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A PRELIMINARY REPORT
THE VIETNAM VETERANS MORTALITY STUDY

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SUMMARY

The patterns of mortality among 24,235 veterans of the Army and Marine Corps who served in Vietnam and 26,685 Vietnam era veterans who served in the Army and Marine Corps other than in Southeast Asia were investigated using standardized proportional mortality ratios (SPMRs). The study subjects were a random sample of Vietnam era veteran deaths taken from the Veterans Administration's Beneficiary Identification and Record Locator Subsystem (BIRLS). Data on the type of military service, place and dates of military service, military occupational speciality code, principal duties, and other demographic information were obtained from the military record. Cause of death information came from death certificates (97%), Department of Defense Reports of Casualty, or VA records. All cause of death information was coded by experienced nosologists using ICDA-8.

The veterans who had served in Vietnam were seen to have died from accidents, violence and trauma significantly more frequently than those who did not serve in Vietnam. The excesses seem to be among deaths from motor vehicle accidents and accidental drug poisonings. A closer investigation revealed that the accidental drug poisonings were predominantly heroin overdoses. Deaths coded as suicides were not in excess among those who served in Vietnam.

The Marines who served in Vietnam appear to have an excess of mortality from malignancies. Part of this excess seems to be lung cancer and non-Hodgkins lymphomas (NHL). Marines with combat related MOSCs have a greater risk for NHL than those with either direct combat support or indirect combat support MOSCs. The excess for NHL among Marines is also seen if general population mortality data or if U.S. cancer mortality data are used as comparisons. Standardized mortality odds ratios were also calculated for the NHL deaths among Marines using all cardiovascular deaths among Marines who did not serve in Southeast Asia as a comparison population. SMOR's were elevated for Marines with combat related MOSCs and for Marines whose first tour of duty was 1967-1969.

Additional data are being collected. Analyses are planned that will investigate the relationship between the place the Veteran served in Vietnam and the herbicide spray patterns in Air Force records.

INTRODUCTION

In response to growing concerns about the potential adverse health effects of military service in Vietnam, studies have been undertaken by governments, veterans organizations and others in the United States and Australia. To address some of these concerns, the Veterans Administration undertook a mortality study of Vietnam veterans based on deaths known to it. The study was designed and the original contracts for data collection were let by the Veterans Administration's Office of Reports and Statistics and subsequently transferred to the Agent Orange Projects Office to be completed. This is a preliminary report on some of the data from the study. The purpose of the study was to compare the mortality patterns of men who served in Vietnam with those of men who served in the military during the same era but who did not serve in Southeast Asia.

SOURCES OF DATA

Ideally one would like to be able to do a cohort study in which one could assess the relative risks of death from all causes or from specific causes for military personnel who served in Vietnam compared to military personnel who did not serve in Vietnam. Unfortunately, there is no complete roster of persons who served in the military during that era. Another approach had to be taken.

The Veterans Administration maintains an automated information system used to identify and to locate records of veterans who have received or are receiving veterans benefits such as compensation, pensions, loan guarantees, or education as well as records for veterans whose beneficiaries have received a death benefit. This system is known as the Beneficiary Identification and Record Locator Subsystem (BIRLS) and contains more than 38 million names. Until October 1981, the Veterans Administration was authorized to pay a lump sum benefit for all eligible veteran deaths. The number of eligible veterans was large and included those who served during the Vietnam era. Although this system does not provide a complete list of all veterans, it is believed to be a reasonably complete source for veteran deaths.

Beebe and Simon (1) assessed the completeness of the file for World War II veterans and found that 98% of independently ascertained deaths were known to the VA and BIRLS has been used as a source of data in other mortality studies of veterans. (2,3,4) This study was undertaken with the assumption that the BIRLS file would be able to provide a similarly complete list of Vietnam era veterans' deaths. The National Academy of Sciences(5), under contract to the Veterans Administration, has assessed the completeness of this file for Vietnam era veterans. Its findings and their implications for this study are discussed in Appendix A-1.

If a reasonably complete roster of Vietnam era veterans' deaths could be assembled and they could be classified as to whether or not they served in Vietnam, they could form the data base for a proportional mortality study (PMR analysis). Although the data in the BIRLS record do not consistently indicate whether or not the veteran has served in Vietnam, they do provide several advantages toward obtaining this information. The basic BIRLS record format may contain information such as social security number, service number, branch of service, dates of enlistment and discharge etc. These are data items needed to identify the veteran in the military record system.

As the name indicates, BIRLS is a file used to locate the VA claim folder for the veteran. It is the paper record of veterans' claims for benefits or claims made in his or her behalf. For deceased veterans, the file contains some kind of notification of death. In many cases this is the death certificate issued by the state or country where the veteran died or a DD1300, a Department of Defense form, Report of Casualty, issued in the event of death to an active member of the armed forces or reserve. The cause of death should be available for most veterans in these files.

Given the type of data readily available, a proportional mortality analysis was planned using a sample of the Vietnam era veterans' deaths found in BIRLS.

The purpose of the study was to describe the proportional mortality patterns of men who served in the Army or Marine Corps during a portion (1965-1973) of the Vietnam era (1965-1975). The study will compare the mortality patterns of servicemen who served in Vietnam with those of servicemen who did not serve in Southeast Asia.

SELECTING THE TARGET POPULATION

Proceeding under the assumption that the BIRLS system had the potential for yielding a reasonably complete roster of Vietnam Era veterans' deaths, it was necessary to devise strategies to select these deaths from among all deaths recorded in BIRLS. The objectives of the selection process were to obtain as complete a list as possible. This list would include all the Vietnam era veterans and would exclude veterans who had not served in the military during the Vietnam era. In the first stage, the attempt was made to provide as complete a list as possible. To do this, all veterans whose service dates included the period 1964-1975 were selected. For those records where the service dates were missing, persons whose birth dates were given as falling between 1935 and 1957 inclusive were selected. This yielded about 815,000 records.

Recalling the purpose of the study, to compare the mortality patterns of men who served in Vietnam with those who did not serve in Vietnam, additional criteria were introduced based on time of service and branch of service.

