

VITAL and HEALTH STATISTICS
DATA FROM THE NATIONAL HEALTH SURVEY

**Monocular-Binocular
Visual Acuity of Adults**
United States-1960-1962

Visual acuity levels for monocular, better monocular, and binocular visual acuity as determined by examination and comparison with visual impairment findings from the interview preceding the examination.

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U.S. DEPARTMENT OF
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COOPERATION OF THE BUREAU OF THE CENSUS

In accordance with specifications established by the National Health Survey, the Bureau of the Census, under a contractual agreement, participated in the design and selection of the sample, and carried out the first stage of the field interviewing and certain parts of the statistical processing.

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THIS REPORT CONTAINS national estimates based on findings from the Health Examination Survey during 1960-62 on monocular and better monocular visual acuity compared with binocular acuity as well as a comparison of acuity test findings with information on visual impairments obtained from the household questionnaire preceding the examination.

For this part of the survey a nationwide probability sample of 7,710 persons was selected to represent the 111 million adults in the civilian, noninstitutional population of the United States aged 18-79 years. Of these, 6,672 adults or more than 85 percent were examined and tested.

Monocular and binocular central visual acuity at distance and near were measured without cycloplegics for each examinee as part of the standardized examination. Testing with a commercial screening instrument was done without glasses for all examinees and repeated with glasses for those who wore or brought theirs to the examination. Nine test levels were used at distance and near.

Binocular visual acuity rates at the level of 20/20 or better were consistently higher than those for better monocular acuity which in turn exceeded the rates for either eye throughout the age range. At the 20/30 or better levels and at the poorer end of the acuity range—20/100 or less—essentially no consistent difference was found between the rates for binocular and better monocular visual acuity.

In general the trends by age and sex for better monocular vision were similar to those for binocular acuity.

Overall, a high order of agreement was found between better monocular and binocular acuity both without and with usual correction. Agreement of test results for the left and the right eye was less good and poorer for tests with usual correction than those without.

Agreement between interview and test data was good for those with extremely defective visual acuity, and less good for those with defective but better acuity.

Comparison with findings from previous studies is also included.

SYMBOLS

Data not available-----	---
Category not applicable-----	...
Quantity zero-----	-
Quantity more than 0 but less than 0.05-----	0.0
Figure does not meet standards of reliability or precision-----	*

MONOCULAR-BINOCULAR VISUAL ACUITY OF ADULTS

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INTRODUCTION

This report is one in the series describing and analyzing the plan, conduct, and findings of the first cycle of the Health Examination Survey. It presents survey results for monocular, better monocular, and binocular visual acuity as well as a comparison of acuity test findings with information on visual impairments obtained from the household questionnaire preceding the examination.

The Health Examination Survey, which is the source of these data, was organized as part of the National Health Survey¹ to obtain statistics on the health status of the population of the United States through direct examination, tests, and measurements. The other two major programs of the National Health Survey are those in which data are obtained by household interview alone or from medical and related records.

Previous reports have described the plan and initial program of the Health Examination Survey² as well as the demographic composition of the sample used for the first cycle, the possible effects of nonresponse on the findings, and the inflation process used to convert examination findings into estimates for the adult population of the United States from which the sample was drawn.³

In the first cycle, the Health Examination Survey obtained data on certain chronic diseases and physical and physiological measurements among adults in the civilian, noninstitutional population of the United States 18 through 79 years

of age. This phase of the survey was started in October 1959 and completed in December 1962. Out of a defined sample of 7,710 adults, 6,672 or more than 85 percent were examined.

No major demographic features of the adult population were seriously distorted by the non-response, according to supplemental information obtained on this latter group of the sample.

Medical and other staff administered the standardized examination given during the single visit of the examinee to the specially designed mobile units used for the survey. Data comparable to those collected at that time by the Health Interview Survey were obtained from the household of the sample person prior to the examination.

A brief description of the sample design and selected standard errors of estimate for the data in this report are shown in the Appendix.

VISION EXAMINATION

Monocular and binocular central visual acuity for distance and near vision were measured without cycloplegics for each examinee as part of the standardized examination in the first cycle of the Health Examination Survey. The right eye, left eye, and binocular acuity were tested without glasses for all examinees. Tests with glasses were repeated for those who brought theirs to the examination.

A commercial screening instrument was used for rapid testing under controlled conditions of lighting and target distance, within the limited

space available in the examining center. Good comparability was found between these targets and the commonly used Snellen-type wall charts and cards in the special methodological study described previously.⁴ The polarization power within the instrument was depended upon for accuracy in monocular testing, rather than the occluder, to reduce testing time and the possibility of occasionally forgetting to use the regular occluder in the field. The degree of overrating when the occluder was not used was found to be negligible in the special study.⁴

Optimum recommended scoring criteria were used.⁴ To "pass," or to be able to read at a particular level, no errors were allowed if the block contained fewer than four letters, and only one error was allowable in steps or blocks of four letters. The visual acuity level or "score" for an examinee was that which designated the block of the smallest letters he or she was able to read with no more than the allowable number of errors. Acuity levels in this report are expressed in the Snellen notation. The following nine test levels were used at distance and the corresponding levels at near: 20/10, 20/15, 20/20, 20/30, 20/40, 20/50, 20/70, 20/100, and 20/200.

Because of the limited staff who could be employed full time in the examining units, vision testing was done by a specially trained dentist. Acuity levels obtained on replicate testing by the various dental examiners in the survey were in at least as good agreement as is usually found among other examiners in this type of testing.

As in the previous reports on acuity findings,⁵⁻⁷ this one is limited to acuity at distance and near uncorrected or without glasses and "corrected" or with whatever correction was usually worn and available at the examination. About 56 percent of the examinees were tested only without glasses. Most of these persons did not own glasses; a few had neglected to bring theirs to the examination. This latter group had acuity scores distributed over the entire test range. Findings for "corrected" acuity will only slightly understate, if at all, the true level of usual correction in the adult population. They will not, of course, represent a measure of "best possible" vision or the degree to which vision is "correctable" among adults, since no tests to determine this were included in the examination.

This report presents data on monocular acuity, better monocular acuity, the relationship between better monocular and binocular acuity, and the relation between acuity as determined by test and as recognized by the examinee during the interview.

FINDINGS

Distance Vision

Health Examination Survey findings indicate an estimated 48 percent of the U.S. adult civilian, noninstitutional population in 1960-62 had uncorrected monocular acuity at distance of at least 20/20 in their better eye. With their usual correction 66 percent reached or exceeded this level (tables 1-4).

The prevalence at this level was greater among men than women--52 percent compared with 44 percent for uncorrected distance vision and 69 percent compared with 63 percent when testing was with usual correction.

This rate without correction was highest among young adults 25-34 years of age, then dropped rapidly from 72 percent at that age to less than 1 percent by 75-79 years (tables 1 and 3 and fig. 1). The peak was in the same age range when testing was with usual correction but dropped somewhat more slowly until the older age groups were reached, from 86 percent to 10 percent (tables 2 and 4 and fig. 1). The pattern by age was similar among both men and women except that the rate fell off most rapidly from 35 to 45 years for women, or 10 years earlier than for men, when tested with usual correction. The explanation for this may lie in the fact that relatively more men than women stay in the labor market during this period and hence are more aware of the need to keep their visual acuity corrected to this high level.

The proportion testing 20/20 or better both without and with usual correction was found to be slightly lower at 18-24 years of age than at 25-34 years, although the differences in uncorrected acuity for men and corrected acuity for women are not statistically significant. This possibly reflects the larger proportion of the military not included in the survey among the younger age group of the population where visual standards with respect to

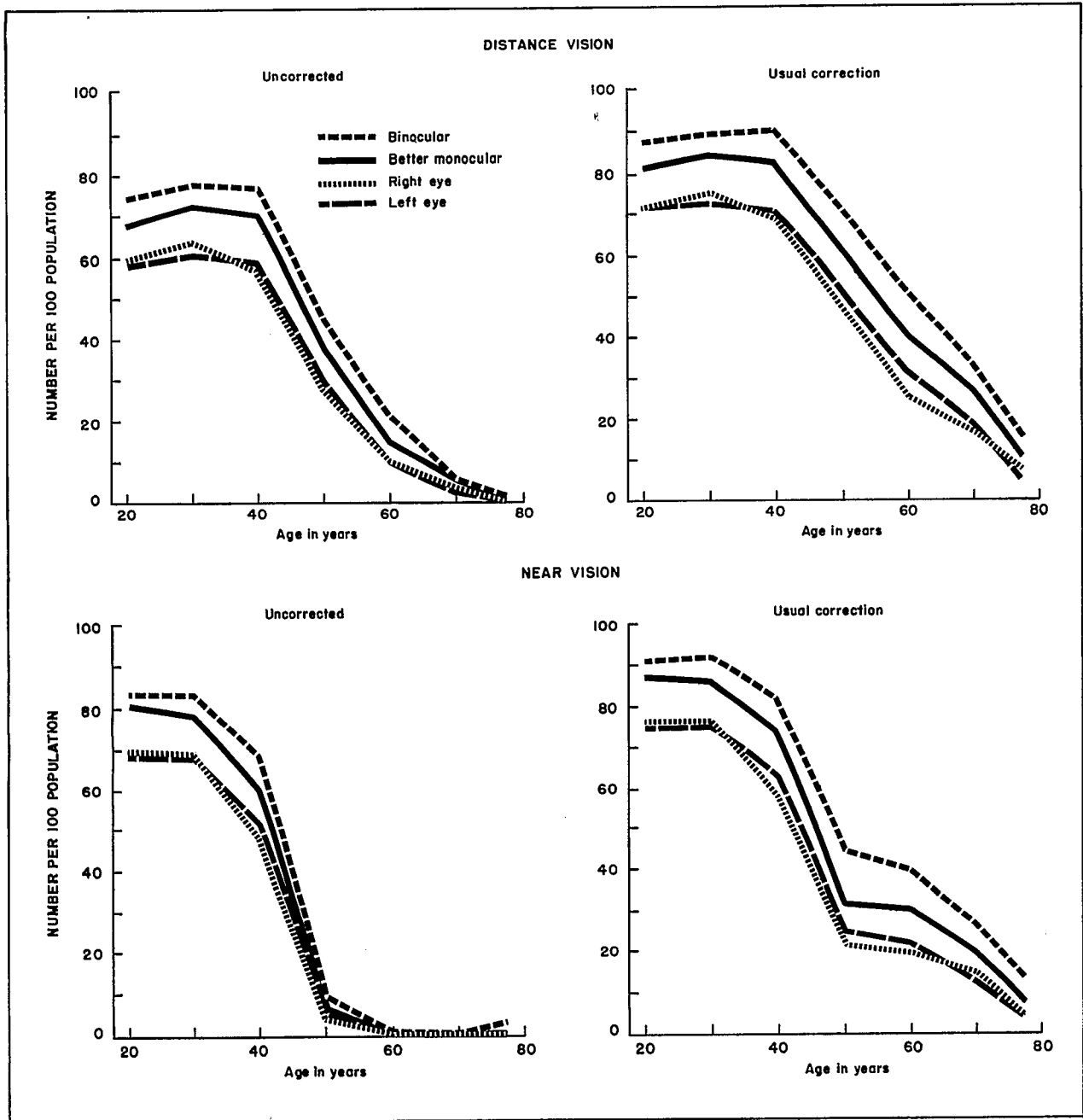


Figure 1. Proportion of American adults with monocular and binocular visual acuity of 20/20 or better at distance and 14/14 or better at near.

induction or enlistment would tend to select persons with adequate distance acuity and reject those with severely defective vision.

