

**VITAL and HEALTH STATISTICS**  
DATA FROM THE NATIONAL HEALTH SURVEY

# **Hearing Status and Ear Examination**

## **Findings Among Adults**

### **United States - 1960-1962**

Hearing test results compared with medical history, household interview, and ear examination findings by age and sex among adults 18-79 years of age.

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
Public Health Service  
Health Services and Mental Health Administration

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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 compares the four methods used in the Health Examination Survey in 1960-62 for determining hearing status among adults and assessing their relationship to ear examination findings and certain medical history items.*

*In this survey hearing status was rated by the following four methods: pure-tone, air-conduction audiometric tests; self-evaluation of hearing (good, fair, or poor); self-evaluation of hearing trouble (trouble or none); and household interview of the examinee or a knowledgeable adult in his family regarding his hearing impairment (deafness or serious trouble hearing).*

*The ear examination by the staff physician included an inspection of the external ear for malformations and a limited examination with an otoscope of the auditory canal for exudate and of the drum for perforation or scarring.*

*Medical history questions about conditions which may affect hearing—such as tinnitus or dizziness or a history of stroke, scarlet fever, or diphtheria—are also considered.*

*Prevalence estimates for these various conditions among the civilian, noninstitutional population of the United States 18-79 years of age based on the survey findings are shown as well as the extent of agreement among them generally but particularly with reference to audiometric test data.*

#### 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-----	*

# HEARING STATUS AND EAR EXAMINATION FINDINGS AMONG ADULTS

Jean Roberts, *Division of Health Examination Statistics*

## INTRODUCTION

The four methods used in the Health Examination Survey in 1960-62 for determining hearing status among adults are compared, and their relation to ear examination findings and certain medical history items are assessed in this report.

National estimates given here are based on data obtained during the first cycle of the Health Examination Survey, one of three programs designed to secure statistics on the health status of the population of the United States. This program obtains data principally through medical examinations, tests, and measurements on a scientifically selected random sample of the population. In the other two programs, health related data are obtained chiefly through household interview, hospital records, and other medical records.

In the first cycle, the Health Examination Survey was limited to civilian adults living outside institutions. Its purpose was to determine the prevalence of certain chronic diseases, the status of dental health, auditory sensitivity and visual acuity levels, and certain anthropometric measurements.

During the survey, which extended from October 1959 through December 1962, 6,672 persons were examined out of 7,710 persons 18-79 years of age selected in the nationwide probability sample. Medical and other survey staff performed the standard examination, which lasted about 2 hours, in mobile clinics especially designed for this purpose.

General plans and the initial program of the Health Examination Survey, the sample population selected as well as those responding, and the effect of nonresponse on the findings are given in previous publications.<sup>1,2</sup>

## SOURCES OF DATA

### Hearing Tests

Hearing thresholds were determined monaurally and individually by trained technicians in an acoustically treated booth within each of the mobile examining centers. As indicated previously,<sup>3</sup> hearing thresholds (or levels) correspond to the weakest intensity of a pure tone produced in the audiometric earphone that is just audible to the ear of the examinee being tested. Pure-tone audiometers were used for testing at frequencies of 500, 1000, 2000, 3000, 4000, and 6000 cycles per second.

Within the testing booth, ambient noise was generally attenuated well below the maximum allowable sound pressure level specified by the American Standards Association for no masking above audiometric zero. Quality of the test results was further controlled by periodic factory calibration of the audiometers and by frequent field checks.<sup>3</sup>

Data from the hearing tests are limited to thresholds for the better ear for comparison with questionnaire data; for the relevant ear in relation to ear examination findings; and to the aver-

age of these thresholds at 500, 1000, and 2000 cycles per second—the estimate of speech reception thresholds as recommended by the American Medical Association's Committee on Medical Rating of Physical Impairment.<sup>4</sup> The levels are grouped into those with "better than normal" hearing (thresholds of 5 decibels or more below audiometric zero), those testing from 4 decibels below to 15 decibels above audiometric zero, and those with some hearing impairment (thresholds of 16 decibels or more above audiometric zero). The latter group is assumed to be persons with some degree of hearing impairment, ranging from difficulty only with faint speech to inability to understand even amplified speech, following approximately the proposal of the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology.<sup>5</sup>

### Medical History

Prior to the start of the examination, each examinee completed a self-administered medical history tailored to the special examination. When necessary, the receptionist-interviewer read the questions to the examinee but did not provide help in defining terms. The six questions on the medical history, related or possibly related to hearing (as shown in appendix I), are ones on tinnitus; dizziness; history of stroke, scarlet fever, or diphtheria; general hearing status; and trouble with hearing.

### Household Interview

Information on known impairments was obtained about all persons in the sample prior to the examination from either the individual or a close adult relative, as part of the household interview. The question was asked, "Does anyone in the family have any of these conditions?" The respondent was then shown a card listing selected impairments including one on "Deafness or SERIOUS trouble with hearing." The replies to this question were classified into the following gradations of impaired hearing:

XO6 Deafness, total, both ears including deaf-mutism. Included persons, with or without speech, who are completely

deaf and cannot benefit from a hearing aid.

XO7 Impaired hearing, severe. Included persons who have some hearing ability but cannot hear ordinary conversation (except with a hearing aid).

XO9 Impaired hearing, except as classifiable to XO6 or XO7.

### Ear Examination

The examination of the ear was performed by the staff physician and included an inspection of the external ear for malformation and an examination of the auditory canal and tympanic membrane with an otoscope for exudate and for perforations or scarring of the drums. Sections of the physical examination form used for recording the findings for each ear are shown in appendix I.

## FINDINGS FROM TESTS AND QUESTIONNAIRES

### Hearing Tests

As indicated in the first report on audiometric test results from the Health Examination Survey of 1960-62,<sup>3</sup> an estimated 52.0 million (47 percent) adults in the United States had "better than normal" hearing (thresholds of 5 decibels or more below audiometric zero) within the frequency range considered most essential for understanding speech (500 through 2000 cycles per second) in the better ear; 51.0 million (46 percent) tested between 4 decibels below and 15 decibels above this reference point; and 8.1 million (7 percent) were considered to have some hearing impairment within the "speech" range (thresholds of 16 decibels or more above—less sensitive than—audiometric zero).

At the extremes of the sensitivity range, the proportion with "better than normal" hearing tended to decrease consistently with age, while the proportion with some hearing impairment increased throughout the age span included in the study (table 1).

Audiometric test results are considered for the purpose of this report to provide the most

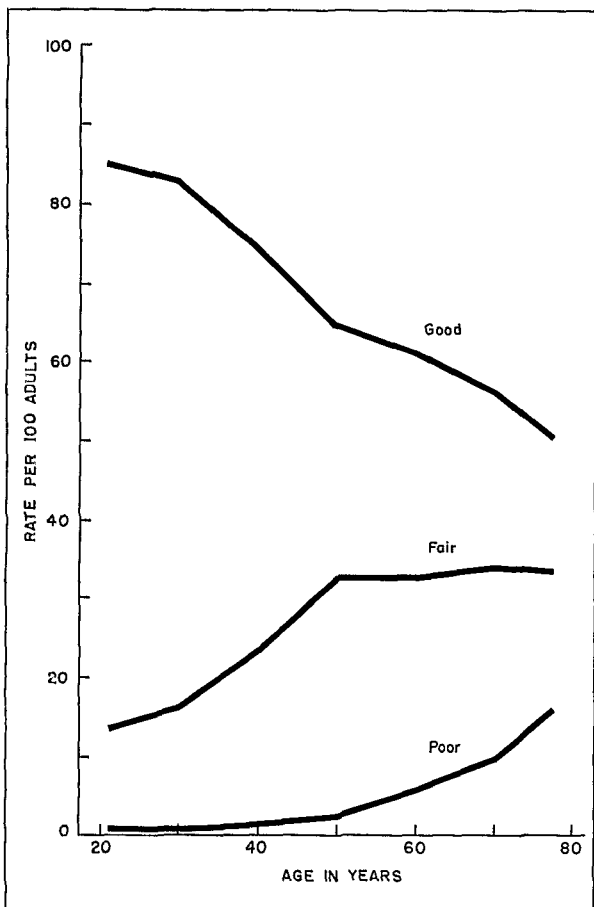


Figure 1. Prevalence rates for adults with good, fair, and poor hearing, by age.

accurate and objective method (of the four used in this survey) of measuring hearing status. The medical history and interview information indicate the person's awareness of his condition, but this information is subject to possible variations in interpretation and extent of recall.

### Medical History

Two indications of hearing status were obtained through the self-administered medical history used in the Health Examination Survey—the examinee's evaluation of his own hearing as good, fair, or poor and his evaluation of whether or not he has trouble hearing. An estimated 3 percent (3.7 million) of the adult population of the United States considered their hearing to be

poor, 25 percent (27.9 million) reported it to be fair, and 72 percent (79.5 million) indicated that it was good. This measure is associated with age as are the hearing test findings (tables 1 and 2). The prevalence of poor hearing increased consistently with age from the youngest to the oldest age group. "Fair hearing" rates increased fairly rapidly to 45 years, then leveled off. Conversely, "good hearing" rates decreased with age and at a slightly slower rate for those 45 years and over (fig. 1).

Hearing trouble was reported among an estimated 15 percent (16.3 million) of the adults, while the remaining 85 percent (94.8 million) indicated no trouble. This measure shows a consistent trend with age (fig. 2 and table 3), as did that for impaired hearing from the test findings.

Certain conditions reported on the medical history which may affect hearing, or appear to do so, are also considered here in relation to these measures of hearing status.

Tinnitus (ringing in the ears), which may be associated with conditions affecting hearing such as Meniere's disease, was reported among an estimated 32 percent (36.0 million) of the adults

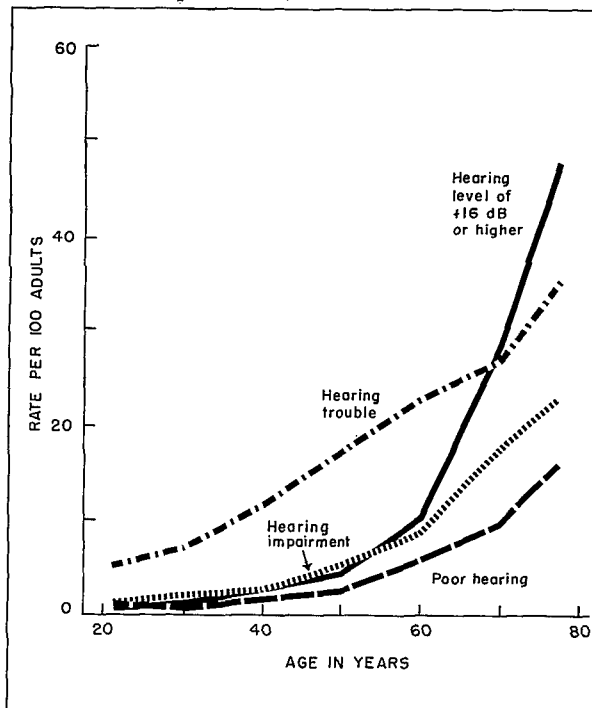


Figure 2. Prevalence rates for adults with impaired hearing, as measured by four criteria, by age.



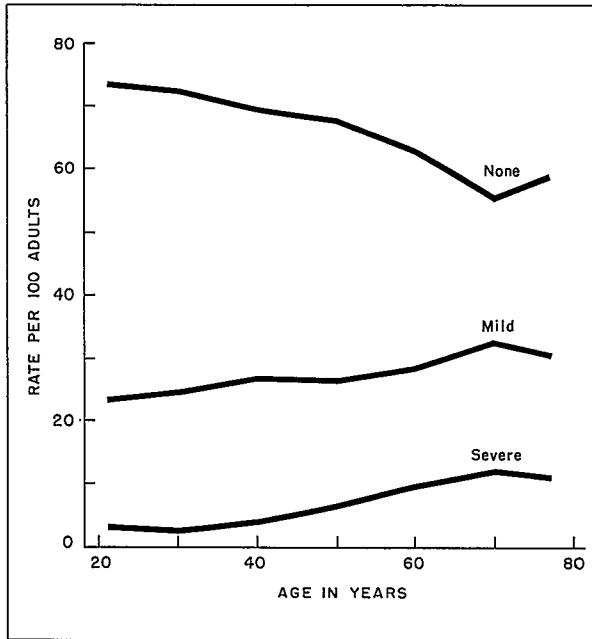


Figure 3. Prevalence rates for adults with severe, mild, and no tinnitus, by age.

