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THE PREVALENCE OF HEARING LOSS WITHIN
SELECTED U. S. ARMY BRANCHES

(Final Report)

by

Brian E. Walden, CPT, MSC
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Army Audiology and Speech Center
/ Walter Reed Army Medical Center
Washington, DC 20012

31 August 1975

Supported by

U. S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
Washington, DC 20314

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SELECTED U. S. ARMY BRANCHES

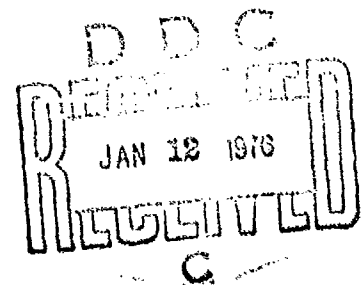
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The results suggest that the prevalence of hearing loss is approximately the same in the infantry, armor and artillery branches. In contrast, there are substantial differences in the prevalence of hearing loss according to length of time in service. Further, the problem of premature hearing loss among U. S. Army troops affects only the mid- to high-frequency range in the majority of soldiers, with speech-reception thresholds and speech discrimination in quiet frequently remaining within normal limits even in advanced cases of noise-induced hearing loss. A comparison of reported profiles and profiles based upon the audiometric data suggests that many soldiers do not appear to carry the appropriate profile for hearing.

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ABSTRACT

THE PREVALENCE OF HEARING LOSS WITHIN
SELECTED U. S. ARMY BRANCHES

The purpose of this investigation was to derive estimates of the prevalence of hearing loss within U. S. Army branches suspected to be high-risk with regard to hearing loss. Of particular interest was the change in the prevalence of hearing loss as service time increases. Questionnaire data also were obtained from high-risk personnel concerning their opinions of their hearing ability, hearing protective devices, and exposure to hazardous noises.

Audiometric and questionnaire data were obtained from 3000 enlisted men representing three combat branches (i.e., infantry, armor, artillery) and five time-in-service categories. Subjects were selected at random, in proportion to population sizes, from ten Army posts. All of the data gathering was accomplished by the Audiology Officer(s) assigned to each post, using locally available equipment. The results of the testing were forwarded to Walter Reed Army Medical Center for analysis.

The results suggest that the prevalence of hearing loss is approximately the same in the infantry, armor, and artillery branches. In contrast, there are substantial differences in the prevalence of hearing loss for the five time-in-service categories. Further, the problem of premature hearing loss among U. S. Army troops affects only the mid- to high-frequency range in the majority of soldiers, with speech-reception thresholds and speech-discrimination in quiet frequently remaining within normal limits even in advanced cases of noise-induced hearing loss. A comparison of reported profiles and profiles based upon the audiometric data suggests that many soldiers do not appear to carry the appropriate profile for hearing.

FORWARD

In 1971, a survey report (1) of the extent of hearing loss in the United States Army was published by the U. S. Army Medical Research and Development Command. The purpose of that report was to provide some objective data concerning the magnitude of this problem in order to stimulate the development and implementation of an effective hearing conservation program with the Army. In this regard, the 1971 study was a success. At present, Audiology Officers are assigned to most of the major Army posts within CONUS, as well as at some overseas installations. The widespread distribution and use of hearing protective devices within the Army has become a reality. Several Technical Bulletins and Post Regulations have been developed in recent years as guidelines for local hearing conservation programs. The interest in hearing loss and hearing conservation generated by the 1971 report undoubtedly played a role in stimulating these recent positive developments.

Although there were many positive effects of the 1971 study, there was one negative effect as well. Since the data of that study were based upon a haphazard sample, they represent the magnitude of the problem of hearing loss in the Army only to a first approximation. Unfortunately, despite warnings of the limitations of the data in the 1971 report, many individuals have used the sample data as prevalence estimates. It is hoped that the data of the present investigation, which represent actual prevalence estimates, will replace the data of the 1971 study as the best available estimates of the magnitude of the problem of hearing loss among high-risk U. S. Army personnel.

In conducting an audiometric survey of this magnitude, the cooperation and technical assistance of a large number of people is required. The greatest contribution made to this study was by the following Audiology Officers who were responsible for gathering the data:

Ft. Benning	CPT Timothy A. Swisher 1LT John W. Bodi	Ft. Hood	CPT Donald R. Bender 1LT Curtis Paskett
Ft. Bliss	CPT Larry E. Dalzell 2LT James A. Beauchamp	Ft. Jackson	CPT William R. Nelson
Ft. Bragg	CPT Larry Baker CPT Teryl Delegrange	Ft. Knox	CPT Richard H. Dennis CPT Dennis T. Sekine
Ft. Campbell	CPT John Pater CPT Michael Moul	Ft. Lewis	CPT Jerod Goldstein 1LT Thomas M. Helfer
Ft. Carson	1LT Kent J. Neilson CPT Alan L. Croshaw	Ft. Riley	CPT Henry King
Ft. Dix	CPT Ernest Hepler CPT David G. Cyr	Ft. Sill	CPT Stuart Dorow
		Ft. Leonard Wood	CPT John Laschkewitsch

Among other individuals deserving of recognition is COL Robert Bailey, Commander, U. S. Army Aeromedical Research Laboratory, who was Project Monitor for this study. He and members of his staff provided valuable suggestions during the writing of the manuscript, as did Dr. Douglas Tang,

Chief, Biostatistics and Applied Mathematics, Walter Reed Army Institute of Research. Recognition also should go to Mrs. Eve S. Kaplan, Biometrics and Information Processing, Walter Reed Army Institute of Research, for her valuable assistance during the computer analysis phase of the project. The authors express their appreciation to Dr. Harry W. McCurdy, former Consultant to the Surgeon's General in Audiology, for his administrative assistance during the formative stages of this investigation. Finally, the months spent in data reduction by SSG Dean E. Christ deserve special acknowledgment.

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THE PREVALENCE OF HEARING LOSS WITHIN SELECTED U. S. ARMY BRANCHES

BACKGROUND

It has long been evident that noise-induced hearing loss is a serious health hazard to U. S. Army personnel. However, until relatively recently, little objective data were available to substantiate this belief. A pilot investigation of the extent of hearing loss among Army personnel suggested that hearing loss may be the most common occupationally related disability among U. S. Army troops (1). As many as 40-50% of all personnel who have been in a combat arms branch for more than ten years may develop hearing losses sufficient to interfere with their job performance.

The purpose of the pilot investigation just referred to was to gather hearing threshold data on a sample of Army personnel who represented a wide range of military occupational specialties and time in service in order to get some estimate of the magnitude of the problem of hearing loss within the Army. The principal goal of that investigation was to focus attention on this problem and stimulate support for the Army Hearing Conservation Program. Data, however, were obtained at only six Army Posts and probability (random) sampling was not utilized. Further, speech audiometry was not included in the testing. For these reasons, the results of the pilot investigation are not definitive. They are indicative of the overall magnitude of the problem, but should not be used as estimates of the prevalence of noise-induced hearing loss within the Army.

The primary purpose of the present investigation was to provide more accurate estimates of the prevalence of hearing loss within selected Army branches than were provided by the pilot investigation by increasing the number of Army posts at which data were gathered and by employing random sampling in the selection of individuals for study. The branches selected for inclusion in this investigation were those that the pilot study indicated had an unusually high occurrence of hearing loss among their personnel (i.e., infantry, armor, artillery). Of particular interest in this project was the change in the prevalence of hearing loss as length of time in service within each branch increases. Questionnaire data also were obtained from the sample of Army personnel concerning their opinions of 1) their hearing ability, 2) hearing protective devices, and 3) their exposure to potentially hazardous noise.

METHOD

Subjects and Sampling Plan

The sample consisted of 3000 enlisted men who were selected according to branch, time-in-service, and Army post. One-thousand men each were tested in the infantry, armor, and artillery branches. Within each of these branches, 200 men were selected in each of the following five time-in-service categories: 1.5-2.4 yrs., 2.5-7.4 yrs., 7.5-12.4 yrs., 12.5-17.4 yrs., 17.5-22.4 yrs. A constant sample size of 200 men was used to insure an adequate representation of each of the five time-in-service categories. Sampling in proportion to population size was not done because this would have resulted in very small sample sizes for the longer time-in-service categories. The sample of 200 men in each time-in-service category within each branch was obtained by random sampling from each of ten posts proportional to the post population sizes for each time-in-service category within each branch. A total of ten different posts were sampled in order to obtain a sample more representative of the entire Army than might be obtained at a single post or at a restricted number of posts. The ten posts sampled were those within CONUS where Army Audiologists were assigned and where there were a significant number of men in all three of the branches of interest. These were: Ft. Benning, Ft. Bliss, Ft. Bragg, Ft. Campbell, Ft. Carson, Ft. Hood, Ft. Knox, Ft. Lewis, Ft. Riley, and Ft. Sill. Hence the population under investigation was infantry, armor, and artillery personnel at the ten posts who had been on active duty between 1.5 years and 22.4 years.

Data concerning the post strengths for each combination of branch and time-in-service category were provided by the Office of Personnel Operations, The Pentagon. Based upon these data, the sample at each post was determined for each separate branch and time-in-service combination, and are given in Appendix A. The first number in each cell is the sample size and the second number is the population size. The percentage in each cell is both the percentage of the total population of men at the ten posts, and the percentage of the sample size of 200, in that combination of branch and time-in-service category at that post.

In addition to these 3000 subjects, 300 inductees were tested during their first week of basic training, prior to any military noise exposure. These consisted of 100 men each at Ft. Dix, Ft. Leonard Wood, and Ft. Jackson. These subjects were randomly selected from the rosters of incoming recruits at each post. These data were obtained in order to provide a reference from which the data of the infantry, armor, and artillery personnel could be evaluated.

Selection of Subjects and Criteria for Inclusion in Sample

Subjects were selected at random in advance of the actual testing from lists of the post populations in each separate branch and time-in-service combination provided by the Office of Personnel Operations. Every effort was made to test the men that were selected. Where this was impossible (e.g., change in duty station, extended maneuvers, etc.), alternate subjects were designated. These alternate subjects also were selected at random from the post population lists. The most common reason that a member of the original sample drawn at a given post was not tested was that he was no longer stationed at that post. At some posts where whole units of men were transferred, this resulted in a substantial number of alternate subjects being selected. However, the criterion of random subject selection was adhered to in all cases. For inclusion in the sample, a man must have spent a minimum of three-fourths of his time on active duty in the branch in which he was categorized. Any subject selected for study who, at the time of testing, proved to be nonorganic was eliminated from the study.

Data Collection Procedures

The audiological testing at a given post was accomplished by the Audiology Officer(s) assigned to that installation, using locally available equipment and test booths. Audiologists from each of the 13 posts met at Walter Reed Army Medical Center for a two-day orientation workshop prior to the initiation of testing. At that orientation, the selection of subjects, the test materials and procedures, and the profiling system were discussed in detail, in order to assure standardization in these areas. The threshold technique to be utilized was also demonstrated at that time. The actual testing of subjects was accomplished over a four-month period from June 1974 to September 1974. Data were mailed to the Army Audiology and Speech Center, Walter Reed Army Medical Center, for analysis.

Electroacoustic calibration was performed a minimum of once a week. All calibration was performed in accordance with ANSI S3.6-1969 (2). Biological calibration checks were performed daily by the audiologists. The ambient noise level in each test booth was measured to insure that it was within the acceptable limits established by ANSI S3.1-1960.

The collection of data from each subject involved: a. Measurement of Pure Tone Thresholds, b. Measurement of Speech Reception Thresholds, c. Measurement of Speech Discrimination, d. Profiling, and e. Completion of Questionnaire.

a. Pure Tone Thresholds:

All audiometric testing was preceded by a period of at least fourteen hours during which there was no known exposure to ambient noise levels in excess of 80 dBA. This requirement could be met by wearing hearing protectors which would effectively reduce the sound intensity

at the ear drum to a level below 80 dBA. This control was introduced to minimize any possible effects of temporary threshold shift on the audiometric data.

The revised Hughson-Westlake ascending method for establishing pure tone auditory thresholds was utilized in this study (3). A standard method was selected for use to avoid differences among the thresholds which could have resulted from use of many varied techniques. Thresholds were obtained at the following frequencies: 250, 500, 1000, 1500, 2000, 3000, 4000, 6000, and 8000 Hz. Contralateral narrow-band masking was used when appropriate.

b. Speech Reception Thresholds:

Auditec recordings (Forms A and B) of the C.I.D. Auditory Test W-1 were utilized to obtain speech reception thresholds. Each subject was familiarized with the list of spondaic words by having him repeat each word as it was read to him by the audiologist in a face-to-face situation. Then, the SRT was established in each ear by using recorded words presented in a descending manner. Descent was in 2 dB steps presenting four words at each step until the lowest level was reached at which two out of the four spondees were understood correctly. This level was taken as the speech reception threshold.

c. Speech Discrimination:

Copies of the master tapes of the NU auditory test No. 6 (4) were obtained from the Auditory Research Laboratories at Northwestern University and were used to measure speech discrimination ability. The Northwestern University Auditory Test No. 6 is composed of four lists of 50 consonant-nucleus-consonant (CNC) monosyllabic words. The four lists have been randomized four times, thus making 16 lists. Testing with both normal and sensorineural hearing loss subjects indicated that the inter-list reliability of the NU 6 lists is high (4).

All discrimination testing was accomplished with recorded material presented at 40 dB above the speech reception threshold. Full lists of 50 words each were used in all cases. Masking was utilized in the contralateral ear in all cases where it was appropriate.

d. Profiling:

Once all audiometric data had been obtained on a subject, a profile was determined in accordance with induction standards (AR 40-501), utilizing the values listed in Table 1. The decibel levels reported in Table 1 have been converted from the earlier standard (ASA 1951, Appendix VII, AR 40-501) to the current national standard (ANSI 1969). For purposes of this study, a clinically significant hearing loss is defined as any loss for which an H-1 profile is not appropriate.

Table 1. Profiling of subjects. Profiling was accomplished in accordance with induction standards (AR 40-501). The decibel levels (dB HTL) have been converted from the earlier standard (ASA 1951, Appendix VII, AR 40-501) to the current national standard (ANSI 1969).

Hearing Profile (ISO or ANSI)

- H-1 Audiometer average level each ear not more than 25 dB at 500, 1000, 2000 Hz, no level greater than 30 dB. Not over 45 dB at 4000 Hz.
- H-2 Both ears: Audiometer average level not more than 30 dB at 500, 1000, 2000 Hz with no individual frequency level greater than 35 dB, and 55 dB at 4000 Hz.

-OR-

Better ear must be better than:

500 Hz - 30 dB
1000 Hz - 25 dB
2000 Hz - 25 dB
4000 Hz - 35 dB

- H-3 Audiometer levels poorer than those listed for H-2 but having a speech reception threshold better than 30 dB HL.
- H-4 Audiometer levels poorer than those listed for H-2 but having a speech reception threshold poorer than 31 dB HL.
-

e. Questionnaire:

Each of the subjects was required to complete a questionnaire which was utilized to gain some insight into their opinion about their hearing ability, whether ear protection had been worn and what types of noise exposure they had experienced. After each subject had completed the questionnaire, he was interviewed by an audiologist to insure that each question was understood and answered as accurately as possible.

RESULTS AND DISCUSSION

The audiometric data and the questionnaire data for the 300 subjects will be presented separately in this section of the report. These data are given for each time-in-service within each branch in Appendices

B and C. Audiometric data for the 300 recruits also are presented in this section.

Audiometric data

Estimates of the prevalence of each profile for any combination of branch and time-in-service categories can be calculated from the data in Appendix B by computing averages weighted according to branch and time-in-service population sizes. Since sampling at the ten posts for a given time-in-service within a given branch was in proportion to the post population sizes, the results in Appendix B are self-weighting and may be taken as direct estimates of the prevalence of profile categories for each time-in-service within each branch.

From the audiometric data of the 3000 subjects, the percentages of H-1, H-2, H-3, and H-4 profiles were determined. For the purposes of comparison, means and standard deviations also were computed for each of the audiometric measures. These data were obtained for each branch and time-in-service category, as well as combinations of these two factors. Mean thresholds were computed rather than medians or modes because the mean is the most familiar of the measures of central tendency and is the most stable measure for small sample sizes such as were encountered at some posts. It should be noted, however, that pure-tone thresholds are not strictly normally distributed. This is due to the fact that the typical clinical audiometer does not measure thresholds better than -10 dB HL. The fact that pure-tone thresholds are not normally distributed is a factor only for mean threshold data for a group of listeners, but does not affect the profiling of individual subjects. Hence, the prevalence estimates presented below are unaffected by this factor.

Branch

The mean audiograms for the infantry, armor, and artillery branches are given in Figure 1. These three mean audiograms have been weighted to reflect the different population sizes for each time-in-service category within each branch. Data for the left and right ears are averaged in Figure 1 since clinically insignificant differences were observed between the two ears for the audiometric data. In general, the mean thresholds are ordered in the mid-frequency range such that infantry personnel demonstrate the best pure-tone sensitivity, and artillery demonstrate the poorest. These differences in mean audiograms, however, are relatively small and insignificant from a clinical viewpoint.

Figure 2 shows the prevalence of H-1, H-2, H-3, and H-4 profiles for each of the three branches. The slightly poorer hearing of artillery personnel suggested in Figure 1 is reflected in a slightly lower prevalence estimate of H-1 profiles in this branch. Again, however, differences among the branches for each of the profile categories were small.