The Vietnam era, as defined by the Veterans Administration, was Aug. 5, 1964 to May 7, 1975. Prior to July 1965 and after January 1973 there were relatively few troops in Vietnam. If one sampled deaths among those who served before 1965 or after Jan. 1, 1973 there would be relatively few decedents who had served in Vietnam. Therefore, the study population was limited to military personnel who were in the armed forces on or after July 4, 1965 but before March 1, 1973.

Data published by the Department of Defense(6) indicate that 81% of those who served in Vietnam were in the Army or Marine Corps. For these branches of service duty in Vietnam meant, in most cases, service "in country". For those in the Air Force or Navy, Vietnam service is not so clear cut. It may be difficult to determine whether Navy personnel who were considered to have service in the Vietnam theatre of operations were ever actually "in country" or if Air Force personnel who flew missions over Vietnam or to Vietnam were ever "in country". Hence the study population was further limited to persons serving in the Army or Marine Corps between July 4, 1965 and March 1, 1973. Since this was to be a proportional mortality study and deaths related to combat could only occur among those with service in Southeast Asia and not among those who did not serve in Southeast Asia, deaths in service before the end of 1973 were excluded. The study population as defined by these criteria consisted of 186,000 names of military personnel who served in the Army or Marine Corps or unknown branch any time between July 4, 1965 and March 1, 1973 or whose year of birth was between 1934 and 1957 inclusive.

SAMPLE SELECTION

Power calculations done by the Office of Reports and Statistics of the Veterans Administration(7) suggested that at least 50,000 eligible cases would be needed for the study. It was assumed that some of the cases selected from the target population of 186,000 would be ineligible for the study based on branch or time of service, (these would be cases included in the target population because these data items were not recorded in the BIRLS) therefore, 60,000 names were selected from the target population by simple random sampling. It was assumed that the extra 10,000 names would allow for the ineligible and the final sample for analysis would be at least 50,000 names. A small sample of the records classified a priori as ineligible for the study by the selection criteria was taken in order to evaluate these criteria. The analysis of this "quality control" sample indicated that about 1% of the deaths of eligible males may have been excluded from the target population file because of incomplete or erroneous data in BIRLS.

In order to spread the work load over time, the 60,000 records were randomly divided into 4 batches to be processed at intervals of three months. The returns for the first batch suggested that the proportion of ineligible cases among those sampled was larger than the 16% allowed for in the 60,000, and if 50,000 eligible cases were to be obtained, the later batches would have to be increased in size. While the first two batches were in process, a committee of experts

(Appendix A-2) was convened. Because of the relative youth of the deaths in the study, the committee suggested that deaths occurring later in the study time frame i.e. after 1975 should be more heavily sampled in the later batches in order to enhance the possibility of seeing a broader spectrum of chronic diseases. Given the need to increase the sample size, and the recommendations of the expert committee, it was decided to select only deaths after 1975 and increase the sample size of the last two batches. Ultimately, 75617 records were selected. Using the results of the quality control sample and the outcome of the military records searches done on the cases selected, it was estimated that there should have been about 144,450 deaths of men meeting the study criteria in BIRLS and that this study included about 36% of them.

MILITARY RECORDS

Military records for discharged veterans are kept in the National Personnel Record Center (NPRC) in St. Louis, MO. Although the military records are not automated, there is a computerized "register" that can be used to locate a veteran's record. To use this register, one needs the veteran's name, branch of service, social security number, birth date, and if available, service number. For most subjects this information was available in BIRLS. A computer tape containing the requisite information was sent to the contractor responsible for the military records searching and abstracting. The tape was matched to the register and the file locations for the required cases were obtained. Attempts were made to locate records for persons not found by computer match by manually searching other unautomated files.

Records for which a location was determined were requested from the NPRC and abstracted by the contractor. The types of data obtained from these records are given in appendix B-1. For some persons whose military record could not be located or obtained at NPRC, VA records were searched for evidence of eligibility, such as branch, time, and place of service.

Abstracted records were returned to the VA project staff on computer tape. The staff of the study project then 'edited' the tape as far as possible looking for inconsistencies among military occupational specialty codes (MOSC), branch and grade codes. For veterans who had served in Southeast Asia, more data elements were abstracted from the military record. Any apparent inconsistencies such as disagreement between unit address and branch of service were resolved.

CAUSE OF DEATH INFORMATION

It had been assumed at the inception of the study that for most cases a death certificate had been filed with the VA by the next of kin in order to obtain some veteran's benefit or that there would be some other form such as DD1300, Report of Casualty that would indicate the cause of death in the veteran's VA file. To obtain this death

information, the records selected were sorted by the location of the record given in the BIRLS file. Lists of names with requisite identifying information were sent to the locations of record. The instructions issued to these offices were to locate the record, search for a death certificate or cause of death information, and send a copy of the death certificate or other document to the contractor responsible for coding the cause of death information.

For about 30% of the names selected the request was returned with no codeable cause of death information. These were cases where the file was not found; the file had been transferred elsewhere; the file contained no death certificate or other document showing cause of death; the death certificate in the file did not show a cause of death; or an incorrect certificate was returned (sometimes certificates for other family members, marriage certificates, baptismal certificates etc. were sent).

Every conceivable approach was taken to obtain cause of death information for these cases. Death certificates were the preferred source of information but Reports of Casualty issued by the military in the event of death active duty personnel or reservists were accepted if the death occurred out of the country and no death certificate could be obtained. It should be noted that most of these cases were accidents and probably little additional information would have been obtained from the death certificate if it were available. For cases where files had been transferred, the request was re-submitted to the new location. If the file was missing, VA records were researched to look for duplicate files in other locations. If BIRLS indicated that the veteran carried insurance, death certificates were requested from the insurance carrier. Arrangements were made with state vital statistics registrars to obtain death certificates from state records. For cases where a death certificate was returned without a cause of death (cases marked "pending" further investigation or certificates from New York City that did not include the portion of the certificate that contained the cause of death information) a request was made of the jurisdiction issuing the certificate to send an amended certificate. BIRLS files were searched for evidence of last known state of residence and requests were directed to that state. If the year of death was 1979 or later the name, birth date and social security number were submitted for a National Death Index search. If the records indicated that the veteran died while on active duty, a request was made to the contractor abstracting military records to look for a death certificate or DD1300 in the military record.

