

## **Aging in the Eighties, Impaired Senses for Sound and Light in Persons Age 65 Years and Over**

### **Preliminary Data From the Supplement on Aging to the National Health Interview Survey: United States, January–June 1984**

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#### **Introduction**

The National Health Interview Survey is the National Center for Health Statistics' large continuing survey of the civilian noninstitutionalized population of the United States. Each year people in about 42,000 households are interviewed by U.S. Bureau of the Census interviewers to obtain information about their health and use of health care. Demographic information that is needed to interpret the data is also obtained. The interviewers have special training on this survey in addition to their regular training, and response rates are high—about 97 percent. The only item with a relatively low response rate is family income.

In 1984 a special supplement was added to the questionnaire to obtain information about elderly people who were living in the community.<sup>1</sup> This supplement, the Supplement on Aging (SOA), was designed to collect information about physical limitations, chronic conditions, housing, retirement status, interactions with family and organizations, use of community services, and other health-related information about middle-aged and older people.

All household members age 65 years and over and a half sample of those 55–64 years of age were asked the questions on the supplement themselves where possible. Another household member was interviewed only when the selected person was unable to answer either because of physical or mental problems or because of being away from the household for a longer period than the interviewer would be in the area. Response rates to the SOA were also high. Of the 5,982 people age 65 years and over who were interviewed house-

holds in January–June 1984, 96 percent had complete interviews; 92 percent answered the questions on the SOA for themselves.

The data in this report are from the interviews that were completed during the first 6 months of 1984. The data are preliminary because only one-half of the year is included and because the data from the SOA have not been edited. Including the full year will double the size of the sample and make estimates more reliable. It will also eliminate any possibility of bias because of seasonality. Editing will change some of the estimates from the SOA that are in the text because information from other parts of the questionnaire or from other family members will be used to correct missing or inconsistent information.

The preliminary data about people age 65 years and over are being published because the need for information about the elderly is critical, and 5,982 people is a large enough sample to make estimates that are reliable for many purposes. The reader should use the material in the technical appendix before deciding that differences not mentioned in the text are likely to be statistically significant. The number of people in the sample is given in each table in addition to the national population estimates.

The primary purpose of this report is to provide estimates of the prevalence of self-reported impairments of hearing and vision in the elderly. In addition, the design of the survey also allows simultaneous consideration of associated limitations in activities of daily living and related medical conditions. Such information may have applications in fostering further scientific inquiry or assisting in future policy decisions.

**Background**

Impairments in hearing and vision are known to be common in the elderly. These deficiencies result from various medical conditions of the ears;<sup>2</sup> from environmental exposures to the eyes, such as sunlight;<sup>3</sup> as well as from the possible effects of the aging process, such as changes of already formed proteins in the lens.<sup>4</sup> National estimates of the prevalence of such impairments are available from the National Health Interview Survey (NHIS) through responses to questions related to medically diagnosed and self-perceived decreases in hearing and vision.<sup>5,6</sup> In 1982, 30.0 percent of those 65 years and over reported hearing impairments and 10.1 percent had visual impairments.<sup>5</sup>

Because questions concerning medical conditions, activities of daily living, and sensory impairments were asked of the same individuals in the SOA, this design, in contrast to NHIS, provided the opportunity to describe the frequency of multiple problems in the elderly. Combinations of such problems have the likely effect of compounding the consequences for the elderly. They can result in a marked diminution in the quality of life for older citizens. Also, there is the likelihood of dependency and possible need for long-term care. The frequency of such multiple problems is much more common in nursing

facilities.<sup>7</sup> However, the results to be presented in this report deal only with the noninstitutionalized population.

Because of the relatively high frequency of hearing and vision troubles among the elderly, it is possible, even in this half-sample of 5,982 persons, to describe impairments by sex and the three age subgroups of 65–74 years, 75–84 years, and 85 years and over. Some caution is urged in interpretations of data from the oldest-old (85 years and over) group. However, because of the general paucity of information concerning this subgroup, presentation of some data was thought justified.