These data suggest that, on the average, a soldier does not run a significantly higher risk of incurring hearing loss depending upon which

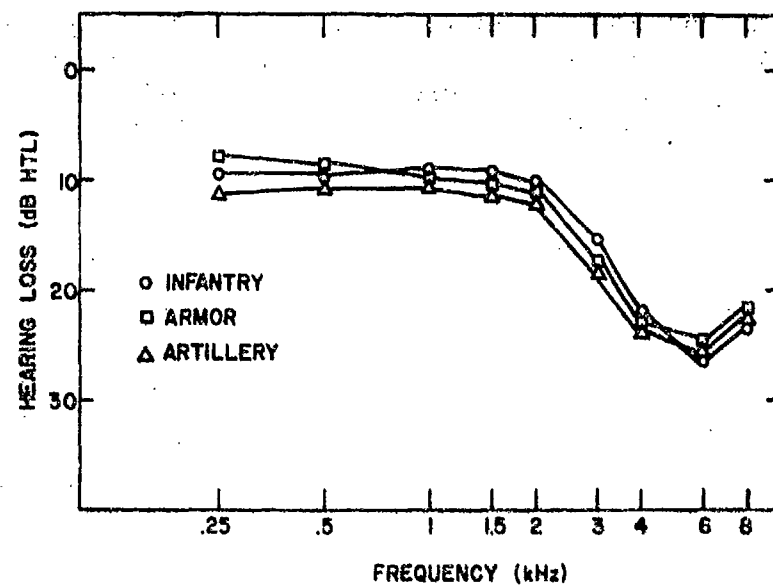


Fig. 1. Mean audiograms for the infantry, armor and artillery branches. Data are weighted to reflect differing population sizes.

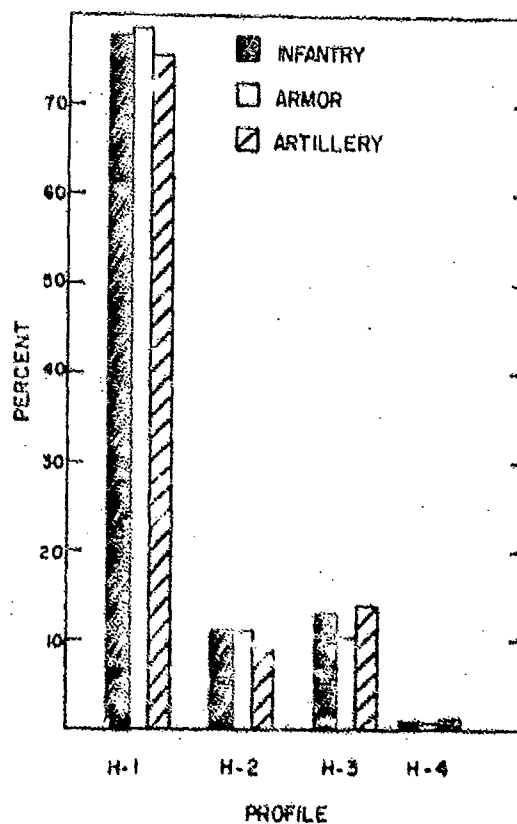


Fig. 2. Estimated prevalence of personnel with H-1, H-2, H-3, and H-4 profiles in each branch.

of these three combat branches he enters. What is startling, however, is that approximately 20-30% of all personnel assigned to these three branches with more than 1.5 years of service have clinically significant hearing losses, the majority of which require duty limitations.

Time-In-Service

The mean audiogram for each of the five time-in-service categories is shown in Figure 3. These data are weighted with respect to the population size of each branch within each time-in-service. Again, data are pooled across ears. A systematic relationship exists between the mean threshold sensitivity and the time-in-service category such that hearing loss increases as duration in service increases. It is interesting to note, however, that the increased reduction in sensitivity for each succeeding time-in-service category is not uniform. There is a disproportionate decrease in hearing ability between the 2.5-7.4 yrs. category and the 7.5-12.4 yrs. category.

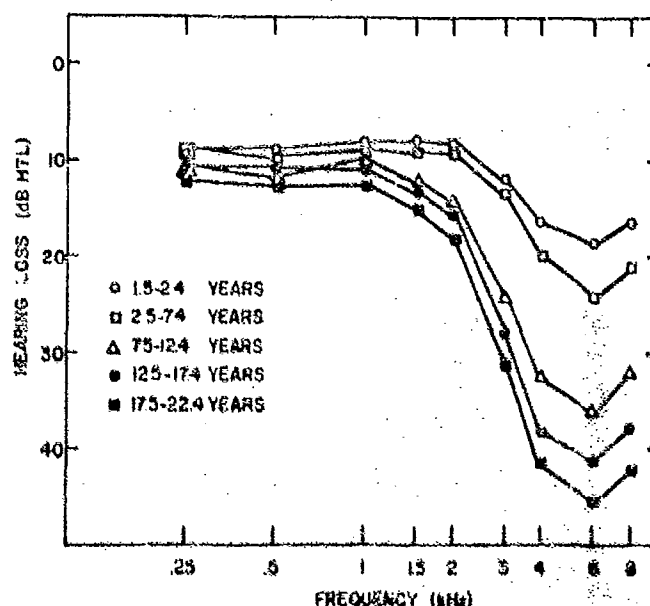


Fig. 3. Mean audiograms for the five time-in-service categories. Data are weighted to reflect differing population sizes.

The estimated prevalence of H-1, H-2, H-3, and H-4 profiles for each time-in-service category is shown in Figure 4. Again, it is clear that hearing ability decreases as time-in-service increases. These data combined with those in Figure 3 suggest that the prevalence of clinically significant hearing loss is relatively small (i.e., less than 20% for personnel in these combat branches with 5-10 years in service or less). However, for personnel with approximately ten years of service or more, the prevalence of hearing loss dramatically increases.

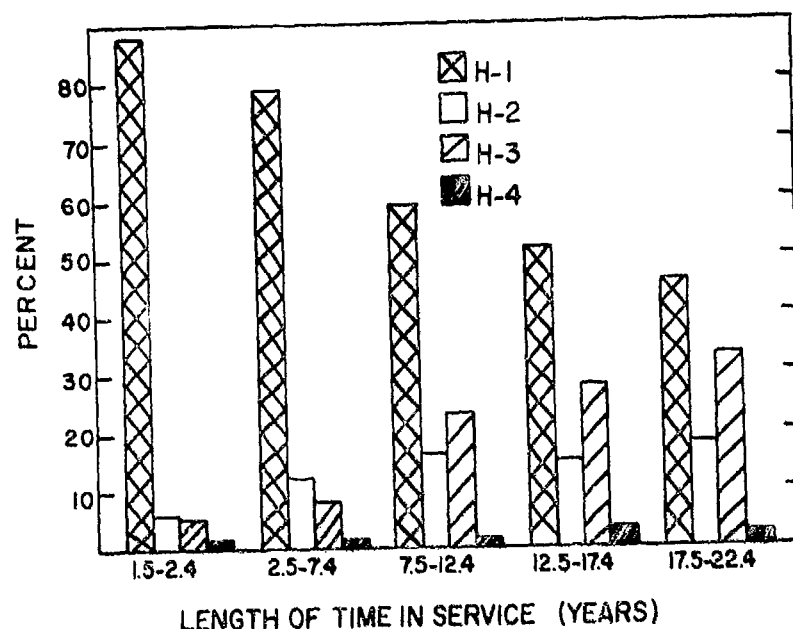


Fig. 4. Estimated prevalence of personnel with H-1, H-2, H-3 and H-4 profiles in each time-in-service category.

The effect of time-in-service on the prevalence of hearing loss is illustrated in Figure 5 for each of the three branches separately. These data present the percentage of the 200 men in each branch and time-in-service category with clinically significant hearing losses (i.e., profile H-1). The slightly greater problem of hearing loss in the artillery branch, seen in Figures 1 and 2, is also illustrated in this figure. Once again, it is clear that the prevalence of hearing loss increases substantially during the period from 5-10 years on active duty. After 15 years of service, the chances that a soldier will have a clinically significant hearing loss are essentially equal to his chances of having normal hearing.

Speech Audiometry

The data in Figures 1 and 3 suggest that hearing loss in the Army is almost exclusively a problem affecting the mid- to high-frequency range, with little hearing loss being observed below 2000 Hz. For this reason, it is not surprising that speech-reception thresholds and discrimination scores in quiet were relatively normal for the vast majority of the 3000 subjects. These data are given according to time-in-service in Table 2.

In addition to the mean speech-reception thresholds and speech-discrimination scores (both weighted with respect to branch population sizes), the estimated prevalence of profiles in each time-in-service category greater than H-1 (i.e., H-2, H-3 and H-4) is also given in Table 2. It can be seen that the mean speech-reception threshold increased

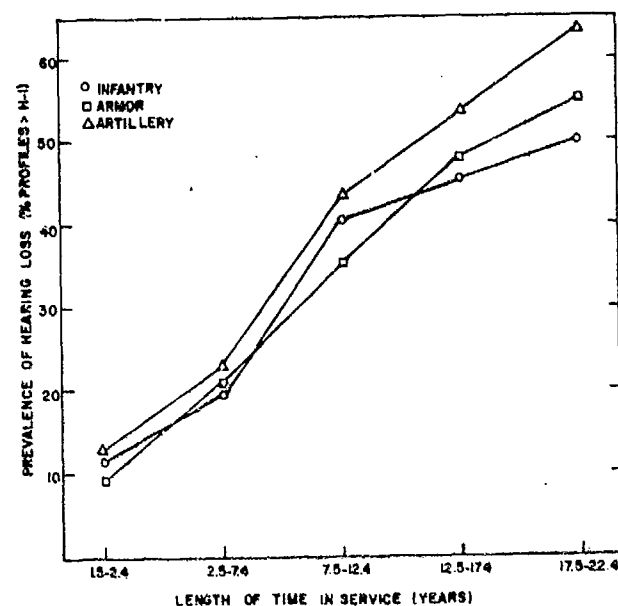


Fig. 5. Prevalence of hearing loss (i.e., profiles H-1) for each time-in-service category within each branch.

Table 2. Mean speech-reception thresholds, mean speech discrimination scores, and prevalence of profiles greater than H-1 for each time-in-service category. All data are weighted to reflect differing branch population sizes.

	Years in service				
	1.5-2.4	2.5-7.4	7.5-12.4	12.5-17.4	17.5-22.4
Speech-Recept.Thres.(dB)	7.7	8.0	10.3	10.6	11.8
Speech-Discrim.Score(%)	98.9	98.3	97.5	96.8	96.1
Profile>H-1 (%)	11.4	20.7	40.5	46.5	54.2

only about 4 dB during the almost 25 years of time-in-service studied in this investigation. Similarly, speech discrimination in quiet decreased by an average of less than 3% during the same period. In

contrast, the percentage of hearing losses which are clinically significant according to the Army's profile system increased by more than 40% during this period.

Several interpretations of the data in Table 2 are possible. Conceivably, it could be argued that these data indicate that the type of hearing loss suffered by most military personnel has little or no effect on speech communication ability. Such an argument, however, would be inconsistent with the view of virtually all military audiologists and otologists. Rather, these data should be interpreted to suggest the inadequacy of standard speech audiometry measures (i.e., speech reception threshold and speech discrimination in quiet) in reflecting the extent of the communication handicap resulting from high-frequency hearing loss. The speech-discrimination score obtained in quiet is particularly misleading. It is well documented, both experimentally and clinically, that the deleterious effects of high-frequency hearing loss on speech communication ability are experienced, not in an artificial listening environment such as a quiet test booth, but in typical daily listening situations where background noise creates a competing distortion (5, 6, 7, 8, 9, 10). Estimates of the amount of time in daily life that speech is distorted range from a conservative figure of 50% up to nearly 100% (7). In such listening situations, an individual with a high-frequency hearing loss can experience considerable difficulty in communicating. In addition to diagnostic and rehabilitative implications, this effect has importance from a combat-readiness point of view, since most combat situations involve a variety of moderately-to-severely intense noises. In such situations, individuals with speech audiometry scores within normal limits may experience incapacitating communication difficulties if they have moderate-to-severe high-frequency hearing losses like those of many of the soldiers tested in this survey.

The data in Table 2 also suggest that basing a classification of H-4 solely on speech audiometry results (i.e., the speech-reception threshold) may be inappropriate. A designation of H-1, H-2, or H-3 is based upon pure-tone results, whereas the H-4 profile is based upon the speech-reception thresholds. Changing AR 40-501 by redefining the H-4 profile simply to increase the number of such profiles to be awarded certainly is not warranted. However, a change to stress characteristics of hearing which can be expected to be affected by long-term military-type noise exposure would seem justified. The speech-reception threshold and speech-discrimination score in quiet may often stay within normal limits, even in advanced cases of noise-induced hearing loss where definite communication handicaps can be documented through other clinical tests such as speech discrimination in noise. These data represent further evidence of the necessity of testing the speech-discrimination ability of individuals with high-frequency hearing loss in a background of noise in order to obtain a valid index of their communication handicap. However, before Army Audiologists can convert from testing speech-discrimination ability in quiet to testing it in noise, the impact of this change must be studied, both from a clinical

and an administrative point of view. Compensation schedules probably would have to be modified to reflect this change, and the type of noise and signal-to-noise ratio to be routinely employed would have to be standardized. Clearly, the use of speech audiometry as it is currently employed to evaluate hearing-impaired Army personnel provides very little insight into the typical patient's communication handicap.

Precision of the Prevalence Estimates

Estimates of the prevalence of H-1, H-2, H-3, and H-4 profiles for each branch and time-in-service category are given in Table 3a (data according to branch) and 3b (data according to time-in-service). All estimates are weighted with respect to population sizes. In order to evaluate the accuracy of each of these prevalence estimates, an index of the dispersion of the data is required. Accordingly, associated with each of the prevalence estimates in Table 3a and 3b is the standard error of the estimate.

Inspection of the standard errors reveals that the largest is only 2.2%, and most are well under 2%. Since all of the standard errors were satisfactorily small, the prevalence estimates derived from the sample data can be regarded as relatively precise estimates of the prevalence of each profile category in these three branches and five time-in-service categories.

Comparison with Previous Research

In Figure 6, the results of the present investigation are compared with those of Walden, et al. (1). These data represent the percentage of clinically significant hearing loss (i.e., H-2, H-3, H-4) in the samples of both studies. Data are given according to branch and are unweighted sample percentages. Unweighted data are presented because population sizes were not considered in the earlier study.

The results of the present investigation suggest a substantially higher occurrence of hearing loss among infantry and artillery personnel than was suggested by the earlier survey. In the case of the artillery branch, the percentage of soldiers with clinically significant hearing loss in the present sample is more than twice as great as for the 1971 sample. Because a much more rigorous experimental design was employed in the present investigation as compared to the 1971 survey, the results of the current study, in all probability, more accurately reflect the magnitude of the problem of noise-induced hearing loss in these three combat branches than do the results from the earlier survey. In any case, these new results strengthen the claim made in the earlier report that noise-induced hearing loss is the number one occupationally-related health hazard to the U. S. Army's combat personnel.

Hearing Loss Accompanying Aging

It is well known that many individuals experience a reduction in hearing sensitivity with advancing age, even in the absence of exposure

Table 3. Prevalence estimates and standard errors. The prevalence estimate and associated standard error (in %) for each profile category are given according to branch (3A) and time-in-service (3B). The standard error associated with each prevalence estimate is given in parentheses.

3A. Branch

Branch	PROFILE			
	H-1	H-2	H-3	H-4
<u>Infantry</u>	77.4 (1.4)	10.8 (1.1)	11.1 (0.9)	0.7 (0.3)
<u>Armor</u>	78.3 (1.3)	10.8 (1.0)	10.3 (0.9)	0.6 (0.2)
<u>Artillery</u>	75.8 (1.4)	9.5 (1.0)	13.9 (1.1)	0.8 (0.2)

3B. Time-In-Service

Time-in-service	PROFILE			
	H-1	H-2	H-3	H-4
<u>1.5-2.4</u>	88.5 (1.4)	5.9 (1.0)	5.5 (1.0)	0.1 (0.1)
<u>2.5-7.4</u>	79.3 (1.8)	12.1 (1.5)	7.9 (1.2)	0.7 (0.4)
<u>7.5-12.4</u>	59.6 (2.1)	16.9 (1.7)	22.6 (1.8)	0.9 (0.2)
<u>12.5-17.4</u>	52.2 (2.1)	15.4 (1.5)	29.7 (1.9)	2.7 (0.7)
<u>17.5-22.4</u>	45.8 (2.2)	18.2 (1.7)	33.8 (2.0)	2.2 (0.6)

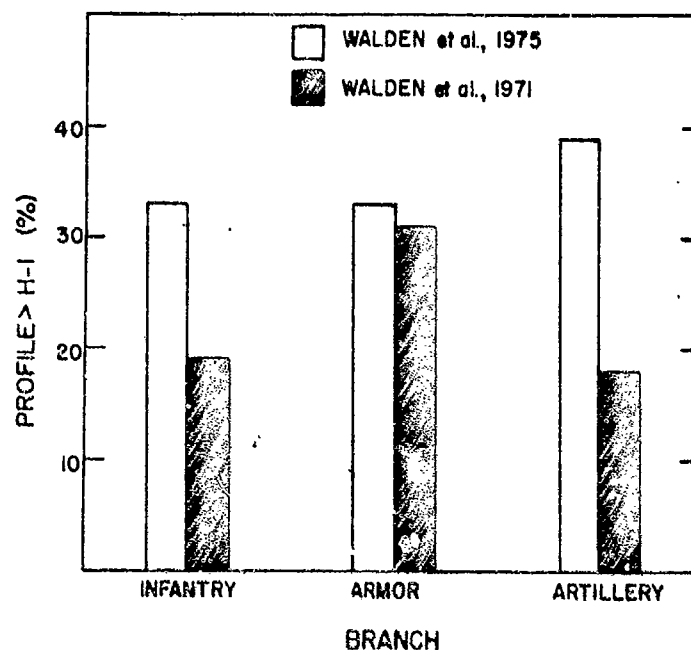


Fig. 6. Percentage of subjects in the present study found to have profiles greater than H-1, compared with that of Walden, Worthington and McCurdy (1971). Data are given according to branch.

to intense noise. This nonoccupational hearing loss accompanying aging was estimated by Glorig, et al. (11) and is reported in Table 4. These data, based upon the 1954 Wisconsin State Fair Hearing Survey, represent changes in hearing sensitivity that can be expected in various age groups due to the normal aging process. The values for 250 and 8000 Hz are taken from Johanssen (12), since Glorig, et al. (11) did not include these frequencies. The Glorig, et al. and Johanssen data were in good agreement at those frequencies included in both studies. It is apparent from these data that significant changes in hearing sensitivity typically should not be expected until an individual is in his late 40's or early 50's. If it is assumed that the typical soldier in the present investigation entered active duty in his early 20's, very little of the hearing loss revealed in this investigation can be attributed to aging. Clearly, being a soldier in the United States Army is a high-risk occupation with regard to hearing loss. It would appear that the prevalence of premature hearing loss among combat arms personnel in the United States Army is completely inconsistent with that encountered in the general civilian population.