The predominant source of information on the cause of death for all cases was the death certificate or an abstract of the death certificate. This was true for both those who served in Vietnam and those who did not.

SOURCE OF CAUSE OF DEATH INFORMATION

Death certificates or abstracts	96.95%
DD 1300	2.13%
VA Forms/records	.92%

DEATH CERTIFICATE CODING

All information contained on the death certificate was coded for inclusion in the data base. Demographic information, geographic information and information on occupation and industry were coded using standard codes. All cause of death information was coded by trained nosologists using the International Classification of Diseases, 8th Revision (ICDA-8)(8) for entry into the Automated Classification of Medical Entities (ACME)(9) system.

All certificates for selected causes of death were reviewed by a senior staff member on the study. It was found that the cause of death information was consistently and accurately coded. A few questionable codes were re-submitted to the nosologist for review. Because the version of ACME used in this study was the earliest attempt to automate the assignment of the underlying cause of death on death certificates, occasionally there were re-submitted to the nosologist for review. Because the version of ACME used in this study was the earliest attempt to automate the assignment of the underlying cause of death on death certificates, occasionally there were codes erroneously assigned by the computer. Many of the cases questioned by the project staff member fell into this category. Consequently, an experienced nosologist, knowledgeable about the ACME system and its inadequacies, re-reviewed the cause of death coding on all certificates.

DATA MERGING

The data tapes containing the information abstracted by the contractors were matched to the original BIRLS data to confirm that the cases abstracted were the cases selected. Non-matches were culled from the tapes to be reviewed and if necessary, re-abstracted. This merge was straight forward for the military information. The military record abstract contained an identification number based on the alphabetical sequence of the names in each batch and this was known to the study staff. In the case of the death certificate abstracts, there was no such common number available on the tape and matches had to be attempted by social security number, name or VA claim number. This was not as straight forward as it may seem. Nearly 18,000 cases could not be matched by these means and had to be matched by someone looking at the data in both files and manually entering the matching file numbers. (For 15% of the eligible cases, there were no matching social security numbers between BIRLS and the death certificate data.) Once it was determined that all death certificate abstracts that could be matched to BIRLS had been identified, the military record file and the death certificate files

were matched. Again, checks were run looking for differences in names, social security numbers, and birth dates. Dates of death recorded on the death certificate abstracts were matched with dates of death given in BIRLS. All discrepancies were investigated. Most mismatches were found in time to be researched and included in the study; some were not and are now classified among the missing certificates. Where demographic data from the military abstract data did not match the BIRLS data for the case, there was no time to have these re-abstracted. These cases are counted among the search completed and not found cases.

CHARACTERISTICS OF THE SAMPLE

The final sample consisted of 75617 names; of these 69.1% (52253) were found to be eligible for inclusion in the study by virtue of branch of service or time of service.

DISTRIBUTION OF SAMPLE BY ELIGIBILITY STATUS

Names Selected	75617	100.0%
Found Eligible	52253	69.1%
Found Ineligible	22332	29.5%
Not found	1032	1.4%

The ineligible count includes duplicate names; men who did not serve in the military during the Vietnam Era; men who served in the Navy, Coast Guard or Air Force; men who were killed in action or reported missing in action and subsequently were declared dead; men who died in service before 1974; men who died of war related injuries; and all women. It should be noted that there were only 340 women identified. No women in this had served in Southeast Asia and not all had served during the Vietnam era.

Of the 52253 men determined to be eligible for the study, cause of death was ascertained for 51421 or 98.4%. The remaining 832 names (1.6%) were cases where the cause of death was pending; the veteran died overseas and the certificate available had no cause of death; the veteran was probably still alive; and cases where the place of death had not been identified.

STATUS OF ELIGIBLE CASES

Eligible by branch and time of service	52253	100.0%
Cause of death known	51421	98.4%
Cause of death not found	832	1.6%

Of the 51421 men for whom military service data and cause of death information was available, 24736 were known to have served in Southeast Asia: 24235; were identified as having served in Vietnam; 450 were known to have served in Thailand, and for 51 the unit with which they served is known but the place of service (i.e. Vietnam or elsewhere in Southeast Asia) has yet to be resolved.

PLACE OF MILITARY SERVICE

No service in Southeast Asia	26685	51.9%
Served in Vietnam	24235	47.1%
Served in Thailand only	450	0.9%
Place of service in Southeast Asia unk.	51	0.1%

This report will be based on 50920 deaths, 24235 men who served in Vietnam and 26685 men who did not serve in Southeast Asia.

METHODOLOGY

Jablon and Seltzer(2) concluded from their studies of veteran populations that it was hazardous to compare "selected cohorts" to the general population since these screened populations may vary systematically or confound the interpretation of an exposure hence there is a need to compare veterans to veterans. In this report we have heeded this advice and will use the Vietnam Era veterans who did not serve in Southeast Asia as a comparison group for those who served in Vietnam.

Of the 50920 men in this report, 83.6% had served in the Army; 47.6% had served in Vietnam (another 1% had served elsewhere in Southeast Asia). The Marines were more apt to have served in Vietnam (54.5% of the Marines and 46.2% of the Army had served in Vietnam). These proportions are close to what those that can be estimated from published data. According to Department of Defense figures(6), 8,844,000 men had served in the military between 4 Aug. 1964 and 27 Jan. 1973, Of these, 5,162,000 were in the Army or Marine Corps. Veterans Administration (9) figures indicate that 3,169,000 Vietnam era veterans served in Vietnam. If 81% of these were in the Army or Marine Corps(6) then 2,535,000 Army or Marine Corps veterans were in Vietnam. Therefore 2535/5162 or 49.1% of Army or Marine Corps personnel during that period served in Southeast Asia.

PLACE OF SERVICE BY BRANCH

	SERVED IN VIETNAM		TOTAL
	YES	NO	
Army	19708	22904	42612
Marine Corps	4527	3781	8308
TOTALS	24235	26685	50920

Of the 50920 deaths used in this report, 79.6% were white, 17.7% were black and 2.7% were of other racial groups.