**Hearing impairments**

Hearing problems are quite frequent in the elderly (table 1). Hearing impairment is defined as the reported presence of Deafness in one or both ears or Any other trouble hearing. Depending on age, from 30.0 percent to 58.3 percent of men reported hearing impairment compared to 17.5 percent to 44.3 percent of women. A similar sex differential has been observed previously both as determined by interview in NHIS reports<sup>5,6</sup> and by direct examination techniques, using audiometry testing, in the National Health Examination Survey<sup>8</sup> and in the Framingham Study.<sup>2</sup> Data from the Framingham Study suggest it is

**Table 1. Percent distribution of people age 65 years and over living in the community by selected hearing characteristics, according to age and sex: United States, January–June 1984**

Hearing characteristic	Total	65–74 years			75–84 years			85 years and over		
		Both sexes	Men	Women	Both sexes	Men	Women	Both sexes	Men	Women
		Number								
Sample .....	5,982	3,731	1,625	2,106	1,803	690	1,113	448	132	316
		Number in thousands								
Estimated population .....	26,290	16,227	7,048	9,178	8,073	3,111	4,962	1,990	574	1,417
		Percent distribution								
Total <sup>1</sup> .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Hearing impairment										
No .....	72.2	77.0	70.0	82.5	67.3	60.1	71.8	51.6	41.7	55.7
Yes .....	27.8	23.0	30.0	17.5	32.7	39.9	28.2	48.4	58.3	44.3
Deafness										
No deafness .....	87.1	89.8	86.7	92.1	85.4	81.0	88.0	71.7	61.5	76.2
Deafness in 1 ear .....	7.5	6.7	8.5	5.4	7.6	9.8	6.4	12.9	18.5	10.3
Deafness in both ears .....	5.2	3.3	4.5	2.5	6.7	8.7	5.4	14.5	19.2	12.4
Any other trouble hearing										
No .....	81.5	84.6	79.4	88.4	77.9	72.1	81.2	68.9	69.2	68.8
Yes .....	18.3	15.3	20.5	11.5	21.8	27.1	18.7	30.0	30.8	29.7
Use hearing aid										
No .....	92.0	94.4	93.0	95.5	88.9	85.2	91.1	84.0	76.6	87.2
Yes .....	8.0	5.6	7.0	4.5	11.0	14.8	8.8	15.8	23.4	12.4
Describe hearing (with hearing aid)										
No trouble .....	61.1	66.9	59.2	72.8	55.0	47.7	59.4	37.5	33.9	39.1
Little trouble .....	33.3	29.8	36.6	24.6	38.0	41.9	35.7	43.2	43.9	43.0
Lot of trouble .....	5.5	3.2	4.1	2.5	6.8	10.1	4.8	19.1	22.3	17.7

<sup>1</sup>Figures may not add to total because of unknowns and rounding.

unlikely that a difference in environmental noise exposure between the sexes is the reason for the male preponderance in hearing loss.<sup>2</sup> Because past estimates of hearing impairments have been made in NHIS using the same questions and similar interviewing techniques, it may be possible with the full data set to examine time trends.

The proportion of men and women age 65 years and over and living in the community who indicated deafness in one or both ears was 12.7 percent, or over 3 million of the total 26 million elders (table 1). Eight percent of the elderly, or about 2 million men and women, reported using hearing aids.

When all persons in the survey (including those using hearing aids) were asked to give the best description of their hearing, from 27.1 to 66.2 percent, depending on age and sex, indicated little or a lot of trouble with hearing. The total 61.1 percent with "no trouble" hearing is slightly lower than the

72.2 percent with no "hearing impairment." This inconsistency is possibly because some people who reported having a "little trouble" hearing did not think it serious enough to respond positively in the context of questions on deafness or other trouble hearing.