Questionnaire Data

Each of the subjects in the survey was asked questions regarding his hearing ability, use of ear protective devices, and exposure to intense noise. In this section of the report, responses to some of the questions will be summarized according to branch and time-in-service. The complete data from the questionnaire for all 3000 subjects are summarized in Appendix C. It should be noted that the questionnaire data reflect each soldier's

Table 4. Average hearing loss (in dB) due to aging.

Age in years	Frequency (Hz)								
	250	500	1000	1500	2000	3000	4000	6000	8000
20 - 29	0	0	0	0	0	0	0	1	3
30 - 39	1	1	1	2	2	5	5	6	8
40 - 49	4	2	3	4	7	11	12	13	14
50 - 59	7	5	6	8	12	18	20	23	25

opinion of his hearing ability, use of hearing protective devices, and noise exposure. Because every subject was tested anonymously (i.e., a subject's name was not recorded on his audiogram or questionnaire), it was not possible to check a soldier's medical or personnel records to determine the validity of his responses to the questionnaire. However, after completing the questionnaire, each subject was interviewed by an audiologist in an effort to insure the accuracy of those responses. Because the questionnaire data represent subjective opinions rather than objective data (such as the audiometric data), only sample percentages are reported for the questionnaire data rather than weighted prevalence estimates.

Hearing Ability

Each subject was asked to state his current profile for hearing. Of the 1702 men who indicated they knew their current profiles, the majority reported an H-1 profile, while no soldier reported an H-4 profile. A comparison of the current profiles of these 1702 men with the profiles they would receive based upon the audiometric testing of this survey are given in Figure 7a and 7b. These data show the percentage of personnel with H-2, H-3, and H-4 profiles in each branch and time-in-service category based upon the questionnaire data and the audiometric data. It would appear that a substantial number of these men, distributed among all of the branch and time-in-service categories, do not carry the appropriate profile for hearing. The discrepancy between current profiles and appropriate profiles is consistently to have fewer H-2, H-3, and H-4 profiles than would be appropriate based upon their actual hearing abilities.

Each of the 3000 subjects was asked if he felt he had a hearing loss. Almost half (49.7%) indicated their hearing was impaired. If an H-1 profile is taken as normal hearing, it would appear that more subjects reported they had a hearing loss than actually did, since only 35.6% of

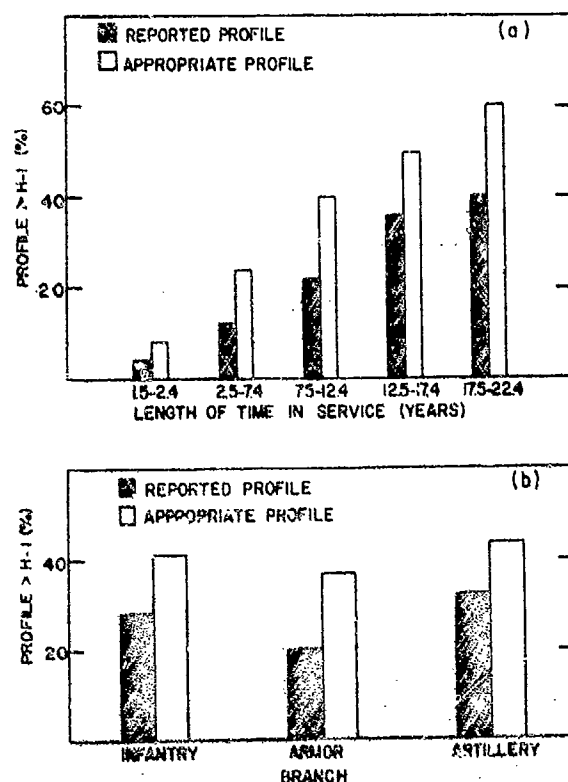


Fig. 7a 7b. Percentage of subjects reporting profiles greater than H-1 compared with the percentage of profiles greater than H-1 based upon the audiometric data. (a) Results according to time-in-service. (b) Results according to branch.

the 3000 subjects did not have H-1 profiles bases upon the audiometric data. However, AR 40-501, Appendix VIII, permits a certain amount of hearing loss to exist under the H-1 profile. Perhaps some of the individuals with H-1 profiles had hearing losses of sufficient magnitude to be noticeable to them. This could account for at least some of the discrepancy between the audiometric and questionnaire data on this point.

The 1462 men who reported a hearing loss were asked to indicate if the hearing loss interfered with a) their ability to communicate with other people easily, b) their ability to function in social situations, and/or c) their ability to perform their jobs to the best of their ability. The results revealed that a substantial majority of these subjects (i.e. 63.0%) felt that their hearing loss did interfere with their communication ability. The fact that a majority of the subjects who reported hearing loss thought that it interfered with speech communication again suggests the inadequacy of speech-reception thresholds and speech-discrimination in quiet to accurately reflect communication handicaps. A majority of the individuals with hearing losses (as revealed by the audiometric data) had speech-reception thresholds and speech-discrimination in quiet within normal limits. In spite of this, the data from the questionnaire suggest that many of these individuals had hearing losses which interfered with their speech communication ability.

Less than half (44.3%) of the 1462 men who indicated they had hearing losses reported that their hearing impairment interfered with social

functioning, while even fewer (37.4%) responded that it interfered with their job performance. With regard to the question concerning job performance, a somewhat unexpected trend was observed when the data were arranged according to time-in-service. A progressively smaller percentage of those individuals with hearing loss reported that their hearing losses interfered with job performance as time-in-service increases. The percentage ranged from 41.5% for the 1.5-2.4 yrs. category, to 32.4% for the 17.5-22.4 yrs. group. This was observed, despite the fact that the severity of the hearing losses of the soldiers with longer periods of service were generally substantially greater than the hearing losses of the soldiers with less time in the military. Interestingly, the percentage of soldiers with hearing losses who thought that it interfered with communication ability also tended to decrease with increasing service time. However, the percentage of hearing impaired soldiers who felt that their hearing losses interfered with social functioning tended to increase with increasing time-in-service.

It is not immediately clear why soldiers would report less detrimental effects on communication ability and job performance as the hearing loss progresses, but more interference in social functioning. One explanation would be that the demands for communication and job performance decreases as service time increases. This, however, appears to be an unlikely possibility. Perhaps soldiers with considerable time in service and, hence, with more severe hearing impairments, become less and less willing to admit their handicaps can be effecting their ability to communicate and perform as a soldier. In this regard, it is probably less threatening to admit that one is socially handicapped, than to admit to defects related to job performance. In any case, it is highly unlikely that interference with communication ability and job performance is not greater for the soldiers with more severe hearing impairments than for the soldiers with relatively mild impairments.

The last question asked of the soldiers who reported hearing losses was what, in their opinion, was the cause of their hearing impairment. The overwhelming majority (84.8%) identified noise as the principal cause. Another 10.7% would not speculate as to the cause of their hearing loss. The fact that most of the soldiers who reported hearing loss attributed it to noise exposure suggests that the Army's Hearing Conservation Program has been successful in educating combat personnel of the health hazard created by exposure to intense noise.

Ear Protection

Each soldier was asked whether or not he routinely used ear protection (either plugs or muffs) when exposed to intense noise. Of the 3000 men, 64% reported that they routinely used ear protection. When viewed according to branch, the data revealed that 61.0% of the infantry sample, 68.6% of the armor sample, and 62.4% of the artillery sample routinely used ear protection when exposed to intense noise. The results according to time-in-service are given in Figure 8. Also shown is the percentage of soldiers in each time-in-service sample with hearing impairments (i.e. profile H-1). Notice that there is a sharp increase in

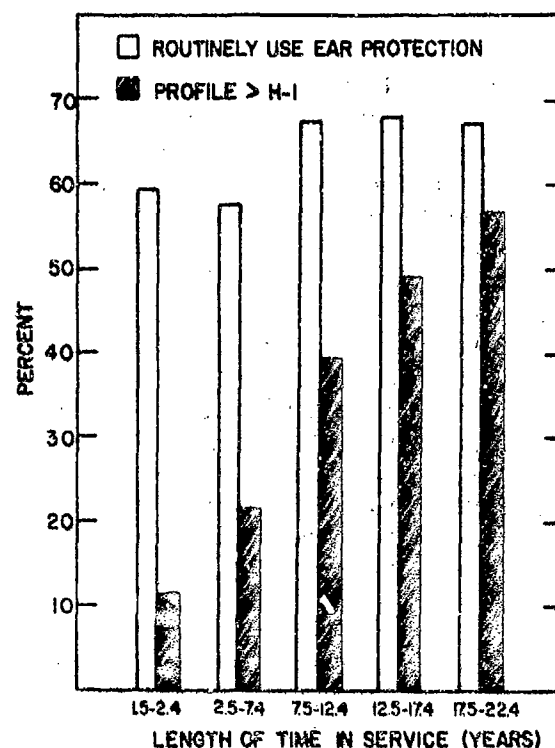


Fig. 8. Percentage of subjects routinely using ear protectors compared with the percentage of subjects having profiles greater than H-1, for each time-in-service category.

both the percentage of soldiers routinely wearing ear protection and the percentage with hearing losses between the 2.5-7.4 yrs. and the 7.5-12.4 yrs. categories. The dramatic decrease in hearing abilities between these two categories is also illustrated in Figure 2. These data suggest that many soldiers do not begin to use ear protection routinely until after they have suffered some hearing impairment.

The 1920 subjects who routinely used hearing protection were asked to indicate for how long they had routinely worn ear protectors in noisy situations. The results revealed that approximately two-thirds of the subjects who use ear protectors have been wearing them for only five years or less. Inspection of the data according to time-in-service suggests that the majority of these subjects in the 1.5-2.4 yrs. and 2.5-7.4 yrs. categories have been using ear protection routinely for about as long as they have been in the military. In contrast, most of the subjects in the 12.5-17.4 yrs. and 17.5-22.4 yrs. categories have been using ear protection regularly for substantially fewer years than they have been in the service. These results illustrate the fact that a meaningful hearing conservation program in the Army, involving the widespread distribution and use of hearing protective devices, is a relatively recent development.

All 3000 soldiers were asked if hearing protective devices are readily available to them when they are exposed to intense noise. The results suggest that the Army's Hearing Conservation Program is about 90% effective in making hearing protective devices available to combat

personnel. The fact that only approximately two-thirds of these personnel choose to use the ear protective devices suggests that further improvement is required in the area of educating high-risk personnel of the benefits of using ear protection.

All of the soldiers were asked to indicate their attitudes toward hearing protective devices. The results revealed that only about one-third of all soldiers actually like hearing protective devices, while almost half of the soldiers disliked them. The approximate ratios were true regardless of branch or time-in-service.

Noise Exposure

All 3000 soldiers were asked to estimate the number of years they had been exposed to small arms fire, artillery fire, noisy vehicles, noisy machinery, and noisy communications systems. In general, the results were quite consistent with what would be expected according to branch. For example, infantry personnel reported the most exposure to small arms fire and artillery personnel the least. Likewise, exposure to artillery fire was substantially greater for the artillery personnel than for armor personnel, who reported more exposure to artillery fire than infantry personnel. Exposure to noisy vehicles was greatest among armor personnel, but almost equaled by artillery personnel, especially as time-in-service increased.

While the vast majority of soldiers in all three branches reported at least some exposure to small arms fire, artillery fire, and noisy vehicles, such was not the case for noisy machinery and noisy communications systems. For example, over one-third of the entire sample reported no exposure to noisy machinery, with almost one-half of the infantry personnel indicating no exposure. On the other hand, 76% of the armor personnel and 65% of the artillery personnel indicated some exposure to noisy machinery. The greatest disparity between branches for noise exposure was for exposure to noisy communication systems. Whereas nearly two-thirds of the infantry and artillery personnel reported no exposure to noisy communication systems, two-thirds of the armor personnel reported at least some such exposure.

In general, armor personnel appear to be exposed to the largest number of different hazardous noises, with the vast majority of these soldiers receiving potentially damaging amounts of exposure during a twenty-year career to virtually all of the hazardous noise sources commonly experienced in a military environment. The same can be said for the artillery branch except that they apparently receive a minimal amount of exposure to noisy communication systems. Infantry personnel, however, seem to receive substantially less exposure to most of the hazardous noise sources with the exception of small arms fire.

Recruits

The audiometric data for the 300 recruits are presented in Table 5. Separate data for each of the three basic training posts are given in Appendix D. Differences among the three posts, however, were extremely small.

It is apparent from these data that very few individuals are being inducted into the Army that do not have normal hearing (H-1 profile). Specifically, 97.3% of the 300 new recruits had normal hearing. This figure is quite comparable to earlier data on the prevalence of hearing loss among newly inducted Army recruits. Of the 246 new recruits at Ft. Dix who were tested in the Walden, et. al. (1) study, 97.6% had H-1 profiles. Hence, it would appear that a small, relatively stable, percentage of new inductees have hearing losses. The vast majority, however, enter active duty with normal hearing.

CONCLUSIONS AND RECOMMENDATIONS

Perhaps the most discouraging conclusion that must be reached as a result of this investigation is that the problem of premature hearing loss in the United States Army is even greater than had previously been suspected. Approximately 20-30% of all personnel with two or more years of service in one of the combat arms branches have clinically significant hearing losses. Among soldiers with 15 years of service or more (i.e., the Army's Senior Noncommissioned Officers), the percentage exceeds 50%. The magnitude of this problem dictates that greater emphasis be placed on the Army's Hearing Conservation Program. The educational program, however, should not be at the expense of de-emphasizing the clinical management of those soldiers who have already suffered premature hearing loss. It is obvious that, at the larger Army posts where there are high concentrations of soldiers in the combat arms branches, more Army Audiologists are required. It is unrealistic to expect that one or two Audiology Officers can effectively manage a problem affecting a quarter or more of the combat troops assigned to their installation.

The results of this investigation reveal that the prevalence of hearing loss is roughly the same in all three of the combat arms branches studied. Although artillery personnel tend to have slightly poorer hearing than armor or infantry personnel, these differences are relatively small. In contrast, there are substantial differences in the prevalence of hearing loss for the five time-in-service categories investigated. These differences cannot be explained on the basis of aging. There are probably two factors contributing to this systematic decrease in hearing ability with increasing service time. First, it is clear that the longer and more frequently a soldier has been exposed to hazardous noise, the greater the probability he will suffer hearing loss. Second, since an effective hearing conservation program in the Army is a relatively recent development, there are many older soldiers still on active duty who probably suffered their hearing losses earlier in their career.

Table 5. Audiometric data for the 300 recruits. The percentage of H-1, H-2, H-3 and H-4 profiles are given, as well as mean values for pure-tone and speech audiometry.

PROFILE DATA										
H-1:	97.3%	H-2:	1.7%	H-3:	1.0%	H-4:	0%			
PURE-TONE DATA										
Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean	8.6	7.4	6.0	5.9	4.8	5.9	7.1	9.5	9.9	6.1
S.D.	7.5	7.5	7.7	7.5	7.8	8.4	9.5	10.7	12.0	7.5
Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean	7.8	7.2	5.8	6.0	5.3	6.9	9.3	11.0	12.0	6.1
S.D.	6.8	6.7	6.9	7.7	7.0	8.0	10.4	12.1	12.5	5.9
SPEECH AUDIOMETRY										
Right Ear						Left Ear				
	SRT		DISC.			SRT		DISC.		
Mean	5.5		98.3		Mean	5.7		98.3		
S.D.	8.1		6.1		S.D.	5.8		4.8		

before the widespread use of hearing protective devices was given command emphasis. It is reasonable to assume that, in the future, the prevalence of hearing loss will be more comparable across time-in-service as more and more soldiers will have used hearing protective devices routinely throughout their military careers.

The results of this investigation suggest that the problem of premature hearing loss among United States Army troops affects only the mid-to high-frequency range in the majority of soldiers, with speech-discrimination ability in quiet frequently being unaffected. Because of this,

most soldiers with noise-induced hearing loss may be able to communicate adequately under ideal listening situations. However, under difficult listening conditions, such as are encountered in a typical combat environment, the effect of hearing loss on communication ability often will be devastating. Because of this, the clinical evaluation of the hearing of Army troops should include speech discrimination in noise. Currently, this is not routinely included in the standard hearing evaluation administered by Army Audiologists. Further, detailed study of the effects of hearing loss on communication ability, and job performance in general, should be initiated. This research should be oriented to the combat readiness of soldiers with noise-induced hearing loss.