Binocular acuity rates for 20/20 or better exceeded those for better monocular acuity at distance, by 6 percent for uncorrected and 7 per-

cent with usual correction. As indicated in figure 1 and tables 3 and 4, this pattern of differential was found in the rates for the younger age groups under 65 years of age with uncorrected vision but throughout the age range when tested with usual correction.

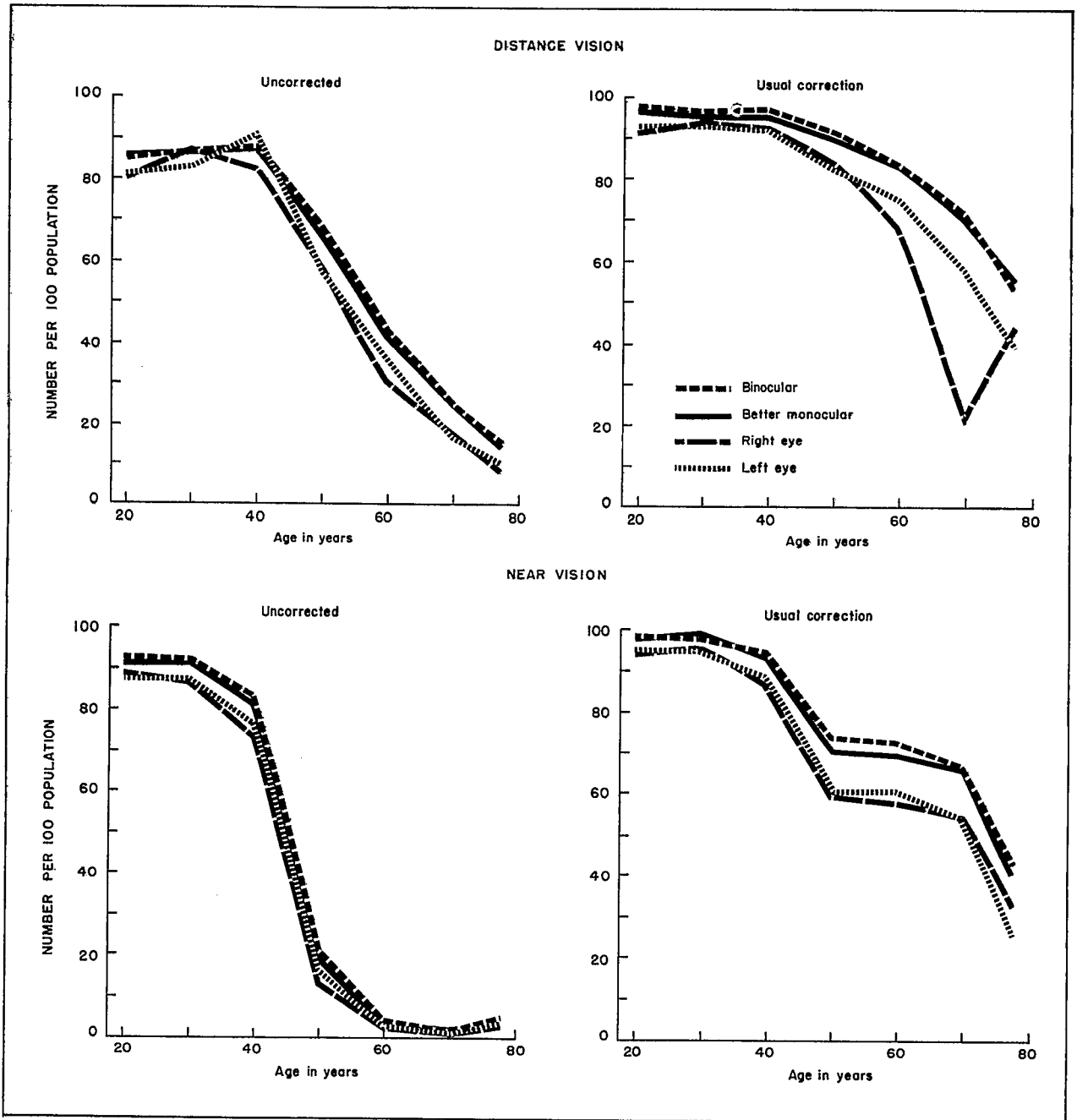


Figure 2. Proportion of American adults with monocular and binocular visual acuity of 20/30 or better at distance and 14/21 or better at near.

Monocular acuity rates, uncorrected, at this level for the right and the left eye were similar. The slightly higher rates for the left eye among those 35-74 years with usual correction probably reflected sampling errors rather than any real

physical difference between the eyes (tables 3-8 and fig. 1).

At the 20/30 or better level there was essentially no difference between the rates for binocular and better monocular distance vision with

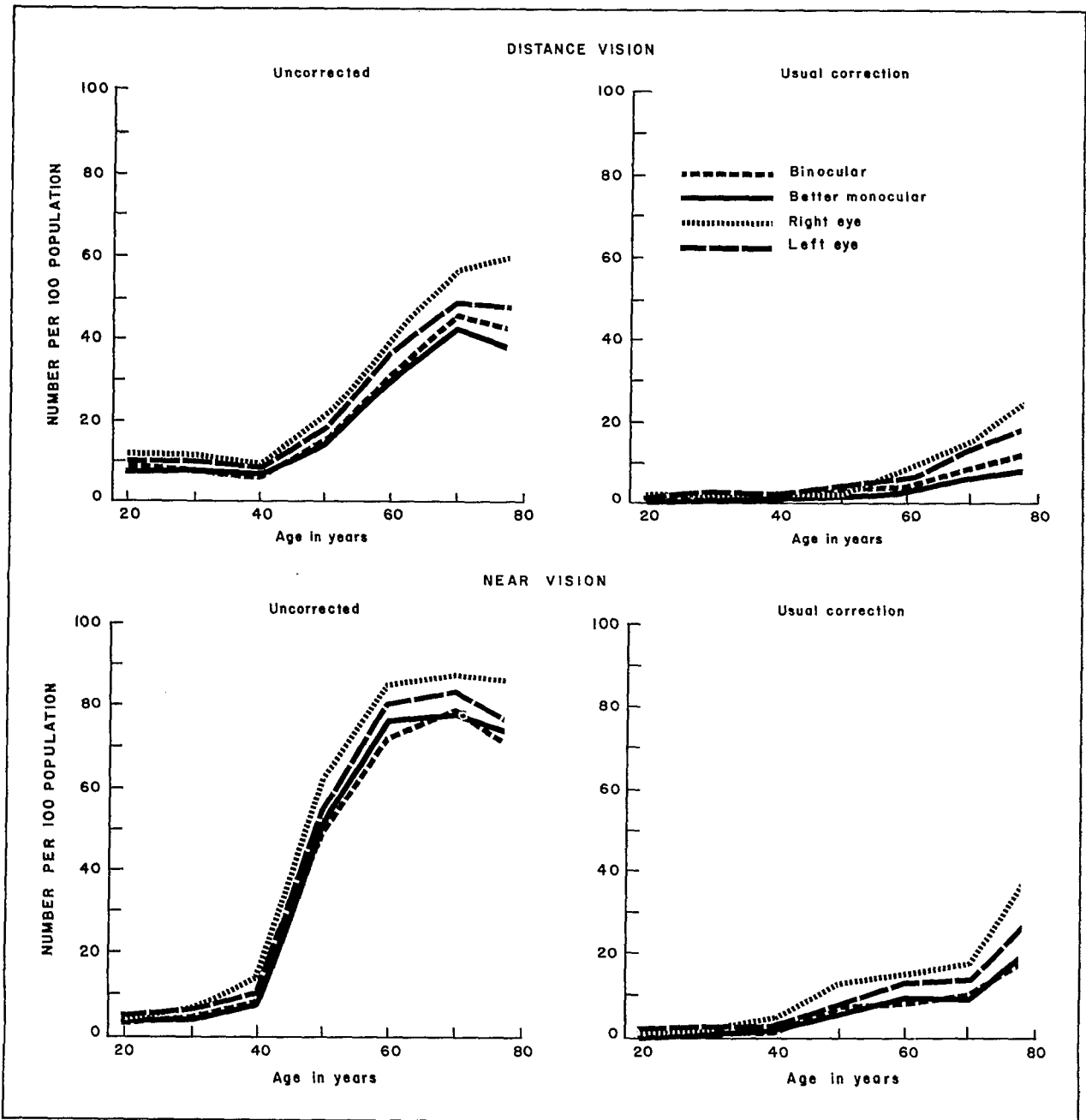


Figure 3. Proportion of American adults with monocular and binocular visual acuity of 20/100 or less at distance and 14/70 or less at near.

or without usual correction. Only chance differences were noted between the right and the left eye (fig. 2).

If the poorer end of the acuity scale is considered where the gradations are coarser, little

difference will be noted between the better monocular and binocular acuity rates at distance with and without usual correction (fig. 3). There was, however, a consistent difference between the right and the left eye which was noticeable par-

ticularly from 35 years of age on. Why the rate for the right eye should consistently exceed that for the left is not readily evident from the available data. Since the order of testing the eyes was alternated, it cannot be attributed to learning.

Near Vision

Without correction 41 percent of the adults were found to test at least 14/14 at near with their better eye, while 57 percent reached this level when tested with their usual correction (tables 9-12).

The prevalence rate at 14/14 or better was slightly greater for men than women, but the difference is not as marked as in distance vision.

At this level, the trend with age was similar to that for distance vision with a few exceptions. Evidence of the rapid decline for near acuity was seen about 10 years earlier than for distance vision, at 35-44 years of age, and from then on was more rapid for uncorrected (but not for corrected) near acuity.

Monocular acuity rates fell short of those for binocular acuity, by 4 percent for those with uncorrected vision and 8 percent for those with usual correction (tables 11 and 12 and fig. 1). This

trend was noted throughout the age range for acuity with usual correction but only for younger persons under 35 years of age with uncorrected vision.

As for distance vision, acuity rates for near vision at this level for the right and for the left eye tended to be similar; the deviations from this trend are too small to be of significance statistically (tables 13-16).

Good agreement was found between the acuity rates at 14/21 or better for binocular and better monocular vision, both without and with usual correction (fig. 2).

At the lower end of the near acuity range, 14/70 or less, essentially no consistent difference was evident between the rates at this level for better monocular and binocular vision, with or without usual correction. The consistent excess in the rate for the right eye over the left was found in near as in distance vision (fig. 3).

Agreement Between Acuity

Measures

Considering the entire range of acuity scores, a high order of agreement was found between binocular and better monocular acuity ranging from +0.90 to +0.93 as shown in table A and

Table A. Correlation between various measures of central visual acuity

Acuity measure	Correlation coefficient ¹		
	Total	Men	Women
<u>Better monocular and binocular</u>			
Uncorrected distance acuity-----	+0.92	+0.91	+0.92
Uncorrected near acuity-----	+0.90	+0.89	+0.90
Distance with usual correction-----	+0.93	+0.91	+0.94
Near with usual correction-----	+0.90	+0.88	+0.92
<u>Right eye and left eye</u>			
Uncorrected distance acuity-----	+0.66	+0.61	+0.69
Uncorrected near acuity-----	+0.76	+0.74	+0.78
Distance with usual correction-----	+0.32	+0.26	+0.37
Near with usual correction-----	+0.44	+0.41	+0.46

¹Product-moment correlation coefficient computed from measurements of acuity in terms of degrees of visual angle (see reference 4).