### Visual impairments

The category Visual impairment, which combines reported Blindness in one or both eyes and Any other trouble seeing, was found in from 9.5 percent of noninstitutionalized persons ages 65-74 years to 26.8 percent in those 85 years and over (table 2). Thus, there is an apparent trend of increasing prevalence of failing vision with older age. In this noninstitutionalized population, blindness in one or both eyes is relatively uncom-

Table 2. Percent distribution of people age 65 years and over living in the community by selected visual characteristics, according to age and sex: United States, January-June 1984

Visual characteristic	Total	65-74 years			75-84 years			85 years and over		
		Both sexes	Men	Women	Both sexes	Men	Women	Both sexes	Men	Women
		Number								
Sample .....	5,982	3,731	1,625	2,106	1,803	690	1,113	448	132	316
		Number in thousands								
Estimated population .....	26,290	16,227	7,048	9,178	8,073	3,111	4,962	1,990	574	1,417
		Percent distribution								
Total <sup>1</sup> .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Visual impairment										
No .....	87.2	90.5	90.3	90.6	84.0	83.3	84.4	73.2	75.0	72.5
Yes .....	12.8	9.5	9.7	9.4	16.0	16.7	15.6	26.8	25.0	27.5
Blindness										
No blindness .....	95.6	97.3	96.6	97.8	94.2	92.9	95.0	88.1	87.7	88.3
Blindness in 1 eye .....	3.2	2.2	2.9	1.6	4.4	5.9	3.6	<sup>2</sup> 6.9	<sup>2</sup> 5.4	<sup>2</sup> 7.6
Blindness in both eyes .....	1.0	<sup>2</sup> 0.5	<sup>2</sup> 0.4	<sup>2</sup> 0.6	<sup>2</sup> 1.3	<sup>2</sup> 1.1	<sup>2</sup> 1.4	<sup>2</sup> 4.8	<sup>2</sup> 6.9	<sup>2</sup> 3.8
Any other trouble seeing										
No .....	89.7	92.1	92.4	91.9	87.4	87.1	87.7	77.6	82.0	75.7
Yes .....	10.2	7.9	7.6	8.1	12.3	12.3	12.3	21.4	<sup>2</sup> 17.2	23.2
Cataracts										
No .....	79.5	86.1	89.5	83.5	71.2	75.4	68.6	59.0	66.9	55.5
Yes .....	19.1	12.9	9.6	15.4	27.0	22.3	29.9	37.9	31.5	40.8
Operation for cataracts										
No .....	89.5	92.9	93.2	92.8	84.6	84.9	84.4	80.3	81.0	80.0
Yes .....	10.5	7.0	6.8	7.3	15.2	14.9	15.4	19.7	<sup>2</sup> 19.1	20.0
Use eyeglasses										
No .....	5.2	5.1	6.4	4.1	4.4	5.3	3.8	9.3	<sup>2</sup> 12.5	<sup>2</sup> 7.9
Yes .....	94.8	94.9	93.6	95.9	95.6	94.7	96.2	90.7	87.5	92.1
Describe vision (with glasses)										
No trouble .....	68.9	75.3	76.7	74.2	60.7	62.0	60.0	47.4	55.0	44.1
Little trouble .....	25.6	21.9	20.8	22.7	32.1	31.9	32.3	30.9	25.8	33.1
Lot of trouble .....	5.4	2.8	2.6	3.0	7.0	6.0	8.0	21.2	<sup>2</sup> 18.3	22.4

<sup>1</sup>Figures may not add to total because of unknowns and rounding.

<sup>2</sup>Less than 30 persons with visual characteristic in age-sex subgroup.

mon; however, in the group age 85 years and over, about 12 percent had blindness in one or both eyes.

The frequency of visual impairments is similar in men and women. However, in the age subgroups 65–74 years and 75–84 years, there is a statistically significant excess of reported cataracts in women when compared with men. Such an increased frequency in women has been identified in previous surveys both by report in NHIS<sup>5,6</sup> and by direct examination of a population-based sample in Framingham.<sup>9</sup> It should also be noted in table 2 that the sex difference in frequency of operative procedures for cataracts is not statistically significant. Although this observation of more reported cataracts in women but equivalent surgery might suggest less severe lens opacification in women, eye examinations performed on men and women in Framingham demonstrated a similar excess in women of both minor and major changes of the lenses.<sup>9</sup>

Finally, the percent of individuals using glasses is shown. In the elderly population 94.8 percent reported that they used glasses, most of which were prescribed. Deterioration of close vision is quite common with aging, even at younger ages than are described here.<sup>4</sup> However, in the total group (including

those wearing glasses) about 50 percent of the oldest old described some trouble seeing. Presumably, this percent is higher than the figure for visual impairment because of inclusion of additional individuals with cataracts in those who described some trouble seeing.

