariates into 4 categories. Predisposing factors (traditional) were the first of these: age, sex, Hispanic background, marital status, educational level, and employment; followed by predisposing factors (vulnerable), place of birth (United States vs other), years lived in the United States, and 2 subscales from the Short Acculturation Scale for Hispanics/Latinos (SASH)[29] (the SASH Language Use subscale assessing respondents' preferred language in various settings and the SASH Ethnic Social Relations subscale assessing the ethnicity of people in respondents' social circles or interactions). Enabling factors were the third group of covariates: health and vision insurance, income, difficulty communicating with health care professional in the past 12 months, and inability to obtain needed health care in the past 12 months owing to cost. Need factors made up the final group: self-rated eyesight, National Eye Institute Visual Function Questionnaire (NEI-VFQ) score,[30] 12-item Short Form (SF-12v2) physical and mental health scores,[31] self-reported chronic diseases, smoking status, alcohol use, and self-reported adherence to 2008 physical activity guidelines.[32]

SASH subscale scores ranged from 1 (least acculturated) to 4 (most acculturated) with a score of 2.99 or less identifying lower acculturation.[29] The NEI-VFQ assessed the effect of self-reported visual health on emotional well-being and social functioning[30] and represented the mean of the subscales within the 25 items ranging from 0 (worst eye health) to 100 (best eye health). Self-rated general health from the HCHS/SOL baseline examination was used to calculate the general health subscale of the NEI-VFQ. One item of the mental health subscale was omitted from the survey and was therefore not included in the calculation (How much of the time do you worry about your eyesight), and the mean score of this subscale was determined using the 3 available items. This modification did not affect the total scoring of NEI-VFQ, and our scores are comparable with those of other studies.[13,33] The SF-12v2 physical and mental health scores were calculated from the 12-item surveys measuring self-reported functional health and well-being.[31] Scores ranged from 0 (poorest health) to 100 (best health) and were norm-based standardizations to a mean (SD) of 50 (10).

Statistical Analysis

Analyses using χ^2 and F tests were performed to compare the sociodemographic status, acculturation indicators, health behavior, and health status of Ocular SOL participants and nonparticipants to ensure that the Ocular SOL sample was representative of the HCHS/SOL parent sample in Miami. Prevalence of the 3 outcomes is reported among Ocular SOL participants overall and by all independent variables. Multivariable logistic regression models for each outcome were built in sequential fashion according to the Andersen categories: (1) predisposing factors (traditional), (2) predisposing factors (vulnerable), (3) enabling factors, and (4) need factors. Variables with significance at $P < .02$ from each category were retained in subsequent models, and the final model consisted of all resulting independent variables at $P < .02$. Analyses were conducted using SAS, version 9.3 (SAS Institute Inc) and were weighted and adjusted for complex survey design. Estimates were reflective of the target population, defined as all Hispanic/Latino adults living in the Miami communities included in HCHS/SOL.[25,26]

Results

There were 2916 HCHS/SOL participants identified as eligible for the Ocular SOL; of those, 1235 individuals (42.4%) were enrolled in the study (478 men, 757 women; mean [SD] age, 53.6 [8.1] years). Those enrolled did not differ significantly from those not enrolled on sociodemographic characteristics. Table 1 and Table 2 describe the weighted population estimates for the predisposing, enabling, and need factors. A total of 691 participants (mean % [SE], 53.5% [2.2%]) were 40 to 54 years; 757 (53.3% [1.7%]) were women; 590 (50.1% [2.1%]) had more than a high school (HS) degree or general educational development certification, 672 (56.2% [2.4%]) were married or living with a partner, and 568 (43.8% [1.9%]) were employed. A total of 1191 participants (95.7% [1.0%]) were born outside the United States, and 748 (73.4% [2.1%]) were of Cuban ethnicity. A total of 481 (46.4% [2.9%]) had health insurance, but 1155 (92.3% [1.5%]) were without vision insurance. Annual income was $20 000 or less (below the US federal poverty level for a 3-per-son family[34]) for 670 people (58.0% [2.0%]), 686 (53.1% [2.8%]) had not seen a health care professional in the past 12 months, and 640 (54.4% [2.0%]) had excellent or good eye health. A total of 515 individuals (40.5% [1.9%]) had no chronic diseases, 643 (51.7% [1.7%]) were never smokers, 454 (50.5% [2.0%]) were low-risk drinkers, 451 (43.6% [2.0%]) were nondrinkers, and 676 (53.6% [1.7%]) met physical activity guidelines. Estimates from the Ocular SOL sample were similar to those from the remainder of Miami HCHS/SOL participants except that Ocular SOL participants were more often married or living with a partner (672 [56.2%] vs 906 [51.1%]) and less often separated, divorced, or widowed (323 [25.9%] vs 514 [31.3%]) (Table 1).

Table 3 and Table 4 describe the prevalence of ever having an eye examination (1112 [89.5%] overall), an eye examination within the past 2 years (706 [58.8%] overall), and difficulty obtaining needed eye care in the past year (168 [11.7%] overall) by levels of predisposing, enabling, and need factors. Compared with individuals aged 65 or older, those aged 40 to 54 had a lower prevalence of ever having an eye examination (596 [83.9%] vs 118 [98.8%]) and an eye examination in the past 2 years (347 [48.0%] vs 103 [88.9%]) and

having a higher prevalence of difficulty obtaining needed ocular care in the past year (109 [14.1%] vs4 [3.4%]). Men had a lower prevalence of ever having an eye examination (404 [84.7%] vs 708 [93.8%] among women) and an eye examination in the past 2 years (248 [54.4%] vs 458 [62.7%]). Compared with the insured sample, those who never had insurance had a lower prevalence of ever having an eye examination (217 [80.0%] vs 462 [96.1%]) and an eye examination in the past 2 years (113 [40.0%] vs 372 [79.1%]) and a higher prevalence of difficulty obtaining ocular care (45 [16.1%] vs 32 [5.7%]). Those without insurance for 3 years or less compared with more than 3 years had similar results (Table 4).