(table 4). Less than one-fifth of them considered it to be severe. The prevalence of the severe form increased slowly with age from 25 through 74 years. The slight drop at 75-79 years probably reflects sampling error rather than any decrease in prevalence or difference in interpretation of the question (fig. 3).

Dizziness—which may be symptomatic of a variety of conditions some of which, like Meniere's disease, affect hearing—was slightly more prevalent than tinnitus. It was reported among an estimated 42 percent (46.8 million) of the adults. About one-sixth of those indicating that they had spells of dizziness considered them to be severe. The prevalence of severe dizziness increased slightly with age from 25 years on, while mild dizziness or the absence of this condition showed no consistent trend with age (fig. 4 and table 5).

Three other conditions which may have sequelae affecting hearing are stroke, scarlet fever, and diphtheria. A history of stroke was reported by an estimated 2 percent (1.8 million) of adults. The increase in the prevalence rate with age from 0.4 to 7.5 per 100 adults accelerated from 55

years on as may be seen in figure 5 and table 6. The proportion of persons who indicated that they had at some time had scarlet fever or diphtheria may be seen to increase with age also, but not beyond age 65. In all, about 12 percent reported a history of scarlet fever but only 5 percent reported a history of diphtheria (tables 7 and 8).

### Interview

According to information given about the examinee by the adult interviewed prior to the examination—an adult from the same household but not necessarily the examinee—less than 6 percent of the adults in this country (or an estimated 6.5 million) have some degree of hearing impairment of the nature defined previously (table 9). This fourth measure of hearing status obtained in the survey is also associated with age as indicated in figure 2.

### Impaired Hearing

The gross prevalence of impaired hearing as determined from pure-tone audiometric tests (7.3

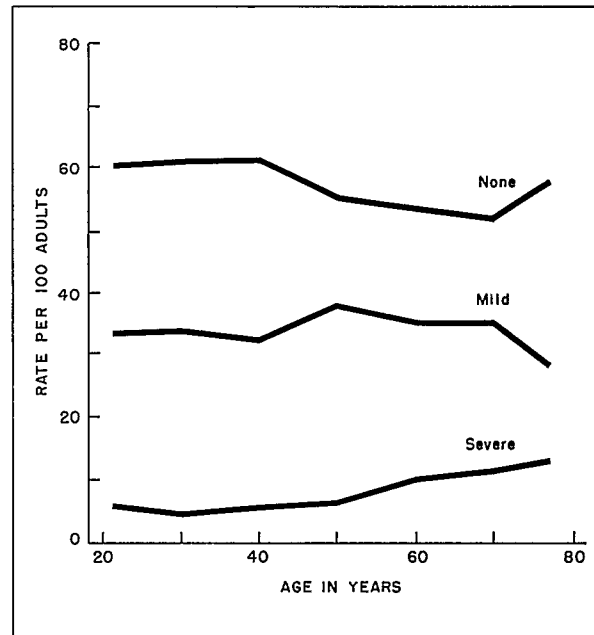


Figure 4. Prevalence rates for adults with severe, mild, and no dizziness, by age.

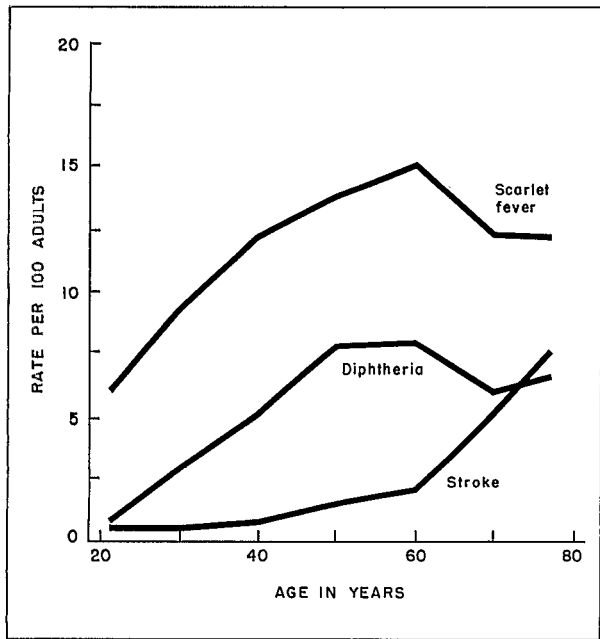


Figure 5. Prevalence rates for adults with a history of stroke, diphtheria, and scarlet fever, by age.

per 100 adults with levels of 16 decibels or more above audiometric zero) exceeded that for poor hearing derived from the medical history (3.3 per 100 adults) and hearing impairment from the household interview (5.9 per 100 adults) but fell short of that for trouble with hearing from the medical history (14.7 per 100 adults).

By age, the pattern of agreement, or lack of it, differed substantially among the measures as indicated in figure 2. Rates for poor hearing and hearing impairment were in fairly good agreement with those for impaired hearing (levels of 16 decibels or higher) through age 64 but substantially below from age 65 years on. Hearing impairment was reported more frequently than poor hearing among older adults, the difference becoming statistically significant from age 65 years on.

Hearing trouble as reported in the medical history was substantially more prevalent than that reported by the two comparable measures from the medical history and household interview throughout the age span included in the survey. Audiometric test results also showed fewer

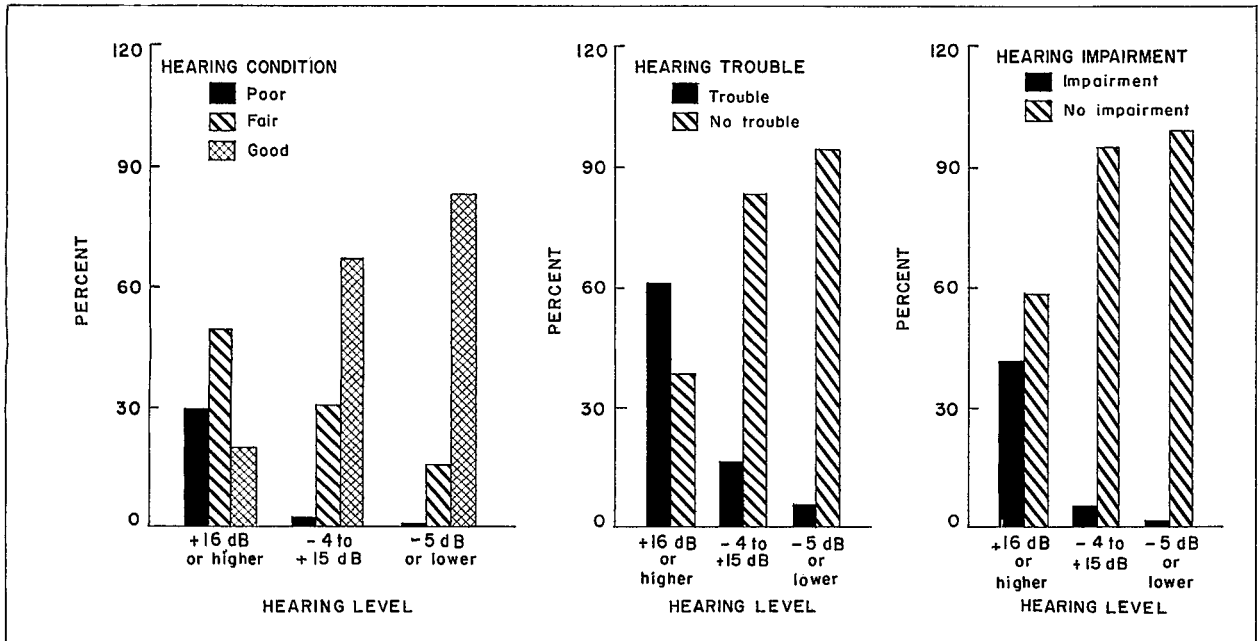


Figure 6. Relation of three questionnaire ratings of hearing condition to hearing levels among adults.

persons with impaired hearing up to age 65. For ages 75-79 years, however, the prevalence of impaired hearing based on test results exceeded that from the interview and medical history data.

Audiometric test results were used in this report as a standard against which the accuracy of the questionnaire ratings were assessed. It can be seen in figure 6 that for all ages combined hearing trouble showed the best agreement with the test results: 60 percent of those with hearing levels of 16 decibels or more reported such trouble as compared with about 40 percent with hearing impairment (according to the interview) and 30 percent with self-ratings of poor hearing.

However, persons with poor hearing or hearing impairment (interview) were less likely than those with hearing trouble to have better hearing levels (15 decibels or less re audiometric zero).

By age, hearing trouble also showed the closest agreement with the test results, of the measures used, with 59 to 70 percent of those 25 years or older found to have hearing levels of 16 decibels or higher also reporting that they had hearing trouble (tables 2, 3, and 9). Agreement was slightly but not significantly better among those in the youngest age group. Hearing impairment (as reported in the interview) showed somewhat better agreement with test results than poor

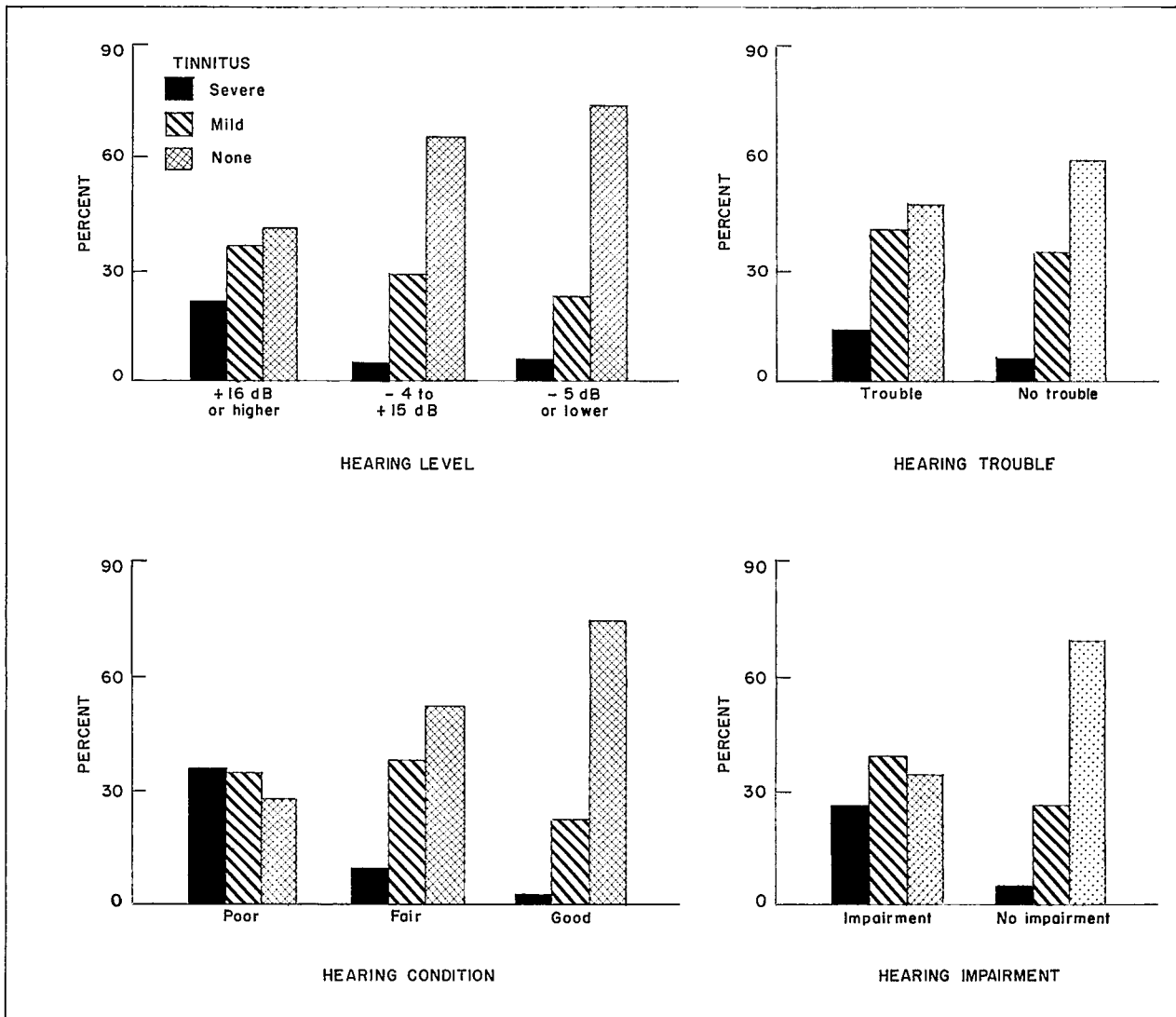


Figure 7. Relation of tinnitus to each of the four measures of hearing status among adults.