Proportional mortality ratios, standardized for age, race, and branch of service (SPMRs) were calculated for all major causes of death among all men who served in Vietnam. To calculate a proportional mortality ratio for a particular cause of death, the deaths were first divided into two groups which were those who served in Vietnam and those who did not. Within each of these groups the deaths were then divided by branch of service and within groups of service, they were divided by race. Within each racial group they were divided into 10 age groups (20-24, 25-29, . . . 60-64, 65+). The the proportion of deaths from the cause of interest was calculated for each age group in the comparison group (veterans who did not go to Vietnam). These proportions were then multiplied by the total number of deaths in the corresponding age-race group in the Vietnam service group to obtain the number of deaths that would be expected to be seen among the veterans with Vietnam service if they had the same proportional distribution of deaths by age, race, branch and cause as those veterans who did not go to Vietnam. These expected numbers for a specific cause are then added to give the total number of deaths that would be expected if the veterans who had served in Vietnam had the same age, race, branch, specific proportional mortality as those veterans who did not serve in Vietnam. Mathematically this process can be expressed as :

$$\text{Expected}(+,+,+,1) = \frac{d(i,j,k,+) \times D(i,j,k,1)}{D(i,j,k,+)}$$

where $d(i,j,k,+)$ = the number of deaths from all causes in the i th branch, j th race and k th age group among veterans who served in Vietnam.

$D(i,j,k,1)$ = the number of deaths from the l th cause in the i th branch, j th race, and k th age group among veterans who did not serve in Vietnam.

$D(i,j,k,+)$ = the number of deaths from all causes in the i th branch, j th race, and k th age group among

The SPMR (standardized proportional mortality ratio) is obtained for each cause by dividing the observed number of deaths from that cause in veterans with Vietnam service by the expected number (O/E). The O/E (observed to expected ratio) indicates whether the group of interest has relatively more deaths (greater than 1) or relatively fewer deaths (O/E less than 1) than expected from a specific cause. In the tables presented here the expected numbers were rounded in printing the table. The Mantel-Haenszel chi-square statistic (11) was calculated for each category to indicate whether the deviation from unity is "statistically significant", that is, whether or not such

differences are likely to be seen by chance. (The O/E ratio and SPMR have been used interchangeably in this report.)

The disadvantages of proportionate mortality analysis are well known. If the overall mortality in the exposed population is different from that of the non-exposed population the SPMR will not approximate the standardized mortality ratio (SMR). That is, if the overall mortality rate is less among those who did not serve in Southeast Asia the the SPMRs will under estimate the cause specific risks for those who did go to Vietnam. A cause specific SPMR is also dependent on the relative distribution of other causes of death. For example, if men who served in Vietnam had a higher mortality rate for accidents than the referent population, then the SPMR for some other cause might be depressed.

All major causes of death were looked at separately among all men with service in Vietnam and in subgroups of that population. SPMRs were calculated separately for the men who served in the Army and for those who served in the Marine Corps because the branches might have had different types of "exposures" in Vietnam either by virtue of the location of their units or the types of duties they were assigned. For example, it is known that virtually all of the Marines in Vietnam were stationed in I Corps (the northern provinces of Vietnam). It is well known that mortality patterns tend to differ by race. For this reason, SPMR's were calculated separately for whites and non-whites. Most of the non-whites were blacks. There were too few persons of other races to consider them separately. Rather than excluding them from consideration, they were grouped with the blacks for the purpose of these preliminary analyses. Conceivably, enlisted men might have different experiences or exposures than officers. Thus, these two groups were considered separately. Certainly one might expect that men who were in combat might differ from those who were not. There was no data element that would indicate whether the man had been in combat. As a surrogate measure for combat, those with "combat" related MOSCs were compared with those who served in Vietnam with non-combat related MOSCs in each branch. Combat related MOSCs were those occupations where the primary duty would involve direct offensive and defensive action against an armed hostile force, for example: rifleman, field artilleryman, tank crew member etc. The MOSC groupings used here are those used in the Wisconsin study(12). They can be found in Appendix B-2. Data from all these analyses are presented in this report. Certainly many other subgroups might be identified as the analyses of this data set continue.

RESULTS AND DISCUSSION

If one looks at the deaths by major disease groups, there would seem to be no remarkable differences between the men who served in Vietnam and their counterparts who did not serve in Vietnam except for "accidents, violence, and trauma (E800-E989) which is "significantly" in excess among those who served in Vietnam. Deaths from "musculoskeletal and connective tissue diseases (710-730)" also

can be seen to be consistently elevated across the several subgroups but the differences are not seen to be "statistically" significant. The only other major disease category seen in significant excess is that of diseases of the nervous system and sense organs (380-389) in the marines with combat related MOSCs where the SPMR is 2.28 based on 17 cases observed.

ACCIDENTS, VIOLENCE AND TRAUMA

Since over half of all the deaths in the study population are due to accidents, violence, or trauma and because they are seen to be in excess, they bear investigation. Within this broad category, motor vehicle accidents account for most of the deaths and they are significantly in excess among all the sub populations except the Marines. A cursory investigation was carried out to see if the men who were in Vietnam were more likely to have civilian jobs that would put them at higher risk of having a motor vehicle accident. The proportion of men with jobs that might require driving a motor vehicle was the same in the two groups.

"Other transport accidents" are seen to be in excess primarily among Army personnel who are not enlisted men. Investigation revealed that these were occurring with greatest relative frequency among warrant officers who had MOSCs that indicated they were helicopter pilots and that helicopter crashes were a leading cause of death in this cause category. It was found that many of these men were killed while at work as helicopter pilots. These accident would not seem to be related to their "Vietnam experience" except for the correlation of MOSC, Vietnam service and civilian occupation. Most of the men with an MOSC that indicated that they were helicopter pilots had served in Vietnam.

The category of "accidental poisonings" was elevated among all groups. They seem to be a particular problem among white, Army enlisted personnel. A sample from all of these deaths was drawn and the death certificates were reviewed for more information. It was found that on 98 of 100 certificates the death was due to narcotic overdose, mostly heroin.

The accidents coded as "other accidents and injury" suggest they might be related to occupation but these have not been looked at in detail.

Death by suicides is relatively less frequent in all of the sub groups presented here except for nonwhite servicemen where the observed number exceeds the expected number by less than 1%.

Deaths by homicide are in excess among officers and those with combat experience. A preliminary investigation revealed that men who had service in Vietnam were more likely to have had a civilian job such as guard, policemen, etc., that would put them at risk of violent death.

