Visual Acuity Impairment and Mortality in US Adults

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Objective: To examine the associations between reported visual impairment (VI) and mortality in a nationally representative sample of US adults.

Methods: The National Health Interview Survey is a multistage probability survey of the US civilian population. Adults within households were administered questions about VI and selected eye diseases (n=116 796). Mortality linkage data with more than 96% of the 1986-1994 survey participants were available through December 31, 1997. Statistical analyses included Cox proportional hazards regression analysis.

Main Outcome Measures: All-cause, cardiovascular disease–related, and cancer-related mortality.

Results: A total of 327 participants (0.3%) had severe bilateral VI; an additional 4754 (4%) had some VI and/or severe VI in at least one eye. Mortality linkage identified 8949 deaths. After controlling for survey design, age, race, marital status, educational level, reported health status, glaucoma, cataract, and retinopathy, women, but not men, with reported severe bilateral VI were at a significantly increased risk of death relative to their counterparts without VI (hazard ratio [95% confidence interval], 2.21 [1.61-3.02] and 1.33 [0.96-1.84], respectively); risk of mortality was also slightly but significantly elevated in women and men with some reported VI compared with those reporting no VI. Similar patterns of associations were found for cardiovascular disease–related mortality. Risk of cancer-related mortality was not associated with VI.

Conclusion: Reported severe bilateral VI and, to a smaller extent, less severe VI are associated with an increased risk of all-cause mortality and cardiovascular disease–related mortality in US women; there is weaker evidence for an association between VI and mortality in US men.

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AN INCREASED risk of mortality among adults with glaucoma,[1-3] retinopathy,[1,4-8] and cataract[1,9-19] has been reported in the literature. Visual impairment (VI) has also been associated with reduced survival in several population-based surveys.[1,7,8,12,20-25] Although some studies[5,7] have examined associations between VI and mortality risk among adults with selected eye diseases, only 2 publications[7,12] have examined associations between VI and mortality while controlling for the presence of disabling eye disease. In the Wisconsin Epidemiologic Study of Diabetic Retinopathy, visual acuity and severity of retinopathy were independently associated with reduced survival in participants with diabetes mellitus who began taking insulin at 30 years or older.[7] Cataract and VI were independently associated with an increased risk of mortality in the Blue Mountains Eye study.[12]

To our knowledge, no study has examined the relationship between VI and risk of mortality while simultaneously controlling for the presence of the 3 major eye diseases associated with reduced survival (glaucoma, retinopathy, and cataract). Such analyses are needed to determine if VI is an independent predictor of mortality. A lack of association between VI and mortality after statistical adjustment for the presence of these major eye diseases may suggest common risk factors for eye disease and reduced survival (eg, selected cardiovascular risk factors). The present study examines the association of reported VI and survival in adults 18 years and older while controlling for eye diseases, using data from a nationally representative sample of the US population.

METHODS

STUDY POPULATION AND DESIGN

The National Health Interview Survey (NHIS) is conducted annually by the National Center for Health Statistics (NCHS).[26] The NHIS is a continuous, multipurpose and multistage, probability-area survey of the US civilian noninstitutionalized population living at addressed dwellings. Each year, approximately

50 000 households are selected to participate in the NHIS. The response rate has ranged from 95% to 98%. For the present analyses, complete data, including survival status, were available for 116 796 adult participants of the 1986-1994 NHIS.

