

Vision Problems in the U.S.

Prevalence of Adult Vision Impairment and Age-Related Eye Disease in America



2008 Update to the Fourth Edition



100 Years. Our Vision Is Vision.™

Founded in 1908, Prevent Blindness America is the nation's leading volunteer eye health and safety organization dedicated to fighting blindness and saving sight. Focused on promoting a continuum of vision care, Prevent Blindness America touches the lives of millions of people each year through public and professional education, advocacy, certified vision screening, training, community and patient service programs and research.

These services are made possible through the generous support of the American public. Together with a network of affiliates, divisions and chapters, Prevent Blindness America is committed to eliminating preventable blindness in the U.S.



The National Eye Institute (NEI), a component of the National Institutes of Health (NIH), supports and conducts research aimed at improving the prevention, treatment, and rehabilitation of diseases that affect the eye and vision. The NIH, a Federal government agency, is part of the U.S. Department of Health and Human Services. Research is conducted on the NIH campus in Bethesda, Maryland, and at universities, medical schools, hospitals, and other institutions throughout the United States and abroad.

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Introduction Vision impairment is one of the most feared disabilities. Although it is believed that half of all blindness can be prevented, the number of people in America who suffer from vision loss continues to increase.

The leading causes of vision impairment and blindness in the United States are primarily age-related eye diseases. The number of Americans at risk for age-related eye diseases is increasing as the baby boomer generation ages. These conditions, including age-related macular degeneration, cataract, diabetic retinopathy and glaucoma, affect more Americans than ever before. Disturbingly, the number of Americans with age-related eye disease and the vision impairment that results is expected to double within the next three decades. As of the year 2004, there were estimated to be more than 130 million people in the United States in this age group. The table on the following pages provides an overview of the U.S. population age 40 and older by race and sex.

Awareness of vision impairment and its causes is important to all of us.

We must be aware of our own personal risk of vision loss and take steps to preserve and protect our precious eyesight. Our communities must be informed so they may prepare the treatment and rehabilitation services that will be needed. Most important, our nation's leaders must comprehend the scope of eye problems in our country so that adequate government resources can be devoted to research, treatment and prevention.

Vision Problems in the U.S., the 2008 Update to the Fourth Edition, provides useful estimates of the prevalence of sight-threatening eye diseases in Americans age 40 and older. This report includes information on the prevalence of blindness and vision impairment, significant refractive error, and the four leading eye diseases affecting older Americans: age-related macular degeneration, cataract, diabetic retinopathy and glaucoma.

The numbers in this 2008 Update to the Fourth Edition are slightly different from the numbers in the original fourth edition for two reasons. First, the projections in this edition use published prevalence rates (based primarily on the same studies as were used to generate the numbers for the original publication). Second, the projections in this edition use 2004 population projections rather than 2000 census data. The 2004 projections reflect the growth and changing racial, ethnic and age composition of the United States population.

U.S. Census 2004 Population

Age 40 and Older by State, Race and Sex

State	Total	Female	Male	White	Black	Hispanic	Other
Total U.S.	130,048,048	68,978,846	61,069,202	99,340,825	13,412,332	11,303,843	5,991,048
Alabama	2,071,075	1,115,005	956,070	1,571,897	451,889	22,488	24,801
Alaska	265,454	129,986	135,468	202,051	7,293	7,676	48,434
Arizona	2,405,858	1,257,539	1,148,319	1,832,191	63,499	385,184	124,984
Arkansas	1,255,239	668,756	586,483	1,060,658	152,929	24,421	17,231
California	14,727,069	7,718,106	7,008,963	8,559,134	906,735	3,267,756	1,993,444
Colorado	1,908,575	985,983	922,592	1,565,837	62,955	224,690	55,093
Connecticut	1,679,637	902,596	777,041	1,416,959	119,909	101,556	41,213
Delaware	382,017	203,450	178,567	300,475	62,013	10,369	9,160
District of Columbia	235,485	128,949	106,536	69,063	146,875	13,389	6,158
Florida	8,515,691	4,526,374	3,989,317	6,184,440	904,495	1,252,586	174,170
Georgia	3,544,731	1,883,897	1,660,834	2,466,138	876,644	111,710	90,239
Hawaii	591,052	311,724	279,328	169,049	7,408	24,174	390,421
Idaho	589,225	303,164	286,061	548,917	1,804	26,220	12,284
Illinois	5,500,934	2,935,552	2,565,382	4,174,178	700,981	422,455	203,320
Indiana	2,751,826	1,460,327	1,291,499	2,467,572	192,269	60,198	31,787
Iowa	1,397,723	739,587	658,136	1,340,549	20,143	21,598	15,433
Kansas	1,216,292	640,395	575,897	1,083,459	55,642	48,870	28,321
Kentucky	1,890,127	1,005,443	884,684	1,740,399	114,866	17,647	17,215
Louisiana	1,948,580	1,046,421	902,159	1,340,463	530,510	43,563	34,044
Maine	671,647	354,735	316,912	658,613	2,648	3,488	6,898
Maryland	2,507,094	1,347,975	1,159,119	1,684,609	627,230	79,660	115,595
Massachusetts	2,976,886	1,600,768	1,376,118	2,620,882	133,278	123,031	99,695
Michigan	4,558,748	2,413,457	2,145,291	3,839,817	531,131	91,441	96,359
Minnesota	2,281,798	1,188,617	1,093,181	2,130,562	53,756	34,962	62,518
Mississippi	1,248,788	673,835	574,953	850,345	372,712	13,185	12,546
Missouri	2,640,166	1,407,503	1,232,663	2,323,976	240,094	36,460	39,636
Montana	457,710	236,588	221,122	429,123	1,055	6,036	21,496
Nebraska	780,550	411,324	369,226	719,922	23,510	24,611	12,507
Nevada	989,474	498,162	491,312	735,196	61,182	121,292	71,804
New Hampshire	624,094	324,952	299,142	604,992	3,668	6,810	8,624
New Jersey	4,026,135	2,162,596	1,863,539	2,925,705	449,962	407,928	242,540
New Mexico	847,726	446,597	401,129	470,095	14,045	296,625	66,961
New York	8,746,820	4,735,175	4,011,645	6,038,595	1,165,442	1,007,242	535,541
North Carolina	3,725,433	1,996,481	1,728,952	2,851,491	696,496	89,198	88,248
North Dakota	300,686	157,325	143,361	287,316	884	1,923	10,563
Ohio	5,297,128	2,833,828	2,463,300	4,643,808	515,728	66,896	70,696
Oklahoma	1,584,104	839,158	744,946	1,312,747	94,672	48,422	128,263
Oregon	1,640,840	857,739	783,101	1,486,093	21,890	66,103	66,754
Pennsylvania	6,062,941	3,261,416	2,801,525	5,346,310	489,620	123,389	103,622
Rhode Island	506,313	273,698	232,615	450,199	17,925	27,324	10,865
South Carolina	1,885,379	1,013,319	872,060	1,363,136	471,068	27,856	23,319
South Dakota	353,344	184,383	168,961	330,213	1,444	3,246	18,441
Tennessee	2,681,788	1,432,133	1,249,655	2,258,401	354,901	35,414	33,072
Texas	8,871,622	4,645,473	4,226,149	5,521,246	908,697	2,140,900	300,779
Utah	795,338	410,343	384,995	712,601	5,254	50,917	26,566
Vermont	312,233	163,621	148,612	305,645	1,265	2,111	3,212
Virginia	3,333,499	1,769,536	1,563,963	2,516,265	575,215	103,377	138,642
Washington	2,767,216	1,437,187	1,330,029	2,378,415	74,757	111,173	202,871
West Virginia	913,208	484,025	429,183	876,705	25,234	4,992	6,277
Wisconsin	2,542,159	1,330,618	1,211,541	2,350,577	97,384	50,915	43,283
Wyoming	240,591	123,025	117,566	223,796	1,326	10,366	5,103

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
52,474,400	46,866,425	7,484,533	5,927,799	5,805,226	5,498,617	3,214,687	2,776,361	Total U.S.
833,702	738,195	257,251	194,638	10,456	12,032	13,596	11,205	Alabama
96,893	105,158	3,500	3,793	3,758	3,918	25,835	22,599	Alaska
961,894	870,297	31,359	32,140	195,014	190,170	69,272	55,712	Arizona
562,477	498,181	85,774	67,155	11,148	13,273	9,357	7,874	Arkansas
4,468,053	4,091,081	486,179	420,556	1,683,684	1,584,072	1,080,190	913,254	California
812,521	753,316	30,866	32,089	112,210	112,480	30,386	24,707	Colorado
759,478	657,481	67,779	52,130	54,186	47,370	21,153	20,060	Connecticut
159,056	141,419	34,506	27,507	5,019	5,350	4,869	4,291	Delaware
33,868	35,195	84,761	62,114	6,861	6,528	3,459	2,699	District of Columbia
3,270,114	2,914,326	495,800	408,695	664,895	587,691	95,565	78,605	Florida
1,294,997	1,171,141	492,482	384,162	48,932	62,778	47,486	42,753	Georgia
82,946	86,103	2,917	4,491	12,659	11,515	213,202	177,219	Hawaii
283,527	265,390	716	1,088	12,193	14,027	6,728	5,556	Idaho
2,222,201	1,951,977	400,555	300,426	205,285	217,170	107,511	95,809	Illinois
1,308,485	1,159,087	106,588	85,681	28,371	31,827	16,883	14,904	Indiana
711,066	629,483	10,050	10,093	10,141	11,457	8,330	7,103	Iowa
572,488	510,971	29,443	26,199	23,380	25,490	15,084	13,237	Kansas
925,399	815,000	63,041	51,825	7,897	9,750	9,106	8,109	Kentucky
707,518	632,945	298,770	231,740	22,505	21,058	17,628	16,416	Louisiana
348,023	310,590	1,095	1,553	1,814	1,674	3,803	3,095	Maine
890,566	794,043	354,164	273,066	41,397	38,263	61,848	53,747	Maryland
1,410,362	1,210,520	72,642	60,636	66,356	56,675	51,408	48,287	Massachusetts
2,020,424	1,819,393	298,279	232,852	44,776	46,665	49,978	46,381	Michigan
1,113,672	1,016,890	25,957	27,799	16,066	18,896	32,922	29,596	Minnesota
450,915	399,430	209,984	162,728	5,987	7,198	6,949	5,597	Mississippi
1,231,906	1,092,070	136,232	103,862	18,017	18,443	21,348	18,288	Missouri
221,362	207,761	410	645	3,175	2,861	11,641	9,855	Montana
380,519	339,403	12,473	11,037	11,426	13,185	6,906	5,601	Nebraska
368,058	367,138	31,184	29,998	58,609	62,683	40,311	31,493	Nevada
315,245	289,747	1,638	2,030	3,535	3,275	4,534	4,090	New Hampshire
1,568,499	1,357,206	254,934	195,028	213,754	194,174	125,409	117,131	New Jersey
247,963	222,132	6,622	7,423	154,759	141,866	37,253	29,708	New Mexico
3,233,606	2,804,989	676,326	489,116	550,508	456,734	274,735	260,806	New York
1,517,457	1,334,034	393,169	303,327	38,141	51,057	47,714	40,534	North Carolina
150,176	137,140	324	560	976	947	5,849	4,714	North Dakota
2,473,535	2,170,273	289,102	226,626	33,694	33,202	37,497	33,199	Ohio
695,824	616,923	51,042	43,630	22,802	25,620	69,490	58,773	Oklahoma
780,608	705,485	10,423	11,467	30,496	35,607	36,212	30,542	Oregon
2,865,709	2,480,601	278,455	211,165	63,004	60,385	54,248	49,374	Pennsylvania
243,880	206,319	9,324	8,601	14,833	12,491	5,661	5,204	Rhode Island
721,591	641,545	266,390	204,678	12,432	15,424	12,906	10,413	South Carolina
172,249	157,964	495	949	1,549	1,697	10,090	8,351	South Dakota
1,198,212	1,060,189	200,527	154,374	15,701	19,713	17,693	15,379	Tennessee
2,890,115	2,631,131	497,181	411,516	1,100,096	1,040,804	158,081	142,698	Texas
369,149	343,452	2,157	3,097	24,682	26,235	14,355	12,211	Utah
160,241	145,404	548	717	1,087	1,024	1,745	1,467	Vermont
1,322,866	1,193,399	318,120	257,095	52,428	50,949	76,122	62,520	Virginia
1,236,211	1,142,204	34,874	39,883	52,970	58,203	113,132	89,739	Washington
464,627	412,078	13,597	11,637	2,493	2,499	3,308	2,969	West Virginia
1,229,659	1,120,918	53,952	43,432	23,952	26,963	23,055	20,228	Wisconsin
114,488	109,308	576	750	5,117	5,249	2,844	2,259	Wyoming

Vision Impairment and Blindness

The term "blindness" can have many connotations and is difficult to define precisely. To many people, blindness refers to the complete loss of vision with no remaining perception of light. However, this ultimate form of complete blindness is rare. Far more people have permanent loss of some, but not all, of their eyesight. The severity of vision loss can vary widely and may result in equally varying degrees of functional impairment.

"Legal blindness" represents an artificial distinction and has little value for rehabilitation, but it is significant in that it determines eligibility for certain disability benefits from the federal government. In the United States, it is typically defined as visual acuity with best correction in the better eye worse than or equal to 20/200 or a visual field extent of less than 20 degrees in diameter. These overly simple criteria for visual impairment are far from comprehensive in defining the visual function deficits that can cause difficulties for daily living tasks.

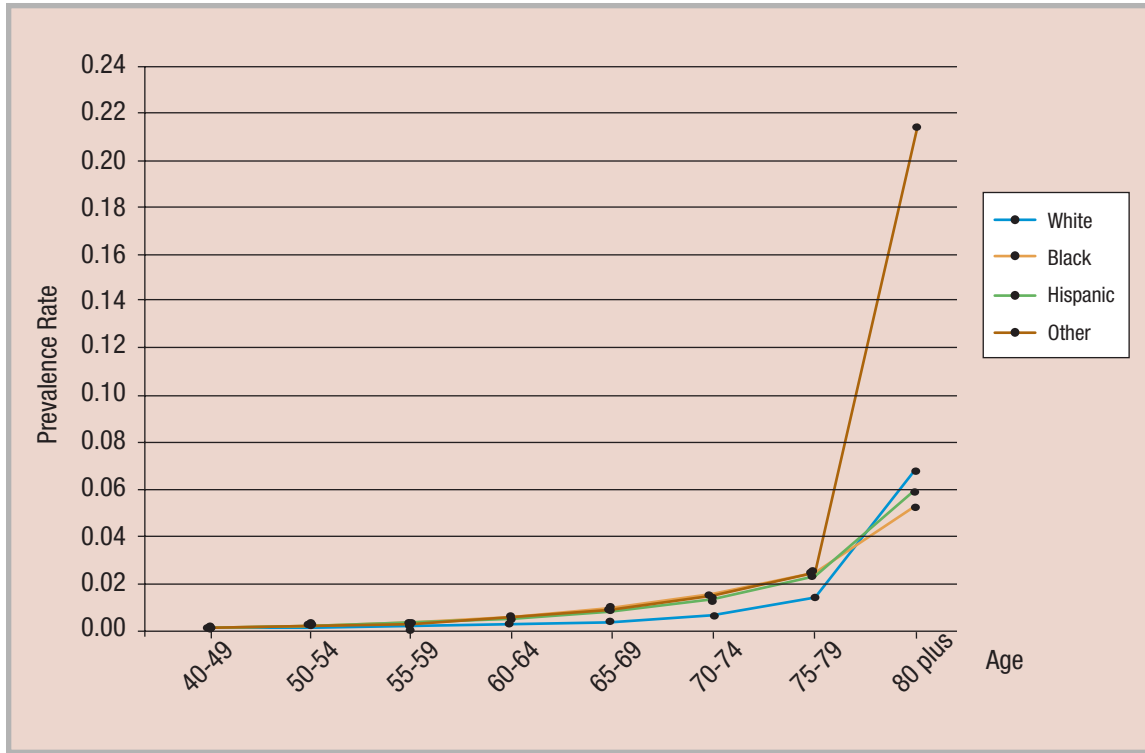
Vision impairment is defined as having 20/40 or worse vision in the better eye even with eyeglasses. People with the least degree of vision impairment may still face challenges in everyday life. For instance, people with vision worse than 20/40 cannot obtain an unrestricted driver's license in most states.

Almost everyone with blindness or vision impairment can benefit from vision rehabilitation, which can help make the most of whatever vision remains.