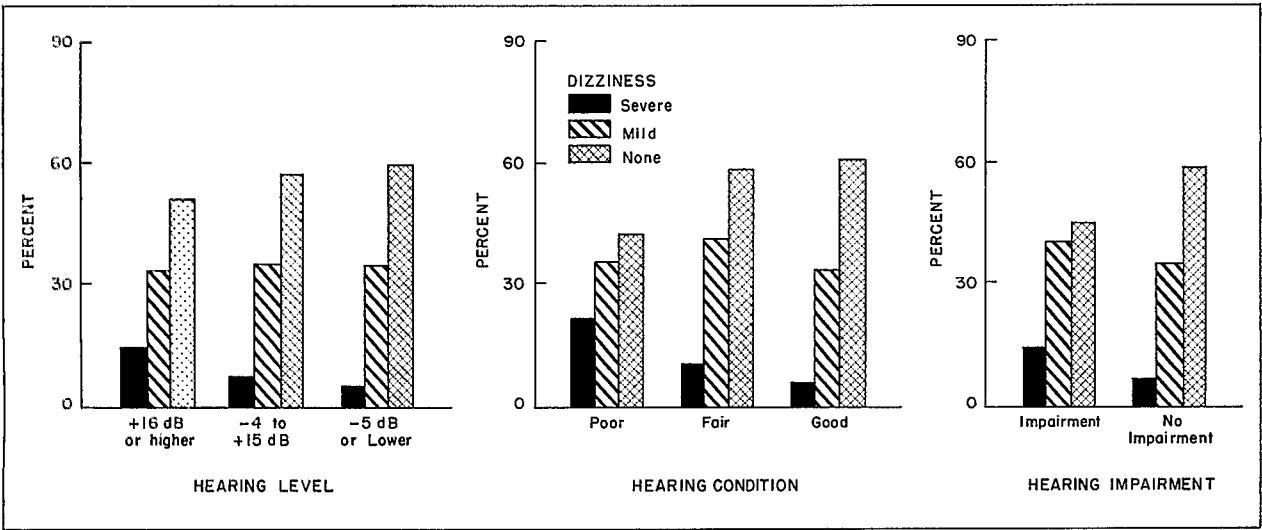


Figure 8. Relation of dizziness to three measures of hearing condition among adults.

hearing from 25 years on but was substantially below that of hearing trouble throughout the age range.

Symptoms of severe tinnitus were more likely to have been reported by persons with impaired hearing than by others, regardless of which measure was considered (fig. 7). Similarly, severe dizziness was found more frequently among persons with impaired hearing than among others (fig. 8).

A history of stroke was reported somewhat more frequently among those with impaired hearing, regardless of the measure of impairment used, than among those without such hearing impairment. Histories of scarlet fever and diphtheria were about as likely to be found among those with hearing impairment as those without; the differences noted in figure 9 are not statistically significant.

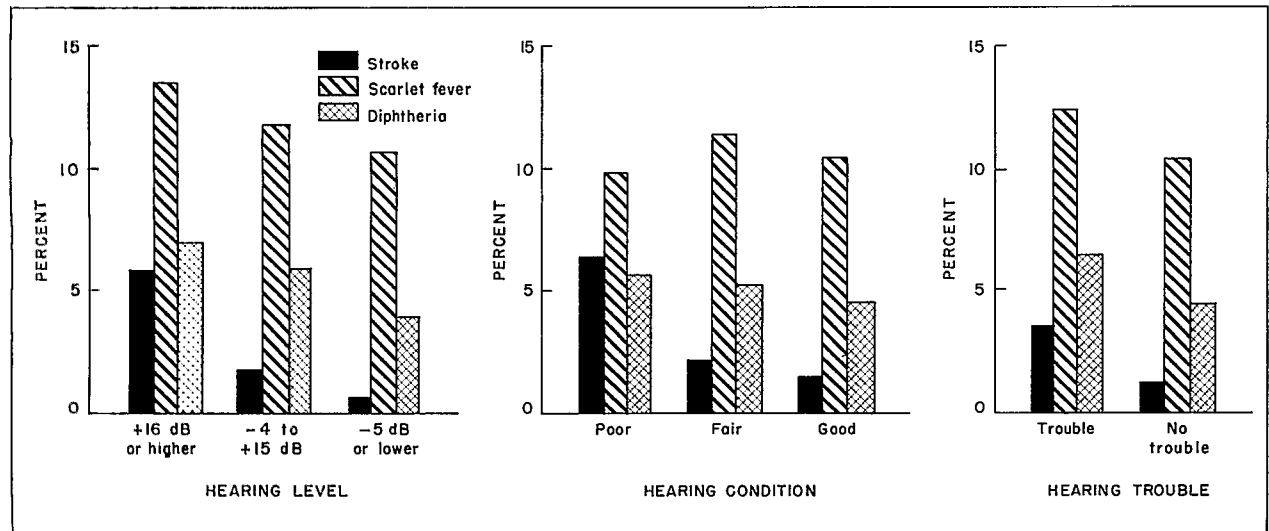


Figure 9. Relation of histories of stroke, scarlet fever, and diphtheria to three measures of hearing condition among adults.

## FINDINGS FROM EAR EXAMINATION

Physicians' findings from inspection and examination with an otoscope indicated that an estimated 77 percent (85.5 million) of the adults in the United States had no abnormal conditions observable in either ear. However, 10 percent (11.6 million) of the adults did have abnormalities in one or both ears, and the drum in at least one ear could not be visualized for about 13 percent or 14.8 million (table A).

Among those for whom the presence of an abnormality was noted, one ear was nearly twice as likely as both ears to have some abnormality, but not necessarily the same condition. When the drum could not be visualized, one ear was slightly more likely than both to be so obstructed, but the difference is not statistically significant.

The majority of those with some abnormality (88 percent) were found to have scarring of one or both tympanic membranes. One ear was more likely to be so affected than both. An exudate in the auditory canal was observed about as frequently as perforation of the drum. When an exudate was observed, however, it was nearly as

Table A. Prevalence rates for adults of findings from the ear examination: Health Examination Survey, 1960-62

Ear condition	Both ears	One ear only
	Rate per 100 adults	
Normal-----	77.0	12.1
Drum not visualized-----	6.1	7.2
Abnormality <sup>1</sup> -----	4.0	6.4
Malformation-----	0.1	0.1
Exudate in auditory canal-----	0.5	0.7
Perforation of drum-----	0.1	1.3
Scarring of drum-----	3.4	5.8

<sup>1</sup>In some ears more than one abnormal condition was observed such as a malformation of the external ear and a condition within the canal or drum or both perforation of the drum and an exudate in the canal.

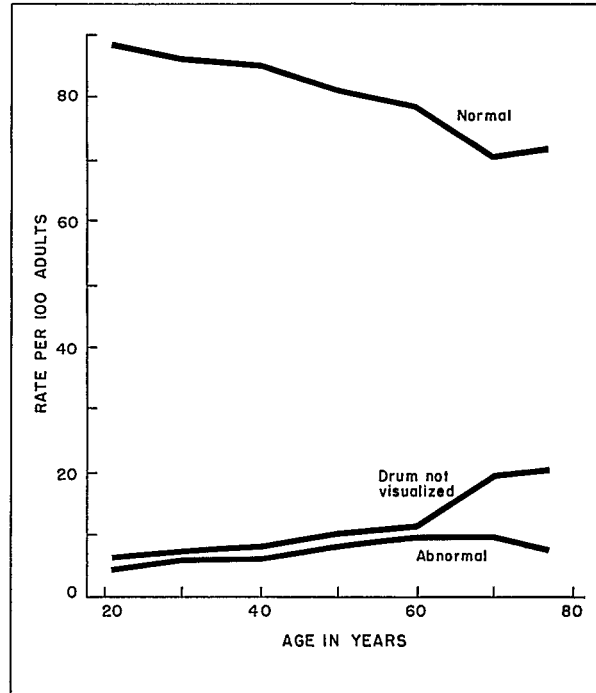


Figure 10. Prevalence rates for adults with gross findings on examination of the right ear, by age.

likely to be present in both ears as in one, whereas a perforation was usually found in just one ear.

Prevalence rates for gross findings and specific abnormalities observed on examination of the right and left ear are shown by age and sex in tables 10-13. As indicated in figure 10 and table 10 for the right ear, the prevalence rate for normal findings generally decreased with age from the youngest to those 65-74 years of age. The slight upsurge at 75-79 years is small enough to be due to sampling errors alone. An upward trend in the rate with age was found for those whose drum could not be visualized and to a lesser extent for those with abnormal findings--the latter continuing only through ages 55-64.

### Relation to Impaired Hearing

The extent of the relationship of these ear examination findings, or the absence of them, to the four measures of hearing impairment are shown in figure 11.

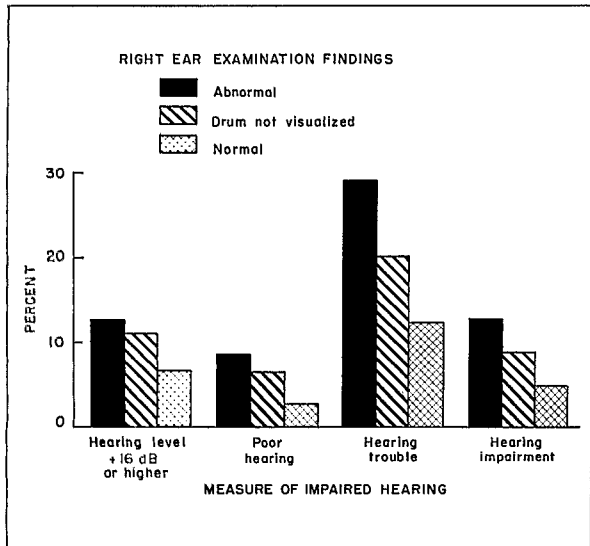


Figure 11. Relation of ear examination findings for right ear to each of the four measures of impaired hearing among adults.

Persons with abnormal findings or whose drum was not visualized on the ear examination were more likely than those with normal examination findings to have impaired hearing by any of the four measures of this condition. Those with abnormalities were also more likely than persons whose drum was not visualized to have impaired hearing as rated by the question on trouble with hearing or by the household interview, but the differences are not statistically significant when based on test results or self-ratings of hearing condition.

Adults found to have a scarred drum were somewhat more likely than expected to have impaired hearing in that ear on the basis of audiometric test results (table 12) as well as on the three questionnaire ratings of hearing condition. The prevalence of the other abnormal findings was too low to provide an adequate basis for such comparison.

## DISCUSSION

Comparable information on the prevalence of symptoms and conditions which may have affected hearing sensitivity, on the prevalence of otologic examination findings, and on the relation of either

or both to hearing is not readily available in the literature.

As part of the clinical investigation of hearing following the 1935-36 National Health Survey,<sup>6</sup> an otologic examination was given to some 8,000 children and adults, and a measure of hearing impairment was obtained by interview. Preliminary data showed that the prevalence of such abnormalities as perforated or scarred drum was over twice that found for adults in the present study, while the proportion with normal ears or whose drum could not be visualized was only half as great. The proportion reporting themselves to have impaired hearing on interview was more than twice that from the present study. The questions used in the interview differed substantially from any of those used in the present study, which may account for some, but not all, of the difference. The otologic examination was also a more complete one than that given in the present study. It should be kept in mind too that data from the 1935-36 National Health Survey are based on a sample from selected large urban areas only, whereas the present study is a probability sample representative of the adult population of the entire United States.

In the present study the comparison of the four measures of impaired hearing gives some indication of the possible extent to which the questionnaire responses may be affected by refinement in wording of the questions, changing attitudes toward such a condition with age as well as by the extent to which symptoms such as tinnitus or dizziness may affect hearing or appear to do so and thus color the response to these questions.