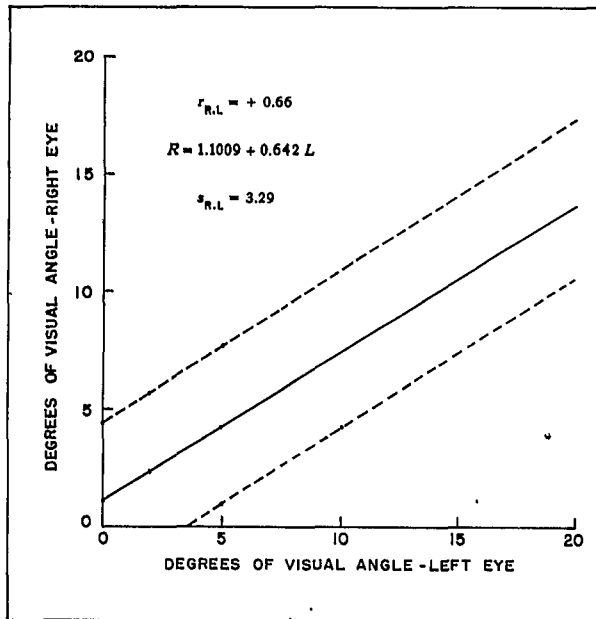


Table B. Extent of disagreement between measures of better monocular and binocular visual acuity

Level difference	Uncorrected		Usual correction	
	Dis-tance	Near	Dis-tance	Near
	Percent of total group			
None-----	68.0	67.5	70.8	69.6
1-----	28.9	29.1	27.3	28.2
2-----	2.4	3.0	1.5	1.8
3-----	0.4	0.4	0.2	0.3
4-----	0.1	0.1	-	-
5-----	-	-	-	-
6-----	-	-	-	-
7-----	-	-	-	-
8-----	-	-	-	-

Figure 4. Regression of right on left uncorrected distance visual acuity for adults. (Visual angle is reciprocal of Snellen notation in decimal form with 20/20=1.0, 20/40=2.0, etc.)

compared with +0.66 and +0.76—as shown in table A. Here the degree of association is better with near than distance vision and consistently better for women than for men.

figure 4. The correlations were slightly but not significantly higher among women than men and of about the same magnitude for distance as for near acuity. As expected with this degree of association, between 68 and 71 percent of the paired scores were at the same level while only 2 to 3 percent differed by more than one level either with or without visual correction. (See table B and the standard error of estimate around the regression line in figure 4.) It is apparent that in general where differences do occur they are found more often in the better than the poorer acuity levels. This would be expected since the scale gradation is finer at the better acuity levels.

From the regression line it will be noted that binocular acuity levels tend, on the average, to exceed those for monocular acuity at levels of 20/80 or better while the reverse is true at the poorer acuity levels.

Agreement between acuity levels attained for the right and the left eye was of a lower order of magnitude than that for binocular and better monocular vision and substantially less good with usual correction than without—+0.32 and +0.44

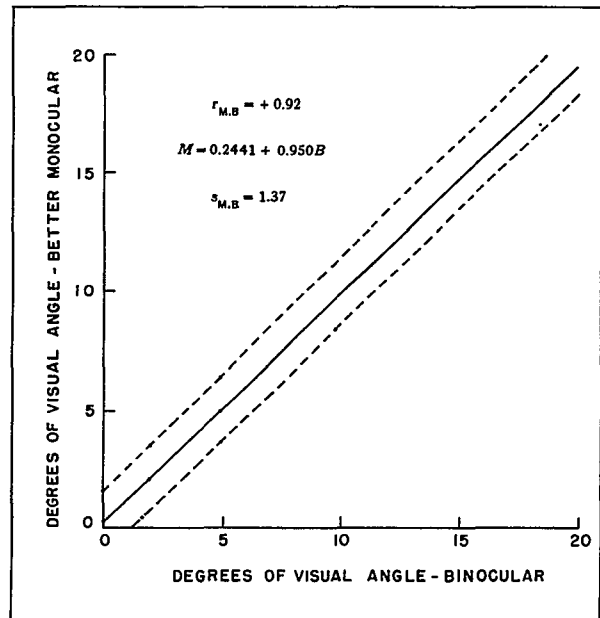


Figure 5. Regression of better monocular on binocular distance visual acuity for adults. (Visual angle is reciprocal of Snellen notation in decimal form with 20/20=1.0, 20/40=2.0, etc.)

Table C. Extent of disagreement between visual acuity in the right and the left eye

Level difference	Uncorrected		Usual correction	
	Dis- tance	Near	Dis- tance	Near
	Percent of total group			
None-----	46.1	50.2	48.7	48.3
1-----	36.0	35.9	36.7	37.4
2-----	9.7	7.5	7.8	7.1
3-----	3.6	2.8	2.0	2.5
4-----	2.0	1.7	1.7	1.7
5-----	1.3	0.8	1.2	1.3
6-----	1.0	0.6	1.2	1.1
7-----	0.3	0.3	0.5	0.4
8-----	0.2	0.1	0.2	0.2

Disagreements of two levels or more were found in 14 to 18 percent of the examinees, most of them occurring within the finer gradations of test-letter size at the better acuity levels (table C).

From the regression line in figure 5 it is apparent that at acuity levels of 20/60 or better, acuity for the right eye on the average fell slightly short of that for the left while at the poorer acuity levels the reverse was found. Despite this, the proportion testing 20/100 or less for the right eye tended to exceed that for the left, as previously indicated, reflecting the skewness of the distribution of acuities.

Agreement Between Interview and Test Data

At the time of the household interview just prior to the examination, prospective examinees

Table D. Visual acuity status on interview and binocular acuity test findings with usual correction

Binocular acuity with usual correction	Total	Impairment as reported on interview				
		Blind, both eyes	One blind, other defective	One blind, other normal or not mentioned	One or both defective	No eye trouble reported
		Percent distribution of interview findings				
Total-----	100.0	10.0	0.1	0.4	2.6	96.9
		Percent distribution of acuity levels				
<u>Distance acuity</u>						
Total-----	100.0	100.0	100.0	100.0	100.0	100.0
20/100 or less-----	2.3	100.0	33.3	7.1	21.4	1.4
20/40-20/70-----	7.2	---	50.0	28.6	19.1	6.6
20/30 or better-----	90.5	---	16.7	64.3	59.5	92.0
<u>Near acuity</u>						
Total-----	100.0	100.0	100.0	100.0	100.0	100.0
14/70 or less-----	4.4	100.0	66.7	10.7	23.7	3.7
14/28-14/49-----	10.9	---	33.3	14.3	30.1	10.4
14/21 or better-----	84.7	---	---	75.0	46.2	85.9

¹0.03 percent.

Table E. Visual acuity status on interview and better monocular acuity test findings with usual correction

Better monocular acuity with usual correction	Total	Impairment as reported in interview				
		Blind, both eyes	One blind, other defective	One blind, other normal or not mentioned	One or both defective	No eye trouble reported
Percent distribution of interview findings						
Total-----	100.0	10.0	0.1	0.4	2.6	96.9
Percent distribution of acuity levels						
<u>Distance acuity</u>						
Total-----	100.0	100.0	100.0	100.0	100.0	100.0
20/100 or less-----	1.8	100.0	100.0	50.0	23.7	1.6
20/40-20/70-----	8.1	---	---	21.4	31.2	9.9
20/30 or better-----	90.1	---	---	28.6	45.1	88.5
<u>Near acuity</u>						
Total-----	100.0	100.0	100.0	100.0	100.0	100.0
14/70 or less-----	4.2	100.0	100.0	50.0	24.9	2.1
14/28-14/49-----	12.3	---	---	32.1	42.2	16.0
14/21 or better-----	83.5	---	---	17.9	32.9	81.9

¹0.03 percent.

were asked "Can you see well enough to read ordinary newspaper print with glasses?" in addition to the general questions on impairments or symptoms. If the person answered "no" to the question on reading newspaper print he was classified as "blind in both eyes." If he otherwise reported having impaired vision or being blind in one or both eyes, the visual status of the examinee was so classified.

The extent of agreement between central visual acuity scores, with usual correction, from the examination and visual status as determined by interview are shown for binocular vision in table D and for better monocular vision in table E.

Agreement between test and interview data is generally fairly good but better for those report-

ing extremely defective vision—"blind in both eyes" or "one blind, other defective"—than for those reporting no eye trouble.

Among those whose "corrected" visual acuity test results were 20/100 or less and 14/70 or less but who reported no eye trouble or trouble reading newspaper, about two-thirds stated they wore glasses at least part of the time but did not bring them to the examination. Hence their actual test results with their usual correction would probably not have been this low. The remaining one-third testing at this level reported they did not wear glasses at all. These examinees apparently either did not realize they had a visual problem or had refused to admit it when they were interviewed.

DISCUSSION

Few studies are reported in the literature giving monocular acuity findings obtained by similar methods to those used in the present survey.

Karpinos⁸ in his study of a 50-percent sample of the 276,000 Selective Service registrants aged through 26 years examined in the Armed Forces examining stations from January 1957 through September 1958 showed a high level of agreement between tests of the right and the left eye. Eighty-five percent tested at the same level and only about seven percent differed by more than one level of acuity. This is a far higher level of agreement than that found among men 18-24 years of age in the present study, where only about 36 percent were in agreement and nearly 20 percent differed by more than one level.

Sorsby and others⁹ found in their study of 1,033 men 18-22 years of age called for National Service in Great Britain that 68 percent tested 6/6 or better (comparable to the 20/20 level but tested with appropriately sized letters at 6 feet) in the better eye without correction, only slightly below the 73 percent found for men 18-24 years of age in the present study.

Rambo and Sangal¹⁰ in their study of the accommodation of the people of India reanalyzed data from previous studies among mid-European groups of Donders,¹¹ Duane,¹²⁻¹⁴ and Sheard.¹⁵ Although testing methods were not the same as those used in the present study, they found only chance differences between acuities in the right and the left eye; their findings showed better agreement but were roughly comparable to those findings from the present study.

SUMMARY

Monocular visual acuity findings for each eye and the better eye are analyzed here and compared with binocular acuity findings and results from previous investigations in this area as reported in the literature. Comparison with responses on visual status from the interview is also included.

From the present study national estimates based on Health Examination Survey findings among a complex probability sample highly representative of adults 18-79 years of age in the ci-

vilian, noninstitutional population of the United States in 1960-62 are as follows.

The rates for binocular visual acuity levels of 20/20 or better were consistently higher than those for better monocular acuity, which in turn exceeded the rates for either the right or the left eye throughout the age range.

At the 20/30 or better levels and at the poorer end of the acuity range—20/100 or less—essentially no consistent difference was found between the rates for binocular and better monocular visual acuity.

In general the trends by age and sex for better monocular vision were similar to those for binocular acuity.

Overall, a high order of agreement was found between better monocular and binocular acuity both without and with usual correction. Agreement of test results for the left and the right eye was less good and was poorer for tests in which usual correction was used than for those without. Agreement was, as expected, better at the lower acuity levels where measurement gradations were coarser.

Agreement between interview and test data was good for those with extremely defective visual acuity and less good for those with better but still defective vision.