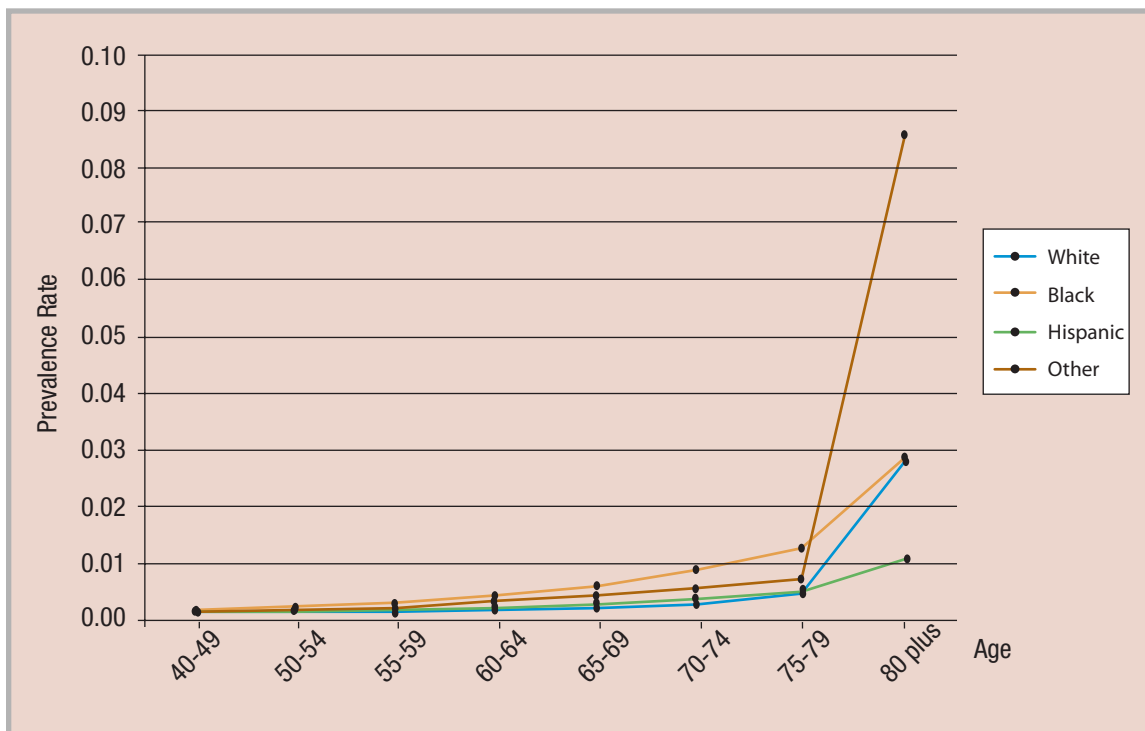
Unfortunately, blindness and vision impairment represent a significant burden, not only to those affected by sight loss, but to our national economy as well. Prevent Blindness America's 2007 study, *The Economic Impact of Vision Problems: The Toll of Major Adult Eye Disorders, Visual Impairment and Blindness on the U.S. Economy* estimates the costs associated with adult vision problems in the United States at \$51.4 billion.

Blindness, as defined above, affects more than one million Americans age 40 and older (see table on pages 8 and 9). The visually impaired, including those who are blind, total more than 3.6 million older Americans (see table on pages 6 and 7). Blindness affects Blacks more frequently than Whites and Hispanics (see chart on page 5). Hispanics, however, have higher rates of vision impairment than other races. The prevalence of blindness and vision impairment increases rapidly in the later years, particularly after age 75.

Estimated Specific Prevalence Rates for Vision Impairment and Blindness



Vision Impairment



Blindness

Estimated Number of Cases of Vision Impairment (including Blindness) in the U.S. Population Age 40 and Older by State, Race and Sex

State	Total	Female	Male	White	Black	Hispanic	Other
Total U.S.	3,638,186	2,380,848	1,257,338	2,829,010	303,016	226,139	280,021
Alabama	52,935	34,399	18,536	40,545	11,150	437	803
Alaska	4,692	2,943	1,749	2,665	101	92	1,834
Arizona	67,811	43,406	24,405	54,371	1,239	7,110	5,091
Arkansas	33,898	22,388	11,510	29,142	3,781	366	609
California	447,807	286,641	161,166	255,851	20,236	63,380	108,340
Colorado	43,715	28,557	15,158	35,939	1,184	4,425	2,167
Connecticut	50,957	34,242	16,715	45,308	2,525	1,744	1,380
Delaware	10,102	6,515	3,587	8,323	1,296	167	316
District of Columbia	7,061	4,139	2,922	1,875	4,604	258	324
Florida	275,412	175,135	100,277	217,181	18,809	33,257	6,165
Georgia	77,450	50,149	27,301	56,253	17,172	1,564	2,461
Hawaii	40,343	25,504	14,839	4,129	123	439	35,652
Idaho	14,999	9,727	5,272	14,057	25	370	547
Illinois	154,097	102,057	52,040	122,765	16,342	6,811	8,179
Indiana	73,682	49,506	24,176	67,013	4,562	1,059	1,048
Iowa	43,716	29,648	14,068	42,516	405	352	443
Kansas	35,912	23,924	11,988	32,802	1,264	874	972
Kentucky	46,133	31,050	15,083	42,638	2,683	297	515
Louisiana	49,218	31,266	17,952	34,645	12,265	1,053	1,255
Maine	17,655	11,802	5,853	17,361	44	67	183
Maryland	65,204	41,564	23,640	46,579	12,728	1,399	4,498
Massachusetts	89,861	60,970	28,891	80,917	2,809	2,037	4,098
Michigan	123,101	80,826	42,275	105,210	12,916	1,691	3,284
Minnesota	62,252	41,618	20,634	58,867	763	506	2,116
Mississippi	31,505	20,217	11,288	21,997	8,778	267	463
Missouri	72,234	48,018	24,216	64,498	5,573	679	1,484
Montana	12,012	7,849	4,163	11,167	18	109	718
Nebraska	22,959	15,336	7,623	21,668	482	383	426
Nevada	23,018	14,168	8,850	17,033	1,288	1,943	2,754
New Hampshire	15,109	10,022	5,087	14,675	55	111	268
New Jersey	118,155	78,243	39,912	91,913	10,130	7,732	8,380
New Mexico	23,122	14,872	8,250	12,814	318	7,128	2,862
New York	259,421	171,568	87,853	188,443	27,377	21,297	22,304
North Carolina	94,758	62,098	32,660	73,944	16,428	1,183	3,203
North Dakota	9,495	6,401	3,094	9,133	2	36	324
Ohio	148,515	98,864	49,651	131,722	12,897	1,309	2,587
Oklahoma	44,909	29,472	15,437	35,853	2,069	731	6,256
Oregon	46,769	30,712	16,057	42,504	445	982	2,838
Pennsylvania	193,167	130,152	63,015	174,171	12,851	2,221	3,924
Rhode Island	16,566	11,316	5,250	15,280	366	466	454
South Carolina	46,972	30,160	16,812	34,626	11,138	452	756
South Dakota	11,162	7,474	3,688	10,432	22	56	652
Tennessee	65,673	43,632	22,041	56,354	7,778	562	979
Texas	210,636	135,861	74,775	139,023	18,671	43,497	9,445
Utah	19,289	12,311	6,978	17,255	92	832	1,110
Vermont	7,664	5,085	2,579	7,497	20	54	93
Virginia	81,444	52,555	28,889	61,953	13,320	1,531	4,640
Washington	74,493	48,709	25,784	62,717	1,341	1,640	8,795
West Virginia	24,651	16,506	8,145	23,506	737	134	274
Wisconsin	70,901	47,650	23,251	66,728	1,739	827	1,607
Wyoming	5,548	3,592	1,956	5,141	27	213	167

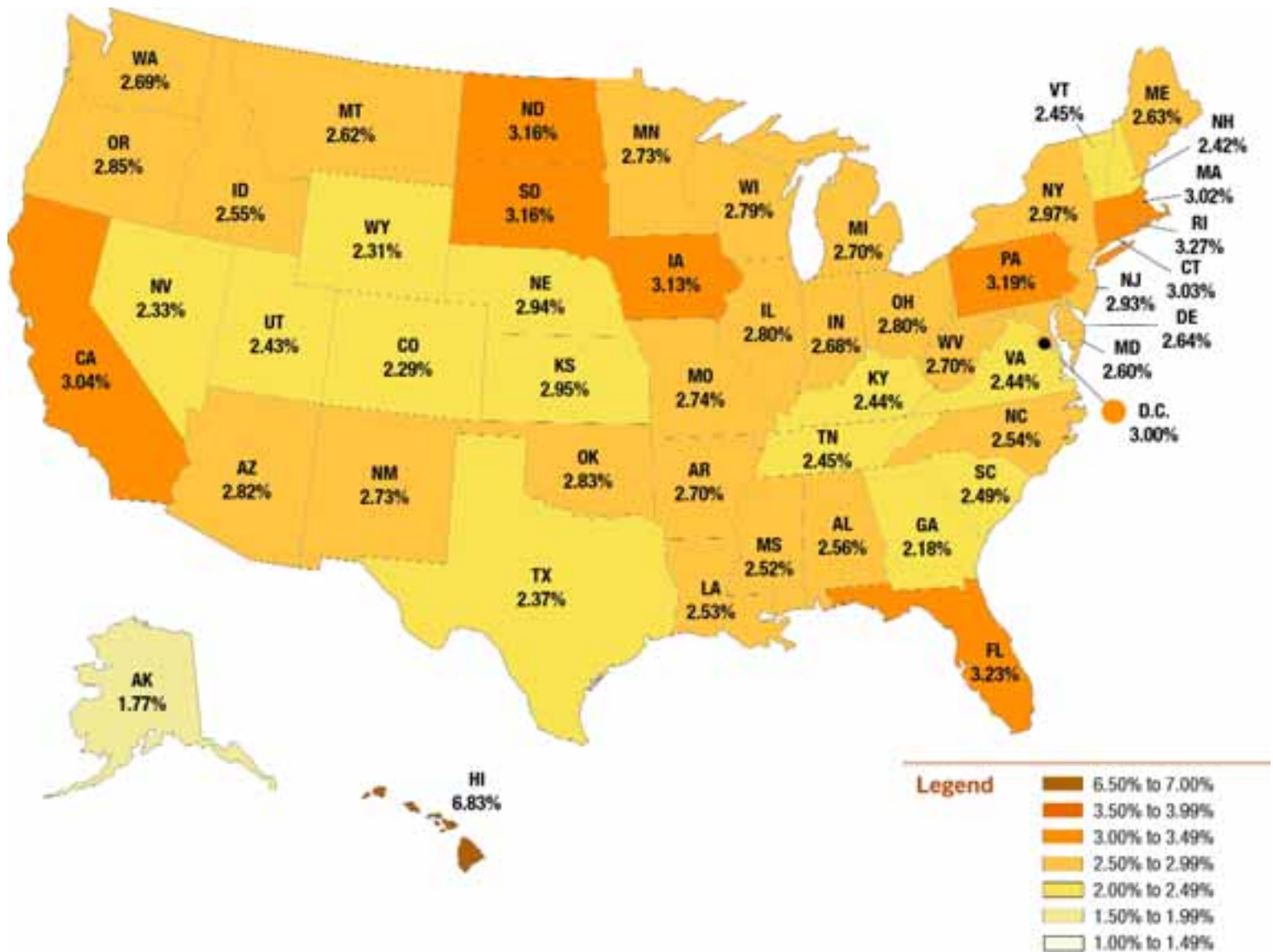
White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
1,904,562	924,448	156,904	146,112	145,130	81,009	174,252	105,769	Total U.S.
27,655	12,890	5,977	5,173	268	169	499	304	Alabama
1,649	1,016	42	59	55	37	1,197	637	Alaska
35,084	19,287	570	669	4,487	2,623	3,265	1,826	Arizona
19,774	9,368	2,026	1,755	215	151	373	236	Arkansas
169,324	86,527	10,025	10,211	40,605	22,775	66,687	41,653	California
23,866	12,073	549	635	2,774	1,651	1,368	799	Colorado
30,950	14,358	1,310	1,215	1,138	606	844	536	Connecticut
5,574	2,749	657	639	101	66	183	133	Delaware
1,236	639	2,506	2,098	178	80	219	105	District of Columbia
140,165	77,016	9,398	9,411	21,797	11,460	3,775	2,390	Florida
38,552	17,701	9,146	8,026	931	633	1,520	941	Georgia
2,588	1,541	46	77	278	161	22,592	13,060	Hawaii
9,167	4,890	8	17	214	156	338	209	Idaho
84,373	38,392	8,416	7,926	4,130	2,681	5,138	3,041	Illinois
45,902	21,111	2,313	2,249	626	433	665	383	Indiana
28,976	13,540	193	212	212	140	267	176	Iowa
22,152	10,650	624	640	534	340	614	358	Kansas
29,162	13,476	1,393	1,290	178	119	317	198	Kentucky
23,506	11,139	6,315	5,950	710	343	735	520	Louisiana
11,623	5,738	18	26	44	23	117	66	Maine
31,384	15,195	6,503	6,225	921	478	2,756	1,742	Maryland
55,684	25,233	1,425	1,384	1,332	705	2,529	1,569	Massachusetts
71,256	33,954	6,511	6,405	1,025	666	2,034	1,250	Michigan
39,656	19,211	342	421	300	206	1,320	796	Minnesota
15,193	6,804	4,584	4,194	165	102	275	188	Mississippi
43,752	20,746	2,919	2,654	422	257	925	559	Missouri
7,298	3,869	7	11	68	41	476	242	Montana
14,605	7,063	235	247	224	159	272	154	Nebraska
10,679	6,354	573	715	1,191	752	1,725	1,029	Nevada
9,763	4,912	21	34	71	40	167	101	New Hampshire
62,757	29,156	5,251	4,879	5,059	2,673	5,176	3,204	New Jersey
8,375	4,439	144	174	4,524	2,604	1,829	1,033	New Mexico
128,590	59,853	14,876	12,501	14,506	6,791	13,596	8,708	New York
50,473	23,471	8,839	7,589	687	496	2,099	1,104	North Carolina
6,164	2,969	1	1	23	13	213	111	North Dakota
89,823	41,899	6,590	6,307	810	499	1,641	946	Ohio
23,914	11,939	1,029	1,040	430	301	4,099	2,157	Oklahoma
28,121	14,383	212	233	587	395	1,792	1,046	Oregon
119,480	54,691	6,872	5,979	1,400	821	2,400	1,524	Pennsylvania
10,552	4,728	173	193	311	155	280	174	Rhode Island
23,482	11,144	5,901	5,237	275	177	502	254	South Carolina
6,989	3,443	7	15	36	20	442	210	South Dakota
38,560	17,794	4,106	3,672	342	220	624	355	Tennessee
92,856	46,167	9,491	9,180	27,729	15,768	5,785	3,660	Texas
11,105	6,150	34	58	516	316	656	454	Utah
4,988	2,509	6	14	34	20	57	36	Vermont
41,816	20,137	6,835	6,485	983	548	2,921	1,719	Virginia
41,526	21,191	587	754	977	663	5,619	3,176	Washington
15,850	7,656	402	335	85	49	169	105	West Virginia
45,238	21,490	862	877	493	334	1,057	550	Wisconsin
3,344	1,797	10	17	130	83	108	59	Wyoming

Estimated Number of Cases of Blindness in the U.S. Population Age 40 and Older by State, Race and Sex