## SUMMARY

Health Examination Survey findings in 1960-62 on hearing among a probability sample of adults aged 18-79 years in the civilian, noninstitutional population of the United States indicate that:

1. On the basis of pure-tone audiometric tests, an estimated 7 percent (8.1 million) of the adults had hearing thresholds 16 decibels or more above—less sensitive than—audiometric zero in the better ear

within the tonal range usually considered essential for understanding speech. Three percent reported poor hearing and 15 percent reported hearing trouble on their medical history, while less than 6 percent reported impaired hearing in the household interview. Prevalence rates generally increased with age for each measure of impaired hearing, but the patterns differed substantially.

2. When audiometric test results were used as the standard for assessing the accuracy of the questionnaire ratings, hearing trouble showed the best agreement with the test results: 60 percent of those with hearing levels of 16 decibels or higher reported hearing trouble as compared with 40 percent with hearing impairment (as reported in the interview) and 30 percent with self-ratings of poor hearing. However, persons reporting poor hearing or impaired hearing were less likely than those with hearing trouble to have better hearing levels (thresholds of 15 decibels or less). A somewhat similar pattern was found throughout the age range.
3. Symptoms of severe tinnitus and, to a lesser extent, severe dizziness were

more likely to have been reported by persons with impaired hearing than those without, regardless of the measure of impairment considered.

4. Persons with a history of stroke were also somewhat more likely to have impaired hearing than others, while those with histories of scarlet fever or diphtheria showed no such relationship.
5. An estimated 77 percent (85.5 million) of the adults in the United States were found to have normal ears on the basis of the limited examination given with an otoscope. Ten percent were found to have an abnormality in one or both ears, and one ear was more likely to be affected than both. For nearly 88 percent of those with an abnormality, the condition noted was scarring of the tympanic membrane.
6. Persons with abnormal findings on examinations or whose drum could not be visualized were more likely than those with normal ears to have impaired hearing on the basis of any of the four measures of this condition.

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<sup>1</sup>National Center for Health Statistics: Plan and initial program of the Health Examination Survey. *Vital and Health Statistics*. PHS Pub. No. 1000-Series 1-No. 4. Public Health Service. Washington. U.S. Government Printing Office, July 1965.

<sup>2</sup>National Center for Health Statistics: Cycle I of the Health Examination Survey, sample and response. *Vital and Health Statistics*. PHS Pub. No. 1000-Series 11-No. 1. Public Health Service. Washington. U.S. Government Printing Office, Apr. 1964.

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<sup>4</sup>Committee on Medical Rating of Physical Impairment: Guides to the evaluation of permanent impairment—ear, nose, throat, and related structures. *J.A.M.A.* 177:489-501, Aug. 19, 1961.

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Table 1. Number and percent of adults with specified hearing sensitivity levels, by sex and age: United States, 1960-62

Sex and age	Hearing level re audiometric zero					
	-5 dB or lower	-4 to +15 dB	+16 dB or higher	-5 dB or lower	-4 to +15 dB	+16 dB or higher
<u>Both sexes</u>	Number per 100 adults			Number of adults in thousands		
All ages, 18-79 years-----	46.8	45.9	7.3	51,983	50,984	8,120
18-24 years-----	74.1	25.1	0.8	11,535	3,914	120
25-34 years-----	67.3	31.4	1.3	14,524	6,771	277
35-44 years-----	54.5	42.6	2.9	12,929	10,089	680
45-54 years-----	40.5	55.2	4.3	8,328	11,352	896
55-64 years-----	22.5	67.2	10.3	3,518	10,501	1,618
65-74 years-----	9.9	61.9	28.2	1,103	6,911	3,150
75-79 years-----	1.6	50.4	48.0	46	1,446	1,379
<u>Men</u>						
All ages, 18-79 years-----	43.3	49.1	7.6	22,845	25,845	4,054
18-24 years-----	68.3	30.5	1.2	4,873	2,180	86
25-34 years-----	63.0	35.6	1.4	6,479	3,663	139
35-44 years-----	50.9	45.4	3.7	5,786	5,172	415
45-54 years-----	35.0	60.9	4.1	3,508	6,121	405
55-64 years-----	23.2	66.2	10.6	1,742	4,979	796
65-74 years-----	8.5	61.0	30.5	421	3,034	1,517
75-79 years-----	2.5	48.8	48.7	36	696	696
<u>Women</u>						
All ages, 18-79 years-----	49.9	43.0	7.1	29,138	25,139	4,066
18-24 years-----	79.0	20.6	0.4	6,662	1,734	34
25-34 years-----	71.3	27.4	1.3	8,045	3,108	138
35-44 years-----	58.0	39.8	2.2	7,143	4,917	265
45-54 years-----	45.7	49.7	4.6	4,820	5,231	491
55-64 years-----	21.9	68.0	10.1	1,776	5,522	822
65-74 years-----	11.0	62.8	26.2	682	3,877	1,633
75-79 years-----	0.7	51.9	47.4	10	750	683

Table 2. Prevalence rates for adults with poor, fair, and good hearing condition and percent distribution of adults in specified hearing sensitivity levels, by hearing condition according to sex and age: United States, 1960-62

Sex and age	Hearing condition			Hearing level re audiometric zero												
				+16 dB or higher with hearing condition:				-4 to +15 dB with hearing condition:				-5 dB or lower with hearing condition:				
	Poor	Fair	Good	Total	Poor	Fair	Good	Total	Poor	Fair	Good	Total	Poor	Fair	Good	
<b>Both sexes</b>		Rate per 100 adults			Percent distribution											
All ages, 18-79 years-----	3.3	25.1	71.6	100.0	29.8	50.0	20.2	100.0	2.2	30.6	67.2	100.0	0.4	15.9	83.7	
18-24 years-----	0.9	13.7	85.4	100.0	43.0	42.5	14.5	100.0	1.9	21.7	76.4	100.0	0.1	10.8	89.1	
25-34 years-----	0.8	16.2	83.0	100.0	35.5	36.9	27.6	100.0	0.3	23.3	76.4	100.0	0.4	12.5	87.1	
35-44 years-----	1.6	23.8	74.6	100.0	29.9	58.3	11.8	100.0	1.0	28.9	70.1	100.0	0.5	17.9	81.6	
45-54 years-----	2.6	32.7	64.7	100.0	22.4	56.9	20.7	100.0	2.7	38.0	59.3	100.0	0.4	22.9	76.7	
55-64 years-----	6.0	32.8	61.2	100.0	29.8	61.1	9.1	100.0	4.1	32.2	63.7	100.0	0.4	21.8	77.8	
65-74 years-----	9.9	34.0	56.1	100.0	30.8	45.6	23.6	100.0	1.8	31.8	66.4	100.0	0.9	15.6	83.5	
75-79 years-----	16.0	33.5	50.5	100.0	30.6	36.1	33.3	100.0	2.6	23.8	73.6	100.0	-	60.0	40.0	
<b>Men</b>		Rate per 100 adults			Percent distribution											
All ages, 18-79 years-----	4.0	29.3	66.7	100.0	33.3	52.9	13.8	100.0	2.5	34.7	62.8	100.0	0.4	19.1	80.5	
18-24 years-----	0.7	16.1	83.2	100.0	19.4	58.7	21.9	100.0	1.5	21.1	77.4	100.0	-	13.1	86.9	
25-34 years-----	0.8	19.4	79.8	100.0	34.6	40.3	25.1	100.0	0.6	26.1	73.3	100.0	0.3	15.3	84.4	
35-44 years-----	2.1	27.4	70.5	100.0	38.4	56.8	4.8	100.0	0.6	31.4	68.0	100.0	0.9	21.7	77.4	
45-54 years-----	2.6	38.9	58.5	100.0	20.7	57.6	21.7	100.0	2.8	44.8	52.4	100.0	0.3	26.5	73.2	
55-64 years-----	7.9	36.4	55.7	100.0	36.6	56.9	6.5	100.0	6.1	36.0	57.9	100.0	-	28.4	71.6	
65-74 years-----	11.0	40.1	48.9	100.0	30.9	53.5	15.6	100.0	2.3	37.9	59.8	100.0	2.3	8.7	89.0	
75-79 years-----	21.3	41.0	37.7	100.0	41.4	31.2	27.4	100.0	2.4	37.0	60.6	100.0	-	46.4	53.6	
<b>Women</b>		Rate per 100 adults			Percent distribution											
All ages, 18-79 years-----	2.8	21.3	75.9	100.0	26.2	47.1	26.7	100.0	1.8	26.3	71.9	100.0	0.3	13.3	86.4	
18-24 years-----	1.0	11.8	87.2	100.0	100.0	-	-	100.0	2.5	22.3	75.2	100.0	0.2	9.1	90.7	
25-34 years-----	0.7	13.3	86.0	100.0	36.4	33.4	30.2	100.0	-	20.1	79.9	100.0	0.4	10.3	89.3	
35-44 years-----	1.1	20.4	78.5	100.0	16.5	60.6	22.9	100.0	1.5	26.4	72.1	100.0	0.3	14.8	84.9	
45-54 years-----	2.6	26.8	70.6	100.0	23.9	56.3	19.8	100.0	2.6	30.1	67.3	100.0	0.5	20.2	79.3	
55-64 years-----	4.1	29.5	66.4	100.0	23.3	65.0	11.7	100.0	2.4	28.8	68.8	100.0	0.8	15.2	84.0	
65-74 years-----	9.0	29.2	61.8	100.0	30.6	38.2	31.2	100.0	1.5	27.0	71.5	100.0	-	19.9	80.1	
75-79 years-----	10.7	26.1	63.2	100.0	19.6	41.0	39.4	100.0	2.9	11.6	85.5	100.0	-	100.0	-	

Table 3. Prevalence rates for adults with and without hearing trouble and percent distribution of adults in specified hearing sensitivity levels, by condition according to sex and age: United States, 1960-62

Sex and age	Hearing trouble	No hearing trouble	Hearing level re audiometric zero										
			+16 dB or higher with:			-4 to +15 dB with:			-5 dB or lower with:				
			Total	Hearing trouble	No hearing trouble	Total	Hearing trouble	No hearing trouble	Total	Hearing trouble	No hearing trouble		
<b>Both sexes</b>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--	14.7	85.3	100.0	61.5	38.5	100.0	16.2	83.8	100.0	5.9	94.1		
18-24 years-----	5.6	94.4	100.0	75.5	24.5	100.0	9.9	90.1	100.0	3.4	96.6		
25-34 years-----	7.1	92.9	100.0	59.7	40.3	100.0	11.0	89.0	100.0	4.4	95.6		
35-44 years-----	11.7	88.3	100.0	69.5	30.5	100.0	14.8	85.2	100.0	6.3	93.7		
45-54 years-----	17.2	82.8	100.0	58.5	41.5	100.0	20.0	80.0	100.0	9.0	91.0		
55-64 years-----	22.7	77.3	100.0	64.2	35.8	100.0	20.0	80.0	100.0	12.1	87.9		
65-74 years-----	27.1	72.9	100.0	60.5	39.5	100.0	15.5	84.5	100.0	5.2	94.8		
75-79 years-----	35.3	64.7	100.0	59.3	40.7	100.0	12.6	87.4	100.0	37.8	62.2		
<b>Men</b>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--	16.9	83.1	100.0	62.7	37.3	100.0	17.9	82.1	100.0	7.7	92.3		
18-24 years-----	7.7	92.3	100.0	64.4	35.6	100.0	10.0	90.0	100.0	5.7	94.3		
25-34 years-----	8.0	92.0	100.0	54.7	45.3	100.0	12.8	87.2	100.0	4.4	95.6		
35-44 years-----	14.1	85.9	100.0	74.4	25.6	100.0	16.6	83.4	100.0	7.5	92.5		
45-54 years-----	19.7	80.3	100.0	56.2	43.8	100.0	21.7	78.3	100.0	12.0	88.0		
55-64 years-----	24.9	75.1	100.0	63.0	37.0	100.0	21.4	78.6	100.0	17.7	82.3		
65-74 years-----	30.1	69.9	100.0	62.3	37.7	100.0	18.0	82.0	100.0	2.3	97.7		
75-79 years-----	40.2	59.8	100.0	62.6	37.4	100.0	17.9	82.1	100.0	46.4	53.6		
<b>Women</b>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--	12.7	87.3	100.0	60.4	39.6	100.0	14.4	85.6	100.0	4.6	95.4		
18-24 years-----	3.7	96.3	100.0	100.0	-	100.0	9.8	90.2	100.0	1.6	98.4		
25-34 years-----	6.3	93.7	100.0	64.8	35.2	100.0	8.9	91.1	100.0	4.4	95.6		
35-44 years-----	9.5	90.5	100.0	61.9	38.1	100.0	12.8	87.2	100.0	5.4	94.6		
45-54 years-----	14.8	85.2	100.0	60.3	39.7	100.0	18.0	82.0	100.0	6.8	93.2		
55-64 years-----	20.7	79.3	100.0	65.4	34.6	100.0	18.6	81.4	100.0	6.6	93.4		
65-74 years-----	24.7	75.3	100.0	58.8	41.2	100.0	13.5	86.5	100.0	7.0	93.0		
75-79 years-----	30.3	69.7	100.0	55.9	44.1	100.0	7.7	92.3	100.0	-	100.0		