The eTable in the Supplement compares mean (SE) values of continuous variables stratified by the outcomes of interest. These factors were largely similar between individuals with and those without the outcome variables, with one exception: those who never had an eye examination had a higher mean SF-12v2 physical score compared with those who had an eye examination (52.7 [0.7] vs 48.0 [0.5]). In addition, those without difficulty obtaining needed eye care in the past year had a higher mean NEI-VFQ score (87.9 [0.6] vs 71.9 [1.5]).

Results of the final logistic regression models are presented in Table 5 and reported here as odds ratio (OR [95% CI]). Participants aged 55 to 64 years were more likely to have ever received an eye examination 3.04 (1.47–6.31); reference, 40–54 years] as were those with a high school degree or general educational development certification (2.06 [1.02–4.13]) or higher levels of education (4.20 [2.12–8.30]). Men were less likely to have ever received an eye examination compared with women (0.31 [0.18–0.53]), as were those who never had insurance (0.19 [0.07–0.53]); reference, currently insured), and those with poor or very poor self-rated eyesight (0.26 [0.12–0.56]; reference, excellent or good). A1-U increase in NEI-VFQ score was associated with a 4% decrease in ever having an eye examination (0.96 [0.94–0.99]), and a 1-U increase in SF-12v2 physical score was associated with a 3% decrease in ever receiving an eye examination (0.97 [0.95–1.00]). In addition, among those who never received an eye examination, cost was the barrier cited most often (45 [35.4%]) after not having any problems or need for an examination (57 [44.9%]).

Older individuals were more likely to have received an eye examination in the past 2 years (55–64 years: 1.29 [0.89–1.86]; ≥65 years: 5.17 [2.18–12.27]; reference group, 40–54 years). Men (0.56 [0.41–0.76]) were less likely to have had an eye examination in the past 2 years, as were those without health insurance (never: 0.22 [0.15–0.33]; >3 years: 0.21 [0.14–0.33]; ≤3 years: 0.50 [0.27–0.93]; reference group, currently insured). A1-U increase in SF-12v2 physical score was associated with a 2% decrease in having an eye examination in the past 2 years (0.98 [0.97–1.00]).

Individuals living in the United States for more than 15 years (0.42 [0.21–0.82]; reference, <5 years) were less likely to have had difficulty obtaining needed eye care in the past year. Each 1-U increase in NEI-VFQ score was associated with a 5% decrease in having had difficulty obtaining needed eye care (0.95 [0.94–0.97]). In contrast, those with less than excellent self-rated eyesight (fair: 2.18 [1.34–3.54]; poor or very poor: 3.00 [1.48–6.11]) and those without insurance (never: 3.72 [1.75–7.93]; >3 years: 4.98 [2.71–9.17]; ≤3 years: 4.85

[1.93–12.18]; reference, currently insured) were more likely to have had difficulty obtaining care. The most commonly cited reasons for having difficulty receiving needed care were cost (145 [88.4%] of those with difficulty), not knowing where to go (29 [17.7%]), and care being unavailable when needed (20 [12.2%]).

Discussion

Hispanic/Latino participants in our study had poor vision and eye care utilization, with only 59% having received an eye examination in the past 2 years (similar to findings of previous studies[35,36]) and 12% having had difficulty obtaining needed ocular care in the past year. This is an important issue because poor eye care among Hispanics/Latinos has been associated[36] with higher rates of undetected eye disease. The factors identified here represent important targets for improving vision and eye care use among Hispanics/Latinos: decreasing the cost of care, increasing awareness of the need for preventive ocular health care, and improving access to facilities and health care professionals.

With cost being the most cited barrier to receiving an eye examination and cause of difficulty obtaining eye care, access to health and vision insurance is a major component for alleviating this burden. Less than half of our study sample had health insurance and only 8% had separate vision insurance. Lack of health insurance was a predictor of all 3 outcomes. The importance of health insurance in obtaining needed care cannot be overstated, and previous studies[13,37–39] among both Hispanics/Latinos and other populations have found greater adherence to screening guidelines among those with health insurance. Not only is health insurance vital for the treatment of disease, it provides an opportunity for important screening services to prevent disease and resulting morbidity. In addition to increasing coverage, however, the costs associated with maintaining and using that coverage must be reduced. Individuals with coverage may not seek vision and eye care if copays present a financial burden. Indeed, 39% of participants in our study who had stopped insurance coverage did so because of the cost or because the insurance company refused coverage. Medical plus vision insurance has been highly correlated with increased eye care use,[13] and although our analyses did not show vision insurance as a predictor in multivariable logistic models (likely owing to the small sample with such coverage), descriptive analyses showed results leaning in that direction.

Individuals with higher levels of education were more likely to have ever received an eye examination, which is similar to the results of other studies[13,37,38] of Hispanics/Latinos and the general population, although a direct comparison was not possible owing to differing categories of education. Education in our study was not, however, associated with having received an eye examination in the past 2 years or with difficulty receiving needed eye care in the past year. This may indicate that our sample understood the importance of eye care, but other, more immediate factors were more important predictors of utilization in the short term.