ASSESSMENT OF VI AND SELECTED EYE DISEASES

A random 1 of 6 sample households were administered a chronic condition list that included questions about glaucoma, cataracts, and a detached retina or any other condition of the retina. Participants were also asked to indicate if they or any of their family members had blindness in one or both eyes and any other trouble seeing with one or both eyes even when wearing glasses. In most cases (63%), the participants themselves answered all the questions, and for the remaining participants, the responses were obtained from their relatives or other proxies. For simplicity, in the present study, self- or proxy-reported data are referred to as "reported." Participants were also asked to name conditions and impairments that were related to the following: (1) activity limitation in the previous 2 weeks and the previous 12 months, (2) a health care visit in the previous 2 weeks, and (3) hospital stays in the previous 12 months. A series of standardized questions was used to detail the name, characteristics, cause, onset, and effects of each reported condition and impairment.[27] Trained medical coders used this information to generate an *International Classification of Diseases, Ninth Revision (ICD-9)*, code for each condition.[28,29] The following *ICD-9* codes were included in the present analyses: glaucoma, codes 365.0 to 365.9; retinopathy, codes 361.0 to 362.9; and cataract, codes 366.0 to 366.9. Specially designed codes were used by the NCHS to classify VI: (1) blind in both eyes, (2) VI in both eyes, (3) blind in one eye and visually impaired in the other eye, and (4) blind or visually impaired in one eye only (other eye, good vision or not mentioned). Adults coded as blind in both eyes were considered to have severe bilateral VI. Consistent with the standard reporting approach used by the NCHS, participants falling into categories 2 through 4 were grouped into a single category—some VI.[30]

MORTALITY LINKAGE

Beginning with the survey year 1986, information was collected by the NCHS to perform a mortality follow-up through linkage with the National Death Index. Information was obtained on the date and underlying cause of death. The latter was recoded and reported using *ICD-9*.[29] The mortality linkage is complete through December 31, 1997, and includes the 1986-1994 NHIS years.[31] A matching algorithm was used to assign a numerical value indicating the probability of a true match based on characteristics recorded on the death certificate and collected during the survey (eg, social security number, name, sex, birth month, birth year, and state of birth). We used the values recommended by the NCHS to determine which potential matches were classified as true matches.

For the present study, cause-specific mortality analyses were limited to cancer (*ICD-9* codes 140-239) and cardiovascular disease (CVD) (*ICD-9* codes 390-448).

ANALYSES

Because of the complex sample survey design, all survival analyses were completed using the Software for the Statistical Analysis of Correlated Data (SUDAAN) package to take into account sample weights and design effects.[32] Sample weights were adjusted to account for the aggregation of data over multiple survey years.[33] Cox proportional hazards regression analyses were performed using the Proc Survival program in SUDAAN.[32] Hazard ratios (HRs) and corresponding 95% confidence intervals (CIs) are reported. Hazard ratios with corresponding 95% CIs that do not include 1.00 are considered statistically significant. A series of models were first run to determine if there were any significant interactions between covariates (age, sex, etc) and reported VI status in the prediction of mortality. The only statistically significant interactions were those for sex. Therefore, sex-specific mortality findings are reported in the "Results" section.

RESULTS

Survival status was not available for a small percentage of participants with missing information necessary for linkage with National Death Index records. **Table 1** presents the sociodemographic characteristics, reported health status, reported eye diseases, and VI status of study participants with and without available survival status information. With the exception of educational level, all χ^2 tests were statistically significant. Compared with subjects with available survival status, subjects without available survival status were more likely to report their race as "other" and to report not being married. The age and sex distributions, and the distributions of reported health status and level of education, were similar in those with vs those without available survival status. Compared with participants without available survival status, participants with available survival status were slightly less likely to report no eye disease and had a slightly higher percentage of some VI.

Table 2 presents the sociodemographic characteristics and reported health status of participants reporting no VI, some VI, and severe bilateral VI. All χ^2 tests comparing the overall distribution of these measures by VI status were statistically significant ($P<.05$). Participants with reported severe bilateral VI were much more likely to be older than 65 years relative to participants reporting none and those reporting some VI. Men were more likely to report some VI relative to women, whereas women were more likely to report severe bilateral VI relative to men. There was little variation in the distribution of race across reported VI categories. Participants with reported severe bilateral VI were less likely to be married than participants reporting some or no VI. The proportion of participants with less than a 12th grade education was almost twice as high among those reporting severe bilateral VI vs those reporting no VI. Reported health status varied considerably across VI categories. Among participants reporting no VI, 3% rated their health as poor; among participants reporting some VI or severe bilateral VI, these percentages were 13% and 25%, respectively.

An examination of potential interactions between covariates and visual status revealed sex-specific differences in mortality across categories of VI (**Figure**). Women with no VI were less likely to have died relative to men with no VI (6% vs 8%); however, women with VI were more likely to have died relative to men with VI. Because of this interaction, all mortality analyses were completed separately among male and female participants.