Table 4. Prevalence rates for adults with severe, mild, and no tinnitus and percent distribution of adults in specified hearing sensitivity levels, by condition according to sex and age: United States, 1960-62

Sex and age	Tinnitus			Hearing level re audiometric zero												
				+16 decibels or higher with tinnitus:				-4 to +15 decibels with tinnitus:				-5 decibels or lower with tinnitus:				
	Severe	Mild	None	Total	Severe	Mild	None	Total	Severe	Mild	None	Total	Severe	Mild	None	
<u>Both sexes</u>		Rate per 100 adults			Percent distribution											
All ages, 18-79 years-	5.6	26.8	67.6	100.0	21.8	36.8	41.4	100.0	5.5	28.7	65.8	100.0	3.2	23.3	73.5	
18-24 years-----	3.0	23.6	73.4	100.0	33.8	66.2	-	100.0	3.5	27.9	68.6	100.0	2.5	21.6	75.9	
25-34 years-----	2.8	24.6	72.6	100.0	17.5	47.8	34.7	100.0	3.4	27.4	69.2	100.0	2.3	22.9	74.8	
35-44 years-----	3.8	26.7	69.5	100.0	20.5	34.8	44.7	100.0	3.7	28.5	67.8	100.0	3.1	24.8	72.1	
45-54 years-----	6.1	26.4	67.5	100.0	19.4	36.6	44.0	100.0	5.9	28.9	65.2	100.0	5.0	21.9	73.1	
55-64 years-----	9.0	28.5	62.5	100.0	25.2	30.2	44.6	100.0	8.0	29.5	62.5	100.0	4.3	24.6	71.1	
65-74 years-----	11.5	33.0	55.5	100.0	23.7	40.8	35.5	100.0	7.0	29.5	63.5	100.0	5.2	32.9	61.9	
75-79 years-----	10.6	30.6	58.8	100.0	16.2	32.2	51.6	100.0	5.9	28.3	65.8	100.0	-	60.0	40.0	
<u>Men</u>		Rate per 100 adults			Percent distribution											
All ages, 18-79 years-	4.7	25.0	70.3	100.0	18.3	36.8	44.9	100.0	4.6	25.2	70.2	100.0	2.3	22.7	75.0	
18-24 years-----	1.7	23.9	74.4	100.0	22.9	77.1	-	100.0	0.9	24.6	74.5	100.0	1.7	22.7	75.6	
25-34 years-----	2.1	22.6	75.3	100.0	22.9	40.0	37.1	100.0	3.4	25.5	71.1	100.0	0.9	20.6	78.5	
35-44 years-----	2.4	25.2	72.4	100.0	16.1	38.0	45.9	100.0	2.4	23.2	74.4	100.0	1.5	26.2	72.3	
45-54 years-----	6.1	24.2	69.7	100.0	19.1	30.8	50.1	100.0	5.6	26.2	68.2	100.0	5.4	20.1	74.5	
55-64 years-----	8.4	25.5	66.1	100.0	18.2	33.2	48.6	100.0	7.9	26.0	66.1	100.0	5.4	20.5	74.1	
65-74 years-----	10.3	31.9	57.8	100.0	20.1	44.5	35.4	100.0	6.6	25.3	68.1	100.0	2.3	34.5	63.2	
75-79 years-----	6.8	23.8	69.4	100.0	13.9	22.2	63.9	100.0	-	24.3	75.7	100.0	-	46.4	53.6	
<u>Women</u>		Rate per 100 adults			Percent distribution											
All ages, 18-79 years-	6.5	28.4	65.1	100.0	25.4	36.7	37.9	100.0	6.5	32.3	61.2	100.0	3.8	23.8	72.4	
18-24 years-----	4.1	23.2	72.7	100.0	60.7	39.3	-	100.0	6.9	32.1	61.0	100.0	3.1	20.9	76.0	
25-34 years-----	3.5	26.4	70.1	100.0	11.9	55.6	32.5	100.0	3.4	29.5	67.1	100.0	3.4	24.8	71.8	
35-44 years-----	5.2	28.0	66.8	100.0	27.4	29.9	42.7	100.0	5.1	34.0	60.9	100.0	4.4	23.7	71.9	
45-54 years-----	6.2	28.4	65.4	100.0	19.7	41.4	38.9	100.0	6.3	32.0	61.7	100.0	4.7	23.2	72.1	
55-64 years-----	9.5	31.2	59.3	100.0	31.9	27.3	40.8	100.0	8.2	32.6	59.2	100.0	3.2	28.6	68.2	
65-74 years-----	12.5	33.8	53.7	100.0	27.1	37.4	35.5	100.0	7.4	32.7	59.9	100.0	7.0	31.8	61.2	
75-79 years-----	14.4	37.3	48.3	100.0	18.2	42.4	39.4	100.0	11.3	32.0	56.7	100.0	-	100.0	-	

Table 5. Prevalence rates for adults with severe, mild, and no dizziness and percent distribution of adults in specified hearing sensitivity levels, by condition according to sex and age: United States, 1960-62

Sex and age	Dizziness			Hearing level re audiometric zero												
				+16 decibels or higher with dizziness:				-4 to +15 decibels with dizziness:				-5 decibels or lower with dizziness:				
	Severe	Mild	None	Total	Severe	Mild	None	Total	Severe	Mild	None	Total	Severe	Mild	None	
<u>Both sexes</u>		Rate per 100 adults			Percent distribution											
All ages, 18-79 years-	7.2	34.9	57.9	100.0	14.8	33.5	51.7	100.0	7.8	35.0	57.2	100.0	5.5	34.9	59.6	
18-24 years-----	5.9	33.7	60.4	100.0	9.1	54.0	36.9	100.0	5.7	34.7	59.6	100.0	6.0	33.2	60.8	
25-34 years-----	4.6	34.3	61.1	100.0	5.3	41.9	52.8	100.0	4.2	35.1	60.7	100.0	4.8	33.8	61.4	
35-44 years-----	5.8	32.9	61.3	100.0	15.1	27.3	57.6	100.0	6.2	32.0	61.8	100.0	4.9	33.9	61.2	
45-54 years-----	6.7	38.5	55.3	100.0	7.6	34.8	57.6	100.0	7.7	35.5	56.8	100.0	5.4	43.1	51.5	
55-64 years-----	10.5	35.7	53.8	100.0	16.3	34.8	48.9	100.0	10.2	37.0	52.8	100.0	8.6	32.2	59.2	
65-74 years-----	12.0	35.6	52.4	100.0	16.4	36.0	47.6	100.0	10.5	37.0	52.5	100.0	8.9	26.5	64.6	
75-79 years-----	13.2	28.7	58.1	100.0	16.3	26.1	57.6	100.0	10.6	30.1	59.3	100.0	-	65.9	34.1	
<u>Men</u>		Rate per 100 adults			Percent distribution											
All ages, 18-79 years-	5.2	26.5	68.3	100.0	13.2	32.8	54.0	100.0	5.2	26.2	68.6	100.0	3.8	25.7	70.5	
18-24 years-----	5.8	22.9	71.3	100.0	-	58.7	41.3	100.0	5.9	24.2	69.9	100.0	5.8	21.7	72.5	
25-34 years-----	2.1	22.3	75.6	100.0	10.5	6.8	82.7	100.0	1.3	26.8	71.9	100.0	2.4	20.1	77.5	
35-44 years-----	3.7	24.4	71.9	100.0	14.8	27.2	58.0	100.0	3.6	22.6	73.8	100.0	3.0	25.7	71.3	
45-54 years-----	4.7	32.5	62.8	100.0	5.2	39.7	55.1	100.0	4.7	27.6	67.7	100.0	4.5	40.2	55.3	
55-64 years-----	8.4	27.0	64.6	100.0	12.7	32.5	54.8	100.0	8.8	26.0	65.2	100.0	5.5	47.5	47.0	
65-74 years-----	9.3	32.5	58.2	100.0	15.6	37.1	47.3	100.0	7.0	31.4	61.6	100.0	3.8	24.8	71.4	
75-79 years-----	9.9	25.3	64.8	100.0	14.8	25.9	59.3	100.0	5.6	23.3	71.1	100.0	-	53.6	46.4	
<u>Women</u>		Rate per 100 adults			Percent distribution											
All ages, 18-79 years-	9.0	42.5	48.5	100.0	16.3	34.3	49.4	100.0	10.4	44.1	45.5	100.0	6.8	42.2	51.0	
18-24 years-----	6.1	42.8	51.1	100.0	33.1	41.7	25.2	100.0	5.3	47.9	46.8	100.0	6.1	41.6	52.3	
25-34 years-----	6.9	45.2	47.9	100.0	-	77.5	22.5	100.0	7.7	44.9	47.4	100.0	6.7	44.8	48.5	
35-44 years-----	7.6	40.8	51.6	100.0	15.7	27.4	56.9	100.0	8.8	41.9	49.3	100.0	6.5	40.5	53.0	
45-54 years-----	8.7	44.3	47.0	100.0	9.5	30.8	59.7	100.0	11.2	44.7	44.1	100.0	6.0	45.2	48.8	
55-64 years-----	12.3	43.7	44.0	100.0	19.7	37.0	43.3	100.0	11.5	46.9	41.6	100.0	11.5	36.7	51.8	
65-74 years-----	14.2	38.1	47.7	100.0	17.2	34.9	47.9	100.0	13.3	41.3	45.4	100.0	12.1	27.6	60.3	
75-79 years-----	16.4	32.0	51.6	100.0	17.9	26.4	55.7	100.0	15.3	36.4	48.3	100.0	-	100.0	-	

Table 6. Prevalence rates for adults with and without a history of stroke and percent distribution of adults in specified hearing sensitivity levels, by condition according to sex and age: United States, 1960-62

Sex and age	History of:		Hearing level re audiometric zero										
			+16 decibels or higher with:			-4 to +15 decibels with:			-5 decibels or lower with:				
	Stroke	No stroke	Total	Stroke	No stroke	Total	Stroke	No stroke	Total	Stroke	No stroke		
<u>Both sexes</u>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--	1.6	98.4	100.0	5.8	94.2	100.0	1.8	98.2	100.0	0.6	99.4		
18-24 years-----	0.4	99.6	100.0	-	100.0	100.0	0.4	99.6	100.0	0.4	99.6		
25-34 years-----	0.4	99.6	100.0	-	100.0	100.0	0.9	99.1	100.0	0.1	99.9		
35-44 years-----	0.7	99.3	100.0	4.5	95.5	100.0	0.2	99.8	100.0	0.9	99.1		
45-54 years-----	1.4	98.6	100.0	2.2	97.8	100.0	1.7	98.3	100.0	0.9	99.1		
55-64 years-----	2.1	97.9	100.0	4.4	95.6	100.0	2.3	97.7	100.0	0.6	99.4		
65-74 years-----	5.3	94.7	100.0	8.3	91.7	100.0	4.2	95.8	100.0	3.1	96.9		
75-79 years-----	7.5	92.5	100.0	6.7	93.3	100.0	8.6	91.4	100.0	-	100.0		
<u>Men</u>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--	1.4	98.6	100.0	3.2	96.8	100.0	1.7	98.3	100.0	0.7	99.3		
18-24 years-----	0.7	99.3	100.0	-	100.0	100.0	0.8	99.2	100.0	0.6	99.4		
25-34 years-----	0.4	99.6	100.0	-	100.0	100.0	0.8	99.2	100.0	0.2	99.8		
35-44 years-----	0.6	99.4	100.0	7.3	92.7	100.0	0.3	99.7	100.0	0.4	99.6		
45-54 years-----	1.9	98.1	100.0	2.0	98.0	100.0	2.0	98.0	100.0	1.8	98.2		
55-64 years-----	2.0	98.0	100.0	3.8	96.2	100.0	2.0	98.0	100.0	1.2	98.8		
65-74 years-----	2.4	97.6	100.0	3.2	96.8	100.0	2.4	97.6	100.0	-	100.0		
75-79 years-----	7.5	92.5	100.0	2.1	97.9	100.0	13.4	86.6	100.0	-	100.0		
<u>Women</u>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--	1.7	98.3	100.0	8.4	91.6	100.0	2.0	98.0	100.0	0.5	99.5		
18-24 years-----	0.2	99.8	100.0	-	100.0	100.0	-	100.0	100.0	0.3	99.7		
25-34 years-----	0.3	99.7	100.0	-	100.0	100.0	1.1	98.9	100.0	-	100.0		
35-44 years-----	0.8	99.2	100.0	-	100.0	100.0	0.1	99.9	100.0	1.3	98.7		
45-54 years-----	0.8	99.2	100.0	2.3	97.7	100.0	1.2	98.8	100.0	0.2	99.8		
55-64 years-----	2.2	97.8	100.0	5.0	95.0	100.0	2.5	97.5	100.0	-	100.0		
65-74 years-----	7.6	92.4	100.0	13.1	86.9	100.0	5.7	94.3	100.0	5.0	95.0		
75-79 years-----	7.5	92.5	100.0	11.3	88.7	100.0	4.2	95.8	100.0	-	100.0		