Men in our study were less likely than women to have ever received an eye examination or to have received one in the past 2 years. This finding is consistent with studies of the general population[37,38] and Hispanics/Latinos specifically, although the magnitude of our results

were greater than those reported previously.[13] These results suggest that there is need for further public health outreach among men.

Participants with poor or very poor self-rated eyesight were substantially less likely to have ever received an eye examination, indicating that this group has significant unmet needs. In subset analyses, those with poor or very poor self-rated eyesight were more likely to be younger and have lower educational levels. Interventions may need to better target younger Hispanics/Latinos with educational information about the importance of preventive eye care. In contrast, however, those with a higher NEI-VFQ score, indicating better functioning, were less likely to have ever had an eye examination and to have had difficulty obtaining needed care in the past year. Better functioning may make it easier to travel to physician visits and navigate the health care system, or it may be that there was no particular need for care in the past year. Our results are virtually identical to those of a previous study,[13] highlighting a consistent association between better visual functioning and lower vision and eye care use among Hispanics/Latinos.

Hispanics/Latinos living in the United States for more than 15 years experienced less difficulty obtaining needed vision and eye care in the past year; however, other acculturation factors in our analysis were not predictors of ocular health outcomes. This indicates that, for those coming from other countries, sufficient time to become familiar with the health care system is a critical component to reducing care access barriers. Those who have been in the United States for less time would, therefore, benefit from patient assistance to better navigate the health care system.

Some factors in each category of variables of the Andersen models[27] (predisposing, enabling, and need) were predictors of vision and eye care utilization among Hispanics/Latinos. Although no individual category was predominant in explaining utilization, age, sex, insurance status, and selfrated eyesight were the most important predictors for the outcomes evaluated. Previous studies[40–42] have used the Andersen models to assess diabetes mellitus preventive care, dental care, and mental health care utilization in Hispanics with varying results. The Anderson models have also been used to assess health behaviors associated with undetected eye disease in a group of primarily Mexican-origin Hispanics/Latinos.[36] However, to our knowledge, ours is the first to use the models to evaluate vision and eye care utilization among Hispanics/Latinos of diverse backgrounds.[40–42]

This study has some limitations. First, it relied on self-reported measures of eye care use and its correlates, which are subject to recall bias. However, recall of health care visits that have ever occurred or have occurred within the past year have been shown to have lower recall bias.[43,44] Second, our outcome of having an eye examination in the past 2 years was based on the question, “When was the last eye examination you had by an eye care provider, such as an ophthalmologist or optometrist?” This question could be interpreted as an eye examination only for glasses (vision care) or a comprehensive dilated eye examination (eye care). This would likely serve to underestimate the rate of comprehensive eye care, particularly since cost is such an important factor. Third, because our study sample consisted of only Hispanics/Latinos in the Miami site of the HCHS/SOL, our results may not generalize to all Hispanics/Latinos. However, this sample allowed for the investigation of

vision and eye care use among Hispanic/Latinos of diverse backgrounds other than Mexican (ie, Cuban, and Central and South American) not available in other samples. This, therefore, can also be considered a significant strength of the present study.

Conclusions

To date, vision and eye care utilization has been little studied among Hispanics/Latinos of diverse backgrounds in the United States. This study identifies key segments of the Hispanic/Latino population that have never received an eye examination, have not received an eye examination within the past 2 years as recommended, and had difficulty accessing needed eye care in the past year. In particular, Hispanics/Latinos who rate their eyesight as poor or very poor are at a particular disadvantage and should be targeted for improved care. Hispanic/Latino individuals of diverse backgrounds may benefit from educational interventions to increase use of preventive vision and eye care. Expanding health and vision insurance coverage, decreasing the costs of obtaining and using coverage, increasing the availability of vision services, and improving convenient access to eye care[39] are also important elements for future interventions.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Funding/Support: This research was supported by grants 5U58DP002651, 1U58DP002652, 5U58DP002653, and 1U58DP002655 from the Centers for Disease Control and Prevention. Grantees include the University of Alabama at Birmingham, The Johns Hopkins University, Wills Eye Hospital, and the University of Miami. The Hispanic Community Health Study/Study of Latinos was carried out as a collaborative study supported by contracts from the National Heart, Lung, and Blood Institute (NHLBI) to the University of North Carolina (N01-HC65233), University of Miami (N01-HC65234), Albert Einstein College of Medicine(N01-HC65235), Northwestern University (N01-HC65236), and San Diego State University (N01-HC65237). The following Institutes/Centers/Offices contribute to the HCHS/SOL through a transfer of funds to the NHLBI:National Institute on Minority Health and Health Disparities, National Institute on Deafness and Other Communication Disorders, National Institute of Dental and Craniofacial Research, National Institute of Diabetes and Digestive and Kidney Diseases, National Institute of Neurological Disorders and Stroke, and National Institutes of Health Office of Dietary Supplements.