Table 3 presents the sex-specific HRs and corresponding 95% CIs for death from all causes, CVD, and cancer, adjusted for the following: (1) the sample sur-

Table 1. Sociodemographic Characteristics, Reported Eye Disease, and Visual Impairment Status by Availability of Follow-up Status

Characteristic	Total	Survival Status*	
		Available	Unavailable
Age, y†			
18-44	**68272**	66136 (57)	2136 (54)
45-64	**32151**	30982 (27)	1169 (30)
≥65	**20312**	19678 (17)	634 (16)
Sex‡			
Male	**55456**	53580 (46)	1876 (48)
Female	**65279**	63216 (54)	2063 (52)
Race†			
Aleut, Eskimo, or American Indian	**33847**	32677 (28)	1170 (30)
Asian or Pacific Islander	**7454**	7175 (6)	279 (7)
Black	**11313**	11011 (9)	302 (8)
White	**64555**	62921 (54)	1634 (41)
Other	**3566**	3012 (3)	554 (14)
Marital status†			
Married	**76824**	74510 (64)	2314 (59)
Single, widowed, separated, or divorced	**43911**	42286 (36)	1625 (41)
Education, grade			
≤11th	**26850**	26311 (23)	539 (16)
12th	**45820**	44546 (38)	1274 (38)
>12th	**46627**	45125 (39)	1502 (45)
Reported health status†			
Excellent	**39747**	38379 (33)	1368 (36)
Very good	**34145**	33079 (28)	1066 (28)
Good	**30644**	29643 (25)	1001 (26)
Fair	**11270**	10998 (9)	272 (7)
Poor	**4459**	4321 (4)	138 (4)
Reported eye disease status†			
No reported glaucoma, cataract, or retinopathy	**114843**	111028 (95)	3815 (97)
Glaucoma only	**1165**	1140 (1)	25 (1)
Cataract only	**3608**	3541 (3)	67 (2)
Retinopathy only	**549**	531 (<1)	18 (<1)
≥2 Eye diseases	**570**	556 (<1)	14 (<1)
Reported visual impairment†			
None	**115531**	111715 (96)	3816 (97)
Some	**4870**	4754 (4)	116 (3)
Severe bilateral	**334**	327 (<1)	7 (<1)

*Data are given as number (percentage) of participants. Percentages are based on the total for each category, and may not total 100 because of rounding.
†χ^2 Values comparing those with available vs those with unavailable vital status: $P<.001$.
‡$P = .03$.

vey design, (2) the survey design plus reported eye disease, (3) the survey design plus reported eye disease and age, and (4) all previously mentioned measures plus race, marital status, educational level, and reported health status. Controlling only for the complex sample survey design, HRs indicated that, compared with participants who reported no VI, the risk of mortality was significantly higher for those reporting some VI and those reporting severe bilateral VI, although, in both cases, these associations were stronger among women than men. In addition, controlling for reported eye disease and reported eye disease and age lowered these risks, but the HRs remained significantly elevated for men and women reporting some VI and those reporting severe bilateral VI. These risks remained significant among women after further controlling for the remaining covariates; mortality risk was slightly, but significantly, elevated in men with some reported VI. In the full multivariate model, only women reporting either some VI or severe bilateral VI were at an increased risk of death due to CVD. After controlling for all covariates, there was no significant association between risk of mortality due to cancer and reported VI or severe bilateral VI in either women or men.

COMMENT

Results of these analyses indicate that reported severe bilateral VI and, to a lesser extent, reported milder VI are independent predictors of reduced overall survival and increased CVD-related mortality in women; however, the evidence to support an association between VI and mortality in men was weaker. This finding for women is significant after adjusting for reported eye diseases, such as glaucoma, cataract, and nonspecific retinopathy, and other covariates, including age, race, marital status, educational level, and reported health status. Therefore, in the present analysis, reported VI seems to be an independent predictor of increased mortality in women. The reason for this sex-specific finding is unclear. A limited number of studies[3,4,6,22] of VI, eye disease, and mortality that reported sex-specific analyses presented larger mortal-

