

Vision Problems in the U.S.

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



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, community and patient service programs and research.

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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.

SECTION 2

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.

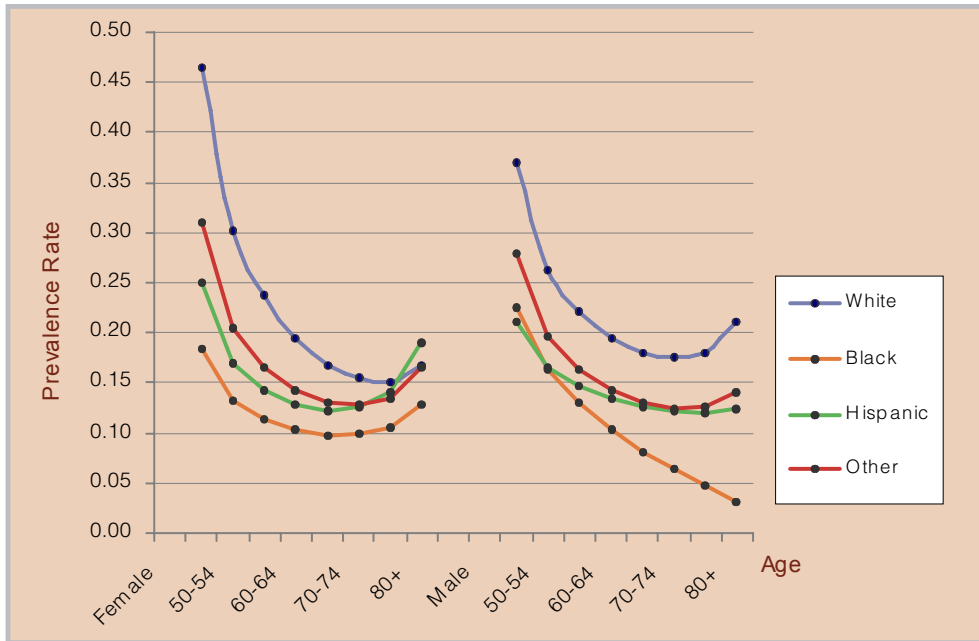
Refractive surgery is now another alternative for correcting problems such as myopia, hyperopia and astigmatism. The number of people seeking refractive surgery is increasing. However, the surgical procedures are not without some risk and the long-term effects of many of these procedures are still unknown.

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.

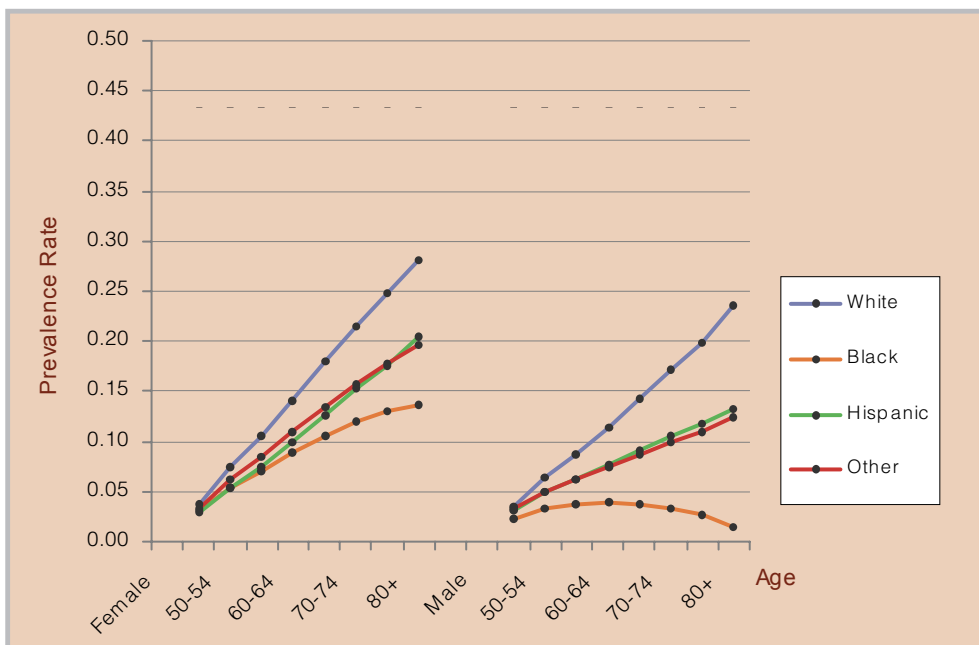
Cases of refractive error described in the following charts include myopia of 1.0 diopters or more. The threshold for clinically significant hyperopia is somewhat higher at 3.0 diopters or more.