MALIGNANCIES

The possibility of excess malignancies occurring among the men who served in Vietnam and who may have been exposed to herbicides has long been a concern to veterans. When all malignancies are grouped together, Marines, non-whites, and officers who served in Vietnam exhibit an excess of cancer when compared to their counterparts who did not serve in Southeast Asia. The excesses are not statistically significant but they suggest that there could be a problem in a subgroups of these men.

SPMRs FOR ALL MALIGNANCIES

GROUP	OBS.	O/E
All cases	2973	1.00
All Army	2452	.97
All Marines	521	1.20
All white servicemen	2480	.99
All non-white servicemen	492	1.06
All enlisted	2566	.99
All officers	318	1.04

The men with combat related MOSCs were not seen to have more malignancies than those who served with non-combat related MOSCs.

SPMRs FOR ALL MALIGNANCIES AMONG COMBAT RELATED MOSCs

BRANCH	OBS.	O/E
Army	550	.76
Marines	158	.98

This might suggest that if there is an "environmental" factor associated with military service in Vietnam that is related to the slight excesses seen in overall malignancies, it is not confined only to men who had a high probability of being in combat.

Differences between the services are seen for specific cancer sites among those who served in Vietnam. The most outstanding differences are the significant excess of deaths from lung cancer and non-Hodgkins lymphoma seen in the Marines. The SPMRs for these malignancies are also elevated among Army personnel although the excess are not seen as statistically significant.

SPMRs FOR SELECTED MALIGNANCIES BY BRANCH

SITE	ARMY		MARINES	
	OBS	O/E	OBS	O/E
All sites	2452	.97	521	1.20
Lung	632	1.03	130	1.58*
Non-Hodgkins Lymphoma	92	1.16	35	2.10*

Soft tissue sarcomas have been of particular interest to those studying the health or mortality of Vietnam veterans since they are a type of tumor that has been reported to be associated with exposure to phenoxy-herbicides by Swedish investigators(13). They are not elevated in this population. In each group the O/E ratio is 1.00 or less.

Some marked differences in the ratios of observed numbers of deaths to expected numbers of deaths have been noted between the men who served in the Army and those who served in the Marine Corps among both those who served in Vietnam and those who did not. Cause specific standardized proportional mortality ratios are dependent upon the relative distribution of other causes of death. The SPMR for the group of external causes of death (accidents, etc.) is higher among those who went to Vietnam relative to those who did not go to Vietnam in both those who served in the Army and those who served in the Marine Corps. This can occur either because those who went to Vietnam had higher relative risks of dying from external causes of death or because they have lower overall mortality rates than their counterparts who did not serve in Vietnam.

It might be expected that in comparison to the general population there would be relatively fewer deaths from circulatory diseases and certain other diseases in the military population because among these causes of death are conditions that would make one ineligible for military service. On the other hand the selection process for military service can not screen out persons likely to have an accident or to suffer from a malignancy in the future. It would be expected that any comparison with the general population there would be lower death rates for some diseases among those who served in the military. Consequently, the proportional mortality ratios will be less than 1 for these causes. Conversely, the proportional mortality ratios for diseases occurring at approximately the same rate or higher than in the general population will be elevated.

Standardized proportional mortality ratios were calculated for white male veteran deaths occurring in the years 1978 to 1981 using the 1978 U.S. white male mortality data (14) for four broad groups of causes of death: all malignancies, circulatory diseases, external causes, and all other. As expected, the groups of causes that are unlikely to be screened out at entry into the military service have relatively larger observed to expected ratios than those for

categories that include conditions that would lessen the likelihood of military service.

SPMRs FOR SELECTED CAUSES OF DEATH WHITE VETERANS 1978-1981

	No Vietnam Service		Vietnam Service	
	Army	Marines	Army	Marines
Malignancies	.99	.88	.98	1.04
Circulatory dis.	.87	.78	.96	.87
External causes	1.10	1.16	1.14	1.17
All other	.88	.66	.69	.60

U.S. white male mortality for 1978 were uses as a comparison.
No significance tests were done.

When compared to the U.S. white male mortality for 1978, the proportion of deaths from external causes tends to be the same for the Marines who went to Vietnam as for those who didn't go. There still appears to be an excess of malignancies among Marines who went to Vietnam when compared to the general population. The deaths among the Marine veterans are distributed differently than those among the Army veterans when compared to deaths among the U.S. white male population. One explanation might be the difference in the ages of the two populations. The mean age of death for the Army veterans was the same for those who went to Vietnam (36.3 years) as for those who did not go (36.2 years). The mean age of death for the Marine Corps veterans was less than that of the Army veterans. The mean age of death for Marines who did not serve in Vietnam was younger (30.9 years) than that of the marines who had served in Vietnam (34.4 years). Mortality rates for most causes of death are related to age. Younger populations will die relatively more frequently from accidents, etc. than older populations. The SPMRs were recalculated for this same group of deaths excluding all external causes of death. When all external causes of death were removed, there is less difference between the distribution of the Army deaths and the Marine deaths among both those who went to Vietnam and those who did not.

OBSERVED TO EXPECTED RATIOS FOR SELECTED CAUSES OF DEATH
WHITE VETERANS 1978-1981 EXCLUDING EXTERNAL CAUSES OF DEATH

	No Vietnam Service		Vietnam Service	
	Army	Marines	Army	Marines
All malignancies	1.09	1.15	1.09	1.35
Circulatory dis.	.93	.95	1.06	1.01
External causes				
All other	1.01	.93	.82	.76

U.S. white male mortality for 1978 used as a comparison.
No significance tests were done.

One might question whether the excess mortality from non-Hodgkins lymphoma or lung cancer might be artifacts of the apparent excess deaths from external causes among Marine veterans who did not go to Vietnam thereby yielding a relatively smaller proportion of expected deaths from malignancies among these men thus increasing the O/E ratios in the internal comparisons presented in this report.

The expected numbers of malignancies were calculated using U.S. mortality data and using only the distribution of specific malignancies(15) within all malignancies.

