

Age-Related Eye Diseases and Visual Impairment Among U.S. Adults

Chiu-Fang Chou, DrPH, Mary Frances Cotch, PhD, Susan Vitale, PhD, MHS, Xinzhi Zhang, MD, PhD,
Ronald Klein, MD, MPH, David S. Friedman, MD, PhD, MPH, Barbara E.K. Klein, MD, MPH,
Jinan B. Saaddine, MD, MPH

Appendix A

Age-standardized prevalence of visual impairment among those aged ≥40 years

	Visual impairment (n=639), % (95% CI)	p-value ^a	p for trend ^b	Visual impairment not due to refractive error (n=185), % (95% CI)	p-value ^a	p for trend ^b
Total	7.5 (6.9, 8.1)			2.0 (1.7, 2.3)		
Age-related macular degeneration		0.095			0.002	
No	5.8 (5.2, 6.4)			0.8 (0.6, 1.1)		
Yes	8.9 (5.9, 13.3)			2.2 (1.5, 3.2)		
Glaucoma		0.056			0.112	
No	5.8 (5.2, 6.6)			1.0 (0.7, 1.3)		
Yes	20.2 (9.2, 38.6)			12.4 (3.7, 34.3)		
Diabetic retinopathy		0.001			0.045	
No	6.3 (5.6, 7.0)			1.2 (1.03, 1.5)		
Yes	14.5 (10.4, 19.8)			3.5 (1.8, 6.6)		
Gender		0.641			0.692	
Female	7.6 (6.6, 8.7)			2.0 (1.6, 2.4)		
Male	7.2 (6.4, 8.2)			1.9 (1.5, 2.4)		
Race/ethnicity		0.001			0.237	
Non-Hispanic white	6.3 (5.5, 7.2)			1.7 (1.4, 2.0)		
Non-Hispanic black	11.3 (9.7, 13.2)			3.1 (2.3, 4.3)		
Mexican American	13.2 (10.3, 16.8)			4.0 (2.4, 6.5)		
Other	10.9 (8.1, 14.3)			2.6 (1.5, 4.4)		
Education		<0.001	<0.001		<0.001	<0.001
> high School	5.9 (5.0, 6.9)			1.3 (0.9, 1.8)		
High School	7.2 (6.0, 8.6)			1.7 (1.3, 2.3)		
< high School	11.8 (9.9, 14.1)			3.4 (2.6, 4.3)		
Insurance coverage^c		0.001			0.013	
Uninsured	17.2 (12.0, 24.0)			9.1 (4.8, 16.3)		
Insured	6.9 (6.3, 7.5)			1.9 (1.6, 2.2)		
BMI^d		0.248	0.577		0.991	0.048
Normal	8.0 (6.5, 9.7)			1.6 (1.2, 2.1)		
Overweight	6.9 (5.8, 8.3)			1.8 (1.4, 2.4)		

	Visual impairment (n=639), % (95% CI)	p-value ^a	p for trend ^b	Visual impairment not due to refractive error (n=185), % (95% CI)	p-value ^a	p for trend ^b
Obese	7.5 (6.6, 8.5)			2.4 (1.8, 3.2)		
Smoking status		0.584	0.169		0.33	0.367
Never smoker	7.3 (6.5, 8.2)			1.9 (1.5, 2.5)		
Past smoker	7.5 (6.0, 9.3)			1.7 (1.3, 2.3)		
Current smoker	9.4 (7.0, 12.5)			2.7 (1.5, 4.9)		
Hypertension^e		0.585			0.898	
No	7.5 (6.6, 8.5)			1.9 (1.4, 2.5)		
Yes	7.8 (7.0, 8.8)			2.0 (1.6, 2.4)		
Cardiovascular disease^f		0.053			0.176	
No	6.9 (6.2, 7.7)			1.8 (1.5, 2.1)		
Yes	9.6 (7.2, 12.6)			2.5 (1.7, 3.8)		

Note: The estimated population of those with visual impairment is 8.9 million. The estimated population of those with visual impairment that is not due to refractive error is 2.2 million. Visual impairment is defined as presenting visual acuity in the better-seeing eye worse than 20/40. Visual impairment not due to refractive error is defined as visual impairment after autorefractive correction. All prevalence estimates are age-standardized to the U.S. 2000 Census population.

^a Based on chi-square test of within-characteristic categories

^b Test for trend

^c Insurance coverage included health insurance obtained through employment or provided through government programs such as Medicare and Medicaid.

^d BMI was classified as <25.0 for normal, 25.0–29.9 for overweight, or ≥30.0 for obese.

^e Hypertension was defined as systolic blood pressure ≥140, diastolic blood pressure ≥90, or as being on hypertension medication.

^f Cardiovascular disease was defined as having self-reported heart attack, heart failure, or stroke.

Data source: National Health and Nutrition and Examination Survey (NHANES), 2005–2008

Appendix B

Ocular conditions present in those with visual impairment not due to refractive error among people aged ≥ 40 years with visual impairment

	%
AMD ^a only	31.1
AMD and glaucoma	1.9
Glaucoma only	2.8
Diabetic retinopathy only	13.1
Other ^b	51.1

^aAge-related macular degeneration (AMD) includes early AMD and late AMD cases.

^bOther could include eye injury or other diseases such as cataracts.

Data source: National Health and Nutrition and Examination Survey (NHANES)