State	Total	Female	Male	White	Black	Hispanic	Other
Total U.S.	1,035,100	652,292	382,808	794,099	129,790	31,009	80,202
Alabama	16,232	9,709	6,523	11,254	4,686	60	232
Alaska	1,336	829	507	744	49	17	526
Arizona	18,145	11,464	6,681	15,143	558	987	1,457
Arkansas	9,929	6,296	3,633	8,108	1,592	53	176
California	120,684	74,639	46,045	72,218	8,811	8,693	30,962
Colorado	11,857	7,621	4,236	10,088	534	613	622
Connecticut	14,564	9,607	4,957	12,841	1,087	238	398
Delaware	2,999	1,834	1,165	2,322	563	23	91
District of Columbia	2,547	1,171	1,376	530	1,892	32	93
Florida	75,132	45,801	29,331	60,705	8,190	4,470	1,767
Georgia	24,022	14,186	9,836	15,676	7,412	223	711
Hawaii	11,464	7,213	4,251	1,163	60	62	10,179
Idaho	4,169	2,718	1,451	3,944	12	54	159
Illinois	44,885	28,444	16,441	34,594	6,975	966	2,350
Indiana	21,210	13,947	7,263	18,802	1,956	150	302
Iowa	12,359	8,412	3,947	12,001	181	50	127
Kansas	10,205	6,729	3,476	9,252	551	123	279
Kentucky	13,225	8,740	4,485	11,889	1,146	44	146
Louisiana	15,414	8,802	6,612	9,659	5,252	141	362
Maine	4,935	3,322	1,613	4,856	20	7	52
Maryland	20,140	11,796	8,344	13,122	5,536	190	1,292
Massachusetts	25,531	17,166	8,365	22,854	1,220	281	1,176
Michigan	36,295	22,859	13,436	29,571	5,543	236	945
Minnesota	17,664	11,819	5,845	16,620	360	72	612
Mississippi	10,009	5,734	4,275	6,102	3,736	37	134
Missouri	20,958	13,558	7,400	18,072	2,367	93	426
Montana	3,360	2,211	1,149	3,129	8	17	206
Nebraska	6,490	4,322	2,168	6,097	213	55	125
Nevada	6,339	3,772	2,567	4,705	577	276	781
New Hampshire	4,245	2,830	1,415	4,124	26	18	77
New Jersey	33,721	21,461	12,260	25,922	4,329	1,059	2,411
New Mexico	5,509	3,417	2,092	3,575	141	971	822
New York	73,787	46,436	27,351	53,031	11,494	2,864	6,398
North Carolina	28,636	17,533	11,103	20,611	6,931	171	923
North Dakota	2,671	1,817	854	2,574	1	3	93
Ohio	43,417	27,980	15,437	37,008	5,484	181	744
Oklahoma	12,786	8,251	4,535	9,989	900	106	1,791
Oregon	13,123	8,633	4,490	11,972	199	139	813
Pennsylvania	55,869	36,829	19,040	49,057	5,374	308	1,130
Rhode Island	4,691	3,185	1,506	4,334	162	64	131
South Carolina	14,639	8,544	6,095	9,630	4,727	64	218
South Dakota	3,145	2,120	1,025	2,941	12	5	187
Tennessee	19,383	12,307	7,076	15,700	3,321	79	283
Texas	55,635	33,747	21,888	38,825	8,117	5,974	2,719
Utah	5,308	3,388	1,920	4,826	46	117	319
Vermont	2,142	1,433	709	2,101	10	4	27
Virginia	24,595	14,815	9,780	17,338	5,710	213	1,334
Washington	21,081	13,720	7,361	17,705	621	234	2,521
West Virginia	6,942	4,630	2,312	6,539	305	18	80
Wisconsin	20,147	13,488	6,659	18,797	769	118	463
Wyoming	1,527	991	536	1,435	12	30	50

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
539,404	254,695	47,246	82,544	15,923	15,086	49,719	30,483	Total U.S.
7,752	3,502	1,784	2,902	29	31	144	88	Alabama
466	278	13	36	8	9	342	184	Alaska
9,864	5,279	174	384	494	493	932	525	Arizona
5,560	2,548	605	987	24	29	107	69	Arkansas
48,163	24,055	3,029	5,782	4,456	4,237	18,991	11,971	California
6,758	3,330	168	366	305	308	390	232	Colorado
8,843	3,998	397	690	125	113	242	156	Connecticut
1,571	751	200	363	11	12	52	39	Delaware
354	176	735	1,157	19	13	63	30	District of Columbia
39,507	21,198	2,848	5,342	2,369	2,101	1,077	690	Florida
10,852	4,824	2,795	4,617	102	121	437	274	Georgia
734	429	15	45	31	31	6,433	3,746	Hawaii
2,596	1,348	1	11	23	31	98	61	Idaho
23,985	10,609	2,529	4,446	459	507	1,471	879	Illinois
12,994	5,808	694	1,262	69	81	190	112	Indiana
8,254	3,747	59	122	23	27	76	51	Iowa
6,305	2,947	188	363	60	63	176	103	Kansas
8,211	3,678	418	728	21	23	90	56	Kentucky
6,614	3,045	1,900	3,352	77	64	211	151	Louisiana
3,280	1,576	5	15	4	3	33	19	Maine
8,918	4,204	1,989	3,547	100	90	789	503	Maryland
15,863	6,991	432	788	148	133	723	453	Massachusetts
20,209	9,362	1,955	3,588	112	124	583	362	Michigan
11,298	5,322	108	252	33	39	380	232	Minnesota
4,263	1,839	1,374	2,362	18	19	79	55	Mississippi
12,374	5,698	875	1,492	45	48	264	162	Missouri
2,066	1,063	1	7	8	9	136	70	Montana
4,146	1,951	71	142	26	29	79	46	Nebraska
2,980	1,725	173	404	132	144	487	294	Nevada
2,767	1,357	6	20	9	9	48	29	New Hampshire
17,843	8,079	1,580	2,749	558	501	1,480	931	New Jersey
2,359	1,216	42	99	493	478	523	299	New Mexico
36,502	16,529	4,457	7,037	1,594	1,270	3,883	2,515	New York
14,208	6,403	2,647	4,284	76	95	602	321	North Carolina
1,754	820	-	1	2	1	61	32	North Dakota
25,455	11,553	1,966	3,518	89	92	470	274	Ohio
6,721	3,268	311	589	48	58	1,171	620	Oklahoma
7,993	3,979	64	135	65	74	511	302	Oregon
33,947	15,110	2,040	3,334	154	154	688	442	Pennsylvania
3,017	1,317	52	110	35	29	81	50	Rhode Island
6,597	3,033	1,773	2,954	29	35	145	73	South Carolina
1,989	952	2	10	2	3	127	60	South Dakota
10,851	4,849	1,239	2,082	37	42	180	103	Tennessee
26,169	12,656	2,881	5,236	3,043	2,931	1,654	1,065	Texas
3,132	1,694	11	35	57	60	188	131	Utah
1,412	689	1	9	2	2	18	9	Vermont
11,815	5,523	2,055	3,655	109	104	836	498	Virginia
11,827	5,878	182	439	109	125	1,602	919	Washington
4,454	2,085	118	187	9	9	49	31	West Virginia
12,865	5,932	265	504	55	63	303	160	Wisconsin
943	492	2	10	14	16	32	18	Wyoming

Estimated Prevalence Rates of Vision Impairment and Blindness for Persons Age 40 and Older by State



The map above reflects estimated state-by-state prevalence rates of vision impairment, including blindness. The overall national rate is 2.80%. When this rate is applied to the total U.S. population age 40 and older of approximately 130 million, the result indicates that more than 3.6 million older Americans are blind or visually impaired. Eighteen states and the District of Columbia have rates above the national average, while 32 states have rates at or below the average. Hawaii and Rhode Island have the highest rates at 6.83% and 3.27% respectively. Alaska has the lowest rate at 1.77%. The largest majority of states (36 states and DC) are within the 2.5% to 3.5% range. Differences between states are likely due to demographic differences in age, race and/or gender distribution.

State	Rate
Total U.S.	0.0280
Alabama	0.0256
Alaska	0.0177
Arizona	0.0282
Arkansas	0.0270
California	0.0304
Colorado	0.0229
Connecticut	0.0303
Delaware	0.0264
District of Columbia	0.0300
Florida	0.0323
Georgia	0.0218
Hawaii	0.0683
Idaho	0.0255
Illinois	0.0280
Indiana	0.0268
Iowa	0.0313
Kansas	0.0295
Kentucky	0.0244
Louisiana	0.0253
Maine	0.0263
Maryland	0.0260
Massachusetts	0.0302
Michigan	0.0270
Minnesota	0.0273
Mississippi	0.0252
Missouri	0.0274
Montana	0.0262
Nebraska	0.0294
Nevada	0.0233
New Hampshire	0.0242
New Jersey	0.0293
New Mexico	0.0273
New York	0.0297
North Carolina	0.0254
North Dakota	0.0316
Ohio	0.0280
Oklahoma	0.0283
Oregon	0.0285
Pennsylvania	0.0319
Rhode Island	0.0327
South Carolina	0.0249
South Dakota	0.0316
Tennessee	0.0245
Texas	0.0237
Utah	0.0243
Vermont	0.0245
Virginia	0.0244
Washington	0.0269
West Virginia	0.0270
Wisconsin	0.0279
Wyoming	0.0231

State	Rate
Alaska	0.0177
Georgia	0.0218
Colorado	0.0229
Wyoming	0.0231
Nevada	0.0233
Texas	0.0237
New Hampshire	0.0242
Utah	0.0243
Kentucky	0.0244
Virginia	0.0244
Tennessee	0.0245
Vermont	0.0245
South Carolina	0.0249
Mississippi	0.0252
Louisiana	0.0253
North Carolina	0.0254
Idaho	0.0255
Alabama	0.0256
Maryland	0.0260
Montana	0.0262
Maine	0.0263
Delaware	0.0264
Indiana	0.0268
Washington	0.0269
Arkansas	0.0270
Michigan	0.0270
West Virginia	0.0270
Minnesota	0.0273
New Mexico	0.0273
Missouri	0.0274
Wisconsin	0.0279
Illinois	0.0280
Ohio	0.0280
Arizona	0.0282
Oklahoma	0.0283
Oregon	0.0285
New Jersey	0.0293
Nebraska	0.0294
Kansas	0.0295
New York	0.0297
District of Columbia	0.0300
Massachusetts	0.0302
Connecticut	0.0303
California	0.0304
Iowa	0.0313
North Dakota	0.0316
South Dakota	0.0316
Pennsylvania	0.0319
Florida	0.0323
Rhode Island	0.0327
Hawaii	0.0683

Refractive Error

Refractive errors are the most frequent eye problems in the United States. They are optical defects that result in light not being properly focused on the eye's retina.

Nearsightedness (myopia) and farsightedness (hyperopia) are the most common refractive errors. People with myopia see near objects clearly, while distant ones are blurred. People with hyperopia experience just the opposite—distant objects are clear while near ones are blurred.

Why refractive errors develop is uncertain. Most infants have some degree of hyperopia, but vision becomes more normal with age, usually leveling off by age 6. However, some children remain farsighted or become so later in life. While some children may be nearsighted early in life, most myopia occurs later during adolescence. Refractive error can continue to change over our lifetime.

Other common refractive errors include astigmatism (uneven focus) and presbyopia (age-related problem with near focus). Fortunately, almost all refractive errors can be corrected by eyeglasses or contact lenses. It is estimated that more than 150 million Americans use corrective eyewear to compensate for their refractive error. Americans are estimated to spend over \$15 billion each year on eyewear, supporting an optical industry in the U.S. worth more than \$30 billion.

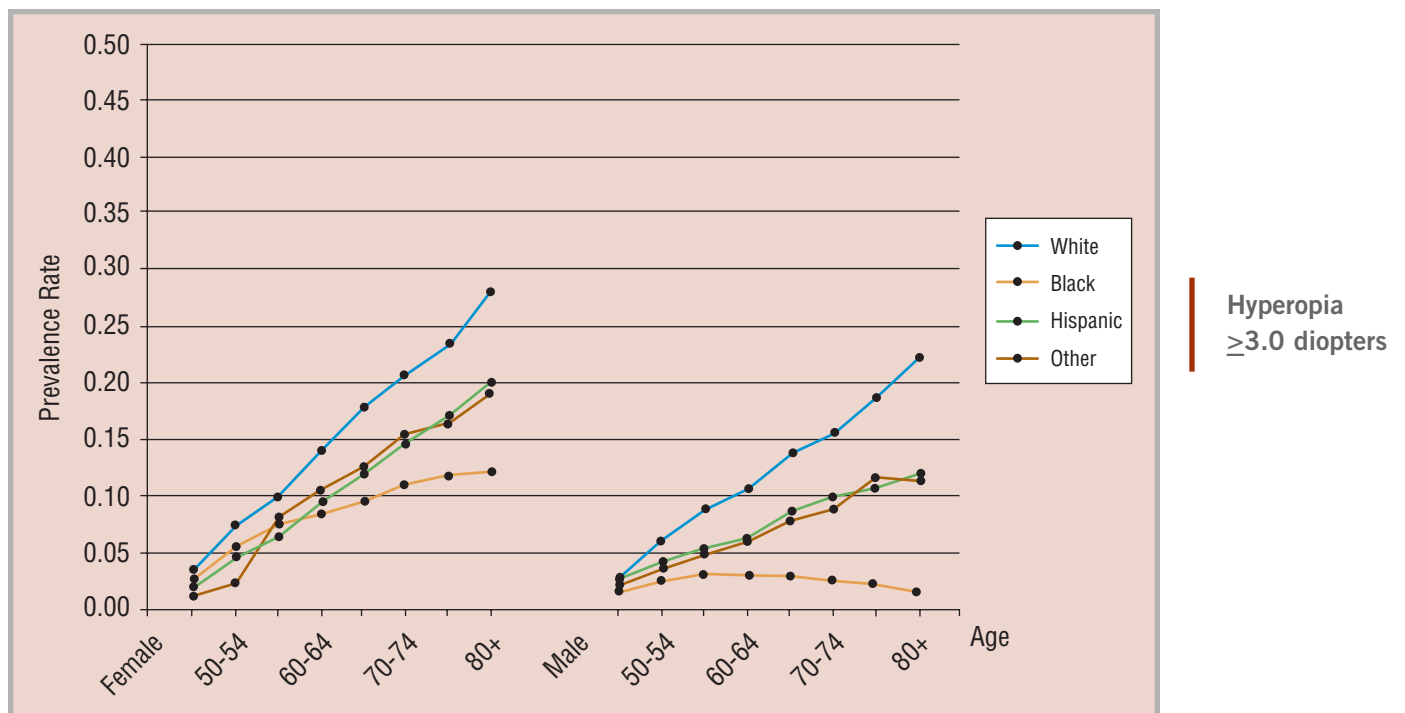
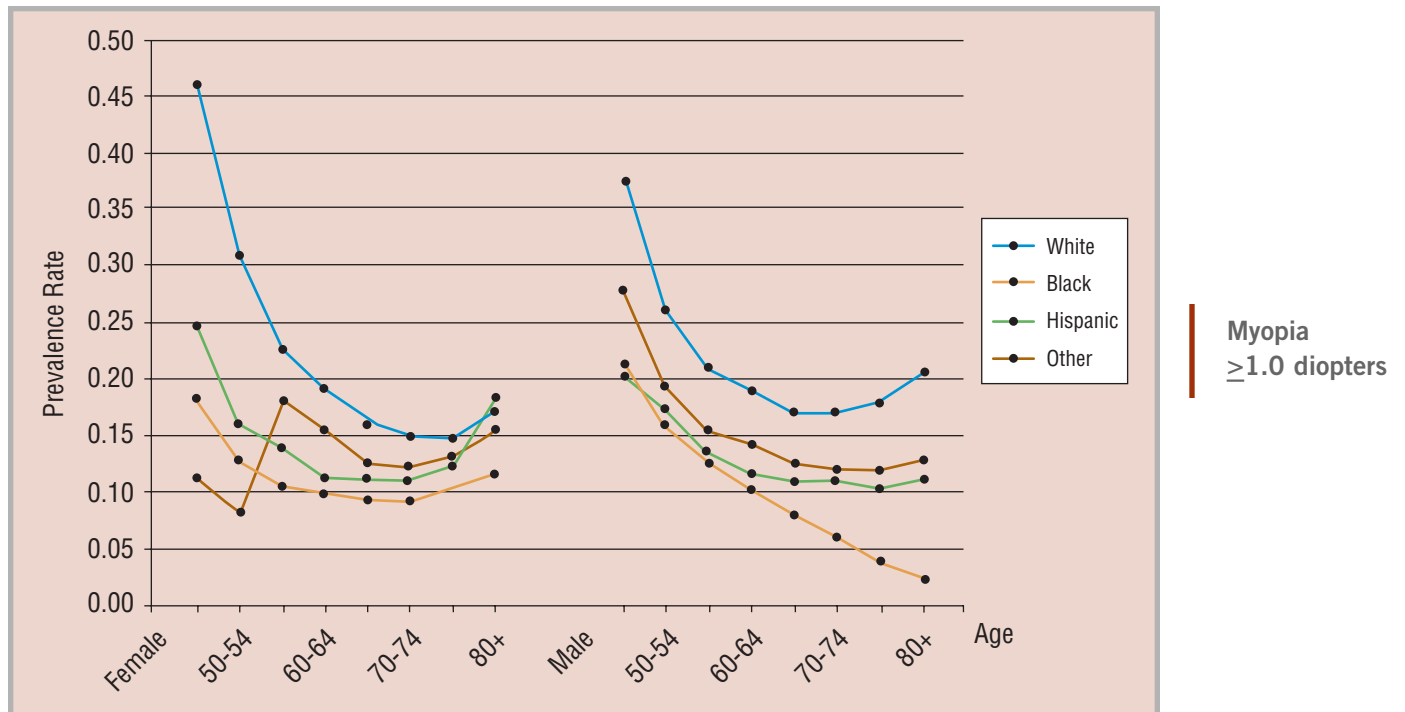
Refractive surgery is now another alternative for correcting problems such as myopia, hyperopia and astigmatism. The number of people seeking refractive surgery is increasing. However, the surgical procedures are not without some risk and the long-term effects of many of these procedures are still unknown.