Table 2. Sociodemographic Characteristics and Reported Health Status by Reported Visual Impairment (VI) Status

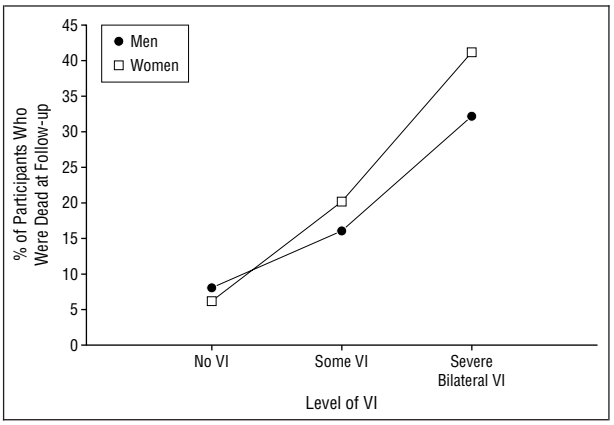
Characteristic	Total	Participants Reporting*		
		No VI	Some VI	Severe Bilateral VI
Age, y				
18-44	**66 136**	64 198 (57)	1862 (39)	76 (23)
45-64	**30 982**	29 513 (26)	1394 (29)	75 (23)
≥65	**19 678**	18 004 (16)	1498 (32)	176 (54)
Sex				
Male	**53 580**	50 632 (45)	2802 (59)	146 (45)
Female	**63 216**	61 083 (55)	1952 (41)	181 (55)
Race				
Aleut, Eskimo, or American Indian	**32 677**	31 187 (28)	1397 (29)	93 (28)
Asian or Pacific Islander	**7175**	6901 (6)	258 (5)	16 (5)
Black	**11 011**	10 561 (9)	418 (9)	32 (10)
White	**62 921**	60 154 (54)	2586 (54)	181 (55)
Other	**3012**	2912 (3)	95 (2)	5 (2)
Marital status				
Married	**74 510**	71 447 (64)	2900 (61)	163 (50)
Single, widowed, separated or divorced	**42 286**	40 268 (36)	1854 (39)	164 (50)
Education, grade				
≤11th	**26 311**	24 641 (22)	1534 (32)	136 (43)
12th	**44 546**	42 819 (39)	1637 (35)	90 (28)
>12th	**45 125**	43 477 (39)	1557 (33)	91 (29)
Reported health status				
Excellent	**38 379**	37 399 (34)	940 (20)	40 (12)
Very good	**33 079**	31 945 (29)	1089 (23)	45 (13)
Good	**29 643**	28 336 (25)	1227 (26)	80 (24)
Fair	**10 998**	10 056 (9)	863 (18)	79 (24)
Poor	**4321**	3620 (3)	621 (13)	80 (24)

*Data are given as number (percentage) of participants. Percentages are based on the total for each category, and may not total 100 because of rounding. All χ^2 values comparing the 3 VI categories are significant ($P<.05$).

ity risk estimates in men relative to women. These studies were much smaller (range of N=353-3091) and had a higher average participant age at enrollment when compared with the present NHIS analysis. However, other eye disease studies[19,34] have reported larger mortality risk estimates in women compared with men. Furthermore, the Atherosclerosis Risk in Communities Study (N=9648)[34] found that retinal arteriolar narrowing is related to risk of coronary heart disease in women but not in men. Additional research is needed to determine the associations between VI and mortality in men and women.

There are several advantages to the use of the NHIS to examine associations between reported VI and mortality. The NHIS is designed to be representative of the US population; only institutionalized and military groups have been omitted from direct sampling. The ability to aggregate data over 9 survey years allowed for the identification of more than 300 participants with reported severe bilateral VI and more than 4700 participants reporting some VI, making this analysis the largest mortality study, to our knowledge, to examine associations between reported VI and mortality. Finally, survey response rates were excellent (95%-98%) and determination of vital status was available for more than 96% of the participants.