One of the more revealing findings of the current investigation is that many soldiers do not appear to carry the appropriate profile for hearing. Since the profile system, and the system of duty limitations that are associated with it, are intended to insure the health of the individual soldier and the battle readiness of the Army, it should be rigorously administered. Associated with this problem is the need for more frequent monitoring audiometry, especially among high-risk personnel. However, maximum use of the additional information obtained from more frequent monitoring audiometry can be made only by the development and utilization of a standard hearing conservation data form that would accompany a soldier's health record as he changes duty stations.

In light of the tremendous amount of time and energy that went into the execution of this study, it must be concluded that this is not a very convenient method of estimating the prevalence of hearing loss among U. S. Army personnel, or of evaluating the efficiency of the Army's Hearing Conservation Program. It is likely that the only efficient method by which close scrutiny of this problem can be maintained is by implementing a computerized central hearing conservation data registry on an Army-wide basis.

Although the data of this investigation dictate several pessimistic conclusions concerning the problem of noise-induced hearing loss in the United States Army, there are some encouraging conclusions to be drawn from this investigation as well. It would appear, for example, that the availability of hearing protective devices to combat arms personnel is nearly total. Further, there is clear evidence that the Army's Hearing Conservation Program has been increasingly successful in recent years in encouraging high-risk personnel to routinely use hearing protective devices when exposed to hazardous noise. Full participation in this program, however, has not been achieved.

Noise-induced hearing loss is the most prevalent occupationally-related health hazard among United States Army troops. It is preventable. To reduce the prevalence of hearing loss in the Army to acceptable limits, however, will require the maximum implementation of the Army's Hearing Conservation Program.

LITERATURE CITED

1. WALDEN, B.E., WORTHINGTON, D.W. and McCURDY, H.W. The extent of hearing loss in the Army -- A survey report. U.S. Army Medical Research and Development (1971).
2. American National Standards Institute. Specifications for audiometers. ANSI 3.6-1969. New York: American National Standards Institute, Inc. (1970).
3. CARHART, R. and JERGER, J. Preferred method for clinical determination of pure tone thresholds. J. Speech Hearing Disorders, 24, 330-345 (1959).
4. TILLMAN, T.W. and CARHART, R. An expanded test for speech discrimination utilizing CNC monosyllabic words (Northwestern University Auditory Test No. 6). Technical Report No. SAM-TR-66-55. USAF School for Aerospace Medicine, Aerospace Medical Division (AFSC), Brooks Air Force Base, Texas (1966).
5. CARHART, R. and TILLMAN, T.W. Interaction of competing speech signals with hearing loss. Arch. Otolaryng., 91, 273-279 (1970).
6. COOPER, J.C. and CUTTS, B.P. Speech discrimination in noise. J. Speech Hearing Res., 14, 332-337 (1971).
7. NIEMEYER, W. Speech discrimination in noise-induced deafness. International Audiology, 6, 42-47 (1967).
8. OLSEN, W.O., JABLEY, T. and PAPPAS, M.J. Speech discrimination in quiet and in competition with a good fidelity system and with three hearing aids. Presented at American Speech and Hearing Association Convention, Washington, D. C. (1966).
9. PALVA, T. Studies of hearing for pure tone and speech in noise. Acta Otolaryng., 45, 231-243 (1955).
10. ROSS, M., HUNTINGTON, D., NEWBY, H.A. and DIXON, R. Speech discrimination of hearing impaired individuals in noise. J. Aud. Res., 5, 47-72 (1965).
11. GLORIG, A., WHEELER, D.E., QUIGGLE, R., GRINGS, W.W. and SUMNER-FIELD, A. Wisconsin state fair hearing survey: Statistical treatment of clinical and audiometric data. American Academy of Ophthalmology and Otolaryngology (1957).
12. JOHANSSON, B. Undersogelser over den aldersbetingede Tunghorighed. Copenhagen. Munksgaard (1943).

APPENDIX A

SAMPLING PLAN

The three tables in Appendix A give the sampling plan for each of the three branches studied. Within each branch, sample and population size are given for each post and time-in-service. A total of 1000 soldiers were tested in each branch. Within each branch, 200 men were tested in each of five time-in-service categories. The 200 men in each time-in-service category within each branch were distributed across the ten posts. The distribution of these 200 men was proportional to the population sizes at each post for that branch and time-in-service. The first number in each cell is the sample size and the second number is the population size. The percentage in each cell is both the percentage of the total population of men at the ten posts, and the percentage of the sample size of 200, in that branch and time-in-service category at that post.

INFANTRY

Length of Time In Service (years)

POST	1.5-2.4	2.5-7.4	7.5-12.4	12.5-17.4	17.5-22.4	TOTAL
BENNING	11 546 5.65%	26 1131 12.98%	29 294 14.61%	33 364 19.17%	33 283 16.31%	137 2618
BLISS	3 142 1.47%	4 180 2.07%	4 44 2.19%	3 31 1.63%	7 62 3.57%	21 459
BRAGG	40 1881 19.45%	43 1926 22.08%	50 506 25.15%	51 483 25.43%	52 459 26.46%	236 5255
CAMPBELL	48 2324 24.03%	15 665 7.63%	16 161 8.00%	18 169 8.90%	17 149 8.59%	114 3468
CARSON	24 1157 11.97%	23 992 11.38%	21 212 10.54%	16 150 7.90%	14 121 6.97%	98 2632
HOOD	26 1274 13.17%	34 1463 16.79%	31 307 15.26%	22 210 11.06%	18 155 8.93%	131 3408
KNOX	4 209 2.16%	7 283 3.25%	10 100 4.97%	16 148 7.79%	17 144 8.30%	54 884
LEWIS	21 1025 10.60%	23 998 11.45%	21 213 10.59%	19 176 9.27%	18 156 9.00%	102 2568
RILEY	20 970 10.03%	21 903 10.36%	16 153 7.60%	15 147 7.74%	20 173 9.97%	92 2346
SILL	3 142 1.47%	4 175 2.01%	2 22 1.09%	2 21 1.11%	4 33 1.90%	15 393
TOTALS	200 9669	200 8716	200 2012	200 1899	200 1735	1000 24031

ARMOR

Length of Time In Service (years)

POST	1.5-2.4	2.5-7.4	7.5-12.4	12.5-17.4	17.5-22.4	TOTAL
BENNING	4 53 1.84%	13 160 6.43%	10 25 4.76%	10 28 4.76%	11 26 5.59%	48 292
BLISS	17 246 8.55%	20 253 10.17%	18 46 8.76%	15 45 7.65%	14 32 6.88%	84 622
BRAGG	8 117 4.07%	16 201 8.08%	11 30 5.71%	9 26 4.42%	9 20 4.30%	53 394
CAMPBELL	2 33 1.15%	4 52 2.09%	3 7 1.33%	2 5 0.85%	5 11 2.37%	16 108
CARSON	39 564 19.60%	24 295 11.86%	33 86 16.38%	28 81 13.78%	25 57 12.26%	149 1083
HOOD	58 831 28.86%	49 618 24.85%	45 118 22.48%	40 117 19.90%	41 96 20.65%	233 1780
KNOX	27 379 13.17%	32 393 15.80%	48 129 24.57%	67 200 34.01%	72 168 36.13%	246 1269
LEWIS	17 246 8.55%	14 169 6.80%	7 18 3.43%	9 27 4.59%	8 18 3.87%	55 478
RILEY	27 392 13.62%	25 307 12.35%	22 57 10.86%	17 50 8.50%	15 36 7.74%	106 842
SILL	1 17 0.59%	3 39 1.57%	3 9 1.72%	3 9 1.54%	0 1 0.21%	10 75
TOTALS	200 2878	200 2487	200 525	200 588	200 465	1000 6943

ARTILLERY

Length of Time In Service (years)

POST	1.5-2.4	2.5-7.4	7.5-12.4	12.5-17.4	17.5-22.4	TOTAL
BENNING	3 62 1.52%	14 203 6.91%	10 30 4.78%	6 18 3.20%	6 17 3.06%	39 330
BLISS	3 68 1.67%	6 91 3.10%	5 15 2.39%	5 15 2.66%	8 21 3.78%	27 210
BRAGG	35 705 17.28%	39 568 19.33%	29 92 14.65%	27 76 13.50%	28 79 14.21%	158 1520
CAMPBELL	19 387 9.48%	10 145 4.93%	11 33 5.25%	11 30 5.33%	11 31 5.58%	62 626
CARSON	25 518 12.69%	18 266 9.05%	17 53 8.44%	20 56 9.95%	18 51 9.17%	98 944
HOOD	33 674 16.52%	31 450 15.31%	36 113 17.99%	29 81 14.39%	28 78 14.03%	157 1396
KNOX	5 105 2.57%	8 119 4.05%	4 12 1.91%	5 15 2.66%	8 22 3.96%	30 273
LEWIS	19 385 9.43%	16 238 8.10%	22 68 10.83%	16 44 7.82%	11 31 5.58%	84 766
RILEY	22 441 10.81%	16 237 8.06%	14 45 7.17%	12 33 5.86%	9 24 4.32%	73 780
SILL	36 738 18.03%	42 622 21.16%	52 167 26.59%	69 195 34.63%	73 202 36.31%	272 1922
TOTALS	200 4081	200 2939	200 628	200 563	200 556	1000 8767

APPENDIX B

AUDIOMETRIC DATA

The 15 tables in Appendix B give the audiometric data for the 200 soldiers in each time-in-service category within each branch. The profile data give the percentage of personnel with H-1, H-2, H-3, and H-4 profiles, the pure tone data give the mean thresholds (dB HTL, right and left ear) at each frequency tested, including the pure-tone average (PTA) and the speech audiometry data give the mean speech reception thresholds (dB HTL) and mean speech-discrimination in quiet scores (% correct, right and left ear).

CATEGORY: Infantry, 1.5-2.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 88.5%

H-2: 6.0%

H-3: 5.5%

H-4: 0%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.7	9.3	8.9	8.9	8.1	11.9	16.6	19.3	17.7	8.7
S.D.:	7.3	7.4	7.6	8.0	8.0	12.3	17.7	19.8	17.9	7.0

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.7	9.1	7.7	8.1	8.0	12.1	16.5	18.9	17.4	8.2
S.D.:	6.6	6.1	6.3	7.2	7.2	12.7	17.3	19.8	19.0	5.4

SPEECH AUDIOMETRY

Right Ear	
SRT	DISC.
Mean: 7.7	99.0
S.D.: 7.2	2.2

Left Ear	
SRT	DISC.
Mean: 7.1	99.0
S.D.: 6.8	2.2

CATEGORY: Infantry, 2.5-7.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1. 80.0% H-2: 12.5% H-3: 6.5% H-4: 1.0%

AIRE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.2	9.3	9.0	8.5	8.2	13.6	18.2	22.9	21.1	8.8
S.D.:	6.8	6.7	7.0	7.4	7.8	13.5	18.1	20.3	19.9	6.2

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	10.0	9.9	9.8	9.6	10.2	10.6	22.0	25.3	21.5	9.9
S.D.:	8.3	9.0	8.8	9.9	10.8	17.1	22.0	21.8	21.2	8.6

SPEECH AUDIOMETRY

Right Ear		Left Ear	
SRT	DISC.	SRT	DISC.
Mean: 7.3	98.1	Mean: 8.0	98.3
S.D.: 6.1	6.7	S.D.: 8.4	6.2

CATEGORY: Infantry, 7.5-12.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 59.0%

H-2: 18.5%

H-3: 22.5%

H-4: 0%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.0	9.8	10.2	10.8	13.1	22.5	30.0	34.5	31.2	11.0
S.D.:	7.6	7.5	7.4	9.2	12.4	17.9	23.6	26.4	24.1	7.5

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.8	10.2	10.3	12.1	15.2	26.1	35.2	38.1	34.1	11.8
S.D.:	7.2	6.7	7.9	11.0	14.2	21.8	26.5	28.1	27.1	7.9

SPEECH AUDIOMETRY

Right Ear		
	SRT	DISC.
Mean:	9.4	98.0
S.D.:	7.0	3.9

Left Ear		
	SRT	DISC.
Mean:	9.9	97.3
S.D.:	7.2	5.3

CATEGORY: Infantry, 12.5-17.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 54.0% H-2: 14.5% H-3: 28.5% H-4: 3.0%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	8.6	9.0	10.8	12.0	13.0	26.0	37.7	41.3	38.3	11.0
S.D.:	7.8	7.5	11.1	11.9	14.9	21.9	26.8	30.0	27.0	9.9

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	8.7	9.2	10.0	11.9	15.5	29.0	39.6	43.0	37.2	11.6
S.D.:	7.0	7.2	10.1	13.0	10.0	23.7	28.3	29.9	27.0	9.6

SPEECH AUDIOMETRY

Right Ear	
SRT	DISC.
Mean: 9.3	96.9
S.D.: 8.8	5.5

Left Ear	
SRT	DISC.
Mean: 9.7	96.5
S.D.: 9.5	8.9

CATEGORY: Infantry, 17.5-22.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 49.5% H-2: 16.5% H-3: 32.0% H-4: 2.0%

PURE TONE DATA

Right Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.2	9.9	12.2	13.8	16.5	29.3	40.8	43.5	42.0	12.7
S.D.:	7.9	8.6	8.6	10.9	16.0	22.8	27.6	30.2	27.1	9.2

Left Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	10.2	10.6	12.3	14.5	17.9	31.5	42.3	46.1	42.1	13.5
S.D.:	12.3	12.5	13.0	15.6	18.4	25.4	28.7	29.6	27.8	12.2

SPEECH AUDIOMETRY

Right Ear

	SRT	DISC.
Mean:	11.0	96.2
S.D.:	9.1	10.7

Left Ear

	SRT	DISC.
Mean:	11.4	95.7
S.D.:	12.2	11.2

CATEGORY: Armor, 1.5-2.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 91.0% H-2: 4.5% H-3: 4.0% H-4: 0.5%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	7.7	8.6	9.3	9.2	8.4	12.5	16.9	17.0	15.0	8.8
S.D.:	7.0	6.5	7.1	7.3	7.8	10.3	14.6	14.3	14.9	6.2

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	6.9	7.4	8.1	8.7	9.4	13.3	16.7	19	16.6	8.3
S.D.:	5.7	5.6	7.0	7.3	9.1	11.5	14.2	15.5	16.4	6.2

SPEECH AUDIOMETRY

Right Ear		
	SRT	DISC.
Mean:	7.4	98.8
S.D.:	6.6	2.0

Left Ear		
	SRT	DISC.
Mean:	7.4	98.8
S.D.:	6.5	3.2

CATEGORY: Armor, .5-7.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 79.0%

H-2: 13.5%

H-3: 7.5%

H-4: 0%

PURE TONE DATA

Right Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	8.0	9.1	10.0	10.3	10.4	14.8	20.8	21.5	19.6	9.9
S.D.:	8.4	9.5	9.7	10.0	11.4	15.2	18.4	20.6	20.4	9.4

Left Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	7.3	8.5	9.8	10.2	11.2	16.5	21.7	24.1	21.3	9.7
S.D.	6.1	6.8	8.0	8.8	10.6	15.9	20.2	21.5	20.3	7.2

SPEECH AUDIOMETRY

Right Ear

	SRT	DISC.
Mean:	7.9	98.3
S.D.:	9.2	7.3

Left Ear

	SRT	DISC.
Mean:	7.9	98.9
S.D.:	6.1	2.1

CATEGORY: Armor, 7.5-12.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 65.0%

H-2: 14.5%

H-3: 19.0%

H-4: 1.5%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	8.3	9.7	11.1	12.0	13.9	21.3	29.2	33.6	30.3	11.5
S.D.:	9.0	8.8	9.8	11.6	15.3	20.5	24.1	25.4	25.4	9.8

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	8.2	9.5	11.1	12.6	14.0	24.3	33.3	37.0	32.8	11.5
S.D.:	8.1	8.4	10.3	11.9	14.3	22.1	25.7	26.7	25.0	9.5

SPEECH AUDIOMETRY

Right Ear		
	SRT	DISC.
Mean:	10.5	97.7
S.D.:	10.3	3.8

Left Ear		
	SRT	DISC.
Mean:	10.0	97.7
S.D.:	8.8	4.4

CATEGORY: Armor, 12.5-17.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 52.0% H-2: 18.5% H-3: 28.0% H-4: 1.5%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	10.1	11.3	13.5	15.4	16.7	26.2	34.4	38.1	37.8	13.9
S.D.:	11.2	10.9	11.6	14.0	15.3	18.4	22.9	24.8	26.9	11.2

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.7	11.4	12.6	15.4	18.3	29.3	38.7	41.6	38.5	14.0
S.D.:	8.3	8.7	10.0	12.3	15.2	21.0	24.8	26.7	27.0	9.9

SPEECH AUDIOMETRY

Right Ear		
	SRT	DISC.
Mean:	11.8	97.8
S.D.:	10.9	4.1

Left Ear		
	SRT	DISC.
Mean:	12.0	97.5
S.D.:	54	18

CATEGORY: Armor, 17.5-22.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 44.0% H-2: 21.5% H-3: 32.5% H-4: 2.0%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.8	11.2	13.0	15.9	18.6	31.3	42.2	45.4	43.7	14.2
S.D.:	8.2	8.6	9.9	10.9	15.2	21.2	25.9	28.3	27.9	9.9