Uncorrected or under-corrected refractive error can result in significant vision impairment. The magnitude of refractive error is measured in units called diopters. For each diopter of refractive error, a person may be unable to read the next smaller line of an eye chart. For instance, a person with more than two diopters of hyperopia might find it difficult to read this text.

Cases of refractive error described in the following charts include myopia of 1.0 diopters or more. The threshold for clinically significant hyperopia is somewhat higher at 3.0 diopters or more.

Myopia is a very common disorder affecting more than 32 million Americans age 40 and older. Prevalence is greater in women through age 60 when rates become more comparable between genders (see chart below). Myopia affects more Whites than other races, and is generally less frequent with age. Because of the higher threshold for significance, hyperopia is less common, affecting over 12 million older Americans. Prevalence of hyperopia generally increases with age (see chart below). It is most frequent in Whites, but also affects Hispanics more often than Blacks.

Estimated Specific Prevalence Rates for Myopia and Hyperopia



Estimated Number of Cases of Myopia (≥ 1.00 diopters or worse) in the U.S. Population Age 40 and Older by State, Race and Sex

State	Total	Female	Male	White	Black	Hispanic	Other
Total U.S.	32,608,376	17,652,359	14,956,017	27,532,387	2,008,214	2,079,427	988,348
Alabama	505,517	275,958	229,559	430,565	66,677	4,177	4,098
Alaska	72,139	36,393	35,746	61,407	1,193	1,472	8,067
Arizona	591,950	317,168	274,782	490,430	9,846	71,122	20,553
Arkansas	317,674	173,015	144,659	287,382	22,817	4,627	2,849
California	3,438,248	1,814,445	1,623,803	2,370,236	136,520	606,101	325,391
Colorado	512,365	276,035	236,330	452,079	9,863	41,284	9,138
Connecticut	439,011	241,622	197,389	394,890	18,035	19,059	7,027
Delaware	95,500	51,912	43,587	82,640	9,385	1,948	1,526
District of Columbia	42,976	22,742	20,234	18,949	20,555	2,473	998
Florida	2,002,312	1,081,022	921,290	1,615,201	136,585	221,996	28,530
Georgia	870,225	469,242	400,982	698,544	135,009	21,474	15,197
Hawaii	115,585	55,393	60,192	47,352	1,239	4,481	62,512
Idaho	161,387	86,730	74,657	154,105	300	4,968	2,014
Illinois	1,378,992	750,157	628,835	1,163,275	103,288	78,836	33,592
Indiana	736,788	402,747	334,041	691,603	28,608	11,240	5,336
Iowa	379,414	206,910	172,504	369,599	3,131	4,097	2,587
Kansas	324,246	176,096	148,150	301,901	8,468	9,150	4,727
Kentucky	511,413	281,473	229,940	487,930	17,279	3,292	2,913
Louisiana	465,249	252,691	212,558	373,070	78,711	7,791	5,676
Maine	186,587	102,607	83,980	184,349	435	651	1,152
Maryland	601,752	326,642	275,110	472,990	94,657	15,059	19,047
Massachusetts	791,817	436,899	354,918	731,395	20,336	23,236	16,850
Michigan	1,190,884	646,534	544,350	1,079,221	78,457	16,904	16,303
Minnesota	631,915	341,034	290,881	605,671	8,939	6,713	10,592
Mississippi	292,561	159,141	133,420	232,427	55,650	2,422	2,063
Missouri	695,285	380,339	314,946	646,180	35,774	6,767	6,564
Montana	124,378	66,766	57,612	119,512	169	1,118	3,578
Nebraska	210,209	114,285	95,924	199,877	3,602	4,663	2,068
Nevada	245,124	126,487	118,637	201,673	9,150	22,699	11,603
New Hampshire	177,549	96,715	80,834	174,200	597	1,294	1,458
New Jersey	993,452	540,920	452,532	810,526	66,796	75,181	40,949
New Mexico	193,573	104,499	89,073	127,580	2,133	52,831	11,028
New York	2,101,397	1,147,008	954,388	1,657,410	171,404	182,681	89,902
North Carolina	924,549	504,299	420,250	788,960	103,593	17,294	14,703
North Dakota	81,554	43,824	37,730	79,270	157	360	1,767
Ohio	1,395,794	766,153	629,641	1,295,715	75,922	12,348	11,809
Oklahoma	404,187	218,053	186,134	359,681	14,337	9,124	21,045
Oregon	438,169	236,951	201,218	411,170	3,415	12,565	11,020
Pennsylvania	1,575,622	865,361	710,261	1,463,495	71,825	23,007	17,296
Rhode Island	134,456	74,641	59,815	124,672	2,780	5,185	1,820
South Carolina	453,014	246,929	206,084	374,319	69,595	5,258	3,842
South Dakota	95,071	50,849	44,223	91,133	247	608	3,083
Tennessee	692,533	379,230	313,303	626,735	53,582	6,706	5,511
Texas	2,129,114	1,144,850	984,264	1,547,745	138,996	391,945	50,427
Utah	218,186	117,254	100,932	203,312	859	9,595	4,419
Vermont	87,758	48,122	39,636	86,639	205	386	528
Virginia	837,108	453,672	383,436	708,291	86,198	19,767	22,852
Washington	739,909	396,207	343,702	673,657	11,966	21,117	33,168
West Virginia	244,902	134,343	110,559	239,313	3,685	883	1,022
Wisconsin	692,795	374,524	318,271	660,853	15,041	9,593	7,308
Wyoming	66,183	35,468	30,715	63,260	205	1,882	837

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
15,068,869	12,463,518	1,057,451	950,763	1,114,406	965,021	411,633	576,715	Total U.S.
236,121	194,444	36,078	30,599	2,035	2,142	1,723	2,375	Alabama
31,830	29,577	528	665	757	715	3,278	4,788	Alaska
266,174	224,256	4,499	5,346	37,656	33,466	8,839	11,714	Arizona
157,478	129,903	12,130	10,687	2,222	2,405	1,185	1,663	Arkansas
1,280,662	1,089,574	68,712	67,808	326,208	279,892	138,862	186,529	California
246,136	205,943	4,449	5,414	21,597	19,687	3,853	5,285	Colorado
218,705	176,185	9,605	8,430	10,633	8,426	2,679	4,348	Connecticut
45,362	37,278	4,939	4,446	987	960	624	903	Delaware
9,565	9,384	11,424	9,131	1,306	1,167	447	551	District of Columbia
875,683	739,518	70,522	66,063	122,668	99,328	12,149	16,381	Florida
382,358	316,186	71,021	63,989	9,888	11,586	5,976	9,222	Georgia
24,380	22,972	443	796	2,457	2,025	28,113	34,399	Hawaii
83,326	70,779	108	193	2,442	2,525	854	1,160	Idaho
640,138	523,137	56,076	47,212	40,152	38,683	13,790	19,802	Illinois
380,003	311,600	15,031	13,576	5,573	5,667	2,140	3,197	Indiana
202,385	167,214	1,444	1,687	2,026	2,071	1,055	1,532	Iowa
165,401	136,499	4,188	4,280	4,595	4,555	1,912	2,815	Kansas
269,853	218,077	8,925	8,354	1,539	1,753	1,157	1,755	Kentucky
204,229	168,841	42,049	36,662	4,168	3,623	2,245	3,431	Louisiana
101,609	82,740	163	272	352	298	482	671	Maine
260,124	212,866	50,475	44,182	8,143	6,916	7,901	11,146	Maryland
406,917	324,477	10,356	9,980	13,104	10,132	6,521	10,328	Massachusetts
589,587	489,633	41,896	36,561	8,690	8,213	6,360	9,943	Michigan
329,709	275,962	3,916	5,023	3,251	3,462	4,158	6,434	Minnesota
127,365	105,062	29,748	25,902	1,146	1,276	882	1,180	Mississippi
354,909	291,271	19,205	16,569	3,503	3,264	2,722	3,843	Missouri
64,615	54,897	59	110	616	502	1,475	2,103	Montana
109,333	90,543	1,785	1,817	2,288	2,374	878	1,190	Nebraska
105,441	96,231	4,377	4,773	11,490	11,209	5,179	6,424	Nevada
95,197	79,003	243	354	704	590	571	887	New Hampshire
448,116	362,410	35,761	31,035	41,068	34,113	15,974	24,975	New Jersey
69,973	57,607	932	1,201	28,833	23,998	4,761	6,267	New Mexico
914,246	743,164	94,094	77,310	103,534	79,147	35,135	54,768	New York
435,095	353,865	55,323	48,270	7,821	9,473	6,061	8,642	North Carolina
42,842	36,428	51	106	192	168	739	1,028	North Dakota
714,381	581,333	40,455	35,467	6,523	5,825	4,793	7,016	Ohio
197,347	162,333	7,254	7,083	4,514	4,610	8,938	12,108	Oklahoma
224,767	186,402	1,495	1,920	6,087	6,478	4,601	6,419	Oregon
807,326	656,169	38,785	33,040	12,335	10,672	6,916	10,380	Pennsylvania
69,633	55,039	1,346	1,434	2,943	2,242	719	1,101	Rhode Island
205,492	168,828	37,338	32,256	2,457	2,801	1,643	2,199	South Carolina
49,193	41,940	74	173	304	304	1,278	1,805	South Dakota
345,318	281,417	28,565	25,016	3,117	3,589	2,230	3,281	Tennessee
843,518	704,227	71,223	67,774	210,125	181,820	19,984	30,444	Texas
110,247	93,065	318	541	4,877	4,717	1,811	2,608	Utah
47,611	39,029	82	122	209	177	220	308	Vermont
388,435	319,856	45,083	41,115	10,469	9,298	9,685	13,168	Virginia
366,064	307,593	5,119	6,847	10,609	10,508	14,414	18,754	Washington
131,583	107,730	1,872	1,812	460	423	428	594	West Virginia
359,036	301,817	7,804	7,236	4,751	4,842	2,932	4,376	Wisconsin
34,046	29,214	82	123	979	903	361	476	Wyoming

Estimated Number of Cases of Hyperopia (≥ 3.00 diopters or worse) in the U.S. Population Age 40 and Older by State, Race and Sex

State	Total	Female	Male	White	Black	Hispanic	Other
Total U.S.	12,703,454	7,670,199	5,033,255	10,937,951	673,322	719,458	372,723
Alabama	199,887	123,605	76,282	173,697	23,401	1,380	1,409
Alaska	20,607	11,043	9,563	17,060	303	403	2,841
Arizona	247,411	145,198	102,213	212,959	2,937	23,928	7,587
Arkansas	130,020	78,900	51,121	119,856	7,795	1,372	997
California	1,322,770	786,575	536,195	944,129	44,613	203,756	130,272
Colorado	177,298	103,586	73,712	157,028	2,878	14,188	3,204
Connecticut	172,010	105,071	66,939	157,678	5,979	6,071	2,281
Delaware	37,614	22,762	14,852	33,441	3,029	603	542
District of Columbia	16,905	11,375	5,530	7,408	8,257	838	401
Florida	908,946	546,296	362,650	763,370	44,326	90,920	10,330
Georgia	308,334	188,645	119,689	255,059	42,380	6,026	4,869
Hawaii	49,355	29,301	20,054	17,370	290	1,488	30,207
Idaho	60,384	34,866	25,518	58,116	72	1,456	741
Illinois	532,099	325,586	206,513	458,797	35,997	24,881	12,424
Indiana	281,099	170,334	110,765	266,038	9,693	3,584	1,785
Iowa	154,174	92,862	61,311	151,156	936	1,230	851
Kansas	126,932	76,022	50,910	119,700	2,709	2,917	1,607
Kentucky	192,612	116,277	76,335	184,872	5,740	1,039	961
Louisiana	176,930	109,761	67,169	144,991	26,899	3,033	2,006
Maine	71,490	42,443	29,047	70,790	109	216	375
Maryland	223,414	137,460	85,954	180,931	30,831	4,724	6,928
Massachusetts	309,967	189,215	120,752	290,444	6,495	7,236	5,792
Michigan	450,243	272,218	178,025	412,162	26,986	5,621	5,474
Minnesota	232,938	137,768	95,170	225,335	2,236	1,902	3,465
Mississippi	114,690	71,730	42,960	94,285	18,839	829	736
Missouri	271,441	164,461	106,980	254,638	12,206	2,242	2,354
Montana	47,597	27,486	20,111	45,949	45	372	1,231
Nebraska	83,166	49,814	33,352	79,928	1,126	1,394	718
Nevada	93,718	53,144	40,574	79,080	2,952	7,129	4,557
New Hampshire	62,632	36,676	25,956	61,618	154	391	469
New Jersey	391,019	239,886	151,133	328,539	22,907	25,672	13,901
New Mexico	77,836	45,980	31,856	52,498	666	20,625	4,048
New York	844,410	521,465	322,945	684,154	60,995	66,951	32,311
North Carolina	356,396	218,994	137,402	311,019	35,626	4,668	5,083
North Dakota	33,102	19,677	13,424	32,370	31	117	584
Ohio	541,969	330,788	211,181	507,147	26,516	4,188	4,118
Oklahoma	161,907	97,031	64,876	146,344	4,634	2,759	8,170
Oregon	171,292	100,812	70,480	162,619	1,006	3,675	3,992
Pennsylvania	652,326	400,458	251,868	613,065	25,698	7,479	6,084
Rhode Island	54,213	33,313	20,900	51,128	840	1,607	637
South Carolina	176,356	108,915	67,441	149,258	24,163	1,596	1,339
South Dakota	38,500	22,782	15,718	37,194	55	196	1,056
Tennessee	265,048	161,233	103,815	243,527	17,684	2,005	1,832
Texas	786,618	469,514	317,105	588,039	43,998	137,686	16,895
Utah	78,520	45,464	33,056	73,792	217	2,965	1,546
Vermont	32,116	18,845	13,271	31,747	52	144	174
Virginia	307,137	185,937	121,200	264,570	28,760	5,788	8,019
Washington	270,756	158,266	112,490	248,931	3,255	6,211	12,359
West Virginia	99,572	59,625	39,948	97,476	1,343	357	397
Wisconsin	263,629	156,967	106,662	253,626	4,603	2,932	2,467
Wyoming	24,052	13,769	10,283	23,027	60	668	296