Role of the Funder/Sponsor: The funding organizations had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

References

1. National Eye Institute. Prevalence of blindness and low vision among adults aged 40 years and older in the United States. Bethesda, MD: National Eye Institute; 2004. http://www.nei.nih.gov/eyedata/pbd_tables. Accessed January 10, 2010
2. Verbrugge LM, Lepkowski JM, Imanaka Y. Comorbidity and its impact on disability. Milbank Q. 1989; 67(3–4):450–484. [PubMed: 2534562]
3. Carabellese C, Appollonio I, Rozzini R, et al. Sensory impairment and quality of life in a community elderly population. J Am Geriatr Soc. 1993; 41(4):401–40. [PubMed: 8463527]
4. Appollonio I, Carabellese C, Magni E, Frattola L, Trabucchi M. Sensory impairments and mortality in an elderly community population: a six-year follow-up study. Age Ageing. 1995; 24(1):30–36. [PubMed: 7762459]

5. Reuben DB, Mui S, Damesyn M, Moore AA, Greendale GA. The prognostic value of sensory impairment in older persons. J Am Geriatr Soc. 1999; 47(8):930–935. [PubMed: 10443852]
6. Wang JJ, Mitchell P, Simpson JM, Cumming RG, Smith W. Visual impairment, age-related cataract, and mortality. Arch Ophthalmol. 2001; 119(8):1186–1190. [PubMed: 11483087]
7. Thompson JR, Gibson JM, Jagger C. The association between visual impairment and mortality in elderly people. Age Ageing. 1989; 18(2):83–88. [PubMed: 2729011]
8. McCarty CA, Nanjan MB, Taylor HR. Vision impairment predicts 5 year mortality. Br J Ophthalmol. 2001; 85(3):322–326. [PubMed: 11222339]
9. Wallhagen MISW, Strawbridge WJ, Shema SJ, Kurata J, Kaplan GA. Comparative impact of hearing and vision impairment on subsequent functioning. J Am Geriatr Soc. 2001; 49(8):1086–1092. [PubMed: 11555071]
10. Christ SL, Zheng DD, Swenor BK, et al. Longitudinal relationships among visual acuity, daily functional status, and mortality: the Salisbury Eye Evaluation Study. JAMA Ophthalmol. 2014; 132(12):1400–1406. [PubMed: 25144579]
11. Patino CM, Varma R, Azen SP, Conti DV, Nichol MB, McKean-Cowdin R, Los Angeles Latino Eye Study Group. The impact of change in visual field on health-related quality of life the Los Angeles Latino Eye Study. Ophthalmology. 2011; 118(7):1310–1317. [PubMed: 21458074]
12. Livingston, G., Minushkin, S., Cohn, D. Hispanics and Health Care in the United States: Access, Information and Knowledge. Princeton, NJ: Robert Wood Johnson Foundation; Washington, DC: Pew Hispanic Center; 2008. http://www.pewhispanic.org/files/reports/91.pdf. Accessed November 17, 2014
13. Morales LS, Varma R, Paz SH, et al. Los Angeles Latino Eye Study Group. Self-reported use of eye care among Latinos: the Los Angeles Latino Eye Study. Ophthalmology. 2010; 117(2):207–15e1. [PubMed: 20018380]
14. Paz SH, Varma R, Klein R, Wu J, Azen SP, Los Angeles Latino Eye Study Group. Noncompliance with vision care guidelines in Latinos with type 2 diabetes mellitus: the Los Angeles Latino Eye Study. Ophthalmology. 2006; 113(8):1372–1377. [PubMed: 16769120]
15. Wilson MR, Eezzuduemhoi DR. Ophthalmologic disorders in minority populations. Med Clin North Am. 2005; 89(4):795–804. [PubMed: 15925650]
16. Varma R, Fraser-Bell S, Tan S, Klein R, Azen SP, Los Angeles Latino Eye Study Group. Prevalence of age-related macular degeneration in Latinos: the Los Angeles Latino eye study. Ophthalmology. 2004; 111(7):1288–129. [PubMed: 15234128]
17. Varma R, Torres M, Peña F, Klein R, Azen SP, Los Angeles Latino Eye Study Group. Prevalence of diabetic retinopathy in adult Latinos: the Los Angeles Latino eye study. Ophthalmology. 2004; 111(7):1298–1306. [PubMed: 15234129]
18. Varma R, Wang MY, Ying-Lai M, Donofrio J, Azen SP, Los Angeles Latino Eye Study Group. The prevalence and risk indicators of uncorrected refractive error and unmet refractive need in Latinos: the Los Angeles Latino Eye Study. Invest Ophthalmol Vis Sci. 2008; 49(12):5264–5273. [PubMed: 18441303]
19. Varma R, Ying-Lai M, Francis BA, et al. Los Angeles Latino Eye Study Group. Prevalence of open-angle glaucoma and ocular hypertension in Latinos: the Los Angeles Latino Eye Study. Ophthalmology. 2004; 111(8):1439–1448. [PubMed: 15288969]
20. Varma R, Ying-Lai M, Klein R, Azen SP, Los Angeles Latino Eye Study Group. Prevalence and risk indicators of visual impairment and blindness in Latinos: the Los Angeles Latino Eye Study. Ophthalmology. 2004; 111(6):1132–1140. [PubMed: 15177963]
21. Aung T. Eye disease in Latinos: insights from the Los Angeles Latino Eye Study. Am J Ophthalmol. 2010; 149(5):697–698. [PubMed: 20399921]
22. Rodriguez J, Sanchez R, Munoz B, et al. Causes of blindness and visual impairment in a population-based sample of US Hispanics. Ophthalmology. 2002; 109(4):737–743. [PubMed: 11927431]
23. Passel, J., Cohn, DUS. Population projections 2005–2050. http://www.pewhispanic.org/files/reports/85.pdf. Published 2008. Accessed November 17, 2014
24. US Census Bureau. USA People QuickFacts. http://quickfacts.census.gov/qfd/states/00000.html. Updated December 2, 2015. Accessed December 29, 2014.