Table 7. Prevalence rates for adults with and without a history of scarlet fever and percent distribution of adults in specified hearing sensitivity levels, by condition according to sex and age: United States, 1960-62

Sex and age	History of:		Hearing level re audiometric zero										
			+16 decibels or higher with:			-4 to +15 decibels with:			-5 decibels or lower with:				
	Scarlet fever	None	Total	Scarlet fever	None	Total	Scarlet fever	None	Total	Scarlet fever	None		
<u>Both sexes</u>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--	11.5	88.5	100.0	13.6	86.4	100.0	11.9	88.1	100.0	10.8	89.2		
18-24 years-----	6.1	93.9	100.0	-	100.0	100.0	3.3	96.7	100.0	7.1	92.9		
25-34 years-----	9.3	90.7	100.0	24.7	75.3	100.0	7.3	92.7	100.0	9.9	90.1		
35-44 years-----	12.3	87.7	100.0	11.9	88.1	100.0	14.2	85.8	100.0	10.8	89.2		
45-54 years-----	13.9	86.1	100.0	22.9	77.1	100.0	13.5	86.5	100.0	13.3	86.7		
55-64 years-----	15.1	84.9	100.0	16.1	83.9	100.0	14.6	85.4	100.0	15.9	84.1		
65-74 years-----	12.3	87.7	100.0	9.9	90.1	100.0	11.4	88.6	100.0	24.3	75.7		
75-79 years-----	12.2	87.8	100.0	13.1	86.9	100.0	11.0	89.0	100.0	22.2	77.8		
<u>Men</u>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--	10.7	89.3	100.0	11.0	89.0	100.0	11.4	88.6	100.0	9.8	90.2		
18-24 years-----	7.3	92.7	100.0	-	100.0	100.0	4.9	95.1	100.0	8.5	91.5		
25-34 years-----	8.8	91.2	100.0	8.6	91.4	100.0	7.5	92.5	100.0	9.4	90.6		
35-44 years-----	12.2	87.8	100.0	7.1	92.9	100.0	14.1	85.9	100.0	11.0	89.0		
45-54 years-----	11.8	88.2	100.0	14.5	85.5	100.0	13.8	86.2	100.0	7.8	92.2		
55-64 years-----	13.0	87.0	100.0	14.0	86.0	100.0	12.3	87.7	100.0	14.4	85.6		
65-74 years-----	10.8	89.2	100.0	9.2	90.8	100.0	11.4	88.6	100.0	12.6	87.4		
75-79 years-----	9.0	91.0	100.0	13.8	86.2	100.0	4.9	95.1	100.0	-	100.0		
<u>Women</u>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--	12.2	87.8	100.0	16.2	83.8	100.0	12.4	87.6	100.0	11.5	88.5		
18-24 years-----	5.0	95.0	100.0	-	100.0	100.0	1.3	98.7	100.0	6.0	94.0		
25-34 years-----	9.7	90.3	100.0	41.0	59.0	100.0	7.0	93.0	100.0	10.2	89.8		
35-44 years-----	12.3	87.7	100.0	19.5	80.5	100.0	14.3	85.7	100.0	10.7	89.3		
45-54 years-----	15.8	84.2	100.0	29.8	70.2	100.0	13.2	86.8	100.0	17.3	82.7		
55-64 years-----	17.0	83.0	100.0	18.1	81.9	100.0	16.7	83.3	100.0	17.3	82.7		
65-74 years-----	13.4	86.6	100.0	10.7	89.3	100.0	11.4	88.6	100.0	31.4	68.6		
75-79 years-----	15.2	84.8	100.0	12.4	87.6	100.0	16.7	83.3	100.0	100.0	-		

Table 8. Prevalence rates for adults with and without a history of diphtheria and percent distribution of adults in specified hearing sensitivity levels, by condition according to sex and age: United States, 1960-62

Sex and age	History of:		Hearing level re audiometric zero										
			+16 decibels or higher with:			-4 to +15 decibels with:			-5 decibels or lower with:				
	Diphtheria	None	Total	Diphtheria	None	Total	Diphtheria	None	Total	Diphtheria	None		
<b>Both sexes</b>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--		5.0	95.0	100.0	7.0	93.0	100.0	5.9	94.1	100.0	3.9	96.1	
18-24 years-----	0.7	99.3	100.0	-	100.0	100.0	-	100.0	100.0	0.9	99.1		
25-34 years-----	3.0	97.0	100.0	10.2	89.8	100.0	2.0	98.0	100.0	3.3	96.7		
35-44 years-----	4.9	95.1	100.0	1.2	98.8	100.0	6.2	93.8	100.0	4.1	95.9		
45-54 years-----	7.8	92.2	100.0	8.6	91.4	100.0	8.9	91.1	100.0	6.2	93.8		
55-64 years-----	7.9	92.1	100.0	6.5	93.5	100.0	7.8	92.2	100.0	8.7	91.3		
65-74 years-----	6.0	94.0	100.0	6.9	93.1	100.0	5.6	94.4	100.0	5.9	94.1		
75-79 years-----	6.6	93.4	100.0	9.7	90.3	100.0	2.6	97.4	100.0	43.6	56.4		
<b>Men</b>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--		4.6	95.4	100.0	6.2	93.8	100.0	5.4	94.6	100.0	3.6	96.4	
18-24 years-----	0.4	99.6	100.0	-	100.0	100.0	-	100.0	100.0	0.6	99.4		
25-34 years-----	2.4	97.6	100.0	20.2	79.8	100.0	1.0	99.0	100.0	2.8	97.2		
35-44 years-----	5.5	94.5	100.0	2.0	98.0	100.0	7.1	92.9	100.0	4.4	95.6		
45-54 years-----	6.6	93.4	100.0	2.9	97.1	100.0	8.2	91.8	100.0	4.2	95.8		
55-64 years-----	6.5	93.5	100.0	4.2	95.8	100.0	6.0	94.0	100.0	9.1	90.9		
65-74 years-----	7.0	93.0	100.0	8.9	91.1	100.0	6.1	93.9	100.0	6.3	93.7		
75-79 years-----	3.8	96.2	100.0	5.0	95.0	100.0	-	100.0	100.0	53.6	46.4		
<b>Women</b>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--		5.4	94.6	100.0	7.8	92.2	100.0	6.5	93.5	100.0	4.1	95.9	
18-24 years-----	0.9	99.1	100.0	-	100.0	100.0	-	100.0	100.0	1.1	98.9		
25-34 years-----	3.5	96.5	100.0	-	100.0	100.0	3.2	96.8	100.0	3.7	96.3		
35-44 years-----	4.4	95.6	100.0	-	100.0	100.0	5.4	94.6	100.0	3.9	96.1		
45-54 years-----	8.9	91.1	100.0	13.2	86.8	100.0	9.7	90.3	100.0	7.6	92.4		
55-64 years-----	9.2	90.8	100.0	8.8	91.2	100.0	9.5	90.5	100.0	8.2	91.8		
65-74 years-----	5.2	94.8	100.0	5.0	95.0	100.0	5.2	94.8	100.0	5.7	94.3		
75-79 years-----	9.5	90.5	100.0	14.2	85.8	100.0	5.1	94.9	100.0	-	100.0		

Table 9. Prevalence rates for adults with and without hearing impairment and percent distribution of adults in specified hearing sensitivity levels, by condition according to sex and age: United States, 1960-62

Sex and age	Hearing impairment	None	Hearing level re audiometric zero										
			+16 decibels or higher with:			-4 to +15 decibels with:			-5 decibels or lower with:				
			Total	Hearing impairment	None	Total	Hearing impairment	None	Total	Hearing impairment	None		
<b>Both sexes</b>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--		5.9	94.1	100.0	41.9	58.1	100.0	4.9	95.1	100.0	1.2	98.8	
18-24 years-----	1.5	98.5	100.0	25.2	74.8	100.0	3.6	96.4	100.0	0.6	99.4		
25-34 years-----	2.2	97.8	100.0	34.0	66.0	100.0	3.0	97.0	100.0	1.2	98.8		
35-44 years-----	2.8	97.2	100.0	42.9	57.1	100.0	2.6	97.4	100.0	0.8	99.2		
45-54 years-----	5.6	94.4	100.0	37.8	62.2	100.0	5.8	94.2	100.0	1.9	98.1		
55-64 years-----	8.9	91.1	100.0	38.4	61.6	100.0	6.5	93.5	100.0	2.6	97.4		
65-74 years-----	17.4	82.6	100.0	45.4	54.6	100.0	7.1	92.9	100.0	1.7	98.3		
75-79 years-----	22.6	77.4	100.0	43.6	56.4	100.0	3.3	96.7	100.0	-	100.0		
<b>Men</b>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--		7.4	92.6	100.0	48.5	51.5	100.0	6.4	93.6	100.0	1.3	98.7	
18-24 years-----	2.1	97.9	100.0	23.4	76.6	100.0	2.7	97.3	100.0	1.4	98.6		
25-34 years-----	2.5	97.5	100.0	43.8	56.2	100.0	3.5	96.5	100.0	1.1	98.9		
35-44 years-----	4.3	95.7	100.0	50.6	49.4	100.0	4.0	96.0	100.0	1.2	98.8		
45-54 years-----	6.8	93.2	100.0	36.4	63.6	100.0	7.8	92.2	100.0	1.6	98.4		
55-64 years-----	10.9	89.1	100.0	46.8	53.2	100.0	8.1	91.9	100.0	2.4	97.6		
65-74 years-----	22.2	77.8	100.0	50.3	49.7	100.0	11.2	88.8	100.0	-	100.0		
75-79 years-----	29.7	70.3	100.0	56.5	43.5	100.0	4.4	95.6	100.0	-	100.0		
<b>Women</b>		Rate per 100 adults			Percent distribution								
All ages, 18-79 years--		4.4	95.6	100.0	35.3	64.7	100.0	3.4	96.6	100.0	1.0	99.0	
18-24 years-----	1.1	98.9	100.0	28.6	71.4	100.0	4.8	95.2	100.0	-	100.0		
25-34 years-----	1.8	98.2	100.0	24.0	76.0	100.0	2.3	97.7	100.0	1.3	98.7		
35-44 years-----	1.4	98.6	100.0	30.6	69.4	100.0	1.2	98.8	100.0	0.4	99.6		
45-54 years-----	4.5	95.5	100.0	38.9	61.1	100.0	3.4	96.6	100.0	2.2	97.8		
55-64 years-----	7.1	92.9	100.0	30.2	69.8	100.0	5.0	95.0	100.0	2.9	97.1		
65-74 years-----	13.6	86.4	100.0	40.9	59.1	100.0	4.0	96.0	100.0	2.7	97.3		
75-79 years-----	15.5	84.5	100.0	30.2	69.8	100.0	2.4	97.6	100.0	-	100.0		

Table 10. Prevalence rates for gross findings on examination of the right ear and percent distribution of these findings within specified hearing sensitivity levels among adults in the United States, by sex and age