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
6,532,088	4,405,862	501,824	171,497	422,199	297,259	214,087	158,636	Total U.S.
104,315	69,382	17,741	5,660	750	630	799	610	Alabama
9,028	8,032	196	107	217	186	1,603	1,238	Alaska
124,960	87,998	2,016	921	13,759	10,169	4,463	3,124	Arizona
71,766	48,090	5,855	1,940	714	658	564	433	Arkansas
558,370	385,759	32,472	12,140	119,489	84,266	76,243	54,029	California
91,675	65,353	1,964	914	8,087	6,101	1,860	1,345	Colorado
95,765	61,913	4,469	1,510	3,618	2,453	1,219	1,062	Connecticut
19,896	13,545	2,232	797	331	271	303	239	Delaware
4,190	3,218	6,436	1,822	505	333	244	157	District of Columbia
452,239	311,130	32,482	11,844	55,658	35,262	5,916	4,414	Florida
151,606	103,453	31,359	11,022	3,066	2,961	2,615	2,254	Georgia
9,632	7,738	166	125	874	614	18,629	11,578	Hawaii
33,642	24,473	41	30	756	700	427	314	Idaho
277,643	181,155	27,257	8,740	13,684	11,197	7,002	5,422	Illinois
160,204	105,834	7,217	2,476	1,927	1,657	987	798	Indiana
91,081	60,075	649	288	659	572	474	377	Iowa
71,570	48,130	1,962	747	1,600	1,317	890	717	Kansas
110,947	73,925	4,250	1,490	546	494	534	427	Kentucky
86,681	58,310	20,152	6,747	1,839	1,194	1,089	917	Louisiana
42,036	28,754	66	43	128	88	213	161	Maine
107,885	73,047	22,890	7,940	2,807	1,917	3,878	3,050	Maryland
176,970	113,473	4,759	1,736	4,336	2,901	3,150	2,642	Massachusetts
245,874	166,288	20,237	6,749	3,125	2,496	2,983	2,492	Michigan
133,396	91,939	1,471	765	993	909	1,909	1,556	Minnesota
56,726	37,559	14,128	4,710	450	380	426	311	Mississippi
152,648	101,990	9,208	2,998	1,266	976	1,338	1,016	Missouri
26,540	19,409	27	18	218	153	701	530	Montana
47,860	32,068	810	317	729	665	415	303	Nebraska
44,428	34,652	2,077	875	3,918	3,211	2,722	1,836	Nevada
36,098	25,520	97	57	227	164	254	215	New Hampshire
199,806	128,733	17,247	5,661	15,270	10,402	7,564	6,338	New Jersey
30,895	21,602	451	215	12,242	8,383	2,392	1,656	New Mexico
415,283	268,871	46,752	14,242	41,687	25,264	17,743	14,569	New York
186,998	124,021	26,805	8,820	2,298	2,370	2,892	2,191	North Carolina
19,257	13,113	16	15	67	50	338	246	North Dakota
306,132	201,014	19,965	6,550	2,391	1,797	2,299	1,819	Ohio
87,404	58,941	3,377	1,257	1,470	1,289	4,780	3,390	Oklahoma
95,914	66,705	678	329	1,938	1,737	2,283	1,709	Oregon
373,213	239,851	19,606	6,092	4,291	3,188	3,347	2,737	Pennsylvania
31,394	19,734	596	244	974	633	349	289	Rhode Island
89,130	60,128	18,176	5,987	835	761	774	565	South Carolina
22,033	15,160	29	26	109	87	612	444	South Dakota
145,953	97,574	13,229	4,454	1,041	964	1,009	823	Tennessee
347,295	240,744	32,193	11,805	80,802	56,884	9,223	7,671	Texas
42,823	30,969	131	86	1,639	1,327	872	674	Utah
18,635	13,111	31	20	85	59	93	80	Vermont
156,705	107,864	21,332	7,428	3,322	2,467	4,578	3,441	Virginia
145,520	103,411	2,128	1,127	3,315	2,896	7,304	5,055	Washington
58,189	39,286	1,005	337	208	149	222	175	West Virginia
150,654	102,972	3,354	1,249	1,566	1,366	1,392	1,075	Wisconsin
13,184	9,843	39	22	374	295	173	124	Wyoming

Age-related Macular Degeneration

Age-related macular degeneration (AMD) is a condition that primarily affects the part of the retina responsible for sharp central vision. There are two forms:

1. **Dry AMD (non-exudative)** is the most common form of the disease. Early AMD involves the presence of drusen, fatty deposits under the light-sensing cells in the retina. Late cases of dry AMD may also involve atrophy of the supportive layer under the light-sensing cells in the retina that helps keep those cells healthy. Vision loss in early dry AMD is usually moderate and only slowly progressive. Atrophy in late cases of dry AMD can result in more significant vision loss.
2. **Wet AMD (exudative)** is less common, but is more threatening to vision. It's called wet AMD because of the growth of tiny new blood vessels (neovascularization) under the retina that leak fluid or break open. This distorts vision and causes scar tissue to form. All cases of the wet form are considered late AMD.

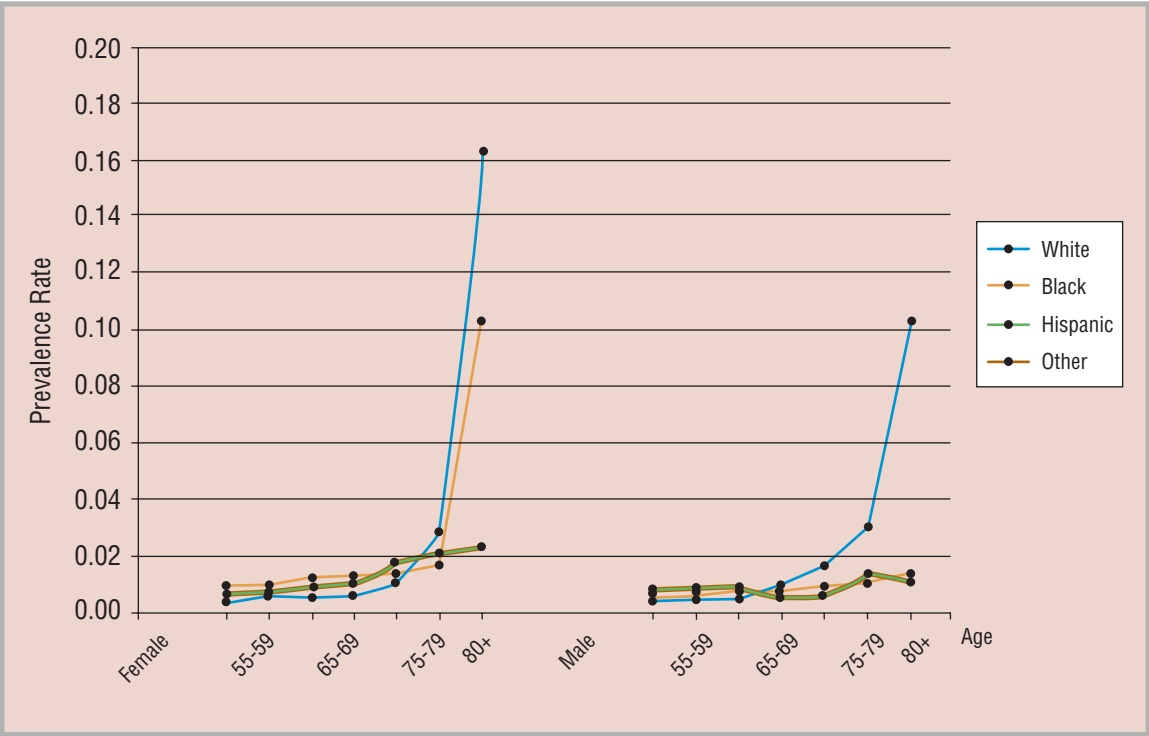
The exact cause of AMD is unknown, but risk factors for the disease include age (rarely affecting those under age 50), White race and cigarette smoking. Research also suggests that long-term diets low in certain antioxidant nutrients may increase the risk of AMD. Because AMD often damages central vision, it is likely the most common cause of legal blindness and vision impairment in older Americans.

Unfortunately, there is no generally-accepted treatment for dry AMD. Laser therapies to destroy leaking blood vessels can help reduce the risk of advancing vision loss in many cases of wet AMD. Research has recently shown that certain doses of zinc, vitamins A and C, and beta-carotene can help control the advance of late AMD, but appear to have no effect in preventing the disease in otherwise healthy individuals.

Only cases of late AMD involving geographic atrophy or neovascularization are included in the prevalence estimates on page 19. Over 2 million Americans age 50 and older have late AMD. Age-specific prevalence rates are initially comparable between races, but advance more significantly for Whites after age 75 (see chart on page 19). In Blacks, the disease is more prevalent in women until about age 75 as well.

Because data are lacking for Hispanics and other races, the rates shown below for these populations are an arithmetic average of the rates for Whites and Blacks.

Estimated Specific Prevalence Rates for AMD



Estimated Number of Cases of Age-related Macular Degeneration in the U.S. Population Age 50 and Older by State, Race and Sex

State	Total	Female	Male	White	Black	Hispanic	Other
Total U.S.	2,074,761	1,367,365	707,396	1,864,742	125,164	53,523	31,331
Alabama	31,769	21,482	10,287	26,877	4,678	99	114
Alaska	1,994	1,153	841	1,696	39	26	232
Arizona	39,012	24,252	14,760	36,156	483	1,744	628
Arkansas	21,130	13,983	7,147	19,356	1,602	91	81
California	202,413	131,725	70,688	168,061	8,192	14,937	11,223
Colorado	25,208	16,079	9,129	23,434	462	1,051	262
Connecticut	31,393	21,038	10,355	29,728	1,054	432	179
Delaware	6,136	4,019	2,117	5,513	538	42	44
District of Columbia	3,264	2,485	779	1,235	1,932	62	35
Florida	160,481	101,723	58,758	144,711	7,580	7,341	849
Georgia	45,091	30,594	14,497	36,941	7,389	382	379
Hawaii	5,651	3,639	2,012	2,707	42	108	2,794
Idaho	9,407	5,869	3,539	9,240	9	96	62
Illinois	90,175	60,877	29,298	80,759	6,644	1,740	1,032
Indiana	46,313	30,807	15,506	44,076	1,840	253	143
Iowa	28,346	18,753	9,593	28,034	162	83	67
Kansas	22,430	14,733	7,696	21,592	503	206	129
Kentucky	29,330	19,321	10,009	28,069	1,113	72	76
Louisiana	28,308	19,199	9,109	22,870	5,035	240	164
Maine	11,498	7,382	4,116	11,435	18	16	30
Maryland	36,784	24,746	12,038	30,559	5,324	333	569
Massachusetts	55,321	37,101	18,219	53,196	1,149	508	467
Michigan	75,235	49,915	25,320	69,165	5,226	409	436
Minnesota	39,250	25,571	13,678	38,555	297	123	274
Mississippi	18,368	12,664	5,704	14,616	3,631	61	60
Missouri	45,172	29,844	15,329	42,524	2,293	162	193
Montana	7,501	4,687	2,814	7,367	8	27	99
Nebraska	14,625	9,554	5,071	14,283	190	94	58
Nevada	12,674	7,607	5,068	11,315	482	493	384
New Hampshire	9,667	6,168	3,498	9,582	21	27	37
New Jersey	67,657	45,463	22,194	60,498	4,158	1,894	1,107
New Mexico	10,580	6,692	3,888	8,490	119	1,635	336
New York	143,783	97,080	46,703	124,378	11,596	5,155	2,653
North Carolina	56,515	38,065	18,450	48,840	6,976	286	412
North Dakota	6,093	3,984	2,109	6,035	3	8	46
Ohio	92,504	61,672	30,831	86,686	5,175	309	334
Oklahoma	25,433	16,391	9,042	23,720	831	187	694
Oregon	28,737	18,357	10,380	27,982	180	244	331
Pennsylvania	121,472	81,714	39,758	115,099	5,340	537	495
Rhode Island	10,349	6,991	3,359	10,045	139	113	52
South Carolina	27,852	18,827	9,026	22,914	4,721	108	109
South Dakota	6,995	4,541	2,454	6,888	8	14	85
Tennessee	40,744	27,128	13,616	37,192	3,272	134	146
Texas	110,852	72,234	38,618	91,511	7,652	10,340	1,349
Utah	11,659	7,174	4,485	11,296	32	205	127
Vermont	4,953	3,148	1,804	4,921	7	11	14
Virginia	47,199	31,398	15,802	40,693	5,469	387	650
Washington	42,997	27,523	15,475	41,030	518	414	1,036
West Virginia	15,974	10,340	5,633	15,600	311	29	34
Wisconsin	44,996	29,532	15,464	43,888	709	201	197
Wyoming	3,471	2,142	1,329	3,385	11	50	24

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
1,209,314	655,429	101,941	23,223	35,324	18,200	20,786	10,545	Total U.S.
17,470	9,407	3,874	804	62	37	76	38	Alabama
955	741	28	11	16	10	154	79	Alaska
22,324	13,832	370	113	1,130	614	427	201	Arizona
12,543	6,813	1,331	271	55	36	54	28	Arkansas
107,798	60,263	6,570	1,623	9,865	5,072	7,492	3,731	California
14,874	8,560	353	108	675	376	177	85	Colorado
19,779	9,949	855	199	289	143	114	65	Connecticut
3,531	1,982	433	105	26	15	29	15	Delaware
784	451	1,634	298	43	19	24	11	District of Columbia
90,169	54,542	6,024	1,556	4,967	2,374	563	287	Florida
24,083	12,857	6,035	1,354	233	150	243	136	Georgia
1,624	1,083	29	13	71	37	1,915	878	Hawaii
5,764	3,476	6	3	57	39	41	21	Idaho
53,703	27,055	5,408	1,236	1,090	650	676	357	Illinois
29,065	15,012	1,493	347	155	98	94	49	Indiana
18,531	9,503	127	35	51	32	44	23	Iowa
14,115	7,476	404	99	129	77	84	45	Kansas
18,315	9,754	911	202	44	28	50	26	Kentucky
14,838	8,032	4,093	941	163	77	104	60	Louisiana
7,339	4,097	13	5	11	5	20	10	Maine
19,864	10,694	4,286	1,038	226	107	370	199	Maryland
35,532	17,664	927	222	342	167	301	167	Massachusetts
45,121	24,044	4,255	970	256	153	282	153	Michigan
25,094	13,462	223	75	75	48	180	94	Minnesota
9,608	5,008	2,977	654	38	23	40	20	Mississippi
27,732	14,792	1,880	413	104	58	128	65	Missouri
4,598	2,769	6	2	18	9	66	33	Montana
9,308	4,974	150	40	56	37	40	19	Nebraska
6,670	4,645	365	118	311	182	261	123	Nevada
6,112	3,470	15	6	18	9	24	13	New Hampshire
40,101	20,397	3,383	775	1,266	628	713	394	New Jersey
5,301	3,189	90	28	1,072	564	229	107	New Mexico
82,183	42,195	9,618	1,979	3,572	1,583	1,708	946	New York
31,856	16,985	5,764	1,212	169	117	276	136	North Carolina
3,945	2,090	2	1	5	3	32	15	North Dakota
57,030	29,656	4,226	949	198	111	219	114	Ohio
15,144	8,576	665	166	114	72	467	227	Oklahoma
17,847	10,135	140	40	150	94	220	111	Oregon
76,595	38,504	4,453	887	346	191	320	176	Pennsylvania
6,772	3,273	108	31	77	36	33	19	Rhode Island
14,802	8,112	3,884	837	67	41	74	35	South Carolina
4,469	2,419	5	2	9	5	58	27	South Dakota
24,269	12,923	2,681	591	83	52	95	51	Tennessee
58,413	33,098	6,150	1,502	6,800	3,540	871	477	Texas
6,938	4,358	23	9	130	75	83	43	Utah
3,128	1,793	4	2	7	4	9	5	Vermont
26,258	14,436	4,452	1,017	255	131	432	218	Virginia
26,176	14,854	389	129	254	160	705	331	Washington
10,039	5,561	261	50	19	10	22	12	West Virginia
28,720	15,168	557	152	123	78	132	66	Wisconsin
2,086	1,299	9	3	31	19	16	8	Wyoming

Cataract

Cataract is a clouding of the eye's naturally clear lens. Most cataracts appear with advancing age. The exact cause of cataract is unclear, but it may be the result of a lifetime of exposure to ultraviolet radiation contained in sunlight, or may be related to other lifestyle factors such as cigarette smoking, diet and alcohol consumption.

Cataract can also occur at any age as a result of other causes such as eye injury, exposure to toxic substances or radiation, or as a result of other diseases such as diabetes.

Congenital cataracts may even be present at birth due to genetic defects or developmental problems. Cataracts in infants may also result from exposure to diseases such as rubella during pregnancy.

According to the World Health Organization, cataract is the leading cause of blindness in the world. In the United States, cataract is sometimes considered a conquered disease because treatment is widely available that can eliminate vision loss due to the disease. However, cataract still accounts for a significant amount of vision impairment in the U.S., particularly in older people who may have difficulty accessing appropriate eye care due to cost, availability or other barriers.

Treatment of cataract involves removal of the clouded natural lens. The lens is usually replaced with an artificial intraocular lens (IOL) implant. Cataract removal is now one of the most commonly performed surgical procedures with more than a million such surgeries performed each year.

Surgery is not truly a cure for cataract, however, and its success in controlling vision loss comes with a price. It is estimated that the direct annual medical costs for outpatient, inpatient and prescription drug services related to the treatment of cataract total \$6.8 billion.

Ongoing research into the normal healthy functioning of the eye's lens may help us better understand the causes of cataract and how they might be prevented. Even partial achievement of this goal might save hundreds of millions of dollars in the annual costs of treating cataract.