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.9	12.0	12.8	17.8	22.3	35.2	43.6	48.8	45.3	15.6
S.D.:	10.6	11.4	11.8	15.7	19.5	23.8	25.0	28.6	26.7	12.3

SPEECH AUDIOMETRY

Right Ear			Left Ear		
	SRT	DISC.		SRT	DISC.
Mean:	12.0	96.3	Mean:	13.2	95.9
S.D.:	9.0	5.8	S.D.:	11.1	9.1

CATEGORY: Artillery, 1.5-2.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 87.0% H-2: 6.5% H-3: 6.5% H-4: 0%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	11.3	10.6	10.2	9.5	9.9	12.6	16.6	18.0	15.7	10.2
S.D.:	7.7	6.6	6.2	6.8	6.3	12.6	16.2	19.0	16.7	5.7

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	10.0	9.8	9.9	10.0	9.9	13.7	16.0	18.9	16.6	9.7
S.D.:	6.5	6.2	6.3	8.5	10.2	13.3	15.7	18.9	17.8	6.1

SPEECH AUDIOMETRY

Right Ear	
SRT	DISC.
Mean: 8.8	98.7
S.D.: 5.7	2.4

Left Ear	
SRT	DISC.
Mean: 8.8	98.7
S.D.: 5.8	3.2

CATEGORY: Artillery, 2.5-7.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 77.5%

H-2: 9.5%

H-3: 12.5%

H-4: 0.5%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	11.7	10.6	10.1	10.0	10.2	16.8	22.1	23.2	21.3	10.4
S.D.:	7.1	6.1	7.1	8.2	10.2	16.7	20.6	20.5	19.5	6.6

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	10.4	9.9	10.2	10.4	11.1	17.6	23.5	26.7	23.6	10.4
S.D.:	6.1	6.0	7.3	8.9	11.6	17.5	21.6	23.0	21.6	6.7

SPEECH AUDIOMETRY

Right Ear		
	SRT	DISC.
Mean:	8.9	98.4
S.D.:	6.2	3.3

Left Ear		
	SRT	DISC.
Mean:	9.2	98.7
S.D.:	6.3	2.7

CATEGORY: Artillery, 7.5-12.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 56.5% H-2: 14.0% H-3: 26.0% H-4: 3.5%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	11.7	11.0	12.8	14.1	16.8	26.4	34.0	38.0	34.6	13.7
S.D.:	8.0	7.6	8.2	10.2	15.5	21.3	35.5	26.6	25.8	8.5

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	11.3	11.8	12.5	15.3	18.1	30.4	36.9	40.9	35.1	13.9
S.D.:	8.3	8.0	8.3	12.2	15.9	23.6	27.5	28.8	26.3	8.8

SPEECH AUDIOMETRY

Right Ear	
SRT	DISC.
Mean: 11.9	97.3
S.D.: 7.7	4.7

Left Ear	
SRT	DISC.
Mean: 12.7	96.9
S.D.: 8.3	5.8

CATEGORY: Artillery, 12.5-17.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 46.5% H-2: 15.0% H-3: 35.5% H-4: 3.0%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	13.1	11.9	12.3	15.8	18.5	30.3	38.6	40.3	38.6	14.2
S.D.:	8.4	7.6	8.0	12.6	16.7	25.3	27.1	28.3	26.0	9.0

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	11.9	11.9	12.5	16.2	20.4	33.7	41.9	43.8	39.2	14.9
S.D.:	7.1	7.8	10.5	14.5	19.4	25.2	27.4	28.0	26.1	10.6

SPEECH AUDIOMETRY

Right Ear		
	SRT	DISC.
Mean:	12.5	96.4
S.D.:	8.1	6.6

Left Ear		
	SRT	DISC.
Mean:	13.2	96.0
S.D.:	10.7	7.3

CATEGORY: Artillery, 17.5-22.4 yrs.

SAMPLE SIZE: 200

PROFILE DATA

H-1: 36.0% H-2: 20.5% H-3: 40.5% H-4: 3.0%

PURE TONE DATA

Right Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	13.6	12.2	13.7	16.5	20.4	33.6	42.1	45.6	42.6	15.6
S.D.:	8.3	8.2	8.5	13.4	17.9	24.8	22.5	29.2	28.6	7.7

Left Ear										
	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	12.0	12.4	12.5	16.4	20.1	35.7	42.8	46.9	43.0	14.9
S.D.:	4.6	6.0	6.5	9.0	9.0	10.0	11.3	11.0	9.0	8.7

SPEECH AUDIOMETRY

Right Ear	
SRT	DISC.
Mean: 13.0	96.3
S.D.: 9.0	7.0

Left Ear	
SRT	DISC.
Mean: 12.7	96.4
S.D.: 8.8	7.0

APPENDIX C
QUESTIONNAIRE DATA

The 15 tables in Appendix C give the questionnaire data for the 200 soldiers in each time-in-service category within each branch. The numbers indicate the number of soldiers answering each question as indicated. Soldiers answering "no" to Question 2 did not answer Questions 3, 4a-4c, or 5. Likewise, soldiers answering "no" to Question 6 did not answer Question 7.

QUESTIONNAIRE DATA

CATEGORY Infantry, 1.5-2.4 yrs.

SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 66 H-2 4 H-3 1 H-4 0 Do Not Know 129

2. Do you believe that you presently have a hearing loss?

YES 61 NO 139

3. How long do you believe you have had a hearing loss?

0-6 Mos 15 6 Mos-2 yrs 36 2-5 yrs 6

5-10 yrs 3 10-15 yrs 0 15-20 yrs 1 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 40 NO 21

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 25 NO 36

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 28 NO 33

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 51 2. Ear disease 3

3. Aging 0 4. Illness 0 5. Do Not Know 5 6. Other 2

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 114 NO 86

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	9	10-15 yrs	0
6 mos-2 yrs	91	15-20 yrs	0
2-5 yrs	14	20+ yrs	0
5-10 yrs	0		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 162 NO 38

9. What is your attitude toward wearing ear protectors?

Like 68 Dislike 97 No Opinion 35

10a. Approximately how many years have you been exposed to small arms fire?

None	12	3 yrs	4	10 yrs	0	20+ yrs	0
6 mos	21	4 yrs	0	12 yrs	1		
1 yr	42	6 yrs	0	15 yrs	0		
2 yrs	120	8 yrs	0	20 yrs	0		

10b. Approximately how many years have you been exposed to artillery fire?

None	141	3 yrs	2	10 yrs	0	20+ yrs	0
6 mos	16	4 yrs	0	12 yrs	0		
1 yr	11	6 yrs	0	15 yrs	0		
2 yrs	30	8 yrs	0	20 yrs	0		

10c. Approximately how many years have you been exposed to noisy vehicles?

None	42	3 yrs	5	10 yrs	0	20+ yrs	0
6 mos	20	4 yrs	1	12 yrs	0		
1 yr	34	6 yrs	0	15 yrs	0		
2 yrs	97	8 yrs	0	20 yrs	1		

10d. Approximately how many years have you been exposed to noisy machinery?

None	104	3 yrs	5	10 yrs	1	20+ yrs	0
6 mos	13	4 yrs	3	12 yrs	0		
1 yr	24	6 yrs	2	15 yrs	0		
2 yrs	47	8 yrs	0	20 yrs	1		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	<u>144</u>	3 yrs	<u>2</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>10</u>	4 yrs	<u>1</u>	12 yrs	<u>0</u>		
1 yr	<u>17</u>	6 yrs	<u>0</u>	15 yrs	<u>0</u>		
2 yrs	<u>26</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10f. Approximately how many years have you been exposed to intense noise?

None	<u>191</u>	3 yrs	<u>1</u>	10 yrs	<u>2</u>	20+ yrs	<u>0</u>
6 mos	<u>0</u>	4 yrs	<u>0</u>	12 yrs	<u>0</u>		
1 yr	<u>1</u>	6 yrs	<u>1</u>	15 yrs	<u>1</u>		
2 yrs	<u>3</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10g. Summed years of noise exposure:

Less than 1	<u>7</u>	28 yrs	<u>1</u>	63 yrs	<u>0</u>	98 yrs	<u>0</u>
1 yr	<u>143</u>	35 yrs	<u>0</u>	70 yrs	<u>0</u>	105 yrs	<u>0</u>
7 yrs	<u>40</u>	42 yrs	<u>0</u>	77 yrs	<u>1</u>	112 yrs	<u>0</u>
14 yrs	<u>5</u>	49 yrs	<u>0</u>	84 yrs	<u>0</u>	119 yrs	<u>0</u>
21 yrs	<u>3</u>	56 yrs	<u>0</u>	91 yrs	<u>0</u>	126 yrs	<u>0</u>

QUESTIONNAIRE DATA

CATEGORY Infantry, 2.5-7.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 73 H-2 8 H-3 4 H-4 0 Do Not Know 115

2. Do you believe that you presently have a hearing loss?

YES 79 NO 121

3. How long do you believe you have had a hearing loss?

0-6 Mos 5 6 Mos-2 yrs 46 2-5 yrs 25

5-10 yrs 2 10-15 yrs 0 15-20 yrs 1 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 49 NO 30

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 31 NO 48

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 32 NO 47

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 67 2. Ear disease 0

3. Aging 0 4. Illness 0 5. Do Not Know 9 6. Other 3

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 117 NO 83

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>14</u>	10-15 yrs	<u>0</u>
6 mos-2 yrs	<u>40</u>	15-20 yrs	<u>0</u>
2-5 yrs	<u>57</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>6</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 164 NO 36

9. What is your attitude toward wearing ear protectors?

Like 60 Dislike 90 No Opinion 50

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>6</u>	3 yrs	<u>50</u>	10 yrs	<u>0</u>	20+ yrs	<u>1</u>
6 mos	<u>11</u>	4 yrs	<u>34</u>	12 yrs	<u>0</u>		
1 yr	<u>19</u>	6 yrs	<u>23</u>	15 yrs	<u>1</u>		
2 yrs	<u>52</u>	8 yrs	<u>3</u>	20 yrs	<u>0</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>95</u>	3 yrs	<u>15</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>27</u>	4 yrs	<u>7</u>	12 yrs	<u>0</u>		
1 yr	<u>30</u>	6 yrs	<u>6</u>	15 yrs	<u>0</u>		
2 yrs	<u>19</u>	8 yrs	<u>1</u>	20 yrs	<u>0</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>34</u>	3 yrs	<u>39</u>	10 yrs	<u>1</u>	20+ yrs	<u>0</u>
6 mos	<u>9</u>	4 yrs	<u>27</u>	12 yrs	<u>0</u>		
1 yr	<u>21</u>	6 yrs	<u>13</u>	15 yrs	<u>0</u>		
2 yrs	<u>53</u>	8 yrs	<u>3</u>	20 yrs	<u>0</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>93</u>	3 yrs	<u>25</u>	10 yrs	<u>1</u>	20+ yrs	<u>0</u>
6 mos	<u>13</u>	4 yrs	<u>16</u>	12 yrs	<u>0</u>		
1 yr	<u>11</u>	6 yrs	<u>8</u>	15 yrs	<u>0</u>		
2 yrs	<u>32</u>	8 yrs	<u>1</u>	20 yrs	<u>0</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	135	3 yrs	16	10 yrs	0	20+ yrs	0
6 mos	7	4 yrs	2	12 yrs	0		
1 yr	15	6 yrs	8	15 yrs	0		
2 yrs	16	8 yrs	1	20 yrs	0		

10f. Approximately how many years have you been exposed to intense noise?

None	188	3 yrs	1	10 yrs	0	20+ yrs	0
6 mos	2	4 yrs	1	12 yrs	1		
1 yr	1	6 yrs	0	15 yrs	1		
2 yrs	5	8 yrs	0	20 yrs	0		

10g. Summed years of noise exposure:

Less than 1	3	28 yrs	3	63 yrs	0	98 yrs	1
1 yr	87	35 yrs	2	70 yrs	0	105 yrs	0
7 yrs	72	42 yrs	1	77 yrs	0	112 yrs	0
14 yrs	24	49 yrs	0	84 yrs	0	119 yrs	0
21 yrs	7	56 yrs	0	91 yrs	0	126 yrs	0

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>11</u>	10-15 yrs	<u>0</u>
6 mos-2 yrs	<u>94</u>	15-20 yrs	<u>0</u>
2-5 yrs	<u>21</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>1</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 173 NO 27

9. What is your attitude toward wearing ear protectors?

Like 62 Dislike 81 No Opinion 57

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>48</u>	3 yrs	<u>7</u>	10 yrs	<u>1</u>	20+ yrs	<u>1</u>
6 mos	<u>36</u>	4 yrs	<u>2</u>	12 yrs	<u>0</u>		
1 yr	<u>25</u>	6 yrs	<u>1</u>	15 yrs	<u>0</u>		
2 yrs	<u>79</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>86</u>	3 yrs	<u>6</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>21</u>	4 yrs	<u>0</u>	12 yrs	<u>0</u>		
1 yr	<u>18</u>	6 yrs	<u>0</u>	15 yrs	<u>0</u>		
2 yrs	<u>69</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>3</u>	3 yrs	<u>13</u>	10 yrs	<u>0</u>	20+ yrs	<u>1</u>
6 mos	<u>7</u>	4 yrs	<u>2</u>	12 yrs	<u>1</u>		
1 yr	<u>32</u>	6 yrs	<u>0</u>	15 yrs	<u>0</u>		
2 yrs	<u>141</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>51</u>	3 yrs	<u>10</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>11</u>	4 yrs	<u>6</u>	12 yrs	<u>1</u>		
1 yr	<u>21</u>	6 yrs	<u>2</u>	15 yrs	<u>0</u>		
2 yrs	<u>98</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>11</u>	10-15 yrs	<u>7</u>
6 mos-2 yrs	<u>39</u>	15-20 yrs	<u>0</u>
2-5 yrs	<u>44</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>36</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 189 NO 11

9. What is your attitude toward wearing ear protectors?

Like 76 Dislike 93 No Opinion 31

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>3</u>	3 yrs	<u>13</u>	10 yrs	<u>53</u>	20+ yrs	<u>0</u>
6 mos	<u>3</u>	4 yrs	<u>13</u>	12 yrs	<u>20</u>		
1 yr	<u>7</u>	6 yrs	<u>37</u>	15 yrs	<u>2</u>		
2 yrs	<u>11</u>	8 yrs	<u>38</u>	20 yrs	<u>0</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>48</u>	3 yrs	<u>13</u>	10 yrs	<u>22</u>	20+ yrs	<u>0</u>
6 mos	<u>17</u>	4 yrs	<u>7</u>	12 yrs	<u>8</u>		
1 yr	<u>20</u>	6 yrs	<u>20</u>	15 yrs	<u>0</u>		
2 yrs	<u>30</u>	8 yrs	<u>15</u>	20 yrs	<u>0</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>27</u>	3 yrs	<u>22</u>	10 yrs	<u>40</u>	20+ yrs	<u>0</u>
6 mos	<u>3</u>	4 yrs	<u>15</u>	12 yrs	<u>14</u>		
1 yr	<u>4</u>	6 yrs	<u>26</u>	15 yrs	<u>1</u>		
2 yrs	<u>17</u>	8 yrs	<u>31</u>	20 yrs	<u>0</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>85</u>	3 yrs	<u>4</u>	10 yrs	<u>24</u>	20+ yrs	<u>0</u>
6 mos	<u>9</u>	4 yrs	<u>13</u>	12 yrs	<u>8</u>		
1 yr	<u>5</u>	6 yrs	<u>17</u>	15 yrs	<u>0</u>		
2 yrs	<u>15</u>	8 yrs	<u>19</u>	20 yrs	<u>1</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	<u>122</u>	3 yrs	<u>8</u>	10 yrs	<u>21</u>	20+ yrs	<u>0</u>
6 mos	<u>8</u>	4 yrs	<u>8</u>	12 yrs	<u>7</u>		
1 yr	<u>3</u>	6 yrs	<u>10</u>	15 yrs	<u>0</u>		
2 yrs	<u>4</u>	8 yrs	<u>9</u>	20 yrs	<u>0</u>		

10f. Approximately how many years have you been exposed to intense noise?