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Table 1. Rates for adults at specified acuity levels for uncorrected central distance vision in the better eye: United States, 1960-62

Sex and age	Acuity level									
	20/10 or more	20/15	20/20	20/30	20/40	20/50	20/70	20/100	20/200	Less than 20/200
<u>Both sexes</u>	Rate per 100 adults									
All ages, 18-79--	0.7	24.7	22.6	20.3	6.4	5.0	4.8	7.5	5.5	2.4
18-24 years-----	1.6	42.2	23.9	17.6	2.7	1.5	2.7	2.6	3.1	2.0
25-34 years-----	1.2	41.2	29.7	14.4	2.8	1.1	2.1	2.1	3.6	1.8
35-44 years-----	1.1	35.4	33.5	17.4	3.3	1.5	1.7	2.5	2.2	2.0
45-54 years-----	0.1	14.5	22.4	28.4	9.4	7.1	4.6	6.7	5.5	1.2
55-64 years-----	0.2	2.8	11.8	26.6	11.4	8.6	9.6	16.8	9.2	2.9
65-74 years-----	-	0.6	3.8	19.6	10.4	13.1	10.9	21.1	13.4	7.0
75-79 years-----	-	-	0.3	14.1	16.3	16.4	15.1	20.3	9.2	8.0
<u>Men</u>										
All ages, 18-79--	1.0	28.8	22.6	20.2	6.3	5.3	4.4	5.6	4.3	1.5
18-24 years-----	2.6	48.4	22.0	16.3	1.1	1.6	2.7	1.5	2.7	1.2
25-34 years-----	1.8	45.1	28.2	12.0	2.1	1.6	1.8	2.7	3.6	1.0
35-44 years-----	1.2	43.2	29.6	14.6	2.8	1.5	1.8	2.1	2.2	0.9
45-54 years-----	0.2	19.4	24.5	27.0	8.8	7.2	4.0	4.8	3.8	0.2
55-64 years-----	-	2.0	15.8	31.9	13.0	9.4	9.1	10.5	6.4	1.8
65-74 years-----	-	0.8	7.8	24.3	11.7	14.3	9.5	17.4	9.8	4.4
75-79 years-----	-	-	0.6	20.1	18.4	15.3	15.4	16.3	6.8	7.0
<u>Women</u>										
All ages, 18-79--	0.5	21.0	22.6	20.4	6.5	4.7	5.2	9.2	6.6	3.2
18-24 years-----	0.7	37.0	25.6	18.7	4.1	1.5	2.8	3.6	3.5	2.6
25-34 years-----	0.6	37.7	31.2	16.7	3.3	0.6	2.3	1.4	3.6	2.5
35-44 years-----	1.0	28.2	37.2	20.2	3.7	1.6	1.7	3.0	2.1	1.5
45-54 years-----	0.1	9.8	20.5	29.7	9.9	7.1	5.2	8.4	7.1	2.2
55-64 years-----	0.4	3.5	8.1	21.8	10.0	7.9	10.1	22.7	11.7	3.8
65-74 years-----	-	0.5	0.4	15.8	9.4	12.2	12.0	24.0	16.4	9.1
75-79 years-----	-	-	-	8.2	14.1	17.6	14.8	24.4	11.8	9.1

Table 2. Rates for adults at specified acuity levels for "corrected" central distance vision in the better eye: United States, 1960-62

Sex and age	Acuity level									
	20/10 or more	20/15	20/20	20/30	20/40	20/50	20/70	20/100	20/200	Less than 20/200
<u>Both sexes</u>										
Rate per 100 adults										
All ages, 18-79--	0.9	32.9	32.1	24.2	4.4	2.4	1.3	0.9	0.5	0.4
18-24 years-----	2.0	50.3	28.9	16.0	1.7	0.5	0.3	0.1	0.1	0.1
25-34 years-----	1.4	50.5	33.6	11.5	1.4	0.3	0.4	0.5	0.2	0.1
35-44 years-----	1.1	44.3	38.0	13.5	1.5	0.6	0.5	0.2	0.2	0.1
45-54 years-----	0.4	25.8	35.6	28.2	5.1	2.1	1.0	0.9	0.5	0.3
55-64 years-----	-	9.2	30.6	43.4	8.0	4.3	2.3	0.8	1.0	0.4
65-74 years-----	-	3.7	22.4	44.4	11.2	7.8	3.7	3.7	1.4	1.6
75-79 years-----	-	1.0	9.1	44.9	14.0	15.1	7.9	4.1	2.4	1.2
<u>Men</u>										
All ages, 18-79--	1.2	37.0	30.7	22.2	4.1	2.3	1.1	0.8	0.4	0.2
18-24 years-----	3.2	53.9	25.5	15.5	0.7	0.7	0.5	-	-	-
25-34 years-----	2.0	55.1	31.8	8.7	1.4	0.4	0.3	0.1	0.1	-
35-44 years-----	1.2	51.1	32.8	11.9	1.6	0.3	0.3	0.3	0.2	0.2
45-54 years-----	0.7	32.0	35.5	23.8	4.3	2.1	0.3	0.8	0.3	0.2
55-64 years-----	-	9.1	30.9	43.1	9.1	3.9	1.8	0.7	0.8	0.5
65-74 years-----	-	4.4	26.8	40.8	10.4	6.6	4.5	4.3	1.6	0.5
75-79 years-----	-	2.0	9.5	51.6	12.0	17.3	4.9	1.1	1.5	-
<u>Women</u>										
All ages, 18-79--	0.6	29.2	33.3	26.0	4.6	2.5	1.5	1.1	0.6	0.5
18-24 years-----	1.0	47.3	31.7	16.4	2.6	0.3	0.1	0.2	0.2	0.2
25-34 years-----	0.8	46.4	35.2	14.1	1.4	0.2	0.5	0.8	0.4	0.1
35-44 years-----	0.9	38.0	42.7	15.1	1.5	0.8	0.6	0.2	0.1	0.1
45-54 years-----	0.2	19.8	35.6	32.4	5.8	2.1	1.7	1.1	0.8	0.4
55-64 years-----	-	9.3	30.2	43.6	6.8	4.7	2.8	1.0	1.1	0.4
65-74 years-----	-	3.0	18.8	47.3	11.9	8.8	3.0	3.3	1.2	2.5
75-79 years-----	-	-	8.8	38.1	16.1	12.9	10.9	7.3	3.4	2.4

Table 3. Rates for adults at selected acuity levels for uncorrected monocular and binocular central visual acuity at distance: United States, 1960-62

Sex and age	Right eye			Left eye			Better eye			Binocular		
	20/20 or better	20/30	20/100 or less	20/20 or better	20/30	20/100 or less	20/20 or better	20/30	20/100 or less	20/20 or better	20/30	20/100 or less
<u>Both sexes</u>	Rate per 100 adults											
All ages, 18-79--	39.6	22.0	22.0	39.7	22.4	19.2	48.1	20.3	15.4	53.9	15.4	16.1
18-24 years-----	59.1	21.1	11.7	58.8	21.6	9.9	67.7	17.6	7.7	74.8	10.4	8.3
25-34 years-----	63.6	18.5	10.9	60.6	21.7	9.6	72.2	14.4	7.4	77.3	9.6	7.5
35-44 years-----	56.5	24.9	9.1	58.6	22.6	8.0	68.5	17.4	5.9	76.7	10.9	5.9
45-54 years-----	27.4	29.9	20.0	29.4	27.4	16.9	37.1	28.4	13.4	44.6	23.7	13.8
55-64 years-----	9.7	21.1	39.9	9.7	25.6	35.9	14.8	26.6	28.8	21.0	21.8	30.0
65-74 years-----	3.0	14.0	55.9	2.6	13.7	48.6	4.4	19.6	41.5	5.7	19.3	44.9
75-79 years-----	0.3	7.9	58.5	-	10.0	47.0	0.3	14.1	37.6	1.5	13.1	42.0
<u>Men</u>												
All ages, 18-79--	42.4	22.2	18.2	43.0	22.7	14.9	52.4	20.2	11.4	57.7	15.5	12.1
18-24 years-----	63.4	19.3	10.1	64.4	19.7	7.2	73.0	16.3	5.4	79.5	9.4	5.8
25-34 years-----	65.4	15.9	10.7	61.9	21.2	9.3	75.1	12.0	7.4	79.8	7.4	7.4
35-44 years-----	57.8	24.7	8.2	61.9	20.3	6.9	74.0	14.6	5.2	79.7	8.8	5.0
45-54 years-----	32.9	29.5	16.0	35.0	26.4	12.5	44.1	27.0	8.9	50.2	22.9	9.4
55-64 years-----	11.9	25.6	30.6	10.6	30.3	25.6	17.8	31.9	18.8	24.7	27.2	20.7
65-74 years-----	5.6	17.1	44.1	5.6	18.6	38.5	8.6	24.3	31.5	9.3	23.4	33.5
75-79 years-----	0.6	10.2	56.4	-	15.7	37.2	0.6	20.1	30.1	1.2	17.6	39.3
<u>Women</u>												
All ages, 18-79--	37.0	21.8	25.5	36.8	22.2	23.0	44.1	20.4	19.0	50.5	15.2	19.7
18-24 years-----	55.5	22.6	13.2	54.1	23.2	12.3	63.3	18.7	9.7	70.7	11.3	10.2
25-34 years-----	61.9	20.8	11.1	59.3	22.2	9.9	69.5	16.7	7.5	75.3	11.6	7.6
35-44 years-----	55.4	25.0	10.0	55.5	24.8	9.0	66.4	20.0	6.6	74.0	12.8	6.6
45-54 years-----	22.1	30.3	23.8	24.0	28.4	21.2	30.4	29.7	17.7	39.4	24.2	18.0
55-64 years-----	7.7	17.0	48.5	8.8	21.1	45.5	12.0	21.8	38.2	17.5	17.0	38.4
65-74 years-----	1.0	11.5	65.6	0.2	9.6	56.8	1.0	15.8	49.6	2.9	16.1	53.7
75-79 years-----	-	5.6	60.7	-	4.2	57.0	-	8.2	45.3	1.6	8.5	45.0

Table 4. Rates for adults at selected acuity levels for "corrected" monocular and binocular central visual acuity at distance: United States, 1960-62