25. Sorlie PD, Avilés-Santa LM, Wassertheil-Smoller S, et al. Design and implementation of the Hispanic Community Health Study/Study of Latinos. Ann Epidemiol. 2010; 20(8):629–641. [PubMed: 20609343]
26. Lavange LM, Kalsbeek WD, Sorlie PD, et al. Sample design and cohort selection in the Hispanic Community Health Study/Study of Latinos. Ann Epidemiol. 2010; 20(8):642–649. [PubMed: 20609344]
27. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? J Health Soc Behav. 1995; 36(1):1–10. [PubMed: 7738325]
28. Gelberg L, Andersen RM, Leake BD. The Behavioral Model for Vulnerable Populations: application to medical care use and outcomes for homeless people. Health Serv Res. 2000; 34(6): 1273–1302. [PubMed: 10654830]
29. Marin G, Sabogal F, Marin B, Otero-Sabagol R, Perez-Stable E. Development of a Short Acculturation Scale for Hispanics. Hisp J Behav Sci. 1987; 9:183–205.
30. Mangione CM, Lee PP, Gutierrez PR, Spritzer K, Berry S, Hays RD, National Eye Institute Visual Function Questionnaire Field Test Investigators. Development of the 25-item National Eye Institute Visual Function Questionnaire. Arch Ophthalmol. 2001; 119(7):1050–1058. [PubMed: 11448327]
31. Ware J Jr, Kosinski M, Keller SDA. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care. 1996; 34(3):220–233. [PubMed: 8628042]
32. US Department of Health and Human Services. 2008 Physical Activity Guidelines for Americans. Washington, DC: US Dept of Health & Human Services; 2008. http://health.gov/paguidelines/pdf/paguide.pdf. Accessed June 10, 2014
33. McKean-Cowdin R, Varma R, Hays RD, Wu J, Choudhury F, Azen SP. Longitudinal changes in visual acuity and health-related quality of life: the Los Angeles Latino Eye study. Ophthalmology. 2010; 117(10):1900–1907. 1907.e1901. [PubMed: 20570364]
34. US Dept of Health and Human Services. Poverty guidelines. 2015. https://aspe.hhs.gov/2015-poverty-guidelines. Published September 3, 2015. Accessed October 20, 2015
35. Baker RS, Bazargan M, Bazargan-Hejazi S, Calderón JL. Access to vision care in an urban low-income multiethnic population. Ophthalmic Epidemiol. 2005; 12(1):1–12. [PubMed: 15848915]
36. Varma R, Mohanty SA, Deneen J, Wu J, Azen SP, LALES Group. Burden and predictors of undetected eye disease in Mexican-Americans: the Los Angeles Latino Eye Study. Med Care. 2008; 46(5):497–506. [PubMed: 18438198]
37. Caban-Martinez AJ, Davila EP, Lam BL, et al. Sociodemographic correlates of eye care provider visits in the 2006–2009 Behavioral Risk Factor Surveillance Survey. BMC Res Notes. 2012; 5:253. [PubMed: 22621330]
38. Lee DJ, Lam BL, Arora S, et al. Reported eye care utilization and health insurance status among US adults. Arch Ophthalmol. 2009; 127(3):303–310. [PubMed: 19273794]
39. Unzueta M, Globe D, Wu J, Paz S, Azen S, Varma R, Los Angeles Latino Eye Study Group. Compliance with recommendations for follow-up care in Latinos: the Los Angeles Latino Eye Study. Ethn Dis. 2004; 14(2):285–291. [PubMed: 15132216]
40. Finlayson TL, Gansky SA, Shain SG, Weintraub JA. Dental utilization among Hispanic adults in agricultural worker families in California's Central Valley. J Public Health Dent. 2010; 70(4):292–299. [PubMed: 20545826]
41. Lee S, Laiewski L, Choi S. Racial-ethnic variation in U.S. mental health service use among Latino and Asian non-US citizens. Psychiatr Serv. 2014; 65(1):68–74. [PubMed: 24081115]
42. Pu J, Chewning B. Racial difference in diabetes preventive care. Res Social Adm Pharm. 2013; 9(6):790–796. [PubMed: 23246362]
43. Roberts RO, Bergstralh EJ, Schmidt L, Jacobsen SJ. Comparison of self-reported and medical record health care utilization measures. J Clin Epidemiol. 1996; 49(9):989–995. [PubMed: 8780606]
44. Varma R, Paz SH, Azen SP, et al. Los Angeles Latino Eye Study Group. The Los Angeles Latino Eye Study: design, methods, and baseline data. Ophthalmology. 2004; 111(6):1121–1131. [PubMed: 15177962]

Key Points

Question

What are the factors associated with ocular health care utilization among Hispanics/Latinos in a cohort study?

Findings

Regular ocular health care use was poor among Hispanics/Latinos in this cohort of primarily Cubans and Central and South Americans.

Meaning

Hispanics/Latinos with poor self-rated eyesight may require enhanced outreach to improve their access to and use of ocular health care.

Table 1

Weighted Population Estimates of Predisposing Factors Among Ocular Study of Latinos Participants and Nonparticipants