**OBSERVED AND EXPECTED NUMBERS OF DEATHS FOR SELECTED MALIGNANCIES,
WHITE MALES, 1973-1981,
ARMY**

	No Vietnam Service			Vietnam Service		
	OBS.	EX1	EX2	OBS.	EX1	EX2
All malignancies	2061	1964		1773	1753	
Ca-colon	133	142	154	107	125	128
Ca-lung,bronchus	488	446	495	443	410	433
Hodgkins Lymphoma	72	94	91	65	83	79
Non-Hodgkins Lymphoma	122	113	115	84	101	100
Leukemia	192	188	184	152	163	157

EX1 = Expected numbers based on 1973-81 total white male mortality
EX2 = Expected numbers based on 1973-81 white male cancer mortality

**OBSERVED AND EXPECTED NUMBERS OF DEATHS FOR SELECTED MALIGNANCIES,
WHITE MALES, 1973-1981
MARINES**

	No Vietnam Service			Vietnam Service		
	OBS.	EX1	EX2	OBS.	EX1	EX2
All malignancies	226	264		409	392	
Ca-colon	10	17	15	18	27	29
Ca-lung,bronchus	40	41	46	103	79	91
Hodgkins Lymphoma	11	18	11	17	22	20
Non-Hodgkins Lymphoma	8	17	13	29	24	25
Leukemia	21	35	24	36	42	36

EX1 = Expected numbers based on 1973-81 total white male mortality
EX2 = Expected numbers based on 1973-81 white male cancer mortality

When the influence of the external causes death is removed from the standardized proportional mortality ratios by calculating the expected numbers using only the proportional distribution within all malignancies as a comparison, the apparent increase in lung cancer and in NHL still exists. Since the SPMSs using the internal comparisons were elevated for a subset of Marines, those with combat related MOSCs, expected numbers for this population were calculated using the U.S. mortality as in the tables above.

**OBSERVED AND EXPECTED NUMBERS OF DEATHS FOR SELECTED MALIGNANCIES,
WHITE MALES, 1973-1981
MARINES WITH COMBAT MOSCs**

	No Vietnam Service			Vietnam Service		
	OBS.	EX1	EX2	OBS.	EX1	EX2
All malignancies	35	51		136	133	
Ca-colon	3	3	2	5	9	9
Ca-lung,bronchus	4	6	4	20	19	24
Hodgkins lymphoma	0	4	2	6	10	8
Non-Hodgkins lymphoma	1	4	2	14	9	9
Leukemia	5	7	4	17	18	17

EX1 = Expected numbers based on 1973-81 total white male mortality
EX2 = Expected numbers based on 1973-81 white male cancer mortality

The observed numbers of NHL are not as different from the expected numbers in those who did not serve in Vietnam as they are among those who served in Vietnam. The results are similar for black males who served in the Army. Therefore, the excess mortality from NHL seen using the internal comparisons is probably not an artifact.

**OBSERVED AND EXPECTED NUMBERS OF DEATHS FOR SELECTED MALIGNANCIES,
BLACK MALES, 1973-1981
ARMY WITH COMBAT MOSC'S**

	No Vietnam Service			Vietnam Service		
	OBS.	EX1	EX2	OBS.	EX1	EX2
All malignancies	290	253		344	281	
Ca-colon	37	18	21	30	20	24
Ca-lung,bronchus	76	71	60	48	86	106
Hodgkins Lymphoma	5	9	10	10	8	9
Non-Hodgkins Lymphoma	8	9	10	18	9	11
Leukemia	21	21	24	21	29	23

EX1 = Expected numbers based on 1973-81 total black male mortality
EX2 = Expected numbers based on 1973-81 black male cancer mortality

ADDITIONAL ANALYSIS FOR NON-HODGKIN'S LYMPHOMA

The SPMR for non-Hodgkin's lymphoma in Marines who went to Vietnam when compared to those who didn't go to Vietnam was 2.10 based on 35 observed cases. This is significantly greater than 1 using the Mantel Haenszel(11) chi-square statistic. Case control analyses (16) were carried out to examine the relationship between mortality from non-Hodgkin's lymphoma (NHL) to service in Vietnam. The controls for these analyses were all cardiovascular deaths (ICDA-8 codes: 390.0-458.9) among Marines who did not go to Southeast Asia. These were chosen because in this mortality study and several others (12,18,19,20) no association was found between Vietnam service and cardiovascular mortality. Also, no biologic hypothesis exists suggesting a relationship between service in Vietnam and cardiovascular mortality. In case control analysis, if the exposure of interest is not a risk factor for the selected control group the standardized mortality odds ratio (SMOR) is equivalent to the SMR. All SMOR analyses were standardized by age.

AGE SPECIFIC MORTALITY ODDS RATIOS FOR NON-HODGKIN'S LYMPHOMA MARINES

Age Group	OBS	MOR	(LCI,UCI)
20-29	7	2.28	(0.64,8.18)
30-39	23	5.11	(1.51,17.3)*
40-49	2	0.28	(0.04,2.03)
50-59	2	0.95	(0.08,10.7)
60+	1	1.58	(0.05,48.8)
Overall	35	2.08	(1.21,3.60)

* p-value for Mantel-Haenszel chi square < .01.
(Cardiovascular deaths among Marines who did not go to Southeast Asia are the control population.)

Marines age 30 through 39 at death had a mortality odds ratio of 5.11 with a lower 95% level of 1.51. The overall SMOR for Marines was 2.08 with a lower 95 percent confidence level of 1.21.

The data collected from the military records included information on military occupational speciality and dates of service in Vietnam. The most usual tour of duty in Vietnam was 13 months for the Marines. If the difference between the date the veteran first went to Vietnam and the date he last left Vietnam was greater than 13 months for a Marine there is a strong possibility that the veteran served more that one tour of duty in Vietnam. Marines thus classified as having one tour had a significantly elevated SMOR of 2.44 for NHL.

STANDARDIZED MORTALITY ODDS RATIOS FOR NON-HODGKIN'S LYMPHOMA
AMONG MARINES BY LENGTH OF SERVICE IN VIETNAM

	OBS	SMOR (LCI,UCI)
1 tour	20	2.44 (1.33,4.47)
1+ tours	15	1.74 (0.93,3.27)

(Cardiovascular deaths among Marines who did not go to Southeast Asia are the control population)

Herbicides were used in Vietnam in greatest volume in 1967 through 1969. The standardized mortality odds ratios are highest in both groups among those who first went to Vietnam during that time interval. The elevation is significant in the Marines but not in the Army personnel.