None	<u>189</u>	3 yrs	<u>1</u>	10 yrs	<u>4</u>	20+ yrs	<u>1</u>
6 mos	<u>0</u>	4 yrs	<u>1</u>	12 yrs	<u>0</u>		
1 yr	<u>3</u>	6 yrs	<u>0</u>	15 yrs	<u>0</u>		
2 yrs	<u>0</u>	8 yrs	<u>1</u>	20 yrs	<u>0</u>		

10g. Summed years of noise exposure:

Less than 1	<u>2</u>	28 yrs	<u>30</u>	63 yrs	<u>0</u>	98 yrs	<u>1</u>
1 yr	<u>12</u>	35 yrs	<u>19</u>	70 yrs	<u>0</u>	105 yrs	<u>0</u>
7 yrs	<u>58</u>	42 yrs	<u>5</u>	77 yrs	<u>0</u>	112 yrs	<u>0</u>
14 yrs	<u>31</u>	49 yrs	<u>9</u>	84 yrs	<u>0</u>	119 yrs	<u>0</u>
21 yrs	<u>26</u>	56 yrs	<u>7</u>	91 yrs	<u>0</u>	126 yrs	<u>0</u>

QUESTIONNAIRE DATA

CATEGORY Infantry, 12.5-17.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 76 H-2 21 H-3 33 H-4 0 Do Not Know 70

2. Do you believe that you presently have a hearing loss?

YES 103 NO 97

3. How long do you believe you have had a hearing loss?

0-6 Mos 3 6 Mos-2 yrs 11 2-5 yrs 37

5-10 yrs 39 10-15 yrs 12 15-20 yrs 1 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 63 NO 40

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 41 NO 62

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 36 NO 67

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 87 2. Ear disease 3

3. Aging 1 4. Illness 2 5. Do Not Know 8 6. Other 2

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 123 NO 77

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>2</u>	10-15 yrs	<u>23</u>
6 mos-2 yrs	<u>28</u>	15-20 yrs	<u>5</u>
2-5 yrs	<u>43</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>22</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 179 NO 21

9. What is your attitude toward wearing ear protectors?

Like 71 Dislike 94 No Opinion 35

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>1</u>	3 yrs	<u>10</u>	10 yrs	<u>12</u>	20+ yrs	<u>39</u>
6 mos	<u>0</u>	4 yrs	<u>10</u>	12 yrs	<u>9</u>		
1 yr	<u>1</u>	6 yrs	<u>11</u>	15 yrs	<u>43</u>		
2 yrs	<u>4</u>	8 yrs	<u>5</u>	20 yrs	<u>55</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>51</u>	3 yrs	<u>16</u>	10 yrs	<u>12</u>	20+ yrs	<u>10</u>
6 mos	<u>6</u>	4 yrs	<u>7</u>	12 yrs	<u>6</u>		
1 yr	<u>17</u>	6 yrs	<u>10</u>	15 yrs	<u>17</u>		
2 yrs	<u>30</u>	8 yrs	<u>3</u>	20 yrs	<u>15</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>21</u>	3 yrs	<u>9</u>	10 yrs	<u>21</u>	20+ yrs	<u>22</u>
6 mos	<u>3</u>	4 yrs	<u>6</u>	12 yrs	<u>14</u>		
1 yr	<u>10</u>	6 yrs	<u>13</u>	15 yrs	<u>36</u>		
2 yrs	<u>9</u>	8 yrs	<u>3</u>	20 yrs	<u>33</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>101</u>	3 yrs	<u>4</u>	10 yrs	<u>9</u>	20+ yrs	<u>8</u>
6 mos	<u>11</u>	4 yrs	<u>2</u>	12 yrs	<u>4</u>		
1 yr	<u>10</u>	6 yrs	<u>3</u>	15 yrs	<u>20</u>		
2 yrs	<u>8</u>	8 yrs	<u>3</u>	20 yrs	<u>17</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	<u>101</u>	3 yrs	<u>6</u>	10 yrs	<u>8</u>	20+ yrs	<u>7</u>
6 mos	<u>9</u>	4 yrs	<u>5</u>	12 yrs	<u>4</u>		
1 yr	<u>4</u>	6 yrs	<u>16</u>	15 yrs	<u>17</u>		
2 yrs	<u>8</u>	8 yrs	<u>2</u>	20 yrs	<u>13</u>		

10f. Approximately how many years have you been exposed to intense noise?

None	<u>180</u>	3 yrs	<u>0</u>	10 yrs	<u>2</u>	20+ yrs	<u>2</u>
6 mos	<u>0</u>	4 yrs	<u>2</u>	12 yrs	<u>0</u>		
1 yr	<u>2</u>	6 yrs	<u>5</u>	15 yrs	<u>3</u>		
2 yrs	<u>3</u>	8 yrs	<u>0</u>	20 yrs	<u>1</u>		

10g. Summed years of noise exposure:

Less than 1	<u>0</u>	28 yrs	<u>25</u>	63 yrs	<u>5</u>	98 yrs	<u>7</u>
1 yr	<u>4</u>	35 yrs	<u>29</u>	70 yrs	<u>9</u>	105 yrs	<u>0</u>
7 yrs	<u>15</u>	42 yrs	<u>14</u>	77 yrs	<u>4</u>	112 yrs	<u>0</u>
14 yrs	<u>19</u>	49 yrs	<u>16</u>	84 yrs	<u>7</u>	119 yrs	<u>3</u>
21 yrs	<u>21</u>	56 yrs	<u>19</u>	91 yrs	<u>3</u>	126 yrs	<u>0</u>

QUESTIONNAIRE DATA

CATEGORY Infantry, 17.5-22.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 80 H-2 20 H-3 37 H-4 0 Do Not Know 63

2. Do you believe that you presently have a hearing loss?

YES 120 NO 80

3. How long do you believe you have had a hearing loss?

0-6 Mos 4 6 Mos-2 yrs 12 2-5 yrs 30

5-10 yrs 48 10-15 yrs 17 15-20 yrs 3 20+ yrs 6

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 64 NO 56

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 45 NO 75

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 27 NO 93

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 96 2. Ear disease 4

3. Aging 3 4. Illness 2 5. Do Not Know 11 6. Other 4

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 125 NO 75

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>8</u>	10-15 yrs	<u>12</u>
6 mos-2 yrs	<u>31</u>	15-20 yrs	<u>13</u>
2-5 yrs	<u>32</u>	20+ yrs	<u>1</u>
5-10 yrs	<u>28</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 174 NO 26

9. What is your attitude toward wearing ear protectors?

Like 72 Dislike 92 No Opinion 36

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>3</u>	3 yrs	<u>7</u>	10 yrs	<u>19</u>	20+ yrs	<u>0</u>
6 mos	<u>3</u>	4 yrs	<u>4</u>	12 yrs	<u>44</u>		
1 yr	<u>3</u>	6 yrs	<u>21</u>	15 yrs	<u>82</u>		
2 yrs	<u>5</u>	8 yrs	<u>4</u>	20 yrs	<u>5</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>46</u>	3 yrs	<u>13</u>	10 yrs	<u>5</u>	20+ yrs	<u>0</u>
6 mos	<u>13</u>	4 yrs	<u>8</u>	12 yrs	<u>18</u>		
1 yr	<u>22</u>	6 yrs	<u>14</u>	15 yrs	<u>27</u>		
2 yrs	<u>31</u>	8 yrs	<u>2</u>	20 yrs	<u>1</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>20</u>	3 yrs	<u>11</u>	10 yrs	<u>18</u>	20+ yrs	<u>0</u>
6 mos	<u>3</u>	4 yrs	<u>14</u>	12 yrs	<u>28</u>		
1 yr	<u>7</u>	6 yrs	<u>24</u>	15 yrs	<u>54</u>		
2 yrs	<u>16</u>	8 yrs	<u>3</u>	20 yrs	<u>2</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>87</u>	3 yrs	<u>4</u>	10 yrs	<u>8</u>	20+ yrs	<u>0</u>
6 mos	<u>10</u>	4 yrs	<u>9</u>	12 yrs	<u>13</u>		
1 yr	<u>11</u>	6 yrs	<u>8</u>	15 yrs	<u>38</u>		
2 yrs	<u>10</u>	8 yrs	<u>0</u>	20 yrs	<u>2</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	<u>112</u>	3 yrs	<u>7</u>	10 yrs	<u>8</u>	20+ yrs	<u>0</u>
6 mos	<u>9</u>	4 yrs	<u>3</u>	12 yrs	<u>12</u>		
1 yr	<u>2</u>	6 yrs	<u>9</u>	15 yrs	<u>26</u>		
2 yrs	<u>11</u>	8 yrs	<u>0</u>	20 yrs	<u>1</u>		

10f. Approximately how many years have you been exposed to intense noise?

None	<u>188</u>	3 yrs	<u>0</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>1</u>	4 yrs	<u>2</u>	12 yrs	<u>2</u>		
1 yr	<u>0</u>	6 yrs	<u>0</u>	15 yrs	<u>5</u>		
2 yrs	<u>1</u>	8 yrs	<u>1</u>	20 yrs	<u>0</u>		

10g. Summed years of noise exposure:

Less than 1	<u>1</u>	28 yrs	<u>27</u>	63 yrs	<u>6</u>	98 yrs	<u>2</u>
1 yr	<u>7</u>	35 yrs	<u>14</u>	70 yrs	<u>11</u>	105 yrs	<u>0</u>
7 yrs	<u>28</u>	42 yrs	<u>18</u>	77 yrs	<u>1</u>	112 yrs	<u>0</u>
14 yrs	<u>36</u>	49 yrs	<u>14</u>	84 yrs	<u>2</u>	119 yrs	<u>0</u>
21 yrs	<u>21</u>	56 yrs	<u>12</u>	91 yrs	<u>0</u>	126 yrs	<u>0</u>

QUESTIONNAIRE DATA

CATEGORY Armor, 1.5-2.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 92 H-2 1 H-3 0 H-4 0 Do Not Know 107

2. Do you believe that you presently have a hearing loss?

YES 61 NO 139

3. How long do you believe you have had a hearing loss?

0-6 Mos 15 6 Mos-2 yrs 40 2-5 yrs 4

5-10 yrs 0 10-15 yrs 0 15-20 yrs 2 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 37 NO 24

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 23 NO 38

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 24 NO 37

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 49 2. Ear disease 1

3. Aging 0 4. Illness 0 5. Do Not Know 9 6. Other 2

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 127 NO 73

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>11</u>	10-15 yrs	<u>0</u>
6 mos-2 yrs	<u>94</u>	15-20 yrs	<u>0</u>
2-5 yrs	<u>21</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>1</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 173 NO 27

9. What is your attitude toward wearing ear protectors?

Like 62 Dislike 81 No Opinion 57

10a. Approximately how many years have you been exposed to small arms fire?

None	<u>48</u>	3 yrs	<u>7</u>	10 yrs	<u>1</u>	20+ yrs	<u>1</u>
6 mos	<u>36</u>	4 yrs	<u>2</u>	12 yrs	<u>0</u>		
1 yr	<u>25</u>	6 yrs	<u>1</u>	15 yrs	<u>0</u>		
2 yrs	<u>79</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10b. Approximately how many years have you been exposed to artillery fire?

None	<u>86</u>	3 yrs	<u>6</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>21</u>	4 yrs	<u>0</u>	12 yrs	<u>0</u>		
1 yr	<u>18</u>	6 yrs	<u>0</u>	15 yrs	<u>0</u>		
2 yrs	<u>69</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>3</u>	3 yrs	<u>13</u>	10 yrs	<u>0</u>	20+ yrs	<u>1</u>
6 mos	<u>7</u>	4 yrs	<u>2</u>	12 yrs	<u>1</u>		
1 yr	<u>32</u>	6 yrs	<u>0</u>	15 yrs	<u>0</u>		
2 yrs	<u>141</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>51</u>	3 yrs	<u>10</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>11</u>	4 yrs	<u>6</u>	12 yrs	<u>1</u>		
1 yr	<u>21</u>	6 yrs	<u>2</u>	15 yrs	<u>0</u>		
2 yrs	<u>98</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	<u>98</u>	3 yrs	<u>8</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>8</u>	4 yrs	<u>1</u>	12 yrs	<u>0</u>		
1 yr	<u>16</u>	6 yrs	<u>0</u>	15 yrs	<u>0</u>		
2 yrs	<u>68</u>	8 yrs	<u>1</u>	20 yrs	<u>0</u>		

10f. Approximately how many years have you been exposed to intense noise?

None	<u>188</u>	3 yrs	<u>1</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>1</u>	4 yrs	<u>0</u>	12 yrs	<u>0</u>		
1 yr	<u>0</u>	6 yrs	<u>0</u>	15 yrs	<u>0</u>		
2 yrs	<u>7</u>	8 yrs	<u>0</u>	20 yrs	<u>1</u>		

10g. Summed years of noise exposure:

Less than 1	<u>1</u>	28 yrs	<u>1</u>	63 yrs	<u>0</u>	98 yrs	<u>0</u>
1 yr	<u>110</u>	35 yrs	<u>3</u>	70 yrs	<u>0</u>	105 yrs	<u>0</u>
7 yrs	<u>80</u>	42 yrs	<u>0</u>	77 yrs	<u>0</u>	112 yrs	<u>0</u>
14 yrs	<u>4</u>	49 yrs	<u>0</u>	84 yrs	<u>0</u>	119 yrs	<u>0</u>
21 yrs	<u>1</u>	56 yrs	<u>0</u>	91 yrs	<u>0</u>	126 yrs	<u>0</u>

QUESTIONNAIRE DATA

CATEGORY Armor, 2.5-7.4 yrs.

SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 89 H-2 7 H-3 1 H-4 0 Do Not Know 103

2. Do you believe that you presently have a hearing loss?

YES 87 NO 113

3. How long do you believe you have had a hearing loss?

0-6 Mos 9 6 Mos-2 yrs 40 2-5 yrs 34

5-10 yrs 3 10-15 yrs 0 15-20 yrs 1 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 63 NO 24

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 40 NO 47

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 38 NO 49

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 73 2. Ear disease 0

3. Aging 0 4. Illness 0 5. Do Not Know 13 6. Other 1

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 122 NO 78

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>9</u>	10-15 yrs	<u>0</u>
6 mos-2 yrs	<u>38</u>	15-20 yrs	<u>0</u>
2-5 yrs	<u>63</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>12</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 170 NO 30

9. What is your attitude toward wearing ear protectors?

Like 52 Dislike 102 No Opinion 46

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>33</u>	3 yrs	<u>29</u>	10 yrs	<u>2</u>	20+ yrs	<u>0</u>
6 mos	<u>28</u>	4 yrs	<u>25</u>	12 yrs	<u>1</u>		
1 yr	<u>15</u>	6 yrs	<u>23</u>	15 yrs	<u>1</u>		
2 yrs	<u>38</u>	8 yrs	<u>5</u>	20 yrs	<u>0</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>87</u>	3 yrs	<u>21</u>	10 yrs	<u>1</u>	20+ yrs	<u>0</u>
6 mos	<u>15</u>	4 yrs	<u>16</u>	12 yrs	<u>1</u>		
1 yr	<u>18</u>	6 yrs	<u>16</u>	15 yrs	<u>0</u>		
2 yrs	<u>21</u>	8 yrs	<u>4</u>	20 yrs	<u>0</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>3</u>	3 yrs	<u>51</u>	10 yrs	<u>1</u>	20+ yrs	<u>0</u>
6 mos	<u>4</u>	4 yrs	<u>44</u>	12 yrs	<u>1</u>		
1 yr	<u>8</u>	6 yrs	<u>38</u>	15 yrs	<u>1</u>		
2 yrs	<u>43</u>	8 yrs	<u>6</u>	20 yrs	<u>0</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>50</u>	3 yrs	<u>36</u>	10 yrs	<u>2</u>	20+ yrs	<u>0</u>
6 mos	<u>8</u>	4 yrs	<u>29</u>	12 yrs	<u>2</u>		
1 yr	<u>6</u>	6 yrs	<u>34</u>	15 yrs	<u>2</u>		
2 yrs	<u>27</u>	8 yrs	<u>4</u>	20 yrs	<u>0</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	<u>86</u>	3 yrs	<u>24</u>	15 yrs	<u>1</u>	20+ yrs	<u>0</u>
6 mos	<u>6</u>	4 yrs	<u>24</u>	12 yrs	<u>1</u>		
1 yr	<u>7</u>	6 yrs	<u>23</u>	15 yrs	<u>0</u>		
2 yrs	<u>23</u>	8 yrs	<u>5</u>	20 yrs	<u>0</u>		

10f. Approximately how many years have you been exposed to intense noise?

None	<u>187</u>	3 yrs	<u>3</u>	10 yrs	<u>0</u>	20+ yrs	<u>1</u>
6 mos	<u>1</u>	4 yrs	<u>1</u>	12 yrs	<u>1</u>		
1 yr	<u>2</u>	6 yrs	<u>2</u>	15 yrs	<u>0</u>		
2 yrs	<u>2</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10g. Summed years of noise exposure:

Less than 1	<u>2</u>	28 yrs	<u>15</u>	63 yrs	<u>0</u>	98 yrs	<u>0</u>
1 yr	<u>58</u>	35 yrs	<u>5</u>	70 yrs	<u>0</u>	105 yrs	<u>0</u>
7 yrs	<u>61</u>	42 yrs	<u>1</u>	77 yrs	<u>0</u>	112 yrs	<u>0</u>
14 yrs	<u>44</u>	49 yrs	<u>1</u>	84 yrs	<u>0</u>	119 yrs	<u>0</u>
21 yrs	<u>12</u>	56 yrs	<u>1</u>	91 yrs	<u>0</u>	126 yrs	<u>0</u>

QUESTIONNAIRE DATA

CATEGORY Armor, 7.5-12.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 116 H-2 9 H-3 8 H-4 0 Do Not Know 67

2. Do you believe that you presently have a hearing loss?

YES 103 NO 97

3. How long do you believe you have had a hearing loss?

0-6 Mos 5 6 Mos-2 yrs 26 2-5 yrs 45

5-10 yrs 27 10-15 yrs 0 15-20 yrs 0 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 61 NO 42

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 44 NO 59

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 42 NO 61

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 95 2. Ear disease 2

3. Aging 0 4. Illness 0 5. Do Not Know 4 6. Other 2

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 137 NO 63

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>2</u>	10-15 yrs	<u>13</u>
6 mos-2 yrs	<u>26</u>	15-20 yrs	<u>0</u>
2-5 yrs	<u>43</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>53</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 176 NO 24

9. What is your attitude toward wearing ear protectors?

Like 55 Dislike 114 No Opinion 31

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>17</u>	3 yrs	<u>10</u>	10 yrs	<u>45</u>	20+ yrs	<u>2</u>
6 mos	<u>7</u>	4 yrs	<u>7</u>	12 yrs	<u>42</u>		
1 yr	<u>11</u>	6 yrs	<u>23</u>	15 yrs	<u>3</u>		
2 yrs	<u>13</u>	8 yrs	<u>20</u>	20 yrs	<u>0</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>44</u>	3 yrs	<u>11</u>	10 yrs	<u>25</u>	20+ yrs	<u>0</u>
6 mos	<u>10</u>	4 yrs	<u>13</u>	12 yrs	<u>27</u>		
1 yr	<u>14</u>	6 yrs	<u>17</u>	15 yrs	<u>2</u>		
2 yrs	<u>16</u>	8 yrs	<u>21</u>	20 yrs	<u>0</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>5</u>	3 yrs	<u>4</u>	10 yrs	<u>58</u>	20+ yrs	<u>1</u>
6 mos	<u>0</u>	4 yrs	<u>10</u>	12 yrs	<u>46</u>		
1 yr	<u>4</u>	6 yrs	<u>39</u>	15 yrs	<u>2</u>		
2 yrs	<u>2</u>	8 yrs	<u>29</u>	20 yrs	<u>0</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>51</u>	3 yrs	<u>4</u>	10 yrs	<u>41</u>	20+ yrs	<u>0</u>
6 mos	<u>6</u>	4 yrs	<u>3</u>	12 yrs	<u>36</u>		
1 yr	<u>3</u>	6 yrs	<u>23</u>	15 yrs	<u>7</u>		
2 yrs	<u>5</u>	8 yrs	<u>21</u>	20 yrs	<u>0</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	<u>50</u>	3 yrs	<u>8</u>	10 yrs	<u>45</u>	20+ yrs	<u>1</u>
6 mos	<u>3</u>	4 yrs	<u>6</u>	12 yrs	<u>29</u>		
1 yr	<u>3</u>	6 yrs	<u>23</u>	15 yrs	<u>2</u>		
2 yrs	<u>4</u>	8 yrs	<u>26</u>	20 yrs	<u>0</u>		

10f. Approximately how many years have you been exposed to intense noise?