### Impairments and associated limitations

Visual and hearing impairments, besides limiting communication and sensory stimulation, also may contribute to compromising the physical mobility and independent activity of the elderly. A series of questions dealing with the activities of daily living (such as walking, going outside, and so forth) has been developed to describe limitations in common movements. An association between an impairment and a limitation may be the result of the sensory loss adding to the difficulty in performing the task. For example, balance necessary for walking may be affected by loss of visual cues or by problems in the semi-circular canals of the ears.

In tables 3 and 4, data on impairments and limitations are shown for the two extreme age groups. Data from the age sub-

**Table 3. Percent distribution of people age 65–74 and 85 years and over living in the community by selected limitations and conditions, according to age and visual impairment: United States, January–June 1984**

<i>Limitation or condition</i>	<i>65–74 years</i>			<i>85 years and over</i>		
	<i>Total</i>	<i>No visual impairment</i>	<i>Visual impairment</i>	<i>Total</i>	<i>No visual impairment</i>	<i>Visual impairment</i>
			Number			
Sample <sup>1</sup> .....	3,524	3,170	354	419	300	119
			Number in thousands			
Estimated population <sup>1</sup> .....	15,322	13,784	1,538	1,859	1,341	519
			Percent distribution			
Total <sup>2</sup> .....	100.0	100.0	100.0	100.0	100.0	100.0
Difficulty walking						
No. ....	85.6	87.7	66.7	56.6	60.7	46.2
Yes. ....	14.4	12.3	33.1	43.0	39.0	52.9
Difficulty getting outside						
No. ....	94.2	95.6	81.6	65.5	70.8	52.1
Yes. ....	5.8	4.4	18.4	33.8	28.9	46.2
Difficulty getting in and out of bed or chair						
No. ....	93.0	94.2	82.2	79.2	80.7	75.6
Yes. ....	7.0	5.8	17.8	20.8	19.3	24.4
Arthritis or rheumatism						
No. ....	48.2	49.9	32.7	44.9	46.0	42.0
Yes. ....	51.0	49.2	66.8	54.4	53.3	57.1
Cardiovascular disease						
No. ....	87.1	88.7	72.1	69.6	75.0	55.0
Yes. ....	12.9	11.3	27.9	30.4	25.0	45.0
Hypertension						
No. ....	55.8	57.1	44.6	55.1	58.9	45.4
Yes. ....	43.8	42.6	55.1	43.9	39.7	54.6

<sup>1</sup>Total sample number and estimated population reduced from table 2 because of missing data or "Don't know" responses.

<sup>2</sup>Figures may not add to total because of unknowns and rounding.

**Table 4. Percent distribution of people age 65–74 and 85 years and over living in the community by selected limitations and conditions, according to hearing impairment: United States, January–June 1984**

Limitation or condition	65–74 years			85 years and over		
	Total	No hearing impairment	Hearing impairment	Total	No hearing impairment	Hearing impairment
			Number			
Sample <sup>1</sup> .....	3,524	2,673	851	419	203	216
			Number in thousands			
Estimated population <sup>1</sup> .....	15,322	11,620	3,703	1,859	906	954
			Percent distribution			
Total <sup>2</sup> .....	100.0	100.0	100.0	100.0	100.0	100.0
Difficulty walking						
No. ....	85.6	87.1	80.7	56.6	64.0	49.5
Yes .....	14.4	12.8	19.3	43.0	35.5	50.0
Difficulty getting outside						
No. ....	94.2	94.7	92.5	65.5	72.4	58.9
Yes .....	5.8	5.3	7.5	33.8	26.6	40.7
Difficulty getting in and out of bed or chair						
No. ....	93.0	93.9	90.1	79.2	85.7	73.2
Yes .....	7.0	6.1	9.9	20.8	14.3	26.9
Arthritis or rheumatism						
No. ....	48.2	50.7	40.1	44.9	52.5	37.8
Yes .....	51.0	48.5	58.6	54.4	47.6	60.8
Cardiovascular disease						
No. ....	87.1	89.1	80.6	69.6	77.9	60.8
Yes .....	12.9	10.9	19.4	30.4	22.1	39.2
Hypertension						
No. ....	55.8	56.3	54.4	55.1	59.3	51.2
Yes .....	43.8	43.4	45.0	43.9	39.7	47.9

<sup>1</sup>Total sample number and estimated population reduced from table 1 because of missing data or "Don't know" responses.