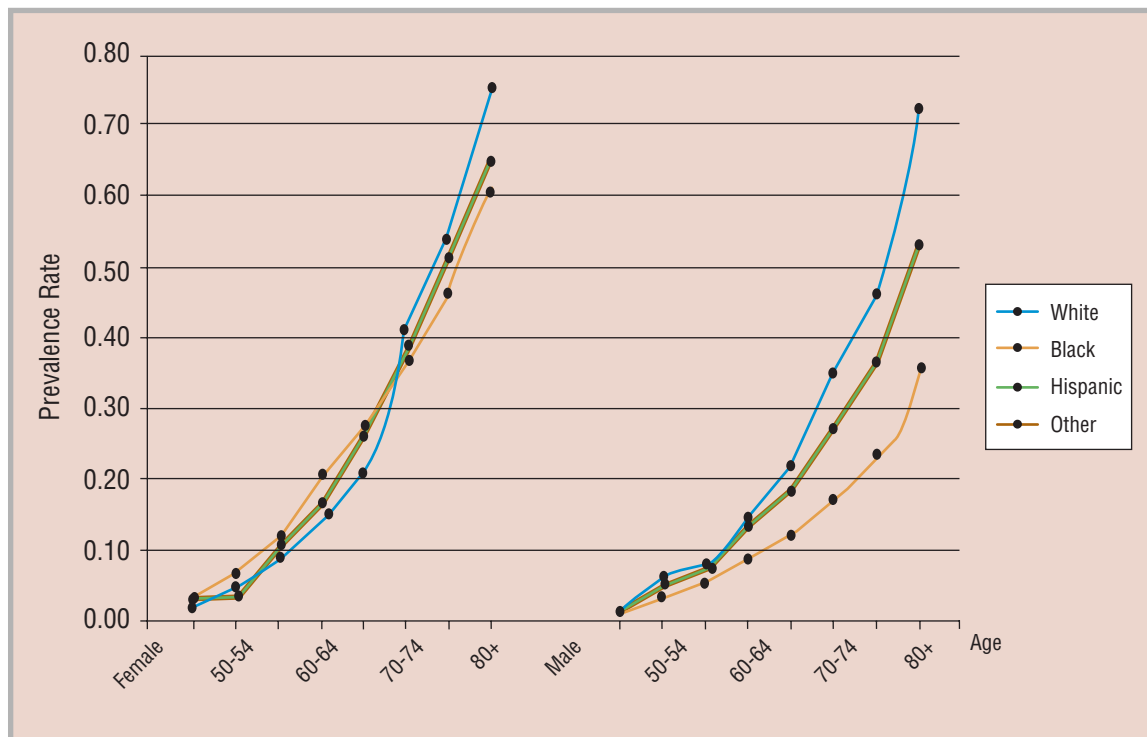
Because of the variety of opacifications possible, cases of cataract can be defined by a number of classification schemes. The cases included in the

prevalence statistics below include cortical cataract affecting 25% or more of the lens, posterior sub-capsular cataract 1mm or larger, and nuclear cataract greater than or equal to the next-to-the-highest grade in the grading system used (generally NII or NIII in the LOCS II grading system).

Cataract affects over 22 million Americans age 40 and older (see table on pages 24 and 25), or about one in every six people in this age range. By age 80, more than half of all Americans have cataract.

Cataract is slightly more common in women than in men (see chart below). It also affects Whites somewhat more frequently than other races, particularly with increasing age.

Estimated Specific Prevalence Rates for Cataract



Estimated Number of Cases of Cataract in the U.S. Population Age 40 and Older by State, Race and Sex

State	Total	Female	Male	White	Black	Hispanic	Other
Total U.S.	22,325,926	13,699,339	8,626,587	18,570,408	1,717,309	1,292,613	745,595
Alabama	355,415	223,012	132,403	288,569	61,796	2,443	2,607
Alaska	29,476	16,225	13,251	22,823	629	575	5,448
Arizona	432,921	255,619	177,302	369,026	7,121	41,895	14,879
Arkansas	227,089	139,834	87,255	202,444	20,557	2,210	1,878
California	2,361,455	1,433,287	928,168	1,616,678	113,509	360,624	270,643
Colorado	287,678	171,115	116,563	249,318	6,858	25,323	6,179
Connecticut	304,151	189,004	115,147	274,923	14,825	10,208	4,195
Delaware	66,182	40,368	25,814	56,677	7,490	995	1,021
District of Columbia	38,536	25,678	12,857	12,202	24,051	1,465	818
Florida	1,701,548	1,024,589	676,959	1,389,852	109,924	182,089	19,684
Georgia	526,081	328,518	197,563	406,598	101,408	9,400	8,675
Hawaii	101,131	62,426	38,706	27,783	640	2,571	70,138
Idaho	99,393	58,047	41,346	95,490	154	2,289	1,459
Illinois	942,405	587,506	354,899	783,984	93,145	41,341	23,934
Indiana	480,044	296,478	183,566	445,336	25,286	6,138	3,284
Iowa	270,038	165,705	104,332	264,197	2,288	2,022	1,531
Kansas	221,576	134,942	86,634	206,646	6,938	5,010	2,983
Kentucky	319,339	196,262	123,076	301,008	14,837	1,753	1,740
Louisiana	319,320	200,397	118,923	240,511	69,172	5,834	3,803
Maine	119,018	71,713	47,305	117,715	253	382	669
Maryland	399,315	248,517	150,799	302,886	75,100	7,995	13,334
Massachusetts	542,352	337,194	205,158	503,051	16,088	11,988	11,225
Michigan	781,698	480,261	301,437	691,057	70,682	9,825	10,134
Minnesota	392,007	236,304	155,703	377,988	4,646	2,986	6,387
Mississippi	208,550	132,107	76,443	156,887	48,765	1,493	1,405
Missouri	470,051	289,152	180,898	430,135	31,489	3,931	4,495
Montana	78,906	46,195	32,712	75,863	110	641	2,292
Nebraska	144,457	87,925	56,532	138,083	2,769	2,275	1,330
Nevada	156,188	89,363	66,825	127,908	7,445	11,864	8,971
New Hampshire	101,420	60,339	41,081	99,595	338	635	852
New Jersey	702,942	438,929	264,012	573,311	58,497	45,198	25,936
New Mexico	137,271	82,196	55,076	87,925	1,725	39,683	7,939
New York	1,534,750	964,751	570,000	1,191,491	158,008	122,458	62,794
North Carolina	624,510	390,072	234,438	515,526	92,332	7,086	9,566
North Dakota	58,147	35,272	22,875	56,821	55	204	1,067
Ohio	945,043	585,844	359,199	859,177	70,669	7,459	7,737
Oklahoma	279,621	169,960	109,661	246,980	11,672	4,469	16,499
Oregon	290,512	173,287	117,225	274,398	2,464	5,830	7,821
Pennsylvania	1,176,500	734,496	442,004	1,082,486	69,615	12,845	11,554
Rhode Island	96,735	60,551	36,184	90,767	2,050	2,681	1,237
South Carolina	313,574	196,158	117,416	245,858	62,613	2,635	2,468
South Dakota	67,672	40,813	26,859	65,218	118	342	1,994
Tennessee	449,681	278,439	171,242	398,699	44,394	3,270	3,318
Texas	1,354,576	823,527	531,049	966,484	107,883	249,226	30,983
Utah	128,576	75,035	53,541	120,127	498	4,932	3,019
Vermont	52,086	30,964	21,122	51,379	116	282	309
Virginia	527,702	324,546	203,156	429,402	74,130	9,188	14,982
Washington	451,135	268,260	182,875	409,338	7,525	9,867	24,404
West Virginia	168,516	102,477	66,039	163,233	3,799	713	772
Wisconsin	450,030	273,301	176,729	429,864	10,677	4,838	4,651
Wyoming	38,608	22,381	16,226	36,693	155	1,208	553

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
11,258,602	7,311,806	1,194,031	523,278	788,369	504,245	458,337	287,258	Total U.S.
176,356	112,213	43,658	18,138	1,402	1,041	1,595	1,012	Alabama
12,165	10,658	385	244	324	252	3,351	2,098	Alaska
216,650	152,376	4,585	2,536	25,027	16,868	9,357	5,522	Arizona
123,037	79,407	14,444	6,113	1,208	1,002	1,145	733	Arkansas
969,322	647,356	76,813	36,696	219,693	140,932	167,459	103,184	California
147,802	101,516	4,431	2,427	15,002	10,322	3,880	2,299	Colorado
169,862	105,061	10,371	4,454	6,310	3,898	2,461	1,734	Connecticut
34,054	22,622	5,135	2,355	571	424	608	413	Delaware
7,055	5,146	17,146	6,906	946	519	532	286	District of Columbia
823,240	566,611	75,014	34,910	114,300	67,789	12,034	7,649	Florida
246,892	159,706	71,357	30,051	5,158	4,242	5,111	3,564	Georgia
15,617	12,165	347	294	1,562	1,008	44,899	25,239	Hawaii
55,829	39,661	85	70	1,235	1,054	898	561	Idaho
484,151	299,833	65,120	28,025	23,698	17,643	14,537	9,397	Illinois
273,676	171,660	17,384	7,902	3,432	2,706	1,986	1,298	Indiana
162,145	102,052	1,496	792	1,141	881	924	607	Iowa
125,583	81,063	4,683	2,255	2,878	2,132	1,799	1,184	Kansas
183,949	117,059	10,269	4,568	982	771	1,062	678	Kentucky
146,380	94,131	48,086	21,087	3,708	2,125	2,223	1,580	Louisiana
70,916	46,798	146	107	234	148	417	252	Maine
183,487	119,400	52,059	23,041	4,998	2,997	7,973	5,361	Maryland
312,044	191,007	11,077	5,011	7,427	4,560	6,646	4,579	Massachusetts
419,869	271,188	48,701	21,981	5,653	4,171	6,038	4,096	Michigan
227,821	150,167	2,973	1,673	1,643	1,343	3,867	2,520	Minnesota
96,338	60,550	34,040	14,725	864	629	865	540	Mississippi
261,996	168,139	22,090	9,400	2,314	1,617	2,753	1,743	Missouri
44,314	31,549	65	46	387	254	1,429	863	Montana
83,987	54,096	1,864	904	1,238	1,037	835	495	Nebraska
72,111	55,797	4,779	2,666	6,830	5,034	5,643	3,328	Nevada
59,244	40,351	201	136	387	249	506	345	New Hampshire
354,549	218,761	40,940	17,557	28,000	17,198	15,440	10,495	New Jersey
51,995	35,930	1,090	636	24,088	15,594	5,023	2,916	New Mexico
734,747	456,744	113,328	44,680	79,353	43,105	37,323	25,471	New York
315,177	200,349	65,188	27,144	3,761	3,325	5,946	3,620	North Carolina
34,445	22,377	28	27	120	83	679	388	North Dakota
527,838	331,339	48,919	21,750	4,394	3,065	4,692	3,045	Ohio
149,185	97,795	7,940	3,733	2,488	1,981	10,348	6,151	Oklahoma
163,638	110,759	1,584	880	3,255	2,575	4,810	3,011	Oregon
670,759	411,726	49,229	20,386	7,636	5,209	6,871	4,683	Pennsylvania
56,768	33,999	1,360	690	1,690	991	732	504	Rhode Island
149,162	96,696	43,965	18,648	1,482	1,153	1,549	919	South Carolina
39,284	25,934	62	56	200	142	1,268	727	South Dakota
243,426	155,272	31,182	13,213	1,831	1,439	2,000	1,318	Tennessee
579,255	387,229	74,198	33,685	151,607	97,619	18,467	12,516	Texas
70,065	50,063	284	213	2,865	2,067	1,821	1,197	Utah
30,552	20,828	64	52	170	112	178	130	Vermont
258,657	170,745	51,121	23,009	5,563	3,625	9,205	5,778	Virginia
242,645	166,693	4,665	2,860	5,487	4,380	15,462	8,943	Washington
98,918	64,315	2,674	1,125	427	286	458	314	West Virginia
260,400	169,464	7,314	3,363	2,701	2,137	2,886	1,765	Wisconsin
21,243	15,449	94	61	697	511	347	206	Wyoming

Diabetic Retinopathy

Diabetic retinopathy is a common complication of diabetes. It affects the tiny blood vessels of the retina. Retinal blood vessels can break down, leak or become blocked— affecting and impairing vision over time. In some people with diabetic retinopathy, serious damage to the eye can occur when abnormal new blood vessels grow on the surface of the retina.

Diabetic retinopathy can affect almost anyone with diabetes. The U.S. Centers for Disease Control and Prevention (CDC) estimate that 10.3 million Americans have diagnosed diabetes, while an additional 5.4 million have diabetes that has not been diagnosed.

In general, the longer someone has diabetes, the greater the risk of developing diabetic retinopathy. Eventually, almost everyone with juvenile-onset diabetes will develop some signs of diabetic retinopathy. Those who acquire diabetes later in life are also at risk of diabetic retinopathy, although they are somewhat less likely to develop advanced diabetic retinopathy.

Diabetes also increases the risk of other eye diseases such as cataract and glaucoma. Because of its dangers to good vision, people with diabetes are urged to seek annual dilated eye exams.

Research suggests that the risk of diabetic retinopathy can be reduced through careful control of blood sugar. People with diabetes are also encouraged to control their blood pressure.

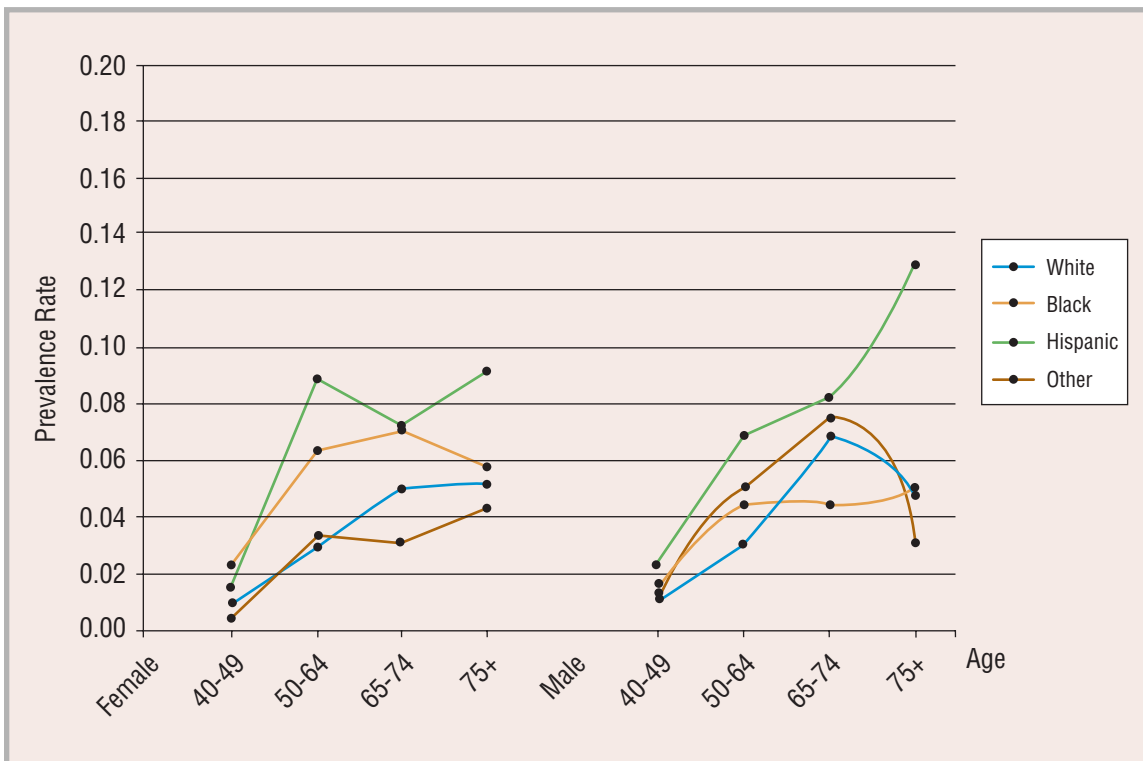
Laser treatment, called photocoagulation, has been shown to reduce the risk of sight loss in advanced cases of diabetic retinopathy. Focal photocoagulation can be used to destroy leaking blood vessels. Scatter photocoagulation, where a large number of spots are destroyed by the laser, is used to control the growth of abnormal blood vessels. In some cases vitrectomy, a surgical procedure to remove clouded fluid and gel from inside the eye, can help.

The prevalence estimates for cases of diabetic retinopathy on pages 28 and 29 include those with mild or worse retinopathy (grade 14 or higher based on fundus photographs), including definite non-proliferative retinopathy (e.g., microaneurysms, blot hemorrhages), macular edema or proliferative changes.

Diabetic retinopathy affects over 4.4 million Americans age 40 and older. Prior to age 40, diabetic retinopathy affects Whites more frequently than other races. In later decades, Hispanics are most commonly affected by the disease.