	Ocular Survey Participants (n = 1235)		HCHS/SOL Participants Eligible but Not Surveyed (n = 1752)	
Characteristic	**No.**	**% or Mean (SE)**	**No.**	**% or Mean (SE)**
Predisposing factors, traditional				
Age group, y	1235		1752	
40–54	691	53.5 (2.2)	985	51.7 (1.6)
55–64	425	27.1 (1.7)	555	23.8 (1.2)
≥65	119	19.4 (1.9)	212	24.5 (1.6)
Sex	1235		1752	
Male	478	46.7 (1.7)	742	48.6 (1.4)
Female	757	53.3 (1.7)	1010	51.4 (1.4)
Hispanic/Latino background	1235		1752	
Cuban	748	73.4 (2.1)	1040	72.2 (2.0)
Centralor South American	407	19.1 (1.7)	584	19.9 (1.7)
Other	80	7.5 (1.2)	128	7.9 (0.9)
Marital status	1231		1747	
Single	236	17.9 (1.5)	327	17.6 (1.1)
Married or living with partner	672	56.2 (2.4)	906	51.1 (1.8)
Separated, divorced, widowed	323	25.9 (1.7)	514	31.3 (1.5)
Educational attainment	1233		1747	
No high school degree or GED certification	328	25.2 (1.8)	497	28.6 (1.5)
High school degree or GED certification	315	24.7 (1.9)	421	24.6 (1.2)
Greater than a high school degree or GED certification	590	50.1 (2.1)	829	46.8 (1.5)
Employment status	1233		1741	
Employed	568	43.8 (1.9)	800	41.5 (1.4)
Retired and not currently employed	108	13.8 (1.6)	182	16.5 (1.5)
Unemployed	557	42.4 (2.0)	759	42.0 (1.5)
Predisposing factors, vulnerable				
Place of birth	1233		1748	
Foreign born	1191	95.7 (1.0)	1690	95.8 (0.8)
US born, including territories	42	4.2 (1.0)	58	4.2 (0.8)
Years lived in US, among those born outside the US	1235		1752	
≤5	315	27.8 (2.1)	407	25.2 (1.7)
6–15	446	34.4 (1.9)	579	32.0 (1.6)
>15	474	37.8 (2.7)	766	42.8 (2.1)
SASH language subscale score[a]	1232	1.4 (0.03)	1735	1.4 (0.02)
SASH ethnic social relations subscale score[a]	1128	2.0 (0.02)	1594	2.0 (0.02)

Abbreviations: GED, general educational development; HCHS/SOL, Hispanic Community Health Study/Study of Latinos; SASH, Short Acculturation Scale for Hispanics/Latinos; US, United States.

[a]Mean (SE) values of the subscale or score are given instead of percentage (SE) values.

Table 2

Weighted Population Estimates of Enabling and Need Factors Among Ocular Study of Latinos Participants and Nonparticipants

	Ocular Survey Participants (n = 1235)		HCHS/SOL Participants Eligible but Not Surveyed (n = 1752)	
Characteristic	**No.**	**% or Mean (SE)**	**No.**	**% or Mean (SE)**
Enabling factors				
Health insurance	1224		NA	
Currently insured	481	46.4 (2.9)	NA	NA
Without insurance up to the past 3 y	117	9.2 (1.0)	NA	NA
Without insurance for >3 y	365	26.3 (1.8)	NA	NA
Never been insured	261	18.1 (1.8)	NA	NA
Vision insurance, separate from health	1229		NA	
Yes	74	7.7 (1.5)	NA	NA
No	1155	92.3 (1.5)	NA	NA
Household income, $	1096		1515	
≤20 000	670	58.0 (2.5)	894	58.4 (1.7)
20 001–40 000	328	30.1 (2.0)	470	29.7 (1.5)
>40 000	98	11.9 (1.9)	151	11.9 (1.2)
Difficulty communicating with a health care professional in the past 12 mo	1235		1752	
No	495	42.9 (2.6)	572	33.7 (2.3)
Yes	54	4.0 (0.7)	71	3.8 (0.6)
Did not see health care professional in past 12 mo	686	53.1 (2.8)	1109	62.5 (2.4)
Could not afford needed health care in the previous 12 mo	1235		1507	
Yes	1041	85.5 (1.7)	1507	87.0 (1.3)
No	194	14.5 (1.7)	245	13.0 (1.3)
Need factors				
Self-reported eyesight	1233		NA	
Excellent or good	640	54.4 (2.0)	NA	NA
Fair	481	36.3 (1.9)	NA	NA
Poor or very poor	112	9.3 (1.0)	NA	NA
NEI-VFQ composite score[a]	1235	86.0 (0.7)	NA	NA
SF-12v2 physical health score[a]	1210	48.5 (0.5)	1701	49.0 (0.4)
SF-12v2 mental health score[a]	1210	49.1 (0.4)	1701	49.3 (0.3)
Self-reported chronic diseases	1235		1751	
None	515	40.5 (1.9)	725	37.4 (1.3)
1	456	35.5 (1.6)	646	38.5 (1.3)
≥2	264	24.0 (1.6)	381	24.1 (1.1)
Smoking status	1229		1743	

	Ocular Survey Participants (n = 1235)		HCHS/SOL Participants Eligible but Not Surveyed (n = 1752)	
Characteristic	**No.**	**% or Mean (SE)**	**No.**	**% or Mean (SE)**
Never	643	51.7 (1.7)	857	49.6 (1.4)
Former	312	25.6 (1.6)	419	23.8 (1.3)
Current	274	22.7 (1.7)	467	26.6 (1.3)
NIAAA risky alcohol use	962		1351	
Nondrinker	451	43.6 (2.0)	617	44.2 (1.7)
Low-risk drinker	454	50.5 (2.0)	637	47.6 (1.7)
At-risk drinker	57	5.9 (1.0)	97	8.2 (0.9)
Meets 2008 physical activity guidelines	1232		1736	
Yes	676	53.6 (1.7)	951	53.4 (1.6)
No	556	46.4 (1.7)	785	46.6 (1.6)

Abbreviations: HCHS/SOL, Hispanic Community Health Study/Study of Latinos; NA, not applicable; NEI-VFQ, National Eye Institute Visual Function Questionnaire; NIAAA, National Institute on Alcohol Abuse and Alcoholism; SF-12v2, 12-item Short Form.

[a]Mean (SE) values of the subscale or score are given instead of percentage (SE) values.