Sex and age	Right ear condition			Hearing level re audiometric zero			
				+16 decibels or higher with ear:			
	Abnor- mality	D.N.V. <sup>1</sup>	Normal	Total	Abnor- mality	D.N.V. <sup>1</sup>	Normal
<u>Both sexes</u>	Rate per 100 adults			Percent distribution			
All ages, 18-79 years---	7.3	10.3	82.4	100.0	11.9	15.0	73.1
18-24 years-----	4.8	6.4	88.8	100.0	26.6	10.4	63.0
25-34 years-----	6.0	7.6	86.4	100.0	15.7	15.9	68.4
35-44 years-----	6.4	8.4	85.2	100.0	11.6	6.1	82.3
45-54 years-----	8.4	10.4	81.2	100.0	9.1	11.4	79.5
55-64 years-----	9.9	11.7	78.4	100.0	18.6	8.6	72.8
65-74 years-----	9.8	19.9	70.3	100.0	8.0	23.7	68.3
75-79 years-----	8.0	20.3	71.7	100.0	8.7	16.1	75.2
<u>Men</u>	Rate per 100 adults			Percent distribution			
All ages, 18-79 years---	7.3	12.7	80.0	100.0	8.4	18.3	73.3
18-24 years-----	5.7	8.4	85.9	100.0	17.4	11.2	71.4
25-34 years-----	5.2	9.6	85.2	100.0	6.6	14.4	79.0
35-44 years-----	8.3	9.7	82.0	100.0	10.6	6.7	82.7
45-54 years-----	7.8	12.5	79.7	100.0	3.3	14.5	82.2
55-64 years-----	8.8	14.0	77.2	100.0	14.4	12.2	73.4
65-74 years-----	8.6	27.1	64.3	100.0	5.6	29.8	64.6
75-79 years-----	5.4	25.6	69.0	100.0	5.1	20.7	74.2
<u>Women</u>	Rate per 100 adults			Percent distribution			
All ages, 18-79 years---	7.5	8.0	84.5	100.0	15.7	11.5	72.8
18-24 years-----	4.1	4.6	91.3	100.0	38.4	9.5	52.1
25-34 years-----	6.6	5.8	87.6	100.0	24.3	17.3	58.4
35-44 years-----	4.7	7.2	88.1	100.0	12.8	5.4	81.8
45-54 years-----	9.0	8.4	82.6	100.0	15.4	8.0	76.6
55-64 years-----	10.9	9.6	79.5	100.0	23.1	4.8	72.1
65-74 years-----	10.7	14.2	75.1	100.0	10.2	18.0	71.8
75-79 years-----	10.8	15.0	74.2	100.0	12.1	11.7	76.2

<sup>1</sup>D.N.V. = drum not visualized.

Table 10. Prevalence rates for gross findings on examination of the right ear and percent distribution of these findings within specified hearing sensitivity levels among adults in the United States, by sex and age—Con.

Hearing level re audiometric zero							
-4 to +15 decibels with ear:				-5 decibels or lower with ear:			
Total	Abnor- mality	D.N.V. <sup>1</sup>	Normal	Total	Abnor- mality	D.N.V. <sup>1</sup>	Normal
Percent distribution							
100.0	8.4	11.6	80.0	100.0	4.5	6.9	88.6
100.0	6.9	8.0	85.1	100.0	3.0	5.4	91.6
100.0	7.0	7.4	85.6	100.0	4.6	7.4	88.0
100.0	7.2	9.8	83.0	100.0	4.8	6.9	88.3
100.0	9.4	11.2	79.4	100.0	6.0	8.4	85.6
100.0	8.8	13.9	77.3	100.0	5.4	5.7	88.9
100.0	11.3	18.6	70.1	100.0	4.4	11.6	84.0
100.0	6.9	26.0	67.1	100.0	-	20.9	79.1
100.0	8.5	14.1	77.4	100.0	4.9	8.7	86.4
100.0	6.8	8.4	84.8	100.0	4.3	8.4	87.3
100.0	5.5	9.4	85.1	100.0	4.7	9.6	85.7
100.0	9.0	11.4	79.6	100.0	6.7	7.9	85.4
100.0	10.4	12.7	76.9	100.0	2.6	11.4	86.0
100.0	8.2	17.0	74.8	100.0	5.3	3.9	90.8
100.0	10.8	27.2	62.0	100.0	5.5	8.9	85.6
100.0	5.2	33.8	61.0	100.0	-	-	100.0
100.0	8.2	9.3	82.5	100.0	4.2	5.5	90.3
100.0	6.8	7.7	85.5	100.0	2.0	3.2	94.8
100.0	8.4	5.4	86.2	100.0	4.7	5.5	89.8
100.0	5.3	8.2	86.5	100.0	3.2	6.2	90.6
100.0	8.5	9.6	81.9	100.0	8.4	6.2	85.4
100.0	9.3	11.1	79.6	100.0	5.8	7.4	86.8
100.0	11.7	12.2	76.1	100.0	4.1	13.3	82.6
100.0	8.5	18.2	73.3	100.0	-	100.0	-



Table 11. Prevalence rates for gross findings on examination of the left ear and percent distribution of these findings within specified hearing sensitivity levels among adults in the United States, by sex and age

Sex and age	Left ear condition			Hearing level re audiometric zero			
				+16 decibels or higher with ear:			
	Abnor- mality	D.N.V. <sup>1</sup>	Normal	Total	Abnor- mality	D.N.V. <sup>1</sup>	Normal
<u>Both sexes</u>	Rate per 100 adults			Percent distribution			
All ages, 18-79 years---	8.0	9.8	82.2	100.0	18.1	13.7	68.2
18-24 years-----	5.4	6.6	88.0	100.0	12.5	17.8	69.7
25-34 years-----	6.3	6.1	87.6	100.0	20.9	5.2	73.9
35-44 years-----	7.3	8.7	84.0	100.0	26.7	9.0	64.3
45-54 years-----	9.1	11.6	79.3	100.0	17.6	15.7	66.7
55-64 years-----	10.1	10.5	79.4	100.0	22.1	9.5	68.4
65-74 years-----	10.1	16.4	73.5	100.0	12.9	16.5	70.6
75-79 years-----	14.9	20.9	64.2	100.0	16.9	17.6	65.5
<u>Men</u>	Rate per 100 adults			Percent distribution			
All ages, 18-79 years---	7.8	12.8	79.4	100.0	15.4	16.6	68.0
18-24 years-----	7.1	7.6	85.3	100.0	15.8	21.2	63.0
25-34 years-----	6.8	8.5	84.7	100.0	24.2	11.0	64.8
35-44 years-----	7.9	10.9	81.2	100.0	24.6	7.4	68.0
45-54 years-----	7.6	15.0	77.4	100.0	16.8	14.0	69.2
55-64 years-----	8.7	14.2	77.1	100.0	18.0	12.5	69.5
65-74 years-----	8.8	22.7	68.5	100.0	8.8	22.4	68.8
75-79 years-----	12.3	27.2	60.5	100.0	11.3	22.5	66.2
<u>Women</u>	Rate per 100 adults			Percent distribution			
All ages, 18-79 years---	8.2	7.0	84.8	100.0	21.1	10.6	68.3
18-24 years-----	3.8	5.8	90.4	100.0	7.1	12.4	80.5
25-34 years-----	5.7	4.0	90.3	100.0	17.9	-	82.1
35-44 years-----	6.7	6.6	86.7	100.0	30.4	11.6	58.0
45-54 years-----	10.6	8.3	81.1	100.0	18.4	17.2	64.4
55-64 years-----	11.3	7.1	81.6	100.0	26.8	6.0	67.2
65-74 years-----	11.3	11.2	77.5	100.0	16.6	11.0	72.4
75-79 years-----	17.7	14.6	67.7	100.0	23.1	12.2	64.7

<sup>1</sup>D.N.V. = drum not visualized.

Table 11. Prevalence rates for gross findings on examination of the left ear and percent distribution of these findings within specified hearing sensitivity levels among adults in the United States, by sex and age—Con.

Hearing level re audiometric zero							
-4 to +15 decibels with ear:				-5 decibels or lower with ear:			
Total	Abnor- mality	D.N.V. <sup>1</sup>	Normal	Total	Abnor- mality	D.N.V. <sup>1</sup>	Normal
Percent distribution							
100.0	8.0	10.8	81.2	100.0	5.0	7.2	87.8
100.0	9.3	5.7	85.0	100.0	2.9	6.8	90.3
100.0	5.8	7.1	87.1	100.0	5.9	5.4	88.7
100.0	6.9	9.4	83.7	100.0	5.3	7.8	86.9
100.0	9.8	11.9	78.3	100.0	5.2	9.9	84.9
100.0	7.6	11.3	81.1	100.0	6.5	8.2	85.3
100.0	8.8	17.5	73.7	100.0	4.7	7.4	87.9
100.0	11.6	26.2	62.2	100.0	-	-	100.0
100.0	7.7	14.1	78.2	100.0	5.4	9.2	85.4
100.0	11.1	4.4	84.5	100.0	3.7	9.4	86.9
100.0	5.5	9.2	85.3	100.0	7.0	7.7	85.3
100.0	7.6	12.7	79.7	100.0	5.3	9.1	85.6
100.0	8.0	16.5	75.5	100.0	3.8	11.6	84.6
100.0	6.3	15.1	78.6	100.0	6.6	12.0	81.4
100.0	8.9	24.6	66.5	100.0	5.9	7.3	86.8
100.0	13.1	35.9	51.0	100.0	100.0	-	-
100.0	8.3	7.5	84.2	100.0	4.7	5.7	89.6
100.0	7.1	7.3	85.6	100.0	2.4	5.0	92.6
100.0	6.1	4.8	89.1	100.0	5.0	3.6	91.4
100.0	6.0	6.0	88.0	100.0	5.4	6.9	87.7
100.0	11.9	6.7	81.4	100.0	6.3	8.6	85.1
100.0	8.8	7.7	83.5	100.0	6.5	5.6	87.9
100.0	8.8	12.0	79.2	100.0	4.2	7.4	88.4
100.0	10.1	18.2	71.7	100.0	-	-	100.0

Table 12. Prevalence rates for adults with specific abnormalities of the right ear and percentage of adults with these abnormalities in specified hearing sensitivity levels, by sex and age: United States, 1960-62

Sex and age	Right ear abnormality				Hearing level re audiometric zero				
					+16 decibels or higher with:				
	Mal-formation	Exu-date	Per-forated drum	Scarred drum	Total	Mal-formation	Exu-date	Per-forated drum	Scarred drum
<u>Both sexes</u>	Rate per 100 adults				Percentage				
All ages, 18-79 years---	0.1	0.8	0.6	6.5	14.1	0.1	2.4	1.6	10.0
18-24 years-----	-	0.5	0.3	4.4	31.7	-	4.4	4.4	22.9
25-34 years-----	0.1	0.6	0.9	5.0	24.6	-	4.9	9.7	10.0
35-44 years-----	0.2	0.9	0.8	5.7	16.1	-	2.3	1.8	12.0
45-54 years-----	0.1	0.7	0.4	7.8	10.8	-	1.3	0.9	8.6
55-64 years-----	-	0.9	0.8	8.6	18.5	-	3.1	1.7	13.7
65-74 years-----	0.3	1.6	0.3	8.4	10.3	0.4	2.5	0.3	7.1
75-79 years-----	-	0.7	-	8.1	10.4	-	1.2	-	9.2
<u>Men</u>									
All ages, 18-79 years---	0.2	0.8	0.6	6.5	10.8	0.3	2.0	1.1	7.4
18-24 years-----	-	0.7	0.3	5.2	18.1	-	-	-	18.1
25-34 years-----	0.1	0.3	0.9	4.5	17.8	-	4.0	7.8	6.0
35-44 years-----	0.5	1.1	1.1	7.3	14.9	-	2.4	1.5	11.0
45-54 years-----	-	1.1	0.2	7.0	6.1	-	2.4	-	3.7
55-64 years-----	-	1.0	0.6	7.9	16.3	-	3.1	1.9	11.3
65-74 years-----	0.7	1.0	0.3	7.7	8.5	0.9	1.8	0.7	5.1
75-79 years-----	-	-	-	5.4	5.7	-	-	-	5.7
<u>Women</u>									
All ages, 18-79 years---	0.1	0.8	0.6	6.5	17.6	-	2.8	2.1	12.7
18-24 years-----	-	0.3	0.3	3.8	49.1	-	10.0	10.0	29.1
25-34 years-----	0.1	0.9	0.9	5.4	31.0	-	5.8	11.6	13.6
35-44 years-----	-	0.8	0.6	4.2	17.8	-	2.2	2.2	13.4
45-54 years-----	0.3	0.3	0.6	8.5	15.8	-	-	1.8	14.0
55-64 years-----	-	0.8	1.0	9.2	20.7	-	3.0	1.5	16.2
65-74 years-----	-	2.1	0.3	8.9	12.1	-	3.2	-	8.9
75-79 years-----	-	1.3	-	10.8	14.7	-	2.3	-	12.4

Table 12. Prevalence rates for adults with specific abnormalities of the right ear and percentage of adults with these abnormalities in specified hearing sensitivity levels, by sex and age: United States, 1960-62—Con.