Myopia is a very common disorder affecting more than 30.5 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 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



Myopia
≥1.0 diopters



Hyperopia
≥3.0 diopters

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.	30,529,637	16,737,458	13,792,179	25,810,362	1,776,919	1,648,865	1,293,491
Alabama	478,381	263,544	214,837	407,129	61,122	2,981	7,149
Alaska	67,927	35,062	32,865	55,527	965	1,143	10,292
Arizona	533,472	290,276	243,196	445,098	7,582	54,942	25,850
Arkansas	299,843	164,527	135,316	270,901	20,764	3,028	5,149
California	3,228,997	1,755,298	1,473,699	2,228,602	119,995	483,893	396,508
Colorado	480,114	260,649	219,465	424,037	8,423	34,087	13,567
Connecticut	409,762	226,979	182,783	370,169	15,033	14,542	10,018
Delaware	86,358	47,403	38,955	75,265	7,722	1,358	2,013
District of Columbia	43,700	23,740	19,960	18,482	21,167	2,130	1,920
Florida	1,820,420	992,696	827,724	1,490,003	112,343	173,888	44,187
Georgia	799,380	436,564	362,816	650,100	115,690	13,768	19,822
Hawaii	119,298	63,536	55,762	40,237	746	3,820	74,495
Idaho	145,170	78,347	66,822	138,124	187	3,643	3,216
Illinois	1,312,845	722,286	590,559	1,110,384	96,245	62,179	44,037
Indiana	697,663	383,728	313,935	654,731	25,969	8,478	8,485
Iowa	357,846	196,263	161,583	348,634	2,637	2,842	3,733
Kansas	307,951	168,643	139,308	286,278	7,589	6,988	7,096
Kentucky	477,530	264,164	213,366	454,636	15,516	2,314	5,063
Louisiana	443,202	242,325	200,877	355,299	72,600	6,479	8,824
Maine	169,892	93,743	76,149	167,254	251	439	1,948
Maryland	561,504	308,038	253,466	445,399	81,242	10,674	24,190
Massachusetts	754,466	421,582	332,884	694,754	16,125	18,086	25,501
Michigan	1,124,343	614,806	509,537	1,012,990	73,242	13,535	24,577
Minnesota	582,754	317,436	265,319	557,964	6,650	4,678	13,463
Mississippi	275,863	151,386	124,478	220,401	50,277	1,832	3,353
Missouri	647,257	357,247	290,010	599,029	32,105	5,090	11,033
Montana	115,545	62,395	53,150	109,781	101	859	4,804
Nebraska	199,550	109,189	90,360	190,118	3,171	3,356	2,904
Nevada	214,648	112,729	101,919	178,826	6,883	15,465	13,474
New Hampshire	158,854	86,803	72,051	155,470	384	872	2,128
New Jersey	940,122	520,180	419,942	771,763	58,918	59,690	49,750
New Mexico	180,143	98,974	81,169	119,461	1,684	45,141	13,858
New York	2,012,984	1,117,455	895,530	1,584,511	152,371	156,778	119,324
North Carolina	859,741	473,187	386,555	736,551	93,012	10,630	19,549
North Dakota	78,177	42,179	35,998	75,529	116	272	2,261
Ohio	1,329,444	734,770	594,674	1,231,209	69,168	9,873	19,193
Oklahoma	387,416	212,915	174,501	336,818	12,733	6,574	31,291
Oregon	416,198	227,611	188,587	388,063	2,816	9,072	16,247
Pennsylvania	1,503,617	832,240	671,377	1,397,464	65,181	17,482	23,490
Rhode Island	125,182	70,097	55,085	115,948	1,986	3,698	3,551
South Carolina	418,478	229,564	188,914	345,710	63,459	3,421	5,888
South Dakota	89,266	48,277	40,990	84,795	159	402	3,911
Tennessee	645,089	356,000	289,089	583,905	47,736	4,392	9,055
Texas	1,948,647	1,060,583	888,064	1,444,438	121,979	317,711	64,519
Utah	202,206	109,713	92,494	188,520	675	7,107	5,905
Vermont	79,798	43,950	35,848	78,349	128	291	1,029
Virginia	773,809	423,918	349,891	654,861	75,910	13,960	29,078
Washington	686,978	373,382	313,596	618,281	9,484	15,657	43,556
West Virginia	236,136	130,206	105,930	229,856	3,420	711	2,150
Wisconsin	640,236	347,964	292,272	610,454	13,092	6,973	9,717
Wyoming	61,433	32,911	28,522	58,258	166	1,640	1,369