Table 3

Population Prevalence of Eye Care Utilization and Difficulty Receiving Care Among Ocular Study of Latino Participants by Predisposing Factors

	Ever Had an Eye Examination		Eye Examination Within the Past 2 y		Difficulty Obtaining Needed Ocular Care in the Past Year	
Characteristic	**No. (%)[a]**	**SE**	**No. (%)[a]**	**SE**	**No. (%)[a]**	**SE**
All participants	1112 (89.5)	1.2	706 (58.8)	2.0	168 (11.7)	1.1
Predisposing factors, traditional						
Age group, y						
40–54	596 (83.9)	2.0	347 (48.0)	2.7	109 (14.1)	1.5
55–64	398 (94.1)	1.3	256 (58.5)	2.7	55 (13.0)	1.9
≥65	118 (98.8)	1.2	103 (88.9)	3.0	4 (3.4)	1.9
Sex						
Male	404 (84.7)	2.1	248 (54.3)	2.9	55 (9.5)	1.4
Female	708 (93.8)	1.2	458 (62.7)	2.3	113 (13.6)	1.5
Hispanic/Latino background						
Cuban	683 (90.6)	1.4	421 (59.6)	2.4	102 (11.5)	1.2
Centralor South American	356 (86.4)	2.3	238 (57.3)	3.6	51 (11.6)	1.9
Other	73 (87.9)	4.9	47 (54.6)	7.9	15 (13.9)	4.0
Maritalstatus						
Single	205 (87.3)	2.8	138 (59.2)	4.3	38 (13.8)	2.5
Married or living with partner	600 (88.1)	1.5	360 (55.5)	2.7	91 (11.5)	1.4
Separated, divorced, or widowed	303 (94.2)	1.3	206 (66.0)	3.2	38 (10.8)	2.4
Educational attainment						
No high school degree or GED certification	281 (85.4)	2.5	183 (58.2)	3.9	51 (13.6)	2.5
High school degree or GED certification	277 (85.9)	2.5	159 (53.2)	3.4	41 (11.4)	1.7
Greater than a high school degree or GED certification	552 (93.5)	1.2	363 (62.0)	2.3	76 (11.0)	1.5
Employment status						
Employed	506 (86.3)	2.0	311 (50.9)	3.0	74 (11.3)	1.4
Retired and not currently employed	107 (99.3)	0.7	86 (85.4)	4.0	7 (3.9)	2.0
Unemployed	497 (89.7)	1.5	308 (58.3)	2.8	86 (14.5)	1.6
Predisposing factors, vulnerable						
Place of birth						

JAMA Ophthalmol. Author manuscript; available in PMC 2018 February 21.

Characteristic	Ever Had an Eye Examination		Eye Examination Within the Past 2 y		Difficulty Obtaining Needed Ocular Care in the Past Year	
	No. (%)[a]	SE	No. (%)[a]	SE	No. (%)[a]	SE
Foreign born	1068 (89.1)	1.2	677 (58.4)	2.0	166 (12.1)	1.1
US born, including territories	42 (100.0)	0	28 (69.3)	7.9	2 (4.1)	2.8
Years lived in US, among those born outside the US						
≤5	286 (90.0)	2.2	164 (54.0)	3.2	54 (16.2)	2.1
6–15	394 (86.3)	2.2	250 (56.1)	3.0	66 (12.2)	1.9
>15	432 (92.3)	1.6	292 (64.7)	3.3	48 (8.0)	1.5
SASH language subscale score[b]	1109 (1.4)	0.03	704 (1.4)	0.03	168 (1.4)	0.05
SASH ethnic social relations subscale score[b]	1015 (2.0)	0.02	604 (2.0)	0.03	149 (2.0)	0.05

Abbreviations: GED, general educational development; SASH, Short Acculturation Scale for Hispanics/Latinos; US, United States.

[a]Number of respondents who answered yes; percentage was weighted to the sample design.

[b]Mean (SE) values of the subscale or score are given instead of percentage (SE) values.

JAMA Ophthalmol. Author manuscript; available in PMC 2018 February 21.

Table 4

Population Prevalence of Eye Care Utilization and Difficulty Receiving Care Among Ocular Study of Latino Participants by Enabling and Need Factors

	Ever Had an Eye Examination		Eye Examination Within the Past 2 y		Difficulty Obtaining Needed Ocular Care in the Past Year	
Characteristic	**No. (%)[a]**	**SE**	**No. (%)[a]**	**SE**	**No. (%)[a]**	**SE**
All participants	1112 (89.5)	1.2	706 (58.8)	2.0	168 (11.7)	1.1
Enabling factors						
Health insurance						
Currently insured	462 (96.1)	1.2	372 (79.1)	2.0	32 (5.7)	1.2
Without insurance up to the past 3 y	101 (82.1)	5.3	67 (50.3)	5.8	23 (18.6)	3.9
Without insurance for >3 y	321 (86.9)	2.5	148 (38.4)	3.3	64 (15.9)	2.0
Never been insured	217 (80.0)	3.0	113 (40.0)	3.8	45 (16.1)	3.0
Vision insurance, separate from health						
Yes	73 (93.9)	5.1	63 (81.3)	5.0	3 (5.9)	3.5
No	1034 (89.2)	1.3	641 (57.1)	2.1	163 (12.0)	1.1
Household income, $						
≤20 000	599 (89.4)	1.4	384 (59.0)	2.3	100 (13.0)	1.5
20 001–40 000	303 (89.9)	2.5	185 (56.6)	3.9	37 (9.8)	1.6
>40 000	86 (88.4)	3.9	62 (61.3)	5.8	10 (7.6)	3.3
Difficulty communicating with a health care professional in the past 12 mo						
No	468 (94.8)	1.4	339 (70.7)	2.6	50 (7.9)	1.4
Yes	50 (94.1)	3.5	34 (60.6)	7.8	8 (13.7)	4.5
Did not see health care professional in past 12 mo	594 (85.1)	1.8	333 (49.0)	2.7	110 (14.6)	1.5
Could not afford needed health care in the previous 12 mo						
Yes	175 (89.6)	2.4	98 (49.3)	5.0	34 (15.4)	2.5
No	937 (89.6	1.3	608 (60.4)	2.1	134 (11.1)	1.2
Need factors						
Self-reported eyesight						
Excellent or good	594 (91.7)	1.4	399 (62.1)	2.7	43 (4.8)	0.8