STANDARDIZED MORTALITY ODDS RATIOS FOR NON-HODGKIN'S LYMPHOMA
AMONG MARINES BY FIRST YEAR IN VIETNAM

	OBS	SMOR (LCI,UCI)
1965-66	16	1.76 (1.02,4.95)
1967-69	17	2.54 (1.22,5.25)
1970+	2	1.88 (0.42,8.36)

(Cardiovascular deaths among Marines who did not go to Southeast Asia are the control population)

Military Occupation Specialty Codes (MOSCs) were categorized as combat troops, direct support of combat troops, and indirect support of combat troops. A description of the categories of MOSC appear in the Appendix B-2. Combat related MOSCs had the highest SMOR for military occupations at 3.25. The SMOR by MOSC decreases from combat to indirect support assignments.

STANDARDIZED MORTALITY ODDS RATIOS FOR NON-HODGKIN'S LYMPHOMA
AMONG MARINES BY MOSC GROUPS

	OBS	SMOR (LCI,UCI)
Combat	17	3.25 (1.45,7.32)
Direct Support	11	1.70 (0.89,3.23)
Indirect Support	7	1.37 (0.94,2.25)

(Cardiovascular deaths among Marines who did not go to Southeast Asia are the control population)

Several studies have revealed an association between herbicide use and non-Hodgkin's lymphoma. A report of a recent population based case control study done by the National Cancer Institute (21) presents an odds ratio of 2.2 (Confidence interval:1.2-4.1) for farmers ever using phenoxyacetic acids. A matched case control study done in Sweden (xx) of malignant lymphomas (Hodgkin's and NHL) found a relative risk of 4.8 for those exposed to phenoxy acids. Because agent orange and other herbicides used in Vietnam contained phenoxyacetic acids, an attempt will be made to try to relate the location of the units in which these men served to the known herbicide spray patterns.

STATE VIETNAM VETERANS MORTALITY STUDIES

Wisconsin, West Virginia, New York and Massachusetts (12,18,20,17) have done mortality studies of Vietnam Era veteran. The Air Force "Ranch Hand Study" (19) includes a cohort mortality analysis. Although the results of these studies are suggestive of possible excess mortality for some causes of death, they are not strictly comparable to the data given in this report. They differ from this study in several ways. They included all Vietnam era veterans from all branches of services, some used only men with service "in country" Vietnam; other chose all who served in Southeast Asia as service in Vietnam.

Wisconsin, New York and West Virginia used other Vietnam era veterans, all other state veteran and non veterans as comparison populations for SPMR analyses. Massachusetts used all other state veterans who applied for veteran bonuses and served between 1958 and 1973 as their comparison group.

In the Ranch Hand Study, a standardized mortality ratio (SMR) analysis was done comparing "Ranch Handers" (i.e. men who were involved with herbicide spraying) with cargo flight crews who did not handle herbicides.

The findings reported by the state studies are somewhat inconsistent with each other and with what was found here. For example, Wisconsin and Massachusetts both seen to have an excess of soft tissue sarcoma among those who went to Vietnam when compared to all other veterans.

Since each state used somewhat different methods and populations, a series of tables comparable to those done for the total study population was done for each of these states using all U.S. veterans who did not serve in Southeast Asia as a comparison group for veterans from each state who had served in Vietnam. Only tables for white servicemen were done to illustrate the differences one might see when comparing more homogeneous groups and holding the comparison group constant.

SPMRs FOR SELECTED EXTERNAL CAUSES OF DEATH BY STATE
WHITE SERVICEMEN

	NY		WI		MA		WV	
	OBS	O/E	OBS	O/E	OBS	O/E	OBS	O/E
All ext causes	412	0.83	214	1.04	172	0.99	11	0.96
Motor veh acc.	137	.73*	105	1.34*	48	0.74*	7	0.92
Acc. poison	31	1.65*	4	0.45	27	3.67*	5	0.92
Suicide	70	.64*	49	1.08*	38	0.98	0	0.60*
All malignancies	79	1.01	34	1.03	26	0.82	30	0.92
Ca-intestines	10	1.87*	3	1.31	1	0.44	2	0.85
Ca-soft tissue	1	0.70	3	5.11*	2	3.81*	1	1.95
Ca-testes	1	0.23	5	2.86*	2	1.40	2	1.69*
Cirrhosis-alcoholic	26	3.17	4	1.01	2	0.56	7	1.89
Cirrhosis-other	20	1.95*	1	0.23	9	2.10*	3	0.64

* P<0.05 for chi-square with 1 degree of freedom

All U.S. veterans who did not go to Vietnam were the comparison group
Cause of death groups consistent with grouping used in other tables

In the largest category of deaths, that for accidents, suicide and trauma, great variation is seen among the states. When some states seem to have significant excess deaths for a particular subgroup another may show significant deficits for the same subgroup. Similar results can be found among other causes of death. These data are shown for selected causes where at least one state's data indicate a significant excess.

Whether these variations among the states are the result of sampling error or whether they suggest an underlying difference in the mortality experience among states is not obvious.

There were sufficient deaths from California in the study population to permit a comparison of SPMRs one could observe using different comparison populations. Using deaths from external causes as an example, it can be seen that white California veterans as a group have a different mortality experience then than of all white U.S. servicemen in the study population.

When using all U.S. white veterans from the study population with no service in Southeast Asia as a comparison group, the white California veterans with no Vietnam service have significantly more deaths from accidental poisoning (drug overdose) and relatively more suicides than other veterans. When the California veterans with Vietnam service are compared to Vietnam era veterans from California who did not serve in Vietnam, these excesses diminish. Suicides are fewer than expected and the deaths from drug overdose are only slightly more than expected.

COMPARISONS OF SPMR'S FOR SELECTED CAUSES
OF DEATH IN CALIFORNIA

	OBS	O/E1	O/E2
All ext. causes	1232	1.05*	1.02
Motor veh. acc.	446	1.00	0.99
Acc. poisoning	97	2.17*	1.06
Suicides	280	1.07	0.92
All malignancies	245	.93	.94
Ca-intestines	11	.56	.42
Ca-soft tissue	18	.97	.56
Ca-testes	17	1.77*	2.87*
Cirrhosis-alcoholic	48	.9.14*	1.14
Cirrhosis-other	45	1.48	1.06

* $p < 0.05$ for chi-square with 1 degree of freedom

O/E1 = All U.S. veteran who did not serve in Vietnam used as a comparison group.