Because severe bilateral VI is relatively rare, most studies of VI and mortality had an insufficient number of participants with severe VI to determine if they were at increased risk of mortality. An increased risk of mortality among adults with a best-corrected visual acuity of 20/200 or worse was found among participants of the Wisconsin Epidemiologic Study of Diabetic Retinopathy.[1] Analyses were stratified into participants with younger-onset vs older-onset diabetes mellitus (ie, onset at <30 vs ≥30 years of age). In most analyses, associations between severe VI and mortality were stronger among participants with a best-corrected visual acuity of 20/200 or worse than among participants with less severe VI (20/40-20/160). In multivariate models controlling for age, sex, and numerous risk factors (eg, hypertension and smoking), compared with the non–visually



Unadjusted rates for all-cause mortality. There is a significant ($P<.001$) interaction between sex and categories of visual impairment (VI).

Table 3. Sex-Specific All-Cause, Cardiovascular Disease–Related, and Cancer-Related Mortality Data for Participants With vs Without Reported Visual Impairment*

Visual Impairment Status by Sex	Model Adjusted for			
	Sample Design	Sample Design and Reported Eye Diseases†	Sample Design, Age, and Reported Eye Diseases†	Sample Design, Reported Diseases, and All Covariates†‡
All-Cause Mortality				
Men				
No visual impairment§	1.00	1.00	1.00	1.00
Some visual impairment	2.11 (1.91-2.34)	1.62 (1.44-1.81)	1.37 (1.21-1.54)	1.14 (1.01-1.29)
Severe bilateral visual impairment	4.71 (3.54-6.26)	2.25 (1.59-3.19)	1.82 (1.31-2.54)	1.33 (0.96-1.84)
Women				
No visual impairment§	1.00	1.00	1.00	1.00
Some visual impairment	3.64 (3.28-4.05)	2.18 (1.93-2.47)	1.77 (1.58-1.99)	1.35 (1.20-1.52)
Severe bilateral visual impairment	7.69 (5.95-9.93)	3.64 (2.71-4.90)	2.89 (2.22-3.77)	2.21 (1.61-3.02)
Cardiovascular Disease–Related Mortality				
Men				
No visual impairment§	1.00	1.00	1.00	1.00
Some visual impairment	2.19 (1.83-2.62)	1.64 (1.34-2.01)	1.35 (1.11-1.66)	1.11 (0.90-1.37)
Severe bilateral visual impairment	5.20 (3.29-8.20)	2.36 (1.47-3.78)	1.81 (1.11-2.97)	1.27 (0.78-2.07)
Women				
No visual impairment§	1.00	1.00	1.00	1.00
Some visual impairment	4.13 (3.56-4.80)	2.13 (1.79-2.53)	1.75 (1.48-2.06)	1.36 (1.15-1.61)
Severe bilateral visual impairment	10.24 (7.35-14.26)	3.97 (2.72-5.79)	3.16 (2.20-4.54)	2.53 (1.68-3.81)
Cancer-Related Mortality				
Men				
No visual impairment§	1.00	1.00	1.00	1.00
Some visual impairment	1.77 (1.43-2.17)	1.36 (1.10-1.67)	1.14 (0.93-1.40)	1.01 (0.82-1.25)
Severe bilateral visual impairment	3.45 (1.81-6.59)	1.68 (0.85-3.32)	1.37 (0.71-2.64)	1.13 (0.58-2.19)
Women				
No visual impairment§	1.00	1.00	1.00	1.00
Some visual impairment	2.24 (1.71-2.94)	1.64 (1.20-2.22)	1.31 (0.98-1.75)	1.04 (0.78-1.39)
Severe bilateral visual impairment	2.05 (0.83-5.08)	1.29 (0.50-3.31)	1.03 (0.41-2.57)	0.82 (0.32-2.06)

*Data are given as hazard ratio (95% confidence interval).
†Reported eye diseases include cataract, glaucoma, retinopathy, and 2 or more of these eye diseases.
‡All covariates include age, race, martial status, educational level, and reported health status.
§Referent.

impaired, participants with younger- and older-onset diabetes mellitus and severe VI were at approximately a 2-fold increased risk of reduced survival (HR, 1.94-2.14). Severe VI was associated with an increased risk of CVD-related mortality in younger-, but not older-onset diabetes mellitus (HR [95% CI], 3.21 [1.58-6.51] and 1.22 [0.57-2.61], respectively). Severe VI was not associated with cancer-related mortality in either diabetic group.