Characteristic	Ever Had an Eye Examination		Eye Examination Within the Past 2 y		Difficulty Obtaining Needed Ocular Care in the Past Year	
	No. (%)[a]	SE	No. (%)[a]	SE	No. (%)[a]	SE
Fair	424 (88.4)	1.9	253 (55.5)	2.4	85 (17.0)	2.0
Poor or very poor	93 (81.5)	5.1	53 (52.0)	6.1	40 (31.5)	5.0
NEI-VFQ composite score[b]	1112 (85.6)	0.7	706 (85.6)	0.8	168 (71.9)	1.5
SF-12v2 physical health score[b]	1090 (48.0)	0.5	692 (46.8)	0.7	161 (47.1)	1.4
SF-12v2 mental health score[b]	1090 (48.8)	0.5	692 (48.2)	0.6	161 (47.5)	0.9
Self-reported chronic diseases						
None	447 (83.9)	2.2	255 (48.4)	2.9	75 (13.4)	1.6
1	414 (91.4)	1.4	264 (58.8)	2.8	63 (12.2)	1.7
≥2	251 (96.5)	1.2	187 (76.3)	2.9	30 (8.2)	1.9
Smoking status						
Never	585 (90.7)	1.5	362 (58.1)	2.7	90 (12.0)	1.4
Former	278 (88.3)	2.6	179 (58.9)	3.5	35 (10.0)	2.2
Current	243 (88.3)	2.2	162 (60.4)	3.8	43 (13.4)	1.8
NIAAA risky alcohol use						
Nondrinker	415 (91.1)	1.9	278 (64.4)	2.9	56 (10.3)	1.5
Low-risk drinker	404 (88.2)	2.2	241 (54.6)	3.2	57 (10.3)	1.8
At-risk drinker	49 (83.5)	7.2	30 (58.1)	9.6	13 (18.9)	5.6
Meets 2008 physical activity guidelines						
Yes	598 (87.3)	1.8	374 (56.7)	2.5	92 (11.0)	1.3
No	511 (92.1	1.3	330 (61.3)	3.0	76 (12.6)	1.8

Abbreviations: NEI-VFQ, National Eye Institute Visual Function Questionnaire; NIAAA, National Institute on Alcohol Abuse and Alcoholism; SF-12v2, 12-item Short Form.

[a]Number of respondents who answered yes; percentage was weighted to the sample design.

[b]Mean (SE) values of the subscale or score are given instead of percentage (SE) values.

Table 5

Final Models for the 3 Outcomes: the Ocular Study of Latinos

Characteristic	OR (95% CI)[a]		
	Ever Had an Eye Examination	Eye Examination Within the Past 2 y	Difficulty Obtaining Needed Ocular Care in the Past Year
Predisposing factors, traditional			
Age group, y			
40–54	1 [Reference]	1 [Reference]	
55–64	3.04 (1.47–6.31)	1.29 (0.89–1.86)	
≥65	5.38 (0.48–59.66)	5.17 (2.18–12.27)	
Sex			
Female	1 [Reference]	1 [Reference]	
Male	0.31 (0.18–0.53)	0.56 (0.41–0.76)	
Educational attainment			
No high school degree or GED	1 [Reference]		
High school degree or GED	2.06 (1.02–4.13)		
Greater than a high school degree or GED	4.20 (2.12–8.30)		
Predisposing factors, vulnerable			
Years lived in US, among those born outside the US			
≤5			1 [Reference]
6–15			0.69 (0.36–1.32)
>15			0.42 (0.21–0.82)
Enabling factors			
Health insurance			
Currently insured	1 [Reference]	1 [Reference]	1 [Reference]
Without insurance up to the past 3 y	0.33 (0.09–1.13)	0.50 (0.27–0.93)	4.85 (1.93–12.18)
Without insurance for >3 y	0.51 (0.16–1.64)	0.21 (0.14–0.33)	4.98 (2.71–9.17)
Never been insured	0.19 (0.07–0.53)	0.22 (0.15–0.33)	3.72 (1.75–7.93)
Need factors			
Self-reported eyesight			
Excellent or good	1 [Reference]		1 [Reference]
Fair	0.72 (0.40–1.27)		2.18 (1.34–3.54)
Poor or very poor	0.26 (0.12–0.56)		3.00 (1.48–6.11)
NEI-VFQ composite score	0.96 (0.94–0.99)		0.95 (0.94–0.97)
SF-12v2 physical health score	0.97 (0.95–1.00)	0.98 (0.97–1.00)	

Abbreviations: GED, general educational development; NEI-VFQ, National Eye Institute Visual Function Questionnaire; OR, odds ratio; SF-12v2, 12-item Short Form Health Survey; US, United States.

[a]Odds ratio and 95% CI are from survey sampling weighted logistic regression. Empty cells indicate that the variable was not significant in the final model.