<sup>2</sup>Figures may not add to total because of unknowns and rounding.

group 75–84 years (not shown) are similar to age groups in the tables. The sample numbers are reduced from tables 1 and 2 because of missing data or "Don't know" responses. The presence of visual impairments in persons is associated with a higher frequency of limitations. In both the 65–74 year and the 85 year and over subgroups, those with a visual impairment (table 3) are more likely to be limited in walking and getting outside. In addition, transferring from bed and chair, an indicator of more severe limitation of activity, shows a similar relationship. As would be expected, a larger percent in each of the activity categories is limited at older ages. For example, overall, only 5.8 percent of the young old (ages 65–74 years) had problems getting outside but 33.8 percent of the oldest old (ages 85 years and over) were so limited. If, in addition, the subgroup 85 years and over had a visual impairment, the prevalence of difficulty getting outside increased from 33.8 to 46.2 percent. Similar relationships for hearing impairments and limitations exist in the oldest old (table 4). Further analyses on the full data set and additional studies in other populations are necessary before any final conclusions can be reached concerning the meaning of these relationships.

### Impairments and associated medical conditions

Analogous to the association of impairments with increased frequency of limitations in the activities of daily living, medical conditions may be present more frequently in those with sensory deficits. Such associations may be the result of the medical condition causing the impairment, for example, diabetes and cataracts. Another possibility is that a separate etiological factor affects both the condition and the impairment, and results in an observed association between them. An example of the latter case is that the common factor "noise" might affect both the hearing impairment and hypertension. Also, those receiving regular medical care for a condition may be more likely to have other conditions or impairments diagnosed and, thus, produce an association. For example, those reporting any urinary difficulty have a greater frequency of at least three medical conditions being present, when compared with those without urinary difficulties.<sup>10</sup>

Respondents were asked on the SOA if they ever had "hypertension, sometimes called high blood pressure," various

types of cardiovascular disease, and other chronic conditions. For arthritis the question was "During the past 12 months did you have . . . ?" After considering various hypotheses, certain of these common medical conditions were selected for analysis. As shown in tables 3 and 4 there is an increased frequency of various medical conditions in those with the presence of either visual or hearing impairments. For example, recent history of arthritis was reported more frequently with both impairments. The presence of cardiovascular disease (a category including self-reported arteriosclerosis, coronary heart disease, angina pectoris, myocardial infarction, any other heart attack or stroke) is more frequent in those with hearing or visual problems. Although in the 65–74 year subgroup the frequency of hypertension is no higher in those with a hearing impairment than in those with no hearing impairment, there is an excess in the 85 year and over subgroup. The possible relationship with hypertension is more pronounced in those with visual impairments. Because of potential validity problems with self-reported medical information; the nonspecificity of the broad impairment groups created for the analysis; the small numbers, especially in the oldest-old subgroup; the multiple comparisons and the selective nature of the illustrated comparisons, any associations should

be considered only as preliminary observations and not necessarily the result of cause and effect.

### Comment

The health issues involved with visual and hearing impairments in the elderly must be put into perspective. Although such impairments are frequent concomitants of age and chronic disease, they are not inevitable and not necessarily disabling. In fact, until the age of 85 years, the majority of noninstitutionalized persons are free of major sensory problems.

On the other hand, such impairments do result in a sensory-limited world for a number of older Americans. Even with modest losses communication becomes more difficult. Fortunately, for many of the elderly, assistance devices to amplify sound or magnify words and palliative or corrective surgery on eyes or ears can be salutary. However, such therapy has an impact on out-of-pocket expenses.

If more could be learned about etiology of impairments of the senses for sound and light, some sensory loss might be prevented or slowed. The SOA provides useful information for both scientific purposes and policy considerations.