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
14,187,803	11,622,560	940,549	836,370	897,549	751,317	711,558	581,932	Total U.S.
224,666	182,463	33,298	27,824	1,497	1,484	4,083	3,066	Alabama
28,476	27,051	418	547	595	548	5,572	4,720	Alaska
242,753	202,345	3,423	4,159	29,465	25,477	14,636	11,215	Arizona
149,016	121,885	11,174	9,590	1,455	1,574	2,882	2,267	Arkansas
1,210,440	1,018,162	60,632	59,362	264,420	219,473	219,806	176,702	California
231,198	192,838	3,792	4,631	18,034	16,053	7,625	5,942	Colorado
205,465	164,703	7,986	7,047	8,174	6,368	5,353	4,665	Connecticut
41,528	33,737	4,086	3,637	693	665	1,096	916	Delaware
9,672	8,810	11,776	9,391	1,172	958	1,119	801	District of Columbia
811,751	678,251	58,495	53,848	97,813	76,075	24,637	19,550	Florida
357,924	292,176	61,354	54,336	6,450	7,318	10,836	8,986	Georgia
20,475	19,762	225	521	2,093	1,726	40,742	33,753	Hawaii
74,706	63,418	61	126	1,793	1,850	1,787	1,428	Idaho
613,968	496,416	52,268	43,977	32,098	30,081	23,952	20,085	Illinois
361,134	293,596	13,670	12,299	4,237	4,241	4,687	3,798	Indiana
191,562	157,072	1,227	1,411	1,410	1,432	2,065	1,668	Iowa
157,402	128,876	3,776	3,813	3,532	3,456	3,933	3,163	Kansas
252,153	202,484	8,107	7,408	1,104	1,210	2,800	2,263	Kentucky
195,118	160,182	38,878	33,721	3,539	2,941	4,791	4,034	Louisiana
92,321	74,933	87	165	240	199	1,096	852	Maine
245,320	200,079	43,336	37,906	5,945	4,729	13,437	10,753	Maryland
389,323	305,430	8,292	7,833	10,257	7,830	13,709	11,792	Massachusetts
555,628	457,362	38,988	34,253	7,008	6,526	13,181	11,396	Michigan
304,939	253,026	2,876	3,774	2,307	2,371	7,314	6,148	Minnesota
121,464	98,937	27,126	23,150	878	955	1,917	1,436	Mississippi
331,051	267,978	17,355	14,750	2,688	2,403	6,153	4,880	Missouri
59,233	50,547	31	70	470	389	2,661	2,144	Montana
104,299	85,819	1,592	1,579	1,653	1,703	1,645	1,259	Nebraska
93,817	85,009	3,260	3,623	7,909	7,557	7,743	5,731	Nevada
85,033	70,437	149	236	477	395	1,145	983	New Hampshire
428,773	342,990	31,774	27,145	33,051	26,639	26,582	23,168	New Jersey
65,591	53,870	744	940	24,786	20,355	7,853	6,005	New Mexico
879,940	704,570	84,341	68,030	90,061	66,717	63,112	56,212	New York
407,607	328,943	49,832	43,180	4,846	5,784	10,901	8,648	North Carolina
40,739	34,789	34	81	144	128	1,262	999	North Dakota
682,003	549,206	36,940	32,229	5,252	4,621	10,575	8,618	Ohio
185,738	151,080	6,485	6,248	3,281	3,293	17,411	13,880	Oklahoma
212,870	175,193	1,216	1,601	4,478	4,594	9,048	7,200	Oregon
774,759	622,705	35,371	29,810	9,365	8,118	12,745	10,745	Pennsylvania
65,069	50,879	948	1,038	2,134	1,564	1,947	1,604	Rhode Island
190,507	155,202	34,094	29,365	1,626	1,795	3,336	2,552	South Carolina
45,880	38,915	42	116	203	199	2,152	1,759	South Dakota
323,239	260,667	25,639	22,098	2,096	2,297	5,026	4,028	Tennessee
789,978	654,460	62,741	59,238	172,802	144,909	35,061	29,458	Texas
102,595	85,925	240	435	3,646	3,461	3,232	2,673	Utah
43,165	35,185	45	83	160	131	580	449	Vermont
360,215	294,645	39,702	36,208	7,592	6,368	16,409	12,670	Virginia
336,786	281,495	4,037	5,446	7,885	7,773	24,674	18,882	Washington
126,882	102,974	1,762	1,658	377	334	1,185	965	West Virginia