Due to a lack of information about diabetic retinopathy in other races, the prevalence estimates for "other" races are the arithmetic average of those for Whites, Blacks and Hispanics.

Estimated Specific Prevalence Rates for Diabetic Retinopathy



Estimated Number of Cases of Diabetic Retinopathy in the U.S. Population Age 40 and Older by State, Race and Sex

State	Total	Female	Male	White	Black	Hispanic	Other
Total U.S..	4,482,885	2,300,979	2,181,905	3,122,598	538,896	633,375	188,016
Alabama	70,621	37,656	32,965	50,153	18,508	1,219	740
Alaska	7,610	3,291	4,319	5,495	260	384	1,472
Arizona	88,026	43,480	44,545	60,547	2,423	21,254	3,803
Arkansas	42,305	21,701	20,604	34,364	6,176	1,245	520
California	549,217	276,966	272,252	268,915	36,052	179,990	64,261
Colorado	63,132	30,868	32,264	46,526	2,378	12,603	1,625
Connecticut	55,483	28,882	26,600	44,050	4,789	5,444	1,199
Delaware	12,824	6,638	6,186	9,549	2,449	546	280
District of Columbia	9,471	5,667	3,804	2,161	6,368	742	200
Florida	328,595	170,017	158,579	210,842	35,816	76,580	5,358
Georgia	117,292	61,974	55,318	75,098	34,157	5,414	2,624
Hawaii	20,531	9,609	10,922	5,163	252	1,335	13,781
Idaho	18,776	8,925	9,850	16,993	62	1,342	379
Illinois	187,928	97,924	90,004	130,195	28,686	22,582	6,465
Indiana	88,257	44,901	43,356	76,328	7,753	3,236	941
Iowa	44,851	22,470	22,380	42,520	770	1,111	449
Kansas	39,555	19,799	19,755	33,917	2,181	2,608	848
Kentucky	59,863	30,192	29,671	53,838	4,589	932	504
Louisiana	67,106	36,243	30,863	41,865	21,575	2,606	1,060
Maine	20,926	10,271	10,655	20,444	93	191	198
Maryland	84,663	45,358	39,305	51,893	24,996	4,185	3,590
Massachusetts	96,239	49,506	46,733	81,520	5,230	6,512	2,977
Michigan	147,805	75,916	71,889	118,178	21,693	5,061	2,872
Minnesota	70,223	34,358	35,865	64,807	1,873	1,728	1,816
Mississippi	43,345	23,560	19,785	27,219	15,021	728	377
Missouri	85,696	43,914	41,783	72,797	9,696	1,990	1,214
Montana	14,446	6,843	7,602	13,433	38	334	640
Nebraska	25,185	12,587	12,598	22,631	914	1,266	374
Nevada	34,547	16,361	18,186	23,438	2,427	6,391	2,291
New Hampshire	18,752	9,072	9,680	18,019	131	352	250
New Jersey	140,099	73,503	66,596	91,845	18,245	22,721	7,288
New Mexico	35,727	18,040	17,688	15,170	549	17,986	2,022
New York	315,153	168,332	146,821	191,874	48,007	58,561	16,711
North Carolina	124,896	65,717	59,180	89,749	28,293	4,217	2,637
North Dakota	9,547	4,696	4,851	9,115	28	105	299
Ohio	171,467	88,715	82,752	144,515	21,068	3,731	2,153
Oklahoma	52,321	26,023	26,298	41,974	3,744	2,512	4,091
Oregon	53,012	25,813	27,198	46,786	834	3,354	2,037
Pennsylvania	200,754	104,511	96,243	170,715	20,143	6,709	3,187
Rhode Island	16,579	8,613	7,967	14,127	686	1,437	329
South Carolina	64,714	34,646	30,068	43,272	19,310	1,427	704
South Dakota	11,259	5,489	5,770	10,499	48	173	539
Tennessee	87,753	45,260	42,493	70,806	14,162	1,802	982
Texas	337,117	173,019	164,098	171,077	35,568	121,459	9,012
Utah	25,255	12,129	13,126	21,629	186	2,657	783
Vermont	9,545	4,630	4,915	9,280	45	125	96
Virginia	109,608	56,677	52,932	77,193	23,011	5,227	4,177
Washington	87,169	42,001	45,168	72,514	2,741	5,685	6,229
West Virginia	29,685	14,761	14,924	28,114	1,050	311	210
Wisconsin	80,310	39,848	40,462	72,610	3,769	2,665	1,266
Wyoming	7,644	3,606	4,038	6,839	51	600	154

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
1,545,887	1,576,711	342,059	196,837	333,815	299,561	79,219	108,797	Total U.S.
24,837	25,317	11,922	6,586	587	632	311	430	Alabama
2,350	3,145	142	117	194	189	605	867	Alaska
29,418	31,128	1,393	1,030	11,020	10,234	1,649	2,154	Arizona
16,970	17,394	3,925	2,251	589	656	218	302	Arkansas
131,859	137,055	22,197	13,856	95,159	84,831	27,751	36,510	California
22,373	24,153	1,360	1,017	6,432	6,171	702	923	Colorado
22,373	21,676	3,072	1,718	2,970	2,475	468	732	Connecticut
4,708	4,842	1,544	906	274	272	114	166	Delaware
995	1,165	4,177	2,191	404	338	90	110	District of Columbia
104,179	106,663	22,365	13,451	41,226	35,353	2,246	3,112	Florida
36,694	38,403	21,765	12,392	2,491	2,923	1,024	1,600	Georgia
2,340	2,823	116	136	710	624	6,443	7,338	Hawaii
8,100	8,893	29	33	635	707	161	217	Idaho
65,436	64,759	18,570	10,116	11,284	11,298	2,634	3,831	Illinois
38,074	38,254	4,887	2,866	1,557	1,679	383	558	Indiana
21,303	21,218	447	323	536	575	185	264	Iowa
16,844	17,073	1,329	853	1,283	1,325	343	505	Kansas
26,673	27,165	2,876	1,713	438	494	205	300	Kentucky
20,673	21,192	13,758	7,817	1,397	1,209	416	644	Louisiana
10,040	10,404	45	47	103	88	83	115	Maine
25,668	26,225	15,969	9,027	2,262	1,923	1,459	2,131	Maryland
41,474	40,046	3,263	1,967	3,589	2,923	1,180	1,797	Massachusetts
58,452	59,726	13,800	7,893	2,523	2,538	1,141	1,732	Michigan
31,756	33,051	1,048	824	821	907	733	1,083	Minnesota
13,486	13,732	9,564	5,457	347	381	162	214	Mississippi
36,154	36,643	6,245	3,451	1,008	982	506	708	Missouri
6,383	7,050	18	20	178	156	264	376	Montana
11,272	11,359	556	358	599	667	160	214	Nebraska
10,734	12,704	1,434	993	3,192	3,199	1,002	1,289	Nevada
8,716	9,303	69	62	188	164	99	151	New Hampshire
46,659	45,186	11,757	6,488	12,237	10,484	2,850	4,438	New Jersey
7,384	7,787	304	245	9,467	8,519	885	1,137	New Mexico
97,137	94,737	31,606	16,401	32,976	25,585	6,613	10,099	New York
44,618	45,131	18,122	10,171	1,878	2,339	1,099	1,538	North Carolina
4,501	4,614	12	16	54	51	129	170	North Dakota
72,516	71,999	13,416	7,652	1,907	1,824	876	1,278	Ohio
20,746	21,228	2,308	1,436	1,217	1,295	1,752	2,340	Oklahoma
22,878	23,908	465	369	1,611	1,743	860	1,178	Oregon
86,739	83,976	13,018	7,126	3,482	3,228	1,273	1,914	Pennsylvania
7,276	6,851	409	277	797	640	131	198	Rhode Island
21,304	21,968	12,372	6,938	671	756	299	405	South Carolina
5,153	5,346	21	28	85	88	231	308	South Dakota
34,967	35,840	9,056	5,106	842	960	395	588	Tennessee
83,320	87,756	22,199	13,369	63,925	57,534	3,574	5,438	Texas
10,379	11,249	91	95	1,327	1,330	332	451	Utah
4,506	4,774	22	23	65	60	38	58	Vermont
37,707	39,486	14,462	8,548	2,760	2,467	1,747	2,431	Virginia
35,008	37,506	1,491	1,250	2,775	2,910	2,727	3,502	Washington
13,869	14,245	650	400	158	153	84	126	West Virginia
35,671	36,939	2,368	1,401	1,286	1,379	523	743	Wisconsin
3,216	3,623	26	25	298	302	66	88	Wyoming

Glaucoma

Glaucoma is a disease that causes a gradual degeneration of cells that make up the optic nerve, which carries visual information from the eye to the brain. As the nerve cells die, vision is slowly lost, usually beginning in the periphery. Often, the loss of vision is unnoticeable until a significant amount of nerve damage has occurred. For this reason, as many as half of all people with glaucoma may be unaware of their disease.

The exact cause of primary open-angle glaucoma, the most common form of the disease, is uncertain. Other forms of glaucoma (such as angle-closure, secondary and congenital glaucoma) occur in relation to specific physical causes.

Elevated fluid pressure within the eye (intraocular pressure) seems related in some way to all cases of glaucoma. The majority of cases of glaucoma exhibit intraocular pressure outside normal limits at some time. However, even those cases with apparently normal pressure seem to benefit from treatment aimed at lowering pressure.

Most cases of glaucoma can be controlled and vision loss slowed or halted by treatment. Medications, laser treatments and surgery can be used to lower intraocular pressure. However, any vision lost to glaucoma cannot be restored.

Unfortunately, glaucoma cannot be prevented. Factors that increase the risk of glaucoma include age, race, diabetes, eye trauma and long-term use of steroid medications.

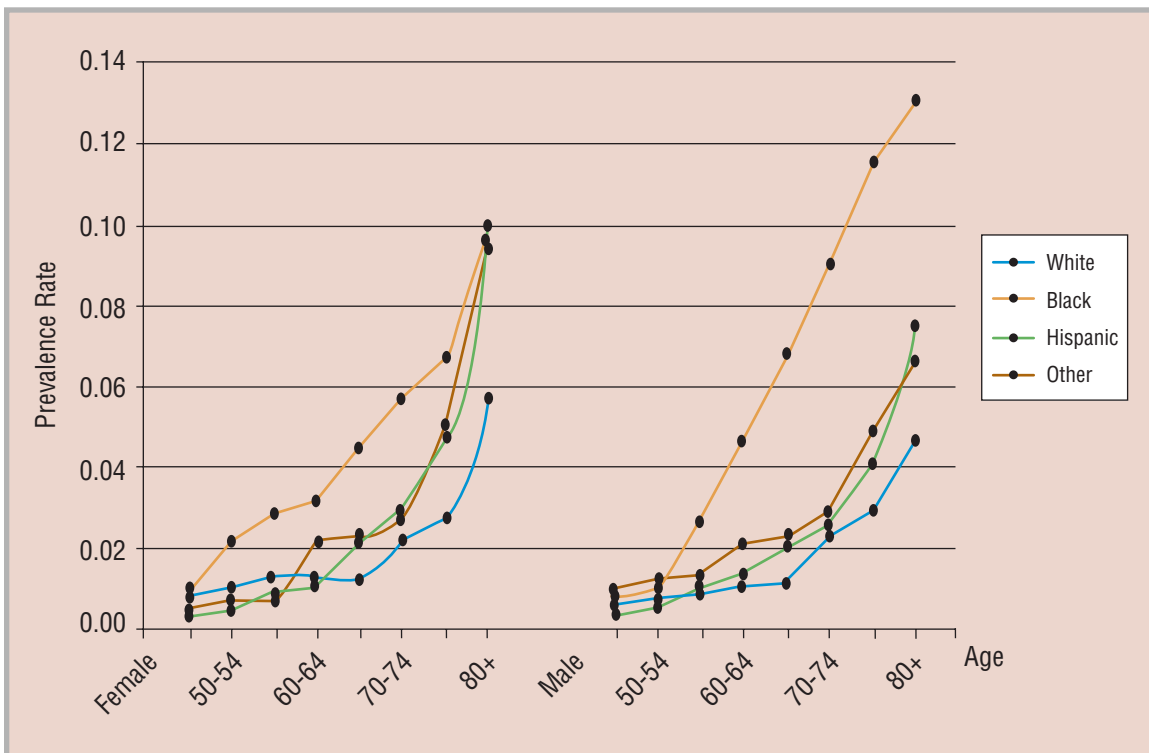
Glaucoma is traditionally defined by a triad of signs, including the presence of at least two of the following: elevated intraocular pressure, optic disc cupping and visual field loss. However, case definitions used in the various epidemiologic studies of the disease have differed on specific criteria. Only cases of primary open-angle glaucoma that had clear signs of optic nerve head damage and/or reproducible visual field loss (definite open-angle glaucoma) are included in the prevalence estimates.

The table on pages 32 and 33 lists state-by-state prevalence estimates for glaucoma by race and sex. Glaucoma affects almost 2.3 million Americans age 40 and older, or about 1.9% of this population. Glaucoma prevalence is clearly related to age and race (on p. 31). In general, glaucoma is more common in Blacks, Hispanics and with increasing age.

In the 65-69 age group, the prevalence rate for White females is about 1.6%, while in Black females the rate is almost three times higher at 4.6%. For those age 80 and older, glaucoma affects more than 10% of Black men and Hispanic women.

Glaucoma appears to be more common initially in women, but by age 65, prevalence becomes more comparable between the sexes.

Estimated Specific Prevalence Rates for Open-Angle Glaucoma

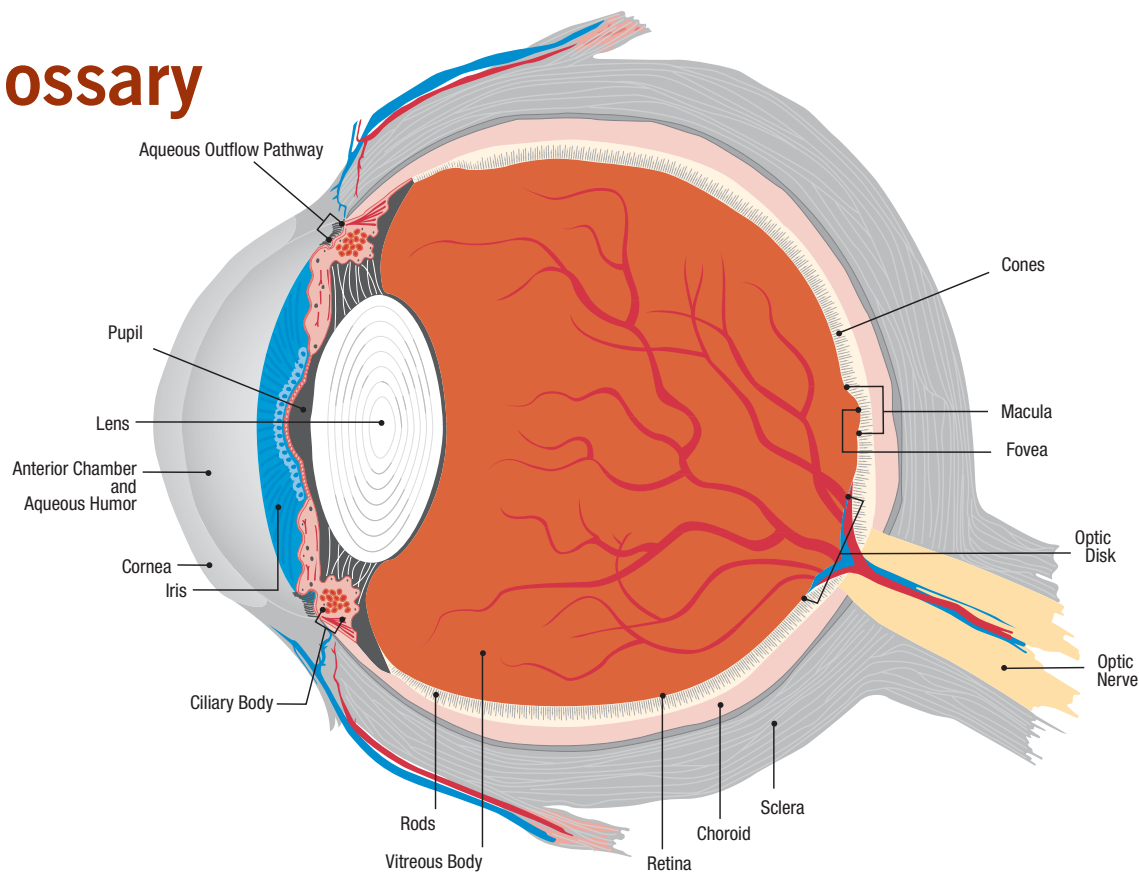


Estimated Number of Cases of Definite Primary Open Angle Glaucoma in the U.S. Population Age 40 and Older by State, Race and Sex