None	<u>191</u>	3 yrs	<u>2</u>	10 yrs	<u>2</u>	20+ yrs	<u>0</u>
6 mos	<u>0</u>	4 yrs	<u>0</u>	12 yrs	<u>1</u>		
1 yr	<u>1</u>	6 yrs	<u>1</u>	15 yrs	<u>2</u>		
2 yrs	<u>0</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10g. Summed years of noise exposure:

Less than 1	<u>1</u>	28 yrs	<u>24</u>	63 yrs	<u>4</u>	98 yrs	<u>0</u>
1 yr	<u>7</u>	35 yrs	<u>35</u>	70 yrs	<u>2</u>	105 yrs	<u>0</u>
7 yrs	<u>19</u>	42 yrs	<u>12</u>	77 yrs	<u>0</u>	112 yrs	<u>0</u>
14 yrs	<u>28</u>	49 yrs	<u>25</u>	84 yrs	<u>1</u>	119 yrs	<u>0</u>
21 yrs	<u>25</u>	56 yrs	<u>17</u>	91 yrs	<u>0</u>	126 yrs	<u>0</u>

QUESTIONNAIRE DATA

CATEGORY Armor, 12.5-17.4 yrs.

SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 106 H-2 16 H-3 23 H-4 0 Do Not Know 55

2. Do you believe that you presently have a hearing loss?

YES 117 NO 83

3. How long do you believe you have had a hearing loss?

0-6 Mos 4 6 Mos-2 yrs 27 2-5 yrs 46

5-10 yrs 30 10-15 yrs 10 15-20 yrs 0 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 67 NO 50

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 49 NO 68

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 39 NO 78

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 103 2. Ear disease 2

3. Aging 0 4. Illness 1 5. Do Not Know 9 6. Other 2

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 151 NO 49

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>3</u>	10-15 yrs	<u>34</u>
6 mos-2 yrs	<u>19</u>	15-20 yrs	<u>10</u>
2-5 yrs	<u>44</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>41</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 178 NO 22

9. What is your attitude toward wearing ear protectors?

Like 63 Dislike 110 No Opinion 27

10a. Approximately how many years have you been exposed to small arms fire?

None	<u>18</u>	3 yrs	<u>15</u>	10 yrs	<u>8</u>	20+ yrs	<u>0</u>
6 mos	<u>3</u>	4 yrs	<u>8</u>	12 yrs	<u>40</u>		
1 yr	<u>6</u>	6 yrs	<u>6</u>	15 yrs	<u>80</u>		
2 yrs	<u>9</u>	8 yrs	<u>2</u>	20 yrs	<u>5</u>		

10b. Approximately how many years have you been exposed to artillery fire?

None	<u>39</u>	3 yrs	<u>9</u>	10 yrs	<u>15</u>	20+ yrs	<u>1</u>
6 mos	<u>5</u>	4 yrs	<u>6</u>	12 yrs	<u>31</u>		
1 yr	<u>21</u>	6 yrs	<u>6</u>	15 yrs	<u>51</u>		
2 yrs	<u>10</u>	8 yrs	<u>6</u>	20 yrs	<u>0</u>		

10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>5</u>	3 yrs	<u>1</u>	10 yrs	<u>20</u>	20+ yrs	<u>1</u>
6 mos	<u>0</u>	4 yrs	<u>3</u>	12 yrs	<u>65</u>		
1 yr	<u>1</u>	6 yrs	<u>7</u>	15 yrs	<u>91</u>		
2 yrs	<u>1</u>	8 yrs	<u>2</u>	20 yrs	<u>3</u>		

10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>43</u>	3 yrs	<u>2</u>	10 yrs	<u>9</u>	20+ yrs	<u>2</u>
6 mos	<u>7</u>	4 yrs	<u>2</u>	12 yrs	<u>41</u>		
1 yr	<u>6</u>	6 yrs	<u>5</u>	15 yrs	<u>79</u>		
2 yrs	<u>1</u>	8 yrs	<u>2</u>	20 yrs	<u>1</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None <u>47</u>	3 yrs <u>2</u>	10 yrs <u>15</u>	20 yrs <u>1</u>
6 mos <u>2</u>	4 yrs <u>2</u>	12 yrs <u>52</u>	
1 yr <u>3</u>	6 yrs <u>6</u>	15 yrs <u>62</u>	
2 yrs <u>4</u>	8 yrs <u>2</u>	20 yrs <u>2</u>	

10f. Approximately how many years have you been exposed to intense noise?

None <u>190</u>	3 yrs <u>0</u>	10 yrs <u>0</u>	20+ yrs <u>0</u>
6 mos <u>0</u>	4 yrs <u>2</u>	12 yrs <u>1</u>	
1 yr <u>0</u>	6 yrs <u>1</u>	15 yrs <u>2</u>	
2 yrs <u>2</u>	8 yrs <u>1</u>	20 yrs <u>1</u>	

10g. Summed years of noise exposure:

Less than 1 <u>5</u>	28 yrs <u>13</u>	63 yrs <u>14</u>	98 yrs <u>0</u>
1 yr <u>0</u>	35 yrs <u>22</u>	70 yrs <u>38</u>	105 yrs <u>0</u>
7 yrs <u>5</u>	42 yrs <u>24</u>	77 yrs <u>2</u>	112 yrs <u>0</u>
14 yrs <u>13</u>	49 yrs <u>15</u>	84 yrs <u>2</u>	119 yrs <u>1</u>
21 yrs <u>14</u>	56 yrs <u>32</u>	91 yrs <u>0</u>	126 yrs <u>0</u>

QUESTIONNAIRE DATA

CATEGORY Armor, 17 5-22.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 100 H-2 21 H-3 36 H-4 0 Do Not Know 43

2. Do you believe that you presently have a hearing loss?

YES 134 NO 66

3. How long do you believe you have had a hearing loss?

0-6 Mos 0 6 Mos-2 yrs 16 2-5 yrs 32

5-10 yrs 55 10-15 yrs 24 15-20 yrs 5 20+ yrs 2

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 85 NO 49

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 76 NO 58

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 53 NO 81

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 124 2. Ear disease 0

3. Aging 1 4. Illness 0 5. Do Not Know 7 6. Other 2

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 151 NO 49

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>1</u>	10-15 yrs	<u>23</u>
6 mos-2 yrs	<u>12</u>	15-20 yrs	<u>24</u>
2-5 yrs	<u>54</u>	20+ yrs	<u>1</u>
5-10 yrs	<u>36</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 183 NO 17

9. What is your attitude toward wearing ear protectors?

Like 66 Dislike 117 No Opinion 17

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>21</u>	3 yrs	<u>2</u>	10 yrs	<u>4</u>	20+ yrs	<u>31</u>
6 mos	<u>0</u>	4 yrs	<u>7</u>	12 yrs	<u>4</u>		
1 yr	<u>4</u>	6 yrs	<u>7</u>	15 yrs	<u>63</u>		
2 yrs	<u>5</u>	8 yrs	<u>2</u>	20 yrs	<u>50</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>42</u>	3 yrs	<u>2</u>	10 yrs	<u>4</u>	20+ yrs	<u>20</u>
6 mos	<u>1</u>	4 yrs	<u>9</u>	12 yrs	<u>5</u>		
1 yr	<u>12</u>	6 yrs	<u>8</u>	15 yrs	<u>47</u>		
2 yrs	<u>8</u>	8 yrs	<u>2</u>	20 yrs	<u>40</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>6</u>	3 yrs	<u>1</u>	10 yrs	<u>8</u>	20+ yrs	<u>27</u>
6 mos	<u>0</u>	4 yrs	<u>1</u>	12 yrs	<u>6</u>		
1 yr	<u>0</u>	6 yrs	<u>1</u>	15 yrs	<u>90</u>		
2 yrs	<u>0</u>	8 yrs	<u>0</u>	20 yrs	<u>60</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>43</u>	3 yrs	<u>2</u>	10 yrs	<u>4</u>	20+ yrs	<u>20</u>
6 mos	<u>3</u>	4 yrs	<u>3</u>	12 yrs	<u>7</u>		
1 yr	<u>3</u>	6 yrs	<u>1</u>	15 yrs	<u>63</u>		
2 yrs	<u>7</u>	8 yrs	<u>0</u>	20 yrs	<u>44</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None <u>58</u>	3 yrs <u>2</u>	10 yrs <u>5</u>	20+ yrs <u>17</u>
6 mos <u>1</u>	4 yrs <u>0</u>	12 yrs <u>6</u>	
1 yr <u>5</u>	6 yrs <u>0</u>	15 yrs <u>58</u>	
2 yrs <u>6</u>	8 yrs <u>1</u>	20 yrs <u>41</u>	

10f. Approximately how many years have you been exposed to intense noise?

None <u>194</u>	3 yrs <u>0</u>	10 yrs <u>0</u>	20+ yrs <u>2</u>
6 mos <u>0</u>	4 yrs <u>0</u>	12 yrs <u>0</u>	
1 yr <u>0</u>	6 yrs <u>1</u>	15 yrs <u>0</u>	
2 yrs <u>0</u>	8 yrs <u>0</u>	20 yrs <u>3</u>	

10g. Summed years of noise exposure:

Less than 1 <u>4</u>	28 yrs <u>16</u>	63 yrs <u>10</u>	98 yrs <u>28</u>
1 yr <u>1</u>	35 yrs <u>7</u>	70 yrs <u>38</u>	105 yrs <u>1</u>
7 yrs <u>2</u>	42 yrs <u>11</u>	77 yrs <u>15</u>	112 yrs <u>0</u>
14 yrs <u>14</u>	49 yrs <u>6</u>	84 yrs <u>5</u>	119 yrs <u>13</u>
21 yrs <u>3</u>	56 yrs <u>21</u>	91 yrs <u>3</u>	126 yrs <u>2</u>

QUESTIONNAIRE DATA

CATEGORY Artillery, 1.5-2.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 82 H-2 4 H-3 1 H-4 0 Do Not Know 113

2. Do you believe that you presently have a hearing loss?

YES 73 NO 127

3. How long do you believe you have had a hearing loss?

0-6 Mos 23 6 Mos-2 yrs 38 2-5 yrs 8

5-10 yrs 4 10-15 yrs 0 15-20 yrs 0 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 54 NO 19

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 27 NO 46

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 29 NO 44

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 54 2. Ear disease 0

3. Aging 0 4. Illness 1 5. Do Not Know 1 6. Other 3

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 118 NO 82

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>13</u>	10-15 yrs	<u>0</u>
6 mos-2 yrs	<u>87</u>	15-20 yrs	<u>0</u>
2-5 yrs	<u>17</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>1</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 176 NO 24

9. What is your attitude toward wearing ear protectors?

Like 58 Dislike 76 No Opinion 66

10a. Approximately how many years have you been exposed to small arms fire?

None	<u>76</u>	3 yrs	<u>2</u>	10 yrs	<u>1</u>	20+ yrs	<u>0</u>
6 mos	<u>51</u>	4 yrs	<u>3</u>	12 yrs	<u>1</u>		
1 yr	<u>18</u>	6 yrs	<u>1</u>	15 yrs	<u>1</u>		
2 yrs	<u>46</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10b. Approximately how many years have you been exposed to artillery fire?

None	<u>10</u>	3 yrs	<u>4</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>25</u>	4 yrs	<u>1</u>	12 yrs	<u>0</u>		
1 yr	<u>43</u>	6 yrs	<u>1</u>	15 yrs	<u>0</u>		
2 yrs	<u>116</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>29</u>	3 yrs	<u>10</u>	10 yrs	<u>0</u>	20+ yrs	<u>0</u>
6 mos	<u>9</u>	4 yrs	<u>3</u>	12 yrs	<u>1</u>		
1 yr	<u>42</u>	6 yrs	<u>2</u>	15 yrs	<u>0</u>		
2 yrs	<u>104</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>78</u>	3 yrs	<u>8</u>	10 yrs	<u>2</u>	20+ yrs	<u>1</u>
6 mos	<u>6</u>	4 yrs	<u>7</u>	12 yrs	<u>0</u>		
1 yr	<u>22</u>	6 yrs	<u>4</u>	15 yrs	<u>2</u>		
2 yrs	<u>68</u>	8 yrs	<u>0</u>	20 yrs	<u>2</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	143	3 yrs	1	10 yrs	0	20+ yrs	0
6 mos	6	4 yrs	0	12 yrs	0		
1 yr	13	6 yrs	2	15 yrs	0		
2 yrs	35	8 yrs	0	20 yrs	0		

10f. Approximately how many years have you been exposed to intense noise?

None	192	3 yrs	2	10 yrs	0	20+ yrs	0
6 mos	2	4 yrs	1	12 yrs	0		
1 yr	0	6 yrs	0	15 yrs	0		
2 yrs	2	8 yrs	0	20 yrs	1		

10g. Summed years of noise exposure:

Less than 1	5	28 yrs	1	63 yrs	0	98 yrs	0
1 yr	122	35 yrs	1	70 yrs	0	105 yrs	0
7 yrs	61	42 yrs	1	77 yrs	0	112 yrs	0
14 yrs	7	49 yrs	1	84 yrs	0	119 yrs	0
21 yrs	1	56 yrs	0	91 yrs	0	126 yrs	0

QUESTIONNAIRE DATA

CATEGORY Artillery, 2.5-7.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 69 H-2 7 H-3 7 H-4 0 Do Not Know 117

2. Do you believe that you presently have a hearing loss?

YES 92 NO 108

3. How long do you believe you have had a hearing loss?

0-6 Mos 4 6 Mos-2 yrs 49 2-5 yrs 30

5-10 yrs 7 10-15 yrs 2 15-20 yrs 0 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 68 NO 24

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 44 NO 48

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 41 NO 51

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 75 2. Ear disease 0

3. Aging 0 4. Illness 2 5. Do Not Know 13 6. Other 2

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 110 NO 90

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>6</u>	10-15 yrs	<u>1</u>
6 mos-2 yrs	<u>40</u>	15-20 yrs	<u>0</u>
2-5 yrs	<u>54</u>	20+ yrs	<u>1</u>
5-10 yrs	<u>8</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 181 NO 19

9. What is your attitude toward wearing ear protectors?

Like 49 Dislike 95 No Opinion 56

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>56</u>	3 yrs	<u>27</u>	10 yrs	<u>2</u>	20+ yrs	<u>1</u>
6 mos	<u>29</u>	4 yrs	<u>15</u>	12 yrs	<u>1</u>		
1 yr	<u>20</u>	6 yrs	<u>19</u>	15 yrs	<u>1</u>		
2 yrs	<u>28</u>	8 yrs	<u>0</u>	20 yrs	<u>1</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>10</u>	3 yrs	<u>57</u>	10 yrs	<u>0</u>	20+ yrs	<u>1</u>
6 mos	<u>15</u>	4 yrs	<u>30</u>	12 yrs	<u>0</u>		
1 yr	<u>12</u>	6 yrs	<u>25</u>	15 yrs	<u>0</u>		
2 yrs	<u>49</u>	8 yrs	<u>1</u>	20 yrs	<u>0</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>26</u>	3 yrs	<u>51</u>	10 yrs	<u>2</u>	20+ yrs	<u>2</u>
6 mos	<u>6</u>	4 yrs	<u>29</u>	12 yrs	<u>0</u>		
1 yr	<u>13</u>	6 yrs	<u>30</u>	15 yrs	<u>0</u>		
2 yrs	<u>39</u>	8 yrs	<u>1</u>	20 yrs	<u>1</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>73</u>	3 yrs	<u>43</u>	10 yrs	<u>4</u>	20+ yrs	<u>2</u>
6 mos	<u>9</u>	4 yrs	<u>24</u>	12 yrs	<u>0</u>		
1 yr	<u>9</u>	6 yrs	<u>20</u>	15 yrs	<u>1</u>		
2 yrs	<u>12</u>	8 yrs	<u>1</u>	20 yrs	<u>2</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	<u>133</u>	3 yrs	<u>16</u>	10 yrs	<u>1</u>	20+ yrs	<u>0</u>
6 mos	<u>13</u>	4 yrs	<u>8</u>	12 yrs	<u>1</u>		
1 yr	<u>6</u>	6 yrs	<u>9</u>	15 yrs	<u>1</u>		
2 yrs	<u>12</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10f. Approximately how many years have you been exposed to intense noise?