Only 2 population-based studies of the general adult population have reported associations between severe VI and mortality. In both studies, associations between VI and mortality were stronger for participants with less severe impairment. In the Melbourne Vision Impairment Project, the odds of death for participants with a visual acuity of 20/200 or worse compared with participants with normal vision was 1.41 after controlling for age, sex, country of birth, hypertension, and arthritis.[23] The group with the greatest risk of death included participants with an acuity between 20/40 and 20/60 (odds ratio, 5.48; 95% CI, 1.78-16.90). A study[23] of adults 75 years and older residing in a single English community found a reduced risk of mortality of participants with severe VI (worse than 20/200); however, this age- and sex-adjusted association was not statistically significant (odds ratio, 0.35; 95% CI, 0.08-1.57). The group with the greatest risk of mortality had a VI of 20/40 to 20/60 (odds ratio, 1.83; 95% CI, 0.93-3.63). It is unclear why results from this study and the Melbourne Vision Impairment Project found the greatest mortality risk for moderately visually impaired rather than severely visually impaired participants. One possibility is that the small number of severely visually impaired subjects in both studies ($n<38$) led to unstable risk estimates.

Several mechanisms have been postulated to account for associations between eye disease, VI, and mortality. These mechanisms include the following: (1) adverse treatment effects for eye diseases, (2) exposure to factors known to increase the risk of these conditions and major cause-specific deaths (eg, CVD), (3) aging, and (4) impaired psychosocial functioning. Egge and Zahl[3] reported that the long-term survival experience of hospitalized patients with glaucoma who had a history of acetazolamide use was lower relative to patients not using this antiglaucoma medication. Glaucoma medications can also cause severe adverse effects, including congestive heart failure (topical cholinergic agonists) and increased blood pressure and tachyarrhythmias (topical adrenergic agonists).[35]

Risk factors for CVD are also thought to play a role in the development and progression of major disabling eye conditions. For example, diabetes mellitus, high blood pressure, and smoking are each associated with one or

more disabling eye conditions.[36-38] However, many of the previously mentioned mortality studies controlled for one or more of these risk factors.* The finding that eye disease is associated with reduced survival after controlling for cardiovascular and other risk factors suggests that exposure to these conditions cannot fully account for the associations between eye diseases and reduced survival.*

Other investigators[3,9,11,13,17] have postulated that associations between eye disease and reduced survival reflect poor health or accelerated aging. Self-rated health, which is itself a predictor of reduced survival in numerous studies, including the NHIS,[39,40] was included in the present multivariate statistical models as a partial control for overall health status. It is difficult to refute or confirm the hypothesis that eye diseases such as cataract serve as a marker of generalized cellular aging. Additional work in the development of valid aging biomarkers will be necessary to further pursue the hypothesis that advanced eye disease and accompanying VI reflect accelerated aging.

Finally, associations between VI and mortality could be mediated by changes in psychosocial functioning. VI increases the risk of impaired activities of daily living,[23,41,42] depression,[42,43] and social isolation.[44] Each of these functional status indicators is associated with either reduced overall survival or increased risk of cause-specific mortality.[45-47]

As indicated earlier, the present study is the first, to our knowledge, to examine associations between reported VI and survival while controlling for the 3 major eye diseases associated with reduced survival. A question about macular degeneration was not included in the NHIS; however, this condition does not seem to be associated with reduced survival.[1,20] Results from the present analyses suggest the possibility that VI is associated with reduced survival and that this association is independent of the presence of glaucoma, cataract, and retinopathy. However, because the NHIS did not grade the severity of eye disease, it is possible that the present associations between VI and mortality reflect, in part, the severity of eye disease. Nevertheless, these findings suggest the need to develop and test more sophisticated models of mortality using data from future longitudinal studies of eye disease and VI that also include assessment of other functional indicators, such as social isolation, depression, and activities of daily living.