Sex and age	Right eye			Left eye			Better eye			Binocular		
	20/20 or better	20/30	20/100 or less	20/20 or better	20/30	20/100 or less	20/20 or better	20/30	20/100 or less	20/20 or better	20/30	20/100 or less
<u>Both sexes</u>	Rate per 100 adults											
All ages, 18-79--	53.7	29.4	5.2	55.1	28.5	4.3	65.9	24.2	1.8	72.8	17.7	2.3
18-24 years-----	71.4	20.8	2.1	71.3	21.6	1.6	81.2	16.0	0.3	87.7	10.2	0.3
25-34 years-----	75.3	18.8	1.8	72.5	20.8	2.4	85.5	11.5	0.8	89.6	7.4	0.8
35-44 years-----	69.4	23.2	2.3	71.0	21.5	1.8	83.3	13.5	0.5	90.0	7.1	0.4
45-54 years-----	47.2	36.0	4.4	50.4	32.0	3.7	61.8	28.2	1.7	71.0	20.5	2.3
55-64 years-----	25.0	43.8	8.5	31.2	43.2	6.0	39.7	43.4	2.3	50.1	33.5	3.7
65-74 years-----	16.4	41.4	14.5	18.2	39.6	12.8	26.1	44.4	6.7	32.2	38.9	8.1
75-79 years-----	7.4	36.8	23.4	5.1	34.2	17.3	10.1	44.9	7.8	15.0	38.6	11.2
<u>Men</u>												
All ages, 18-79--	55.2	28.3	5.0	57.8	26.6	3.9	68.9	22.2	1.4	75.7	15.8	1.9
18-24 years-----	70.8	20.3	3.0	74.1	19.1	1.3	82.6	15.5	-	89.6	8.6	-
25-34 years-----	78.0	15.6	1.2	74.7	19.2	1.6	88.9	8.7	0.2	92.5	5.4	0.6
35-44 years-----	68.4	24.0	2.5	72.6	20.4	1.7	85.2	11.9	0.6	91.3	5.8	0.5
45-54 years-----	52.4	32.6	3.6	56.4	28.0	3.4	68.2	23.8	1.2	75.3	18.0	1.3
55-64 years-----	24.8	43.9	9.6	31.0	43.2	6.0	40.0	43.1	2.0	51.5	32.5	3.5
65-74 years-----	18.6	40.3	14.1	22.3	35.5	12.9	31.3	40.8	6.4	36.9	35.0	7.6
75-79 years-----	11.6	42.6	19.6	4.7	39.9	13.0	11.6	51.6	2.5	18.9	38.0	9.8
<u>Women</u>												
All ages, 18-79--	52.3	30.4	5.3	52.7	30.2	4.7	63.1	26.0	2.2	70.4	19.5	2.6
18-24 years-----	71.8	21.2	1.4	69.0	23.6	1.8	80.0	16.4	0.6	86.0	11.6	0.6
25-34 years-----	72.9	21.8	2.4	70.4	22.1	3.0	82.4	14.1	1.3	87.1	9.3	0.9
35-44 years-----	70.3	22.4	2.0	69.5	22.6	1.9	81.6	15.1	0.4	88.8	8.2	0.4
45-54 years-----	42.3	39.3	5.2	44.7	35.9	4.0	55.7	32.4	2.2	66.9	22.9	3.2
55-64 years-----	25.2	43.7	7.5	31.5	43.3	6.0	39.5	43.6	2.5	48.9	34.4	3.8
65-74 years-----	14.6	42.2	14.9	14.9	42.9	12.8	21.9	47.3	7.0	28.5	42.1	8.5
75-79 years-----	3.3	31.0	27.5	5.5	28.6	21.8	8.8	38.1	13.1	11.2	39.1	12.4

Table 5. Rates for adults at specified acuity levels for uncorrected central distance vision in the right eye: United States, 1960-62

Sex and age	Acuity level									
	20/10 or more	20/15	20/20	20/30	20/40	20/50	20/70	20/100	20/200	Less than 20/200
Both sexes										
Rate per 100 adults										
All ages, 18-79--	0.3	18.0	21.3	22.0	6.6	7.0	2.8	10.3	6.8	5.0
18-24 years-----	0.9	30.5	27.7	21.1	4.2	1.9	1.8	3.8	4.8	3.1
25-34 years-----	0.4	31.0	32.1	18.5	2.8	2.4	1.8	3.4	4.2	3.2
35-44 years-----	0.2	25.9	30.4	24.9	3.9	3.7	1.8	4.3	2.5	2.3
45-54 years-----	-	9.5	17.9	29.9	9.3	9.9	3.6	9.3	7.4	3.4
55-64 years-----	0.1	2.0	7.6	21.1	12.1	12.7	4.4	21.8	11.6	6.4
65-74 years-----	-	0.5	2.6	14.0	9.8	13.4	3.7	27.2	14.2	14.6
75-79 years-----	-	-	0.3	7.9	7.9	19.6	5.7	27.6	13.7	17.2
Men										
All ages, 18-79--	0.3	20.7	21.5	22.2	7.1	7.2	2.9	9.0	5.3	3.9
18-24 years-----	1.3	34.4	27.7	19.3	4.0	2.0	1.2	3.1	5.3	1.7
25-34 years-----	0.6	34.0	30.8	15.9	3.0	2.9	2.1	4.0	4.0	2.6
35-44 years-----	-	30.1	27.7	24.7	3.8	3.0	2.4	3.6	2.4	2.1
45-54 years-----	-	13.7	19.2	29.5	9.2	8.5	3.8	8.8	4.4	2.8
55-64 years-----	-	1.2	10.7	25.6	13.4	14.3	4.2	16.9	8.3	5.3
65-74 years-----	-	0.4	5.2	17.1	13.2	16.1	3.8	23.0	10.4	10.7
75-79 years-----	-	-	0.6	10.2	8.4	21.2	3.2	29.9	11.8	14.6
Women										
All ages, 18-79--	0.2	15.6	21.2	21.8	6.1	6.8	2.7	11.5	8.1	5.9
18-24 years-----	0.4	27.2	27.8	22.6	4.4	1.8	2.4	4.4	4.4	4.3
25-34 years-----	0.3	28.3	33.4	20.8	2.6	2.0	1.6	2.9	4.4	3.8
35-44 years-----	0.4	22.0	32.9	25.0	4.0	4.4	1.2	5.0	2.7	2.4
45-54 years-----	-	5.5	16.6	30.3	9.3	11.2	3.3	9.8	10.2	3.9
55-64 years-----	0.2	2.8	4.7	17.0	11.0	11.3	4.5	26.4	14.8	7.4
65-74 years-----	-	0.5	0.4	11.5	7.0	11.2	3.7	30.6	17.3	17.7
75-79 years-----	-	-	-	5.6	7.3	18.0	8.3	25.3	15.6	19.8

Table 6. Rates for adults at specified acuity levels for uncorrected central distance vision in the left eye: United States, 1960-62

Sex and age	Acuity level									
	20/10 or more	20/15	20/20	20/30	20/40	20/50	20/70	20/100	20/200	Less than 20/200
<u>Both sexes</u>	Rate per 100 adults									
All ages, 18-79--	0.5	18.4	20.8	22.4	7.3	3.5	7.9	7.0	6.9	5.3
18-24 years-----	0.7	33.6	24.5	21.6	3.8	1.8	4.0	3.1	3.0	3.9
25-34 years-----	0.9	32.0	27.8	21.7	3.8	1.4	2.8	2.0	3.6	4.1
35-44 years-----	0.9	25.4	32.2	22.6	5.5	1.4	3.9	2.5	3.2	2.3
45-54 years-----	0.1	9.7	19.5	27.4	10.8	5.3	10.0	7.2	6.1	3.7
55-64 years-----	0.1	1.2	8.4	25.6	9.4	5.7	13.8	15.2	13.3	7.4
65-74 years-----	-	0.3	2.3	13.7	11.0	7.3	16.8	18.1	16.7	13.8
75-79 years-----	-	-	-	10.0	16.4	7.0	19.4	15.1	17.7	14.3
<u>Men</u>										
All ages, 18-79--	0.7	22.2	20.0	22.7	7.6	4.0	7.8	5.5	5.5	3.9
18-24 years-----	1.2	41.3	21.9	19.7	3.2	1.7	3.7	1.6	3.1	2.6
25-34 years-----	1.4	34.8	25.7	21.2	3.0	1.8	2.6	2.3	4.2	2.8
35-44 years-----	1.2	32.3	28.4	20.3	5.1	1.4	4.4	2.7	2.4	1.8
45-54 years-----	0.2	13.2	21.7	26.4	11.2	7.0	7.8	5.0	4.8	2.6
55-64 years-----	-	1.4	9.2	30.3	11.9	6.2	15.4	9.8	9.8	5.9
65-74 years-----	-	0.8	4.8	18.6	12.6	7.4	17.3	17.1	10.5	11.0
75-79 years-----	-	-	-	15.7	18.0	8.0	21.0	11.0	15.1	11.1
<u>Women</u>										
All ages, 18-79--	0.3	15.0	21.5	22.2	7.0	3.0	8.0	8.4	8.2	6.5
18-24 years-----	0.2	27.1	26.7	23.2	4.3	2.0	4.2	4.3	2.9	5.0
25-34 years-----	0.4	29.3	29.6	22.2	4.5	1.0	3.0	1.7	3.0	5.2
35-44 years-----	0.7	19.1	35.7	24.8	5.8	1.3	3.4	2.4	3.9	2.8
45-54 years-----	0.1	6.4	17.5	28.4	10.5	3.8	12.1	9.2	7.2	4.7
55-64 years-----	0.2	1.1	7.6	21.1	7.0	5.2	12.4	20.2	16.4	8.8
65-74 years-----	-	-	0.2	9.6	9.7	7.2	16.4	18.9	21.9	16.1
75-79 years-----	-	-	-	4.2	14.7	6.0	17.9	19.2	20.3	17.5

Table 7. Rates for adults at specified acuity levels for "corrected" central distance vision in the right eye: United States, 1960-62

Sex and age	Acuity level									
	20/10 or more	20/15	20/20	20/30	20/40	20/50	20/70	20/100	20/200	Less than 20/200
<u>Both sexes</u>	Rate per 100 adults									
All ages, 18-79--	0.3	24.6	28.9	29.4	6.0	4.5	1.2	2.4	1.1	1.7
18-24 years-----	0.8	36.4	34.2	20.8	3.2	1.5	1.0	1.1	0.5	0.6
25-34 years-----	0.5	39.0	35.8	18.8	1.7	1.1	1.1	1.0	0.6	0.3
35-44 years-----	0.2	33.5	35.6	23.2	2.6	1.7	0.8	1.5	0.4	0.4
45-54 years-----	-	18.2	29.0	36.0	6.4	4.4	1.5	1.9	0.9	1.6
55-64 years-----	-	6.7	18.3	43.8	12.3	9.6	0.7	4.0	2.4	2.1
65-74 years-----	-	3.1	13.3	41.4	14.9	10.6	2.2	5.4	2.2	7.0
75-79 years-----	-	1.0	6.4	36.8	9.2	19.7	3.2	10.0	3.6	9.9
<u>Men</u>										
All ages, 18-79--	0.3	27.1	27.8	28.3	5.9	4.1	1.4	2.4	0.9	1.7
18-24 years-----	1.6	38.6	30.7	20.3	3.3	1.1	1.4	1.8	0.4	0.8
25-34 years-----	0.6	42.4	35.0	15.6	2.2	1.4	1.5	0.7	0.3	0.2
35-44 years-----	-	37.3	31.1	24.0	3.0	1.1	1.0	1.8	0.3	0.4
45-54 years-----	-	22.3	30.0	32.6	5.6	4.3	1.5	1.3	0.4	1.8
55-64 years-----	-	6.1	18.8	43.9	11.2	9.5	1.0	4.8	2.2	2.6
65-74 years-----	-	3.1	15.5	40.3	17.0	7.8	2.1	5.2	3.1	5.8
75-79 years-----	-	2.0	9.5	42.6	5.2	19.5	1.6	8.6	2.1	8.9
<u>Women</u>										
All ages, 18-79--	0.2	22.3	29.8	30.4	6.0	4.9	1.1	2.3	1.2	1.8
18-24 years-----	0.2	34.5	37.1	21.2	3.1	1.8	0.6	0.5	0.6	0.3
25-34 years-----	0.4	35.9	36.6	21.8	1.3	0.8	0.8	1.2	0.8	0.3
35-44 years-----	0.4	30.1	39.8	22.4	2.3	2.4	0.6	1.3	0.4	0.4
45-54 years-----	-	14.2	28.1	39.3	7.2	4.5	1.5	2.4	1.4	1.3
55-64 years-----	-	7.3	17.9	43.7	13.4	9.7	0.5	3.3	2.5	1.7
65-74 years-----	-	3.0	11.6	42.2	13.2	12.8	2.3	5.5	1.4	8.0
75-79 years-----	-	-	3.3	31.0	13.2	20.0	5.0	11.3	5.2	10.9

Table 8. Rates for adults at specified acuity levels for "corrected" central distance vision in the left eye: United States, 1960-62