State	Total	Female	Male	White	Black	Hispanic	Other
Total U.S.	2,290,846	1,388,698	902,148	1,589,670	440,861	153,860	106,455
Alabama	40,621	24,489	16,131	24,387	15,548	297	389
Alaska	3,281	1,858	1,424	2,230	184	70	798
Arizona	39,674	23,485	16,189	30,660	1,926	4,963	2,125
Arkansas	22,742	13,813	8,929	17,007	5,189	269	277
California	249,602	148,472	101,130	139,063	29,533	43,221	37,785
Colorado	27,989	16,870	11,119	22,197	1,860	3,026	906
Connecticut	29,434	18,367	11,068	23,737	3,834	1,225	638
Delaware	7,037	4,207	2,830	4,801	1,968	120	149
District of Columbia	7,157	4,111	3,046	1,062	5,804	176	115
Florida	166,640	99,070	67,570	113,539	28,847	21,402	2,853
Georgia	64,469	38,861	25,608	35,475	26,506	1,156	1,331
Hawaii	12,317	7,221	5,096	2,459	189	305	9,364
Idaho	8,832	5,308	3,525	8,298	46	278	211
Illinois	99,577	60,820	38,756	67,449	23,737	4,929	3,462
Indiana	46,142	28,511	17,630	38,416	6,488	742	495
Iowa	23,651	14,814	8,837	22,559	612	248	232
Kansas	20,611	12,681	7,931	17,758	1,799	607	447
Kentucky	30,265	18,699	11,566	25,995	3,797	211	262
Louisiana	39,541	23,522	16,019	20,581	17,712	689	559
Maine	10,374	6,422	3,952	10,154	72	46	102
Maryland	48,909	29,234	19,675	26,317	19,686	968	1,937
Massachusetts	50,610	31,770	18,841	43,329	4,183	1,441	1,658
Michigan	80,583	48,971	31,612	59,827	18,059	1,177	1,520
Minnesota	35,695	22,046	13,649	33,037	1,323	369	966
Mississippi	26,059	15,552	10,507	13,237	12,436	180	205
Missouri	45,943	28,233	17,710	36,797	8,019	472	655
Montana	7,009	4,217	2,793	6,564	31	76	338
Nebraska	13,013	8,043	4,970	11,807	731	278	198
Nevada	15,517	8,789	6,728	10,859	1,999	1,410	1,249
New Hampshire	9,118	5,609	3,509	8,814	97	77	130
New Jersey	73,158	44,851	28,307	48,990	14,959	5,348	3,861
New Mexico	13,754	8,157	5,596	7,463	459	4,688	1,143
New York	164,395	101,075	63,320	101,305	39,592	14,374	9,123
North Carolina	69,683	42,199	27,484	44,002	23,381	884	1,416
North Dakota	5,045	3,135	1,911	4,843	17	25	160
Ohio	93,852	57,763	36,089	73,894	17,918	894	1,146
Oklahoma	26,767	16,185	10,582	20,861	3,038	537	2,332
Oregon	26,212	15,953	10,258	23,700	662	715	1,135
Pennsylvania	112,325	70,012	42,313	91,756	17,321	1,544	1,705
Rhode Island	8,852	5,610	3,242	7,800	545	325	182
South Carolina	37,509	22,413	15,096	20,922	15,898	321	367
South Dakota	5,923	3,651	2,272	5,552	35	42	294
Tennessee	46,496	28,436	18,061	34,186	11,407	401	502
Texas	145,790	86,920	58,870	83,327	28,242	29,566	4,655
Utah	11,648	6,971	4,677	10,470	142	594	442
Vermont	4,631	2,844	1,786	4,513	34	35	48
Virginia	59,790	35,730	24,060	37,404	19,063	1,114	2,209
Washington	42,820	25,876	16,944	36,025	2,095	1,204	3,497
West Virginia	14,954	9,210	5,744	13,828	929	86	111
Wisconsin	41,344	25,566	15,778	37,194	2,868	589	693
Wyoming	3,486	2,080	1,406	3,218	42	144	81

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
991,193	598,477	247,981	192,881	89,804	64,056	59,721	46,735	Total U.S.
15,222	9,165	8,886	6,661	163	134	218	171	Alabama
1,281	948	93	91	37	33	446	351	Alaska
18,453	12,206	981	945	2,830	2,134	1,221	904	Arizona
10,566	6,441	2,953	2,236	139	130	154	123	Arkansas
85,909	53,154	16,000	13,533	25,201	18,020	21,362	16,424	California
13,680	8,517	955	904	1,716	1,310	519	387	Colorado
15,119	8,618	2,183	1,651	724	501	340	298	Connecticut
2,967	1,835	1,094	874	65	54	81	68	Delaware
634	427	3,299	2,505	109	67	69	46	District of Columbia
68,678	44,860	15,849	12,997	12,948	8,454	1,595	1,258	Florida
22,174	13,301	15,371	11,135	600	556	715	616	Georgia
1,436	1,023	81	107	176	129	5,527	3,837	Hawaii
5,027	3,271	20	26	142	136	119	92	Idaho
42,818	24,631	13,409	10,328	2,677	2,252	1,916	1,546	Illinois
24,260	14,157	3,584	2,905	395	347	273	221	Indiana
14,234	8,325	319	293	133	115	128	104	Iowa
11,127	6,631	974	825	333	274	246	201	Kansas
16,322	9,673	2,120	1,677	112	99	145	117	Kentucky
12,846	7,735	9,956	7,756	423	267	297	262	Louisiana
6,304	3,850	33	39	27	19	58	44	Maine
16,461	9,857	11,133	8,554	578	390	1,062	874	Maryland
27,684	15,645	2,338	1,845	855	586	893	764	Massachusetts
37,456	22,371	10,046	8,014	645	531	824	697	Michigan
20,617	12,419	705	618	193	176	530	436	Minnesota
8,298	4,939	7,039	5,398	100	81	115	90	Mississippi
23,041	13,756	4,561	3,459	265	207	366	289	Missouri
3,968	2,596	13	17	44	32	191	147	Montana
7,390	4,418	396	334	144	134	113	84	Nebraska
6,299	4,559	1,001	998	770	640	718	531	Nevada
5,447	3,366	46	51	45	32	71	60	New Hampshire
31,131	17,860	8,464	6,495	3,171	2,177	2,085	1,776	New Jersey
4,539	2,924	224	236	2,733	1,955	661	482	New Mexico
64,120	37,185	23,094	16,498	8,945	5,428	4,915	4,208	New York
27,577	16,425	13,374	10,007	445	439	803	613	North Carolina
3,020	1,823	8	10	14	11	93	68	North Dakota
46,669	27,225	9,955	7,962	503	391	636	510	Ohio
12,903	7,958	1,663	1,374	281	255	1,337	995	Oklahoma
14,601	9,099	336	326	378	336	638	496	Oregon
58,322	33,434	9,886	7,435	879	665	925	780	Pennsylvania
5,023	2,777	292	253	197	128	98	83	Rhode Island
13,000	7,922	9,030	6,868	172	149	211	156	South Carolina
3,443	2,109	14	21	23	18	170	124	South Dakota
21,404	12,783	6,542	4,865	214	187	276	226	Tennessee
51,423	31,904	15,792	12,450	17,185	12,381	2,520	2,135	Texas
6,335	4,135	64	78	328	265	244	199	Utah
2,783	1,731	15	19	21	15	26	22	Vermont
23,246	14,158	10,600	8,464	641	473	1,244	965	Virginia
22,174	13,852	1,038	1,056	637	566	2,027	1,470	Washington
8,578	5,250	521	408	50	36	61	50	West Virginia
23,250	13,943	1,612	1,256	313	276	391	302	Wisconsin
1,934	1,285	19	23	80	64	47	35	Wyoming

Glossary



accommodation: ability of the lens to adjust its shape for vision at various distances in order to produce a clear image on the retina

anterior chamber: space in front portion of the eye between the cornea and the iris and lens, which is filled with aqueous humor

aqueous humor: clear, watery fluid that fills the anterior chamber and the posterior chamber in the front part of the eye and provides nutrients to structures in the anterior chamber

aqueous outflow pathway: the main exit route of aqueous humor from the eye, including the trabecular meshwork and Schlemm's canal

astigmatism: irregular curvature of the cornea or lens resulting in a distorted image because light rays are not focused on a single point on the retina

binocular vision: coordinated use of the two eyes to see a single fused three-dimensional image

blindspot: in testing the visual field, this is the blind area corresponding to the optic disk where the optic nerve fibers exit the eye and where there are no light-sensitive cells

central visual field: the area of objects in space seen without moving the head or eyes; corresponds to an area within 30 degrees of the fixation point (fovea)

choroid: the middle layer of the eye containing blood vessels that furnish nourishment to the other parts of the eye, especially the retina

ciliary body: a ring of tissue between the iris and the choroid consisting of muscles and blood vessels that changes the shape of the lens and manufactures aqueous humor

color vision deficiency (color blindness): inability to recognize certain colors, primarily red or green, but rarely blue

cones: cone-shaped, light-sensitive cells in the retina particularly in the macula area; cone function predominates in daylight with a small pupil allowing one to make out details and shapes, especially colors

congenital: present at birth

conjunctiva: delicate tissue that lines the inside of the eyelids and covers the front part of the eye except the cornea

cornea: the clear, curved structure that comprises the front of the eye, a refractive surface through which light enters

degeneration: tissue changes that make it less able to carry out its function

depth perception: the blending of slightly dissimilar images from the two eyes for the perception of three-dimensional depth

diopter: metric unit used to denote the refractive error of the eye or lens

distance vision: ability to distinctly perceive objects at a distance, usually tested at 20 feet

farsightedness: also called hyperopia; a refractive error in which the focal point for light rays is behind the retina; distant objects are seen more clearly than near objects

focus: the point at which light rays meet after passing through the cornea and lens; in normal eyes this point is on the fovea of the retina

hereditary: appearing in, or characteristic of, successive generations; individual differences in human beings passed from parent to offspring

incidence: number of new cases of a particular problem or disease that occurs within a period of time

iris: colored, circular membrane that is in front of the lens and controls the size of the opening at its center (pupil), thereby regulating the amount of light entering the eye

laser: surgical tool using an intense beam of light energy to close rips, make holes, destroy new vessels (photocoagulation) or to open channels as in the treatment of glaucoma

legal blindness: visual acuity that does not exceed 20/200 in the better eye with correcting lens; field of vision no greater than 20 degrees in its widest angle (visual acuity of 20/200 means that a person can see at a distance of 20 feet what one with "normal" sight can see at 200 feet)

low-vision aids: powerful optical devices useful to persons with vision impairments that are not successfully corrected by the usual prescription lenses

macula: a rod-free area at the center of the retina that surrounds the fovea and is responsible for best central vision

myopia: see nearsightedness

nearsightedness: also called myopia; a refractive error of the eye where the image of a distant object is formed in front of the retina and cannot be seen distinctly; near objects are seen more clearly than distant objects

near vision: the ability to perceive objects distinctly at normal reading distance (usually about 14 inches from the eye)

night blindness: condition in which sight is good by day but deficient at night and in any faint light

optic disk: head of optic nerve; formed by the meeting of all retinal nerve fibers in the retina

optic nerve: special nerve of sight beginning in the retina as the optic disk, which carries messages from the retina to the brain, resulting in visual images

peripheral vision: the ability to perceive the presence or motion of objects outside the direct line of vision

presbyopia: decreased elasticity of the lens due to advancing age which moves the near point of vision farther from the eye, making it difficult to focus on near objects

prevalence: total number of cases of a problem or disease in the population at a given time

pupil: the opening in the center of the iris that appears as a black dot and through which light enters the eye

refraction: measurement of the focusing characteristics of the eye to determine refractive error and the need for prescription glasses

retina: innermost layer of the eye containing light-sensitive nerve cells and fibers connecting with the brain through the optic nerve and nourished by a network of blood vessels; receives image and sends it to the brain

rods: light-sensitive cells in the retina that work best in darkness or dim illuminations

sclera: the white part of the eye; a tough covering that along with the cornea forms the external protective layer of the eye

severe vision impairment: inability to read ordinary newspaper print, even with the aid of glasses, and impairment indicating no useful vision in either eye; includes those who are legally blind

20/20 vision: the ability to correctly perceive an object or letter of a designated size from a distance of 20 feet; normal visual acuity

visual acuity: measurement of the ability of the eye to perceive the shape of objects in the direct line of vision and to distinguish detail; generally determined by finding the smallest symbol on an eye chart that can be recognized at a given distance

vision impaired: persons who have some difficulty seeing with one or two eyes even when wearing glasses

vitreous body: transparent, colorless mass of soft, gelatinous material filling the globe of the eye between the lens and the retina

Methods and Sources

In 2001, a consensus meeting was convened by the National Eye Institute at which many of the world's leading ophthalmic epidemiologists created standard case definitions for the eye conditions included in this report. Data was obtained from a review of the major epidemiological studies with the cooperation of their authors (see Table of Sources below).

The number of individuals with each disease and the total number at risk were provided in five-year age increments by race and sex for the adult population from each of the studies. These age, race and sex-specific prevalence rates were then combined using a meta-analysis technique for reducing the overall variance of the pooled rate. Appropriate logistic regression models were fit to the age, race and sex-specific pooled prevalence rates. These models were applied to the state level U.S. Census 2000 populations for each year of age to arrive at the number of individuals with disease by race and sex for each state. The state-level prevalence rates were then derived by dividing the number of individuals with disease in each state by the total population in each state. To estimate the prevalence of disease in the "other" race category, the age and sex-specific rates for Whites, Blacks and Hispanics were averaged, then logistic regression models were developed based on these averages.

While the methods used in this report are similar to those used in previous editions of *Vision Problems in the U.S.*, there are minor differences. Changes in statistical techniques and significantly broader source data have resulted in the most accurate estimates Prevent Blindness America has ever produced. For these reasons, however, direct comparisons between current and previous estimates are inappropriate.

Obtaining an actual count of the number of eye disease cases in America would be virtually impossible. While these estimates do not represent exact measurements, they provide the best available information on the scope of the most serious threats to good vision for American adults in the 21st century.

Table of Sources

Study	Location	Eye Condition					
		B/VI	R/E	AMD	Cataract	D/R	Glaucoma
Baltimore Eye Survey	Baltimore, MD	B W	B W	B W			B W
Barbados Eye Study	Barbados, West Indies			B	B	B	
Beaver Dam Eye Study	Beaver Dam, WI	W	W	W	W	W	W
Blue Mountains Eye Study	Blue Mountains, Australia	W		W	W	W	W
Kongwa Eye Survey	Kongwa, Tanzania						B
Proyecto Ver	Tucson, AZ	H	H			H	H
Rotterdam Study	Rotterdam, Netherlands	W	W	W			W
Salisbury Eye Evaluation Project	Salisbury, MD	B W		B W	B W		
San Antonio Heart Study	San Antonio, TX					H W	
San Luis Valley Diabetes Study	San Luis Valley, CO					H W	
Visual Impairment Project	Melbourne, Australia	W		W	W	W	W
Wisconsin Epidemiologic Study of Diabetic Retinopathy	Madison, WI					W	

Primary prevalence rate source for: B = Blacks, W = Whites, H = Hispanics
 B/VI = blindness and vision impairment, R/E = refractive errors, AMD = age-related macular degeneration,
 D/R = diabetic retinopathy

The Tables in this 2008 Update to the Fourth Edition of *Vision Problems in the U.S.* were updated using revised prevalence numbers from a meta-analysis of multiple smaller studies of blindness and vision impairment published in a special issue on blindness in the *Archives of Ophthalmology* in 2004. The population numbers were also updated using the 2004 census estimates of the U.S. population.

Acknowledgements

Funding for *Vision Problems in the U.S.* and the 2008 Update to the Fourth Edition, was provided through a subcontract from the National Eye Institute, National Institutes of Health, and the U.S. Department of Health and Human Services.

Research described in this report was conducted by dozens of scientists from all over the world. We gratefully acknowledge the invaluable contribution of data from their work.

Prevalence estimates for *Vision Problems in the U.S.* were created under a grant from Prevent Blindness America to Johns Hopkins University. We offer our appreciation to the investigators:

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