332,395	278,059	6,757	6,336	3,497	3,476	5,315	4,402	Wisconsin
31,235	27,023	65	100	863	777	748	622	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.	11,958,486	7,316,349	4,642,138	10,393,571	596,572	564,190	404,154
Alabama	190,641	119,562	71,079	165,964	21,537	1,003	2,137
Alaska	17,695	9,563	8,132	14,203	231	297	2,965
Arizona	222,810	131,860	90,950	194,272	2,213	18,399	7,927
Arkansas	125,164	76,826	48,338	115,432	7,200	889	1,642
California	1,225,044	739,856	485,188	896,858	39,081	158,923	130,183
Colorado	161,848	95,527	66,321	144,090	2,415	11,506	3,836
Connecticut	163,440	100,672	62,769	151,037	4,984	4,548	2,871
Delaware	34,257	20,959	13,298	30,744	2,500	421	591
Dist. of Columbia	16,990	11,650	5,340	7,176	8,472	698	644
Florida	851,477	515,981	335,496	728,505	36,536	73,314	13,122
Georgia	283,163	175,847	107,317	237,690	36,374	3,760	5,339
Hawaii	45,416	27,346	18,069	14,111	155	1,265	29,883
Idaho	54,228	31,579	22,649	52,178	43	1,037	971
Illinois	512,907	318,155	194,751	447,293	33,180	18,909	13,525
Indiana	268,134	164,357	103,777	254,197	8,786	2,661	2,490
Iowa	149,775	91,628	58,147	147,039	803	870	1,064
Kansas	122,989	75,007	47,982	116,263	2,452	2,220	2,054
Kentucky	182,586	111,827	70,759	174,993	5,230	762	1,601
Louisiana	169,039	106,027	63,013	139,183	24,650	2,488	2,719
Maine	66,164	39,900	26,264	65,398	62	145	560
Maryland	207,551	128,746	78,805	171,025	26,071	3,279	7,176
Massachusetts	300,149	186,328	113,821	281,830	5,165	5,499	7,654
Michigan	426,354	260,338	166,016	389,883	24,876	4,415	7,181
Minnesota	218,076	130,956	87,120	211,387	1,636	1,308	3,745
Mississippi	109,535	69,512	40,024	90,627	17,226	625	1,057
Missouri	259,346	159,692	99,654	243,204	11,046	1,704	3,392
Montana	44,110	25,761	18,350	42,395	26	282	1,408
Nebraska	80,408	48,849	31,558	77,579	993	995	840
Nevada	79,952	45,467	34,485	68,886	2,147	4,723	4,197
New Hampshire	56,514	33,604	22,910	55,581	99	251	583
New Jersey	375,547	233,300	142,247	321,167	20,393	19,981	14,006
New Mexico	70,656	41,994	28,663	48,482	530	17,363	4,281
New York	813,579	508,909	304,670	667,378	54,278	55,790	36,132
North Carolina	331,003	205,839	125,163	290,591	31,949	2,795	5,667
North Dakota	32,211	19,256	12,956	31,443	22	89	658
Ohio	520,602	321,517	199,085	487,349	24,164	3,305	5,784
Oklahoma	156,380	95,609	60,771	139,969	4,142	1,985	10,285
Oregon	159,925	95,157	64,768	151,719	822	2,552	4,832
Pennsylvania	633,898	394,186	239,712	597,522	23,640	5,604	7,132
Rhode Island	51,836	32,356	19,481	48,980	604	1,126	1,127
South Carolina	161,801	100,936	60,865	137,222	21,820	1,034	1,726
South Dakota	36,781	22,042	14,739	35,455	33	131	1,162
Tennessee	248,795	153,699	95,096	228,944	15,872	1,302	2,678
Texas	720,358	436,201	284,157	553,278	38,720	110,292	18,068
Utah	71,678	41,941	29,737	67,663	167	2,159	1,689
Vermont	29,318	17,550	11,768	28,893	31	104	291
Virginia	281,835	173,153	108,682	244,223	25,366	4,006	8,240
Washington	248,534	147,267	101,267	228,445	2,565	4,455	13,069
West Virginia	96,766	59,053	37,713	94,472	1,264	284	745
Wisconsin	249,296	150,325	98,971	240,457	3,953	2,070	2,815
Wyoming	21,922	12,677	9,245	20,896	48	568	410