Sex and age	Acuity level									
	20/10 or more	20/15	20/20	20/30	20/40	20/50	20/70	20/100	20/200	Less than 20/200
<u>Both sexes</u>	Rate per 100 adults									
All ages, 18-79--	0.6	24.3	30.1	28.5	6.3	2.5	3.3	1.2	1.1	2.1
18-24 years-----	1.3	39.7	30.4	21.6	3.3	0.7	1.4	0.3	0.3	1.1
25-34 years-----	1.0	39.5	32.0	20.8	2.5	0.9	1.0	0.6	0.5	1.2
35-44 years-----	0.9	32.2	37.9	21.5	3.1	0.9	1.7	0.4	0.6	0.8
45-54 years-----	0.5	17.3	32.7	32.0	7.5	3.6	2.7	1.1	0.6	2.0
55-64 years-----	-	5.2	26.1	43.2	8.7	3.6	7.2	0.9	2.1	3.0
65-74 years-----	-	1.6	16.6	39.6	15.3	6.9	7.1	5.1	2.2	5.5
75-79 years-----	-	-	5.1	34.2	21.6	8.9	12.6	3.1	7.6	6.7
<u>Men</u>										
All ages, 18-79--	1.0	28.4	28.4	26.6	5.9	2.8	3.1	1.2	0.8	1.9
18-24 years-----	1.8	46.8	25.4	19.1	3.1	0.8	1.6	0.2	0.2	1.0
25-34 years-----	1.6	43.0	30.1	19.2	2.3	1.2	0.9	0.3	0.5	0.9
35-44 years-----	1.2	38.8	32.7	20.4	3.1	0.7	1.5	0.3	0.4	0.9
45-54 years-----	0.7	21.9	33.8	28.0	6.0	4.1	2.0	1.0	0.4	2.0
55-64 years-----	-	5.3	25.7	43.2	8.9	4.1	6.8	0.9	1.9	3.2
65-74 years-----	-	2.7	19.6	35.5	15.2	6.4	7.6	7.2	1.3	4.3
75-79 years-----	-	-	4.7	39.9	20.8	10.4	11.1	2.1	5.9	5.0
<u>Women</u>										
All ages, 18-79--	0.4	20.6	31.7	30.2	6.6	2.3	3.5	1.1	1.3	2.2
18-24 years-----	0.8	33.6	34.6	23.6	3.6	0.6	1.3	0.4	0.3	1.1
25-34 years-----	0.5	36.2	33.8	22.1	2.7	0.6	1.1	1.0	0.6	1.5
35-44 years-----	0.6	26.1	42.7	22.6	3.1	1.0	1.8	0.5	0.7	0.8
45-54 years-----	0.2	12.8	31.7	35.9	9.0	3.0	3.4	1.2	0.9	1.9
55-64 years-----	-	5.1	26.4	43.3	8.5	3.2	7.5	1.0	2.3	2.7
65-74 years-----	-	0.8	14.1	42.9	15.3	7.4	6.7	3.4	2.9	6.5
75-79 years-----	-	-	5.5	28.6	22.4	7.5	14.2	4.1	9.2	8.5

Table 9. Rates for adults at specified acuity levels for uncorrected central near vision in the better eye: United States, 1960-62

Sex and age	Acuity level									
	14/7 or more	14/10.5	14/14	14/21	14/28	14/35	14/49	14/70	14/140	Less than 14/140
<u>Both sexes</u>	Rate per 100 adults									
All ages, 18-79--	0.5	20.5	19.8	11.8	4.3	4.3	6.3	11.8	14.9	5.7
18-24 years-----	1.1	45.8	33.3	11.4	3.2	1.0	0.9	1.9	0.7	0.6
25-34 years-----	1.0	42.3	34.7	13.9	1.4	1.1	1.8	1.1	1.7	1.0
35-44 years-----	0.5	26.0	34.3	20.5	5.0	2.5	3.7	3.6	3.2	0.7
45-54 years-----	0.2	1.2	4.9	12.7	7.9	9.2	13.1	23.4	21.9	5.3
55-64 years-----	-	0.1	0.3	2.9	3.7	6.3	10.3	27.5	36.1	12.7
65-74 years-----	-	-	-	2.6	3.5	7.0	9.0	18.6	38.3	21.0
75-79 years-----	-	-	-	4.2	7.2	5.2	9.6	21.4	33.9	18.2
<u>Men</u>										
All ages, 18-79--	0.7	23.7	19.2	10.9	4.2	4.4	6.7	12.7	12.9	4.5
18-24 years-----	1.7	52.7	30.1	9.7	2.2	0.2	0.6	1.7	0.3	0.9
25-34 years-----	1.5	47.8	32.9	9.9	1.0	0.7	2.4	1.2	1.7	0.9
35-44 years-----	0.2	31.6	34.5	19.3	4.8	2.4	2.4	2.8	1.7	0.4
45-54 years-----	0.5	1.8	6.0	13.1	8.0	9.4	14.2	24.7	19.0	3.4
55-64 years-----	-	0.2	0.4	2.8	4.4	7.4	12.5	29.3	31.9	10.9
65-74 years-----	-	-	-	3.6	2.9	8.6	10.4	23.1	34.9	16.5
75-79 years-----	-	-	-	8.5	11.6	4.6	6.4	24.5	28.6	15.7
<u>Women</u>										
All ages, 18-79--	0.3	17.6	20.3	12.7	4.4	4.1	5.9	11.1	16.6	6.8
18-24 years-----	0.6	40.0	36.1	12.9	4.1	1.6	1.2	2.1	1.0	0.4
25-34 years-----	0.6	37.3	36.4	17.6	1.8	1.4	1.2	1.0	1.6	1.0
35-44 years-----	0.7	20.8	34.2	21.5	5.3	2.6	4.9	4.5	4.5	1.0
45-54 years-----	-	0.7	3.9	12.4	7.8	8.9	12.1	22.3	24.8	7.0
55-64 years-----	-	-	0.2	3.1	3.0	5.3	8.3	25.8	39.9	14.4
65-74 years-----	-	-	-	1.8	3.9	5.6	7.8	15.0	41.2	24.7
75-79 years-----	-	-	-	-	2.8	5.8	12.9	18.3	39.4	20.8

Table 10. Rates for adults at specified acuity levels for "corrected" central near vision in the better eye: United States, 1960-62

Sex and age	Acuity level									
	14/7 or more	14/10.5	14/14	14/21	14/28	14/35	14/49	14/70	14/140	Less than 14/140
Both sexes										
Rate per 100 adults										
All ages, 18-79--	0.6	25.0	31.4	26.5	6.4	3.4	2.5	2.4	1.3	0.5
18-24 years-----	0.8	50.7	35.4	11.0	1.5	0.3	0.2	-	0.1	-
25-34 years-----	1.4	47.1	37.2	12.7	0.7	0.2	0.3	0.2	0.2	0.1
35-44 years-----	0.8	30.5	42.1	20.2	2.8	1.6	0.7	1.0	0.3	0.1
45-54 years-----	0.1	7.5	23.8	39.1	10.9	6.5	6.2	4.0	1.3	0.6
55-64 years-----	0.1	3.8	26.5	39.3	11.4	6.4	3.2	5.0	3.6	0.8
65-74 years-----	-	1.4	18.3	46.2	13.5	6.2	5.0	4.4	3.5	1.5
75-79 years-----	-	-	7.1	33.2	21.3	11.9	7.4	12.7	2.5	3.8
Men										
All ages, 18-79--	0.6	28.9	29.7	23.8	5.8	3.8	2.9	2.8	1.3	0.4
18-24 years-----	1.1	56.4	31.5	9.1	1.7	0.2	-	-	-	-
25-34 years-----	1.8	53.5	34.4	8.4	1.2	0.3	0.3	0.1	-	0.1
35-44 years-----	0.6	36.1	38.7	19.9	2.6	0.8	0.4	0.6	0.2	0.2
45-54 years-----	-	9.9	25.6	34.9	8.5	6.9	7.4	4.6	1.5	0.6
55-64 years-----	-	6.0	25.8	32.6	10.8	8.9	4.5	6.1	4.6	0.8
65-74 years-----	-	2.6	18.4	45.2	11.7	6.3	5.8	6.3	3.4	0.3
75-79 years-----	-	-	2.4	44.0	19.6	12.2	5.4	11.7	1.5	3.1
Women										
All ages, 18-79--	0.5	21.4	32.9	28.9	7.1	3.1	2.1	2.1	1.3	0.6
18-24 years-----	0.6	46.0	38.6	12.6	1.3	0.3	0.4	-	0.3	-
25-34 years-----	1.0	41.2	39.7	16.5	0.4	0.2	0.2	0.2	0.5	0.1
35-44 years-----	1.0	25.4	45.2	20.4	3.0	2.3	0.9	1.3	0.4	0.1
45-54 years-----	0.2	5.2	22.1	43.1	13.3	6.0	5.0	3.4	1.2	0.6
55-64 years-----	0.1	1.7	27.0	45.6	12.0	4.1	1.9	4.0	2.7	0.7
65-74 years-----	-	0.4	18.1	47.1	15.0	6.0	4.5	2.8	3.6	2.5
75-79 years-----	-	-	11.8	22.3	23.0	11.5	9.3	13.8	3.6	4.6

Table 11. Rates for adults at selected acuity levels for uncorrected monocular and binocular central visual acuity at near: United States, 1960-62

Sex and age	Right eye			Left eye			Better eye			Binocular		
	14/14 or better	14/21	14/70 or less	14/14 or better	14/21	14/70 or less	14/14 or better	14/21	14/70 or less	14/14 or better	14/21	14/70 or less
<u>Both sexes</u>	Rate per 100 adults											
All ages, 18-79-----	34.5	13.8	39.3	34.8	14.5	35.6	40.8	11.8	32.4	44.7	8.9	31.8
18-24 years-----	69.8	18.8	4.7	68.3	19.9	4.9	80.2	11.4	3.2	83.3	9.6	3.1
25-34 years-----	69.5	17.9	6.6	67.9	19.4	6.5	78.0	13.9	3.7	83.8	8.3	4.3
35-44 years-----	47.7	25.6	13.8	51.3	25.1	9.6	60.8	20.5	7.5	68.7	14.5	8.0
45-54 years-----	3.9	9.1	62.9	4.8	10.8	54.4	6.4	12.7	50.6	9.5	11.3	48.8
55-64 years-----	0.4	1.8	85.8	0.1	2.1	80.9	0.4	2.9	76.3	0.8	3.1	72.5
65-74 years-----	-	1.4	86.9	-	1.4	83.5	-	2.6	78.0	-	2.2	78.6
75-79 years-----	-	3.5	86.7	-	4.2	76.5	-	4.2	73.6	3.5	1.2	71.7
<u>Men</u>												
All ages, 18-79-----	37.0	12.9	37.2	37.7	13.4	33.5	43.5	10.9	30.2	47.6	7.7	29.6
18-24 years-----	73.8	17.0	5.0	73.1	17.5	4.7	84.4	9.7	2.8	87.3	7.4	2.8
25-34 years-----	73.6	13.0	6.8	73.0	15.4	6.3	82.1	9.9	3.8	86.5	4.9	4.3
35-44 years-----	53.1	25.6	10.2	56.3	24.5	7.1	66.4	19.3	4.8	75.1	12.6	4.9
45-54 years-----	4.9	10.1	59.0	6.4	10.5	50.6	8.2	13.1	47.0	12.2	12.2	46.4
55-64 years-----	0.6	1.6	83.9	0.2	1.9	78.0	0.6	2.8	72.2	1.0	3.0	69.4
65-74 years-----	-	1.9	85.0	-	2.0	80.2	-	3.6	74.5	-	2.4	75.2
75-79 years-----	-	7.0	76.6	-	8.5	71.5	-	8.5	68.8	7.0	1.1	61.0
<u>Women</u>												
All ages, 18-79-----	32.1	14.6	41.2	32.2	15.6	37.5	38.3	12.7	3.4	42.1	9.9	33.7
18-24 years-----	66.4	20.4	4.5	64.3	22.0	5.0	76.7	12.9	3.4	79.6	11.5	3.4
25-34 years-----	65.7	22.4	6.4	63.2	23.0	6.6	74.3	17.6	3.7	81.2	11.4	4.3
35-44 years-----	42.8	25.6	17.1	46.6	25.7	11.8	55.7	21.5	10.0	62.8	16.2	10.9
45-54 years-----	3.0	8.1	66.6	3.2	11.0	58.1	4.7	12.4	54.1	7.0	10.5	50.9
55-64 years-----	0.2	1.9	87.4	-	2.2	83.6	0.2	3.1	80.1	0.7	3.2	75.3
65-74 years-----	-	0.9	88.5	-	0.8	86.2	-	1.8	80.8	-	2.0	81.4
75-79 years-----	-	-	96.8	-	-	81.6	-	-	78.5	-	1.3	82.3