None	<u>189</u>	3 yrs	<u>1</u>	10 yrs	<u>1</u>	20+ yrs	<u>0</u>
6 mos	<u>0</u>	4 yrs	<u>1</u>	12 yrs	<u>1</u>		
1 yr	<u>2</u>	6 yrs	<u>1</u>	15 yrs	<u>1</u>		
2 yrs	<u>2</u>	8 yrs	<u>1</u>	20 yrs	<u>0</u>		

10g. Summed years of noise exposure:

Less than 1	<u>6</u>	28 yrs	<u>5</u>	63 yrs	<u>0</u>	98 yrs	<u>1</u>
1 yr	<u>56</u>	35 yrs	<u>4</u>	70 yrs	<u>0</u>	105 yrs	<u>0</u>
7 yrs	<u>70</u>	42 yrs	<u>2</u>	77 yrs	<u>0</u>	112 yrs	<u>0</u>
14 yrs	<u>42</u>	49 yrs	<u>0</u>	84 yrs	<u>0</u>	119 yrs	<u>0</u>
21 yrs	<u>14</u>	56 yrs	<u>0</u>	91 yrs	<u>0</u>	126 yrs	<u>0</u>

QUESTIONNAIRE DATA

CATEGORY Artillery, 7.5-12.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 69 H-2 10 H-3 28 H-4 0 Do Not Know 93

2. Do you believe that you presently have a hearing loss?

YES 104 NO 96

3. How long do you believe you have had a hearing loss?

0-6 Mos 3 6 Mos-2 yrs 22 2-5 yrs 52

5-10 yrs 27 10-15 yrs 0 15-20 yrs 0 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 77 NO 27

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 53 NO 51

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 47 NO 57

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 93 2. Ear disease 0

3. Aging 0 4. Illness 0 5. Do Not Know 8 6. Other 3

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 129 NO 71

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>5</u>	10-15 yrs	<u>4</u>
6 mos-2 yrs	<u>27</u>	15-20 yrs	<u>0</u>
2-5 yrs	<u>45</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>48</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 195 NO 5

9. What is your attitude toward wearing ear protectors?

Like 64 Dislike 98 No Opinion 38

- 10a. Approximately how many years have you been exposed to small arms fire?

None	<u>35</u>	3 yrs	<u>10</u>	10 yrs	<u>34</u>	20+ yrs	<u>0</u>
6 mos	<u>11</u>	4 yrs	<u>11</u>	12 yrs	<u>17</u>		
1 yr	<u>23</u>	6 yrs	<u>26</u>	15 yrs	<u>4</u>		
2 yrs	<u>19</u>	8 yrs	<u>10</u>	20 yrs	<u>0</u>		

- 10b. Approximately how many years have you been exposed to artillery fire?

None	<u>5</u>	3 yrs	<u>9</u>	10 yrs	<u>63</u>	20+ yrs	<u>0</u>
6 mos	<u>0</u>	4 yrs	<u>15</u>	12 yrs	<u>19</u>		
1 yr	<u>5</u>	6 yrs	<u>55</u>	15 yrs	<u>1</u>		
2 yrs	<u>3</u>	8 yrs	<u>25</u>	20 yrs	<u>0</u>		

- 10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>17</u>	3 yrs	<u>12</u>	10 yrs	<u>49</u>	20+ yrs	<u>0</u>
6 mos	<u>3</u>	4 yrs	<u>11</u>	12 yrs	<u>24</u>		
1 yr	<u>6</u>	6 yrs	<u>47</u>	15 yrs	<u>3</u>		
2 yrs	<u>9</u>	8 yrs	<u>19</u>	20 yrs	<u>0</u>		

- 10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>60</u>	3 yrs	<u>9</u>	10 yrs	<u>40</u>	20+ yrs	<u>0</u>
6 mos	<u>5</u>	4 yrs	<u>4</u>	12 yrs	<u>18</u>		
1 yr	<u>4</u>	6 yrs	<u>36</u>	15 yrs	<u>3</u>		
2 yrs	<u>10</u>	8 yrs	<u>11</u>	20 yrs	<u>0</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	122	3 yrs	3	10 yrs	11	20+ yrs	0
6 mos	5	4 yrs	9	12 yrs	7		
1 yr	6	6 yrs	19	15 yrs	1		
2 yrs	13	8 yrs	4	20 yrs	0		

10f. Approximately how many years have you been exposed to intense noise?

None	195	3 yrs	0	10 yrs	3	20+ yrs	0
6 mos	1	4 yrs	0	12 yrs	0		
1 yr	0	6 yrs	1	15 yrs	0		
2 yrs	0	8 yrs	0	20 yrs	0		

10g. Summed years of noise exposure:

Less than 1	3	28 yrs	39	63 yrs	1	98 yrs	0
1 yr	5	35 yrs	26	70 yrs	1	105 yrs	0
7 yrs	37	42 yrs	11	77 yrs	0	112 yrs	0
14 yrs	28	49 yrs	9	84 yrs	0	119 yrs	0
21 yrs	34	56 yrs	6	91 yrs	0	125 yrs	0

QUESTIONNAIRE DATA

CATEGORY Artillery, 12.5-17.5 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 70 H-2 26 H-3 35 H-4 0 Do Not Know 69

2. Do you believe that you presently have a hearing loss?

YES 111 NO 89

3. How long do you believe you have had a hearing loss?

0-6 Mos 3 6 Mos-2 yrs 10 2-5 yrs 46

5-10 yrs 42 10-15 yrs 9 15-20 yrs 1 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 67 NO 44

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 51 NO 60

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 39 NO 72

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 95 2. Ear disease 2

3. Aging 0 4. Illness 0 5. Do Not Know 11 6. Other 3

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 136 NO 64

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>3</u>	10-15 yrs	<u>31</u>
6 mos-2 yrs	<u>15</u>	15-20 yrs	<u>10</u>
2-5 yrs	<u>37</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>40</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 190 NO 10

9. What is your attitude toward wearing ear protectors?

Like 65 Dislike 84 No Opinion 51

10a. Approximately how many years have you been exposed to small arms fire?

None	<u>22</u>	3 yrs	<u>5</u>	10 yrs	<u>7</u>	20+ yrs	<u>2</u>
6 mos	<u>6</u>	4 yrs	<u>9</u>	12 yrs	<u>40</u>		
1 yr	<u>17</u>	6 yrs	<u>6</u>	15 yrs	<u>67</u>		
2 yrs	<u>15</u>	8 yrs	<u>1</u>	20 yrs	<u>3</u>		

10b. Approximately how many years have you been exposed to artillery fire?

None	<u>3</u>	3 yrs	<u>3</u>	10 yrs	<u>21</u>	20+ yrs	<u>0</u>
6 mos	<u>1</u>	4 yrs	<u>1</u>	12 yrs	<u>64</u>		
1 yr	<u>1</u>	6 yrs	<u>11</u>	15 yrs	<u>88</u>		
2 yrs	<u>1</u>	8 yrs	<u>4</u>	20 yrs	<u>2</u>		

10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>19</u>	3 yrs	<u>6</u>	10 yrs	<u>17</u>	20+ yrs	<u>2</u>
6 mos	<u>2</u>	4 yrs	<u>5</u>	12 yrs	<u>48</u>		
1 yr	<u>0</u>	6 yrs	<u>12</u>	15 yrs	<u>81</u>		
2 yrs	<u>2</u>	8 yrs	<u>4</u>	20 yrs	<u>2</u>		

10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>64</u>	3 yrs	<u>4</u>	10 yrs	<u>9</u>	20+ yrs	<u>2</u>
6 mos	<u>7</u>	4 yrs	<u>5</u>	12 yrs	<u>35</u>		
1 yr	<u>3</u>	6 yrs	<u>10</u>	15 yrs	<u>50</u>		
2 yrs	<u>5</u>	8 yrs	<u>3</u>	20 yrs	<u>3</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	<u>106</u>	3 yrs	<u>5</u>	10 yrs	<u>9</u>	20+ yrs	<u>0</u>
6 mos	<u>2</u>	4 yrs	<u>6</u>	12 yrs	<u>17</u>		
1 yr	<u>9</u>	6 yrs	<u>7</u>	15 yrs	<u>31</u>		
2 yrs	<u>7</u>	8 yrs	<u>0</u>	20 yrs	<u>1</u>		

10f. Approximately how many years have you been exposed to intense noise?

None	<u>192</u>	3 yrs	<u>0</u>	10 yrs	<u>0</u>	20+ yrs	<u>2</u>
6 mos	<u>1</u>	4 yrs	<u>1</u>	12 yrs	<u>1</u>		
1 yr	<u>0</u>	6 yrs	<u>0</u>	15 yrs	<u>0</u>		
2 yrs	<u>3</u>	8 yrs	<u>0</u>	20 yrs	<u>0</u>		

10g. Summed years of noise exposure:

Less than 1	<u>3</u>	28 yrs	<u>21</u>	63 yrs	<u>6</u>	98 yrs	<u>1</u>
1 yr	<u>1</u>	35 yrs	<u>26</u>	70 yrs	<u>14</u>	105 yrs	<u>0</u>
7 yrs	<u>9</u>	42 yrs	<u>40</u>	77 yrs	<u>2</u>	112 yrs	<u>0</u>
14 yrs	<u>12</u>	49 yrs	<u>10</u>	84 yrs	<u>3</u>	119 yrs	<u>1</u>
21 yrs	<u>12</u>	56 yrs	<u>31</u>	91 yrs	<u>0</u>	126 yrs	<u>0</u>

QUESTIONNAIRE DATA

CATEGORY Artillery, 17.5-22.4 yrs. SAMPLE SIZE 200

1. What is your current profile for hearing?

H-1 79 H-2 14 H-3 47 H-4 0 Do Not Know 60

2. Do you believe that you presently have a hearing loss?

YES 129 NO 71

3. How long do you believe you have had a hearing loss?

0-6 Mos 4 6 Mos-2 yrs 16 2-5 yrs 44

5-10 yrs 50 10-15 yrs 13 15-20 yrs 2 20+ yrs 0

4a. Does your hearing loss sometimes interfere with your ability to communicate with other people easily?

YES 70 NO 69

4b. Does your hearing loss sometimes interfere with your ability to function in social situations?

YES 56 NO 73

4c. Does your hearing loss sometimes interfere with your ability to perform your job to the best of your ability?

YES 44 NO 85

5. What do you believe was the primary cause of your hearing loss?

1. Exposure to loud noise 111 2. Ear disease 0

3. Aging 0 4. Illness 1 5. Do Not Know 17 6. Other 0

6. Do you usually wear ear protection (earplugs or muffs) when exposed to intense noise?

YES 135 NO 65

7. For how many years have you routinely worn ear protectors in noisy situations?

0-6 mos	<u>3</u>	10-15 yrs	<u>28</u>
6 mos-2 yrs	<u>19</u>	15-20 yrs	<u>9</u>
2-5 yrs	<u>49</u>	20+ yrs	<u>0</u>
5-10 yrs	<u>27</u>		

8. Are ear protectors usually available to you when you are exposed to intense noise?

YES 186 NO 14

9. What is your attitude toward wearing ear protectors?

Like 67 Dislike 96 No Opinion 37

10a. Approximately how many years have you been exposed to small arms fire?

None	<u>29</u>	3 yrs	<u>10</u>	10 yrs	<u>7</u>	20+ yrs	<u>30</u>
6 mos	<u>10</u>	4 yrs	<u>6</u>	12 yrs	<u>4</u>		
1 yr	<u>8</u>	6 yrs	<u>5</u>	15 yrs	<u>34</u>		
2 yrs	<u>10</u>	8 yrs	<u>0</u>	20 yrs	<u>47</u>		

10b. Approximately how many years have you been exposed to artillery fire?

None	<u>5</u>	3 yrs	<u>1</u>	10 yrs	<u>12</u>	20+ yrs	<u>34</u>
6 mos	<u>1</u>	4 yrs	<u>3</u>	12 yrs	<u>7</u>		
1 yr	<u>2</u>	6 yrs	<u>7</u>	15 yrs	<u>73</u>		
2 yrs	<u>4</u>	8 yrs	<u>1</u>	20 yrs	<u>50</u>		

10c. Approximately how many years have you been exposed to noisy vehicles?

None	<u>21</u>	3 yrs	<u>4</u>	10 yrs	<u>15</u>	20+ yrs	<u>32</u>
6 mos	<u>0</u>	4 yrs	<u>3</u>	12 yrs	<u>7</u>		
1 yr	<u>5</u>	6 yrs	<u>6</u>	15 yrs	<u>62</u>		
2 yrs	<u>7</u>	8 yrs	<u>2</u>	20 yrs	<u>36</u>		

10d. Approximately how many years have you been exposed to noisy machinery?

None	<u>67</u>	3 yrs	<u>0</u>	10 yrs	<u>9</u>	20+ yrs	<u>24</u>
6 mos	<u>2</u>	4 yrs	<u>2</u>	12 yrs	<u>8</u>		
1 yr	<u>13</u>	6 yrs	<u>3</u>	15 yrs	<u>36</u>		
2 yrs	<u>4</u>	8 yrs	<u>1</u>	20 yrs	<u>32</u>		

10e. Approximately how many years have you been exposed to noisy communications equipment?

None	99	3 yrs	6	10 yrs	10	20+ yrs	11
6 mos	3	4 yrs	2	12 yrs	6		
1 yr	10	6 yrs	10	15 yrs	21		
2 yrs	5	8 yrs	1	20 yrs	16		

10f. Approximately how many years have you been exposed to intense noise?

None	186	3 yrs	0	10 yrs	2	20+ yrs	2
6 mos	0	4 yrs	1	12 yrs	2		
1 yr	1	6 yrs	1	15 yrs	1		
2 yrs	2	8 yrs	1	20 yrs	1		

10g. Summed years of noise exposure:

Less than 1	5	28 yrs	16	63 yrs	7	98 yrs	17
1 yr	1	35 yrs	8	70 yrs	25	105 yrs	2
7 yrs	3	42 yrs	21	77 yrs	14	112 yrs	0
14 yrs	11	49 yrs	13	84 yrs	8	119 yrs	3
21 yrs	13	56 yrs	28	91 yrs	3	126 yrs	2

APPENDIX D

RECRUIT DATA

The three tables in Appendix D provide the audiometric data for the 300 recruits. The profile data give the percentage of H-1, H-2, H-3, and H-4 profiles; the pure tone data give the mean thresholds (right and left ear) at each frequency tested; and the speech audiometry data give the mean speech reception thresholds (SRT) and mean speech discrimination in quiet scores (right and left ear).

CATEGORY: Inductees, Ft. Dix

SAMPLE SIZE: 100

PROFILE DATA

H-1: 97%

H-2: 2%

H-3: 1%

H-4: 0%

PURE TONE DATA

Right Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	5.5	6.5	4.7	4.8	4.3	5.0	6.6	8.2	9.4	5.4
S.D.:	8.3	8.2	8.6	8.7	9.3	9.3	11.0	8.8	11.5	9.7

Left Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	4.5	4.9	3.8	4.2	4.4	5.7	8.7	9.7	11.1	4.3
S.D.:	4.9	4.7	5.4	7.8	7.0	7.9	10.3	11.4	13.9	4.8

SPEECH AUDIOMETRY

Right Ear

	SRT	DISC.
Mean:	7.0	96.6
S.D.:	11.2	10.2

Left Ear

	SRT	DISC.
Mean:	5.8	97.1
S.D.:	4.8	7.8

CATEGORY: Inductees, Ft. Jackson

SAMPLE SIZE: 100

PROFILE DATA

H-1: 98%

H-2: 1%

H-3: 1%

H-4: 0%

PURE TONE DATA

Right Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	10.2	9.1	9.1	9.6	7.0	7.2	8.8	11.5	10.0	8.3
S.D.:	5.8	6.0	5.2	5.9	6.7	8.0	8.9	11.8	12.4	4.8

Left Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.0	9.4	9.6	10.0	8.6	9.3	13.1	13.3	13.0	9.1
S.D.:	5.9	6.6	6.3	7.1	6.9	7.9	11.3	13.4	13.6	5.7

SPEECH AUDIOMETRY

Right Ear

	SRT	DISC.
Mean:	7.3	99.4
S.D.:	4.9	1.2

Left Ear

	SRT	DISC.
Mean:	8.9	99.2
S.D.:	5.5	1.8

CATEGORY: Inductees, Ft. Leonard Wood

SAMPLE SIZE: 100

PROFILE DATA

H-1: 97%

H-2: 2%

H-3: 1%

H-4: 0%

PURE TONE DATA

Right Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	10.2	6.5	4.4	3.4	3.0	5.6	6.0	9.0	10.5	4.7
S.D.:	7.3	8.0	8.0	6.3	6.5	7.8	8.4	11.0	12.3	6.9

Left Ear

	250	500	1000	1500	2000	3000	4000	6000	8000	PTA
Mean:	9.8	7.3	4.3	4.0	3.2	5.7	6.2	10.1	12.1	5.0
S.D.:	8.1	7.6	7.4	6.7	5.9	7.7	8.4	11.2	9.9	6.0

SPEECH AUDIOMETRY

Right Ear

	SRT	DISC.
Mean:	2.2	98.9
S.D.:	5.6	1.7

Left Ear

	SRT	DISC.
Mean:	2.5	98.8
S.D.:	5.3	1.9

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