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## Technical notes

Each week a probability sample of households in the United States is visited by U.S. Bureau of the Census interviewers to obtain a wide range of information about the health and health care characteristics of the people living in these households. A description of the survey design, methods used to make the national estimates, and general qualifications of the data are provided in *The National Health Interview Survey design, 1973-84, and procedures, 1975-83*.<sup>11</sup>

In January-June 1984 there were about 21,000 households in the sample. The total noninterview rate was about 3 percent—mostly because the interviewer was unable to locate an eligible respondent despite repeated calls.

The rules for the survey are that all adults who are in the household when the interviewer calls are asked to join in the interview and to respond for themselves. People age 65 years and over are likely to be at home and are, thus, more likely to respond for themselves to the questions on the basic, or core, questionnaire. During the first 6 months of 1984, 84 percent answered the questions themselves.

For the Supplement on Aging (SOA), the interviewers made an additional effort to encourage the people selected to answer the SOA questions and to respond for themselves. They encouraged the household respondent to ask an older person to talk to the interviewer and, if necessary, made extra calls. The results of their efforts were both positive and negative. The positive result was that an even higher proportion, 92 percent, of the responses to the SOA were completely self responses. The negative result was that in a few cases information was obtained from a household respondent for the core questions but no information was obtained for the supplement. Fortunately the latter was rare; 5,629 of the 5,982, 95 percent, people age 65 years and over who were in the sample during January-June had complete interviews on the supplement.

The estimates in this report are based on a sample rather than on the entire population of people age 65 years and over in the civilian noninstitutionalized population. Therefore, the estimates are subject to sampling error. In addition, the sample had a complex design that has the effect of making the sampling errors somewhat larger than they would be from a simple random sample of the same size using the same procedures.

A conservative estimate is that, on the average, the variance for estimated proportions from this sample is 20 percent larger than it would have been from a simple random sample of the same size using the same procedures.

To estimate the sampling errors, convert the percent to a proportion, calculate the variance of a proportion assuming simple random sampling, multiply that variance by 1.2 to allow for the complex sample, then compute standard errors, confidence intervals, or significance tests.

For example, the estimate is that 61 percent of the 954,000 persons age 85 years and over reporting a hearing impairment (table 4) had arthritis or rheumatism. There were 216 people

reporting a hearing impairment in the sample age 85 years and over; therefore,

$$\begin{aligned}\text{Variance (simple random sample)} &= \frac{pg}{n} \\ &= \frac{(0.61)(0.39)}{216} \\ &= 0.0011\end{aligned}$$

$$\begin{aligned}\text{Variance (complex sample)} &= (0.0011)(1.2) \\ &= 0.0013\end{aligned}$$

$$\begin{aligned}\text{Standard error} &= (0.0013)^{1/2} \\ &= 0.0364\end{aligned}$$

$$\begin{aligned}95 \text{ percent confidence interval} &= 61 \pm (1.96)(3.64) \\ &= 61 \pm 7 \text{ percent}\end{aligned}$$

Because the estimation procedure includes poststratification to independent U.S. Bureau of the Census estimates, there is no sampling error for the number of people age 65 years and over—either for the total or for either sex.<sup>11</sup> The only sampling error is in the numerator. Therefore, the sampling errors for those groups are somewhat smaller than estimated by this method.

Perhaps more important for interpretation than sampling errors, however, is a thorough understanding of what data from this, or any other, cross-sectional survey can provide. There are two issues—one important for any cross-sectional analysis and the other of especial importance for older people.

The NHIS is a point-in-time study. Associations at one point in time should not be interpreted as causality. The differences among the age groups, for example, could be the result of aging or, alternatively, they could be the result of different cohorts moving through time. Based on external knowledge, one could interpret a difference in health status as the result of aging and a difference in educational status as the result of cohort differences, but the data from a cross-sectional survey do not enable one to make that distinction.

The second is that this is a study of people who were living in the community at the time they, or a proxy respondent, were interviewed. All of those elderly people who had left the population, either through death or institutionalization, are excluded. Thus, the estimate that 1 percent of elderly people had blindness in both eyes should not be interpreted to mean that only 1 percent of the elderly people were so afflicted. Data from the 1977 Nursing Home Survey indicated that 5.5 percent of residents were blind.<sup>7</sup>

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