White Female	White Male	Black Female	Black Male	Hisp. Female	Hisp. Male	Other Female	Other Male	State
6,285,544	4,108,027	446,037	150,535	333,967	230,223	250,801	153,353	Total U.S.
101,206	64,758	16,437	5,100	562	442	1,358	780	Alabama
7,461	6,742	146	85	161	136	1,796	1,169	Alaska
114,676	79,596	1,512	701	10,659	7,740	5,013	2,914	Arizona
69,852	45,581	5,473	1,727	465	424	1,036	606	Arkansas
536,137	360,721	28,457	10,624	93,795	65,128	81,468	48,715	California
84,894	59,196	1,646	769	6,583	4,924	2,404	1,432	Colorado
92,519	58,518	3,713	1,271	2,717	1,831	1,723	1,148	Connecticut
18,521	12,223	1,844	656	233	189	361	230	Delaware
4,186	2,990	6,605	1,867	436	262	423	221	Dist. of Columbia
435,485	293,020	26,911	9,626	45,432	27,882	8,153	4,968	Florida
143,548	94,143	27,114	9,260	1,934	1,825	3,251	2,088	Georgia
7,681	6,430	79	76	729	537	18,858	11,026	Hawaii
30,422	21,756	23	19	536	501	597	373	Idaho
274,365	172,928	25,038	8,142	10,443	8,467	8,309	5,216	Illinois
154,843	99,354	6,537	2,249	1,433	1,228	1,544	946	Indiana
89,942	57,097	562	241	471	399	654	410	Iowa
70,718	45,545	1,791	662	1,229	991	1,270	784	Kansas
106,492	68,502	3,911	1,318	415	348	1,010	591	Kentucky
84,320	54,863	18,524	6,126	1,521	967	1,662	1,057	Louisiana
39,431	25,967	36	26	85	60	349	211	Maine
103,053	67,972	19,313	6,757	1,987	1,292	4,393	2,784	Maryland
174,537	107,292	3,799	1,367	3,303	2,196	4,689	2,965	Massachusetts
234,950	154,933	18,580	6,296	2,448	1,967	4,360	2,821	Michigan
126,905	84,482	1,075	561	689	620	2,288	1,457	Minnesota
55,435	35,191	13,053	4,173	347	278	676	381	Mississippi
148,221	94,983	8,364	2,682	977	726	2,130	1,263	Missouri
24,714	17,681	15	11	161	120	871	537	Montana
47,079	30,501	718	275	523	472	529	311	Nebraska
38,715	30,171	1,493	654	2,596	2,128	2,664	1,533	Nevada
33,053	22,528	60	38	145	107	347	237	New Hampshire
197,599	123,568	15,346	5,048	11,931	8,050	8,423	5,582	New Jersey
28,618	19,864	364	166	10,306	7,057	2,706	1,575	New Mexico
410,470	256,908	41,668	12,610	34,920	20,870	21,850	14,282	New York
176,774	113,818	24,117	7,831	1,390	1,405	3,558	2,109	North Carolina
18,783	12,661	10	11	50	39	412	245	North Dakota
297,862	189,487	18,184	5,980	1,884	1,421	3,587	2,197	Ohio
84,971	54,998	3,043	1,098	1,069	915	6,525	3,760	Oklahoma
90,265	61,453	553	270	1,353	1,199	2,986	1,846	Oregon
368,559	228,962	18,064	5,576	3,201	2,403	4,362	2,771	Pennsylvania
30,537	18,443	429	175	686	440	704	423	Rhode Island
82,845	54,377	16,451	5,369	546	487	1,094	631	South Carolina
21,228	14,227	16	17	73	58	725	437	South Dakota
139,374	89,569	11,966	3,906	693	609	1,666	1,011	Tennessee
331,500	221,778	28,472	10,248	65,271	45,021	10,957	7,111	Texas
39,615	28,047	100	66	1,192	968	1,033	656	Utah
17,295	11,598	18	13	61	42	176	115	Vermont
146,800	97,423	18,857	6,509	2,358	1,647	5,137	3,102	Virginia
134,953	93,492	1,684	881	2,372	2,083	8,258	4,811	Washington
57,459	37,013	962	303	169	116	464	282	West Virginia
144,599	95,858	2,872	1,081	1,110	961	1,744	1,071	Wisconsin
12,077	8,819	31	17	319	249	249	161	Wyoming