Table 12. Rates for adults at selected acuity levels for "corrected" monocular and binocular central visual acuity at near: United States, 1960-62

Sex and age	Right eye			Left eye			Better eye			Binocular		
	14/14 or better	14/21	14/70 or less	14/14 or better	14/21	14/70 or less	14/14 or better	14/21	14/70 or less	14/14 or better	14/21	14/70 or less
<u>Both sexes</u>	Rate per 100 adults											
All ages, 18-79-----	46.3	29.6	8.5	47.4	29.2	6.9	56.9	26.5	4.2	64.9	19.8	4.4
18-24 years-----	76.4	18.2	0.8	74.7	20.1	1.4	86.9	11.0	0.1	90.9	7.7	0.2
25-34 years-----	76.3	19.3	1.2	75.2	19.5	2.2	85.6	12.7	0.5	91.9	6.4	0.6
35-44 years-----	58.2	28.8	4.1	62.2	26.3	2.9	73.4	20.2	1.4	82.0	12.2	1.3
45-54 years-----	21.1	37.8	13.0	24.4	36.3	8.8	31.4	39.1	5.9	43.8	29.7	7.3
55-64 years-----	18.8	38.8	15.8	21.6	39.0	13.9	30.3	39.3	9.4	39.2	33.2	8.2
65-74 years-----	14.4	39.8	17.9	12.0	42.3	14.6	19.6	46.2	9.4	26.1	40.3	10.9
75-79 years-----	4.4	27.8	35.2	4.4	21.5	26.3	7.1	33.2	18.9	13.0	30.0	17.1
<u>Men</u>												
All ages, 18-79-----	48.5	26.2	9.2	50.4	26.3	7.2	59.2	23.8	4.5	67.1	17.2	4.8
18-24 years-----	78.0	16.2	0.9	78.0	17.3	1.6	89.0	9.1	-	91.5	7.4	-
25-34 years-----	80.8	14.3	1.3	80.0	14.3	2.0	89.6	8.4	0.2	93.8	3.9	0.5
35-44 years-----	61.7	27.0	3.5	63.9	26.5	2.5	75.4	19.9	1.0	85.5	11.0	1.1
45-54 years-----	23.3	34.4	14.8	29.6	31.9	9.4	35.5	34.9	6.7	47.0	26.0	8.5
55-64 years-----	19.2	31.8	19.4	24.0	33.7	16.0	31.8	32.6	11.5	40.5	27.5	10.4
65-74 years-----	15.8	36.0	18.5	13.5	40.8	14.7	21.1	45.2	10.0	27.2	37.6	11.2
75-79 years-----	2.4	36.2	27.8	1.5	26.9	22.2	2.4	44.0	16.2	17.0	26.4	13.9
<u>Women</u>												
All ages, 18-79-----	44.2	32.6	7.9	44.6	31.8	6.7	54.8	28.9	4.0	63.0	22.2	4.1
18-24 years-----	75.0	19.9	0.8	72.0	22.4	1.2	85.2	12.6	0.3	90.5	7.9	0.3
25-34 years-----	72.2	23.8	1.2	70.8	24.3	2.4	81.8	16.5	0.8	90.0	8.7	0.8
35-44 years-----	54.9	30.4	4.7	60.5	26.1	3.3	71.5	20.4	1.8	78.9	13.3	1.5
45-54 years-----	19.0	41.0	11.2	19.4	40.4	8.2	27.5	43.1	5.1	40.8	33.3	6.1
55-64 years-----	18.4	45.3	12.4	19.3	43.9	11.9	28.9	45.6	7.5	38.1	38.4	6.3
65-74 years-----	13.3	42.9	17.4	10.7	43.5	14.4	18.5	47.1	8.9	25.0	42.4	10.8
75-79 years-----	6.4	19.4	42.8	7.3	16.1	30.6	11.8	22.3	22.0	9.0	33.5	20.4

Table 13. Rates for adults at specified acuity levels for uncorrected central near vision in the right eye: United States, 1960-62

Sex and age	Acuity level									
	14/7 or more	14/10.5	14/14	14/21	14/28	14/35	14/49	14/70	14/140	Less than 14/140
<u>Both sexes</u>	Rate per 100 adults									
All ages, 18-79--	0.2	15.7	18.6	13.8	3.8	5.0	3.6	13.7	15.2	10.4
18-24 years-----	0.2	37.0	32.7	18.8	3.4	2.1	1.1	2.4	1.0	1.3
25-34 years-----	0.5	33.2	35.8	17.9	2.1	2.1	1.8	2.6	2.0	1.9
35-44 years-----	0.2	18.0	29.6	25.6	5.0	4.6	3.3	7.3	4.3	2.2
45-54 years-----	0.2	0.8	3.0	9.1	6.3	10.3	7.5	26.8	25.9	10.2
55-64 years-----	-	0.1	0.3	1.8	2.4	5.4	4.3	27.1	35.4	23.2
65-74 years-----	-	-	-	1.4	3.0	5.2	3.4	18.9	33.2	34.8
75-79 years-----	-	-	-	3.5	3.9	4.3	1.5	26.0	29.5	31.1
<u>Men</u>										
All ages, 18-79--	0.2	18.3	18.5	12.9	3.6	5.2	4.0	14.2	14.2	8.8
18-24 years-----	0.2	43.3	30.4	17.0	1.5	1.4	1.3	2.9	0.8	1.3
25-34 years-----	0.6	37.2	35.8	13.0	1.9	2.0	2.7	2.6	2.1	2.0
35-44 years-----	0.1	22.3	30.7	25.6	4.3	4.2	2.5	6.2	2.9	1.0
45-54 years-----	0.3	1.2	3.3	10.1	6.2	10.9	8.9	26.8	24.1	8.0
55-64 years-----	-	0.2	0.4	1.6	3.0	5.2	5.6	29.6	33.0	21.3
65-74 years-----	-	-	-	1.9	3.0	7.7	2.4	22.2	33.6	29.1
75-79 years-----	-	-	-	7.0	6.4	6.9	3.1	22.9	26.0	27.7
<u>Women</u>										
All ages, 18-79--	0.2	13.4	18.6	14.6	4.1	4.7	3.2	13.2	16.2	11.8
18-24 years-----	0.2	31.6	34.6	20.4	5.0	2.7	1.0	2.0	1.1	1.3
25-34 years-----	0.4	29.4	35.9	22.4	2.2	2.2	1.0	2.6	2.0	1.8
35-44 years-----	0.3	14.0	28.5	25.6	5.6	5.0	4.0	8.2	5.6	3.3
45-54 years-----	-	0.4	2.6	8.1	6.4	9.6	6.2	26.7	27.6	12.3
55-64 years-----	-	-	0.2	1.9	1.8	5.5	3.1	24.8	37.7	24.9
65-74 years-----	-	-	-	0.9	3.1	3.1	4.3	16.2	32.9	39.5
75-79 years-----	-	-	-	-	1.5	1.6	-	29.1	33.2	34.6

Table 14. Rates for adults at specified acuity levels for uncorrected central near vision in the left eye: United States, 1960-62

Sex and age	Acuity level									
	14/7 or more	14/10.5	14/14	14/21	14/28	14/35	14/49	14/70	14/140	Less than 14/140
<u>Both sexes</u>	Rate per 100 adults									
All ages, 18-79--	0.3	15.1	19.4	14.5	4.2	3.2	7.6	10.2	15.9	9.6
18-24 years-----	0.9	33.7	33.7	19.9	3.0	1.7	2.1	1.8	1.3	1.7
25-34 years-----	0.6	30.2	37.2	19.4	2.8	1.5	1.9	1.4	2.5	2.5
35-44 years-----	0.3	19.8	31.2	25.1	5.3	2.4	6.3	3.9	3.4	2.2
45-54 years-----	0.1	1.0	3.7	10.8	8.0	5.7	16.3	21.6	23.9	9.0
55-64 years-----	-	0.1	-	2.1	2.6	4.0	10.2	20.9	37.5	22.5
65-74 years-----	-	-	-	1.4	1.7	4.2	9.1	14.9	39.9	28.6
75-79 years-----	-	-	-	4.2	4.3	4.3	10.4	15.1	33.7	27.7
<u>Men</u>										
All ages, 18-79--	0.4	18.0	19.2	13.4	4.1	3.3	8.0	11.2	13.9	8.3
18-24 years-----	1.5	40.0	31.7	17.5	2.7	0.9	1.0	1.9	0.7	2.1
25-34 years-----	1.0	35.1	36.9	15.4	1.8	1.7	1.9	1.0	2.8	2.5
35-44 years-----	0.2	24.6	31.6	24.5	4.7	1.7	5.6	3.0	2.5	1.6
45-54 years-----	0.2	1.7	4.6	10.5	8.6	6.5	17.3	23.8	20.0	6.8
55-64 years-----	-	0.2	-	1.9	2.8	5.4	11.6	22.8	32.8	22.3
65-74 years-----	-	-	-	2.0	1.9	3.7	12.2	19.5	37.8	22.9
75-79 years-----	-	-	-	8.5	7.5	4.6	7.9	20.1	29.4	22.0
<u>Women</u>										
All ages, 18-79--	0.2	12.5	19.5	15.6	4.3	3.1	7.3	9.2	17.6	10.7
18-24 years-----	0.4	28.4	35.4	22.0	3.3	2.4	3.0	1.7	1.8	1.4
25-34 years-----	0.2	25.6	37.4	23.0	3.8	1.3	2.0	1.8	2.3	2.5
35-44 years-----	0.4	15.4	30.8	25.7	5.9	3.0	7.0	4.6	4.3	2.8
45-54 years-----	-	0.4	2.8	11.0	7.4	5.0	15.3	19.4	27.6	11.1
55-64 years-----	-	-	-	2.2	2.4	2.7	9.0	19.1	41.8	22.7
65-74 years-----	-	-	-	0.8	1.6	4.7	6.6	11.2	41.7	33.3
75-79 years-----	-	-	-	-	1.3	4.2	12.9	10.1	38.0	33.5

Table 15. Rates for adults at specified acuity levels for "corrected" central near vision in the right eye: United States, 1960-62