Several study limitations should be noted. The NHIS does not annually assess important risk factors, including smoking status, which is associated with disabling eye conditions such as cataract.[36] To our knowledge, the NCHS has never published a study that validated reported chronic conditions against standardized physician-confirmed diagnoses. Because of the self- or proxy-reported nature of ascertainment of all ophthalmic conditions in the NHIS, there is likely some misclassification of reported VI, glaucoma, cataract, and retinopathy. However, our findings are consistent with previous reports[12,20,24] of slight elevations in mortality among visually impaired adults.

Only one standardized VI question was administered in the NHIS. However, respondents who reported difficulty seeing in one or both eyes even when wearing glasses were then asked a series of questions to determine if they had discussed the condition with their health care provider, whether their health care provider assigned a diagnosis or named the condition, and whether the impairment affected the left, the right, or both eyes. These questions were also asked if eye conditions or VIs were mentioned earlier in the interview. Medical coders used this information to determine the level of VI. Thus, determination of VI in the NHIS is unique when compared with other self-reported indexes of visual functioning in which single items or a standardized series of items are used to determine the presence and extent of VI.

Validation studies[48,49] conducted by the NCHS and others suggest that proxy reports lead to slightly lower prevalence estimates of chronic conditions when compared with reports obtained directly from respondents. To address this potential limitation, we repeated our mortality analyses including only the 63% of NHIS participants who were interviewed directly. Findings indicate similar, but slightly lower, HR estimates when compared with the estimates given in Table 3. For example, the all-cause HR for women with severe bilateral VI interviewed directly was 2.08; the HR that included direct and proxy responses was 2.21.

To summarize, after controlling for the effects of survey design, the presence of reported glaucoma, cataract, and retinopathy, age, race, marital status, educational level, and reported health status, there is more than a 2-fold increased risk in all-cause mortality and approximately a 2.5-fold increased risk of CVD-related mortality in women with reported bilateral severe VI. A slight 35% to 36% elevation of all-cause mortality and CVD-related mortality risk was found for women reporting less severe VI.

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Correction

Error in Tables. In the Epidemiology and Biostatistics article titled "Visual Acuity Impairment and Mortality in US Adults," published in the November issue of the ARCHIVES (2002;120:1544-1550), **Table 1** and **Table 2** contained errors. The correct race distributions are printed here. These errors had no measurable impact on the hazard ratios adjusted for race that were presented in Table 3. In no case did the corrected estimates vary by more than 0.01 units for the hazard ratios and corresponding 95% confidence intervals.

In addition, in Table 1, the *P* value for Education should have been indicated as $P<.001$.

Table 1. Sociodemographic Characteristics, Reported Eye Disease, and Visual Impairment Status by Availability of Follow-up Status

		Survival Status*	
Characteristic	Total	Available	Unavailable
Race†			
Aleut, Eskimo, or American Indian	**898**	879 (<1)	19 (<1)
Asian or Pacific Islander	**3070**	2931 (3)	139 (4)
Black	**16483**	15996 (14)	487 (12)
White	**97652**	94867 (81)	2785 (71)
Other	**2632**	2123 (2)	509 (13)

*Data are given as number (percentage) of participants. Percentages are based on the total for each category, and may not total 100 because of rounding.

†χ^2 Value comparing those with available vs those with unavailable survival status: $P<.001$.

Table 2. Sociodemographic Characteristics and Reported Health Status by Reported Visual Impairment (VI) Status

		Participants Reporting*		
Characteristic	Total	No VI	Some VI	Severe Bilateral VI
Race†				
Aleut, Eskimo or American Indian	**879**	835 (<1)	43 (<1)	1 (<1)
Asian or Pacific Islander	**2931**	2884 (3)	46 (1)	1 (<1)
Black	**15996**	15320 (14)	629 (13)	47 (14)
White	**94867**	90641 (81)	3953 (83)	273 (84)
Other	**2123**	2035 (2)	83 (2)	5 (2)

*Data are given as number (percentage) of participants. Percentages are based on the total for each category, and may not total 100 because of rounding.

†χ^2 Value comparing the 3 VI categories are significant ($P<.05$).