Hearing level re audiometric zero									
-4 to +15 decibels with:					-5 decibels or lower with:				
Total	Mal-formation	Exu-date	Per-forated drum	Scarred drum	Total	Mal-formation	Exu-date	Per-forated drum	Scarred drum
Percentage									
8.9	0.1	0.1	0.6	7.5	4.8	0.1	0.4	0.3	4.0
8.0	-	1.0	0.4	6.6	3.0	-	0.2	0.1	2.7
7.5	0.2	0.7	1.1	5.5	5.0	-	0.4	0.3	4.3
8.5	0.2	0.8	1.1	6.4	5.5	0.3	0.9	0.4	3.9
10.0	-	0.7	0.4	8.9	6.6	0.5	0.5	0.3	5.3
9.1	-	0.5	0.4	8.2	5.9	-	0.4	0.6	4.9
11.3	0.2	1.2	0.3	9.6	4.7	-	-	-	4.7
7.0	-	-	-	7.0	-	-	-	-	-
9.4	0.2	0.8	0.7	7.7	5.2	0.2	0.5	0.3	4.2
8.5	-	1.4	0.8	6.3	4.3	-	0.4	-	3.9
6.1	0.2	0.5	1.1	4.3	5.1	-	-	0.4	4.7
11.0	0.4	0.8	1.5	8.3	7.5	0.7	1.2	0.4	5.2
10.9	-	1.2	0.3	9.4	2.6	-	0.4	-	2.2
8.7	-	0.5	0.2	8.0	5.9	-	0.7	1.2	4.0
10.9	0.6	0.6	-	9.7	5.5	-	-	-	5.5
5.3	-	-	-	5.3	-	-	-	-	-
8.7	-	0.7	0.6	7.4	4.6	0.1	0.4	0.3	3.8
7.5	-	0.6	-	6.9	2.0	-	-	0.2	1.8
9.0	0.2	0.9	1.1	6.8	4.9	-	0.7	0.2	4.0
6.2	-	0.8	0.8	4.6	3.8	-	0.6	0.3	2.9
8.9	-	0.1	0.5	8.3	9.4	0.8	0.5	0.5	7.6
9.5	-	0.5	0.6	8.4	5.8	-	-	-	5.8
11.7	-	1.7	0.5	9.5	4.1	-	-	-	4.1
8.8	-	-	-	8.8	-	-	-	-	-

Table 13. Prevalence rates for adults with specific abnormalities of the left ear and percentage of adults with these abnormalities in specified hearing sensitivity levels, by sex and age: United States, 1960-62

Sex and age	Left ear abnormality				Hearing level re audiometric zero				
	Mal-formation	Exu-date	Per-forated drum	Scarred drum	+16 decibels or higher with:				
					Total	Mal-formation	Exu-date	Per-forated drum	Scarred drum
<u>Both sexes</u>	Rate per 100 adults				Percentage				
All ages, 18-79 years---	0.1	0.9	1.0	7.0	22.0	0.2	2.4	4.5	14.9
18-24 years-----	-	0.7	0.7	4.6	19.1	-	-	5.1	14.0
25-34 years-----	0.1	0.6	0.7	5.7	37.1	-	7.6	7.6	21.9
35-44 years-----	0.2	1.5	0.8	6.2	39.4	-	8.7	9.4	21.3
45-54 years-----	-	0.8	0.7	8.4	20.7	-	2.0	4.4	14.3
55-64 years-----	0.2	1.0	1.2	8.2	23.1	1.0	2.6	4.5	15.0
65-74 years-----	0.1	0.9	2.0	8.8	16.1	-	0.6	4.0	11.5
75-79 years-----	-	0.7	1.5	14.0	19.3	-	1.1	1.4	16.8
<u>Men</u>	Rate per 100 adults				Percentage				
All ages, 18-79 years---	0.1	1.1	0.9	6.8	19.6	-	2.2	5.0	12.4
18-24 years-----	-	0.8	0.9	5.9	25.5	-	-	8.3	17.2
25-34 years-----	0.1	0.5	0.5	6.7	47.7	-	11.2	11.2	25.3
35-44 years-----	0.3	2.1	1.1	6.0	39.3	-	10.0	11.5	17.8
45-54 years-----	-	1.0	0.5	7.1	17.3	-	2.2	2.4	12.7
55-64 years-----	-	1.1	0.8	7.4	18.3	-	1.2	2.9	14.2
65-74 years-----	0.3	0.7	2.0	7.8	12.5	-	-	5.0	7.5
75-79 years-----	-	-	3.1	10.3	13.6	-	-	2.7	10.9
<u>Women</u>	Rate per 100 adults				Percentage				
All ages, 18-79 years---	0.1	0.8	1.0	7.2	24.7	0.5	2.6	4.1	17.5
18-24 years-----	-	0.7	0.5	3.5	8.9	-	-	-	8.9
25-34 years-----	0.1	0.6	0.9	4.9	27.5	-	4.3	4.3	18.9
35-44 years-----	-	0.9	0.6	6.3	39.3	-	6.4	5.8	27.1
45-54 years-----	-	0.7	1.0	9.7	23.9	-	1.7	6.4	15.8
55-64 years-----	0.5	1.0	1.7	8.9	28.9	2.2	4.3	6.4	16.0
65-74 years-----	-	1.1	2.0	9.6	19.5	-	1.1	3.1	15.3
75-79 years-----	-	1.3	-	17.7	25.6	-	2.3	-	23.3

Table 13. Prevalence rates for adults with specific abnormalities of the left ear and percentage of adults with these abnormalities in specified hearing sensitivity levels, by sex and age: United States, 1960-62—Con.

Hearing level re audiometric zero									
-4 to +15 decibels with:					-5 decibels or lower with:				
Total	Mal-formation	Exu-date	Per-forated drum	Scarred drum	Total	Mal-formation	Exu-date	Per-forated drum	Scarred drum
Percentage									
8.8	0.1	0.9	0.7	7.1	5.4	0.1	0.5	0.3	4.5
9.7	-	0.7	0.9	8.1	3.6	-	0.7	0.5	2.4
6.6	0.1	0.6	0.7	5.2	6.2	0.1	0.3	0.4	5.4
7.9	0.2	1.4	0.7	5.6	5.7	0.1	0.7	-	4.9
10.7	-	0.8	0.6	9.3	5.5	-	0.4	-	5.1
8.2	0.1	0.6	0.5	7.0	6.9	-	0.9	0.6	5.4
10.0	0.3	1.3	0.9	7.5	4.8	-	-	-	4.8
11.6	-	-	1.7	9.9	-	-	-	-	-
8.5	0.1	1.2	0.4	6.8	5.4	0.1	0.4	0.2	4.7
11.9	-	1.4	1.1	9.4	3.7	-	0.4	0.5	2.8
6.4	-	0.6	0.3	5.5	7.1	0.2	-	0.1	6.8
8.7	0.4	2.0	0.6	5.7	5.3	0.3	0.8	-	4.2
8.9	-	0.9	0.4	7.6	4.5	-	0.7	-	3.8
6.8	-	1.0	-	5.8	7.6	-	1.0	1.6	5.0
10.1	0.6	1.2	-	8.3	5.8	-	-	-	5.8
13.3	-	-	3.8	9.5	-	-	-	-	-
9.1	0.1	0.6	0.9	7.5	5.3	-	0.6	0.3	4.4
7.1	-	-	0.6	6.5	3.3	-	0.9	0.4	2.0
6.7	0.3	0.6	1.0	4.8	5.4	-	0.5	0.6	4.3
7.1	-	0.8	0.8	5.5	6.0	-	0.6	-	5.4
12.5	-	0.7	0.7	11.1	6.3	-	0.2	-	6.1
9.5	0.2	0.2	1.0	8.1	6.4	-	0.8	-	5.6
9.9	-	1.3	1.7	6.9	4.3	-	-	-	4.3
10.3	-	-	-	10.3	-	-	-	-	-

# APPENDIX I

## HEALTH EXAMINATION SURVEY

Record Forms

### History - Self-Administered HES-204

3. a. At any time over the past few years, have you ever noticed ringing (tinnitus) in your ears or have you been bothered by other funny noises in your ears?  YES  NO  ?
- If YES b. How often?  Every few days  Less often
- c. Do they bother you  quite a bit  just a little
- 
4. a. Have you ever had spells of dizziness?  YES  NO  ?
- If YES b. How often?  Every few days  Less often
- c. Do they bother you  quite a bit  just a little
- 
49. Is your hearing  good  fair  poor
- 
50. a. Do you have any trouble with your hearing?  YES  NO  ?
- If YES b. Have you seen a doctor about it?  YES  NO  ?
- c. Did he say what caused it? \_\_\_\_\_
- 
68. Have you ever had: YES NO ?
- a. Scarlet fever
- b. Diphtheria
- c. Polio (infantile paralysis)

### Physical Examination HES-205

EARS	RIGHT	LEFT	REMARKS	CODE
20. Normal				<input checked="" type="checkbox"/>
21. Drum not Visualized				
22. Malformation				
23. Exudate				
24. perforated Drum				
25. Scarred Drum				

## APPENDIX II

### 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 18-74 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 to which the units were classified. As used here a PSU is a standard metropolitan statistical area or one or 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 the conduct of the survey have been described in previous reports.<sup>1,2</sup>

#### 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 2, which dealt principally with an analysis of the faithfulness with which the sampling design was carried out. This study notes that out of the 7,000 sample persons the 6,670 who were examined—response rate of over 86 percent—gave evidence that they were a highly representative sample of the civilian, noninstitutional population of the United States. Imprecision of nonrespondents was accomplished by attributing to nonexamined persons the characteristics of compa-

table examined persons as described in reference 2. The specific procedure 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 hearing tests were not available. For each of the 27 examinees not given the hearing test, a respondent of the same age-sex-race groups was selected at random, and his test results were assigned to the nonexamined person.

When only incomplete test results were available (56 persons), a variety of methods was used, depending upon the extent of missing data. If only one ear was tested, it was assumed that the findings for the other ear would have been the same. If partial results were available, the levels reached by the other ear at the particular frequencies were used as the estimates if they were consistent with the rest of the audiogram for the ear on which the data were missing. Otherwise projections were made on the parts of the audiogram available.

#### Sampling and Measurement Errors

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 are coming thousands of statistics, many for subclasses of 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 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. For this report, as in the others of this series, only differences which equal or exceed the 95-percent confidence interval are referred to as being statistically significant.

An overestimate of the standard error of a difference  $d = x - y$  of two statistics  $x$  and  $y$  is given by the formula  $s_d = [x^2 V_x^2 + y^2 V_y^2]^{1/2}$ , where  $V_x$  and  $V_y$  are the relative sampling errors, respectively, of  $x$  and  $y$ , and  $xV_x$  and  $yV_y$  are the sampling errors as shown in table I.

#### Small Categories

In some tables magnitudes are shown for cells for which 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 in 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.

Table I. Standard error, expressed as percentage of prevalence rates for adults with hearing and ear conditions, by age: United States, 1960-62

Age	Prevalence in percent			
	1 or 99	5 or 95	25 or 75	50
	Standard error in percent			
All ages, 18-79 years-----	0.0	0.5	1.5	2.0
18-24 years-----	0.6	1.0	4.0	4.0
25-34 years-----	0.5	1.0	3.5	3.5
35-44 years-----	0.4	1.0	2.5	3.0
45-54 years-----	0.3	1.0	2.5	3.0
55-64 years-----	0.5	1.0	2.5	3.0
65-74 years-----	0.6	1.5	2.5	3.5
75-79 years-----	0.9	3.0	5.5	6.0

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