Sex and age	Acuity level									
	14/7 or more	14/10.5	14/14	14/21	14/28	14/35	14/49	14/70	14/140	Less than 14/140
Rate per 100 adults										
<u>Both sexes</u>										
All ages, 18-79--	0.3	18.9	27.1	29.6	7.1	6.4	2.2	4.4	2.2	1.9
18-24 years-----	0.2	40.8	35.3	18.2	2.6	1.2	0.7	0.4	0.4	0.1
25-34 years-----	0.7	37.5	38.1	19.3	1.6	0.9	0.7	0.4	0.6	0.3
35-44 years-----	0.4	21.0	36.7	28.8	3.7	3.5	1.7	2.9	0.9	0.4
45-54 years-----	0.1	4.6	16.5	37.8	11.7	11.5	4.9	8.5	2.6	1.9
55-64 years-----	0.1	2.7	16.1	38.8	12.7	11.6	2.3	7.6	5.5	2.7
65-74 years-----	-	0.8	13.6	39.8	13.2	11.9	2.7	6.1	5.1	6.7
75-79 years-----	-	-	4.4	27.8	14.1	14.2	4.1	18.3	4.1	12.8
<u>Men</u>										
All ages, 18-79--	0.3	21.9	26.3	26.2	6.9	6.7	2.4	4.8	2.5	1.9
18-24 years-----	0.2	45.4	32.4	16.2	2.4	1.4	1.1	0.2	0.5	0.2
25-34 years-----	1.0	42.3	37.4	14.3	1.6	1.2	0.6	0.4	0.6	0.3
35-44 years-----	0.4	25.7	35.6	27.0	3.8	2.6	1.3	2.4	0.8	0.3
45-54 years-----	-	5.5	17.8	34.4	10.9	10.7	5.8	9.2	3.3	2.4
55-64 years-----	-	4.4	14.9	31.8	12.7	13.8	3.0	9.3	6.6	3.5
65-74 years-----	-	1.8	14.0	36.0	12.8	14.0	2.8	7.6	5.6	5.1
75-79 years-----	-	-	2.4	36.2	13.8	15.7	4.0	14.8	1.1	11.9
<u>Women</u>										
All ages, 18-79--	0.2	16.2	27.7	32.6	7.2	6.1	2.0	4.1	2.0	1.8
18-24 years-----	0.2	37.0	37.9	19.9	2.8	1.0	0.4	0.5	0.3	-
25-34 years-----	0.4	33.1	38.7	23.8	1.6	0.6	0.7	0.3	0.5	0.3
35-44 years-----	0.4	16.8	37.7	30.4	3.6	4.4	2.0	3.4	0.9	0.4
45-54 years-----	0.2	3.7	15.2	41.0	12.4	12.2	4.0	7.8	1.9	1.4
55-64 years-----	0.1	1.1	17.2	45.3	12.7	9.5	1.7	6.0	4.4	2.0
65-74 years-----	-	-	13.3	42.9	13.5	10.2	2.7	4.8	4.6	8.0
75-79 years-----	-	-	6.4	19.4	14.4	12.8	4.2	21.9	7.2	13.8

Table 16. Rates for adults at specified acuity levels for "corrected" central near vision in the left eye: United States, 1960-62

Sex and age	Acuity level									
	14/7 or more	14/10.5	14/14	14/21	14/28	14/35	14/49	14/70	14/140	Less than 14/140
<u>Both sexes</u>	Rate per 100 adults									
All ages, 18-79--	0.3	18.0	29.1	29.2	8.2	3.3	5.0	2.6	2.0	2.3
18-24 years-----	0.6	38.0	36.1	20.1	1.9	0.8	1.0	0.1	0.4	0.8
25-34 years-----	0.7	32.5	42.0	19.5	1.2	1.0	0.9	0.6	0.6	0.9
35-44 years-----	0.4	23.2	38.6	26.3	4.3	1.7	2.6	1.2	0.8	0.9
45-54 years-----	-	5.5	18.9	36.3	13.9	6.2	10.4	4.6	1.8	2.4
55-64 years-----	-	1.7	19.9	39.0	13.8	5.2	6.4	5.1	4.4	4.3
65-74 years-----	-	0.8	11.1	42.3	16.3	5.8	9.1	3.8	4.7	6.1
75-79 years-----	-	-	4.3	21.5	24.5	7.6	15.4	11.1	10.3	4.9
<u>Men</u>										
All ages, 18-79--	0.3	21.6	28.6	26.3	7.0	3.6	5.5	2.9	1.9	2.3
18-24 years-----	0.9	44.0	33.1	17.3	1.6	1.1	0.4	-	0.3	1.2
25-34 years-----	0.8	38.2	41.0	14.3	1.1	1.3	1.2	0.6	0.5	0.9
35-44 years-----	0.2	28.1	35.7	26.5	3.6	1.4	1.9	0.9	0.6	1.0
45-54 years-----	-	8.0	21.6	31.9	11.9	6.3	10.8	5.1	1.7	2.6
55-64 years-----	-	2.5	21.5	33.7	10.3	6.8	9.2	5.9	4.2	5.8
65-74 years-----	-	1.4	12.1	40.8	16.2	5.3	9.5	5.6	5.7	3.4
75-79 years-----	-	-	1.5	26.9	22.3	7.5	19.5	10.9	7.2	4.2
<u>Women</u>										
All ages, 18-79--	0.3	14.8	29.5	31.8	9.1	3.1	4.6	2.4	2.1	2.2
18-24 years-----	0.4	32.9	38.6	22.4	2.1	0.7	1.6	0.3	0.4	0.5
25-34 years-----	0.6	27.2	42.9	24.3	1.2	0.6	0.7	0.7	0.8	1.0
35-44 years-----	0.6	18.8	41.2	26.1	5.0	1.9	3.1	1.5	1.0	0.8
45-54 years-----	-	3.0	16.4	40.4	15.8	6.1	10.1	4.1	2.0	2.1
55-64 years-----	-	1.0	18.4	43.9	17.1	3.8	3.9	4.4	4.6	3.0
65-74 years-----	-	0.4	10.3	43.5	16.4	6.2	8.8	2.4	3.9	8.2
75-79 years-----	-	-	7.3	16.1	26.8	7.8	11.4	11.5	13.4	5.6

APPENDIX

STATISTICAL NOTES

The Survey Design

The first cycle of the Health Examination Survey employed a highly stratified multistage probability design in which a sample of the civilian, noninstitutional population of the conterminous United States 18-79 years of age was selected. At the first stage, a sample of 42 primary sampling units (PSU's) was drawn from among the 1,900 geographic units into which the United States was divided. Random selection was controlled within regional and size-of-urban-place strata into which the units were classified. As used here a PSU is a standard metropolitan statistical area or one to three contiguous counties. Later stages result in the random selection of clusters of typically about four persons from a neighborhood within the PSU. The total sample included some 7,700 persons in 29 different States. The detailed structure of the design and conduct of the survey have been described in previous reports.^{2,3}

Reliability

The methodological strength of the survey derives especially from its use of scientific probability sampling techniques and highly standardized and closely controlled measurement processes. This does not imply that statistics from the survey are exact or without error. Data from the survey are imperfect for three major reasons: (1) results are subject to sampling error, (2) the actual conduct of a survey never agrees perfectly with the design, and (3) the measurement processes themselves are inexact even though standardized and controlled.

The first-stage evaluation of the survey was reported in reference 3, which dealt principally with an analysis of the faithfulness with which the sampling design was carried out. This study notes that out of the 7,700 sample persons the 6,670 persons who were examined—a response rate of over 86 percent—gave evidence that they were a highly representative sample of the civilian, noninstitutional population of the United States. Imputation of nonrespondents was accomplished by attributing to nonexamined persons the character-

istics of examined persons as described in reference 3. The specific procedures used amounted to inflating the sampling weight for each examined person in order to compensate for sample persons at that stand of the same age-sex group who were not examined. In addition to persons not examined at all, there were some whose examination was incomplete in one procedure or another. Age, sex, and race were known for every examined person, but for a number of the examinees, one or more of the vision tests were not available. The extent of these missing data is shown in reference 5. As indicated there, a regression-type decision was made subjectively on the basis of existing scores and test results for other persons of the same age, sex, and race for persons for whom at least one part of the vision test was completed. Where none of the vision tests were given, for some a probability selection was made of a response from the same age-sex-race group and his scores assigned to the nonrespondent. For the remainder the distribution of acuity levels was assumed to be the same as for the examined group.

Sampling and Measurement Error

In the present report, reference has been made to efforts to minimize bias and variability of the measurement techniques.

The probability design of the survey makes possible the calculation of sampling errors. Traditionally the role of the sampling error has been the determination of how imprecise the survey results may be because they come from a sample rather than from the measurement of all elements in the universe. The estimation of sampling errors for a study of the type of the Health Examination Survey is difficult for at least three reasons: (1) measurement error and "pure" sampling error are confounded in the data—it is not easy to find a procedure which will either completely include both or treat one or the other separately, (2) the survey design and estimation procedure are complex and accordingly require computationally involved techniques for the calculation of variances, and (3) from the survey come thousands of statistics, many for subclasses of

Table I. Relative sampling error for proportion of persons with specified visual acuity,¹ by sex and age: United States, 1960-62

Acuity level	Total, 18-79 years	Men				Women			
		18-79 years	18-24 years	35-44 years	65-74 years	18-79 years	25-34 years	45-54 years	75-79 years
20/10 or better-----	0.16	0.18	0.30	0.50	---	0.18	0.35	---	---
20/15-----	0.02	0.04	0.05	0.05	0.70	0.04	0.05	0.07	---
20/20-----	0.02	0.05	0.10	0.06	0.15	0.02	0.05	0.08	---
20/30-----	0.04	0.05	0.08	0.12	0.12	0.06	0.18	0.09	0.50
20/40-----	0.05	0.06	0.18	0.30	0.16	0.05	0.25	0.13	0.25
20/50-----	0.06	0.09	0.60	0.25	0.22	0.06	0.40	0.14	0.30
20/70-----	0.10	0.10	0.50	0.22	0.28	0.16	0.50	0.15	0.50
20/100-----	0.04	0.06	0.30	0.25	0.15	0.05	0.25	0.10	0.26
20/200-----	0.06	0.10	0.40	0.30	0.22	0.05	0.30	0.10	0.30
Less than 20/200-----	0.08	0.18	---	0.60	0.15	0.09	0.30	0.24	0.60
20/20 or better-----	0.02	0.04	0.05	0.05	0.15	0.02	0.05	0.07	0.75
20/100 or less-----	0.04	0.06	0.30	0.25	0.15	0.05	0.25	0.10	0.26

¹Estimated relative sampling errors are shown in the table, as computed, for selected cells. It should be understood in any instance in which the estimated error for a particular cell differs markedly from those for other similar cells that the discrepancy may be a reflection of a real phenomenon, but might be the consequence of the fact that the sampling error is itself subject to sampling variation.

the population for which there are a small number of sample cases. Estimates of sampling error are obtained from the sample data and are themselves subject to sampling error when the number of cases in a cell is small or, even occasionally, when the number of cases is substantial.

Estimates of approximate sampling variability for selected statistics used in this report are presented in table I. These estimates have been prepared by a replication technique which yields overall variability through observation of variability among random subsamples of the total sample. The method reflects both "pure" sampling variance and a part of the measurement variance.

In accordance with the usual practice, the interval estimate for any statistic may be considered the range

within one standard error of the tabulated statistic with 68 percent confidence, or the range within two standard errors of the tabulated statistic with 95 percent confidence.

Small Categories

In some tables magnitudes are shown for cells for which the sample size is so small that the sampling error may be several times as great as the statistic itself. Obviously in such instances the statistic has no meaning itself except to indicate that the true quantity is small. Such numbers, if shown, have been included in the belief that they help to convey an impression of the overall story of the table.



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