O/E2 = California veterans who did not serve in Vietnam used as a comparison group.

CONCLUSIONS

The results of the preliminary analysis of some of the data from the Vietnam Veterans Mortality Study indicate that veterans who served in Vietnam were more likely to die from accidents, violence, or trauma than their counterparts who did not serve in Southeast Asia. In particular, they were more likely to die from motor vehicle accidents or from drug overdoses. There was no evidence that there are excess numbers of suicides among those who served in Vietnam.

The SMPRs suggest that there might be some causes of death that should be investigated further. One of these causes, non-Hodgkins lymphoma, was submitted to further analysis. The excess of NHL among Marines are seen using the U.S. mortality data as a comparison. Standardized mortality odds ratios using cardiovascular deaths among all Marines who did not serve in Vietnam as a control, indicate elevated risks for Marines with combat related military occupational speciality codes and for Marines who served in Vietnam for the first time between 1967 and 1969.

The data collection for this study has been extended to include veteran deaths from 1982-1984. When these data are available for analysis they will be added to the data presented here and re-analyzed. One such analysis will look at the location of the unit in which a man served in Vietnam relative to the herbicide spray patterns recorded by the Air Force.

REFERENCES

1. Beebe, G.W. and Simon, A.H. Ascertainment of mortality in U.S. veteran population. *Amer. Jour. of Epid.*:89:636-643.
2. Seltzer, C. C. and Jablon, S. Effects of selection on mortality. *Amer. Jour. Epid.*:100:367-370.
3. Seltzer, C. C. and Jablon, S.H. Army rank and subsequent mortality by cause: 23 year follow-up. *Amer. Jour. Epid.*: 105:559-566
4. Robinette, C. D. and Fraumini, J.F. Asthma and subsequent mortality in World War II veterans. *J. Chron. Dis.* :31:619-624
5. Ascertainment of Mortality in the U.S. Vietnam Veteran Population. Report of contract V101 (93) P-937, National Academy of Sciences Commission on the Life Sciences Medical Follow-up Agency, Washington, DC., 1985.
6. Selected Manpower Statistics, Fiscal Year 1981, Directorate for Information, Operations, and Reports, Department of Defense.
7. Protocol for the Vietnam Veterans Mortality Study. Office of Reports and Statistics, Statistical Policy and Research Service, Veterans Administration, Washington,DC., 1983.
8. Eighth Revision International Classification of Disease, Adapted for Use in the United States. Public Health Service Washington, DC.
9. Instructions for Medical Classification of Death Records for Automated Classification of Medical Entities, 1976-1978 U.S.Dept. of Health .Education and Welfare, Public Health Service, Washington DC, 1977
10. 1979 National Survey of Veterans. Reports and Statistics Service, Office of the Controller, Veterans Administration, Washington, DC, 1980.
11. Mantel, N. and Haenszel, W. "Statistical aspects of the analysis of data from retrospective studies of disease," *Journal of the National Cancer Institute*:28:947 (1962)
12. Wisconsin Vietnam Veteran Mortality Study, Final Report. State of Wisconsin Department of Health and Social Services, Division of Health, 1986.

13. Hardell, L., et al. "Malignant Lymphoma and exposure to Chemicals Especially Organic Solvents, Chlorophenols and Phenoxy Acids: A Case-Control Study". *British Journal of Cancer*:43, 169-76. 1981.
14. *Vital Statistics of the United States, 1978, Mortality*. U.S. Dept. Health and Human Services, Public Health Service, National Center for Health Statistics, Rockville, MD
15. SEER Program Report, Cancer Incidence and Mortality in the United States 1973-1981. NIH Publication 85-1837, U.S. Dept. Health and Human Services, Public Health Service, National Cancer Institute, Bethesda, MD, 1984
16. Miettinen, O. S. and Wang, J. "An Alternative to the Proportionate Mortality Ratio". *Amer.Jour. of Epid.*:114 : 144-48, 1981.
17. *Mortality Patterns Among Vietnam Veterans in Massachusetts 1972-83*. Massachusetts Office of Commissioner of Veterans Services, Agent Orange Program, Massachusetts Department of Public Health, Division of Health Statistics, 1985.
18. *West Virginia Vietnam Era Veterans Mortality Study. West Virginia Residents 1968-1983, Preliminary Report*. West Virginia Health Department, 1986.
19. *An Epidemiologic Investigation of Health Effects in Air Force Personnel Following Exposure to Herbicides, Baseline Mortality Study*. The Surgeon General, United States Air Force. June 30, 1983.
20. *Mortality Patterns Among Vietnam and Vietnam Era Veterans*, New York State Department of Health, draft report submitted to the Veterans Administration for review, 1983.
21. Hoar, S. K., et al. "Agricultural Herbicide Use and Risk of Lymphoma and Soft-Tissue Sarcoma". *Journal of the American Medical Association* : 1986.

APPENDIX A

APPENDIX A-1

The National Research Council (NRC) tested the completeness of BIRLS as a source of Vietnam era veterans deaths by selecting a sample of men who died in 1980 from the vital statistics records of 8 states. The names and social security numbers of the men were matched against the military records files at NRC to ascertain military service; 3583 Vietnam era veterans were identified. Of these 3583, 88.8% were found to be recorded in BIRLS as dead; 5.3% were found in BIRLS with no death recorded and 5.9% were not found in BIRLS. The researcher used the social security number and name given on the death certificate to search the BIRLS file.

It was the experience of the investigators in the VA's Vietnam Veterans Mortality Study that some veterans had more than one social security number or the name found on the death certificate was not the name in the BIRLS file. It was also found that some men, particularly those who served in the Vietnam era, may have had more than one BIRLS file. About the time the military switched from assigning service number to using social security numbers as the service number, the VA changed from assigning claims file numbers to using social security numbers as a claim file number. As a result of change in the VA's method of assigning claims file numbers, some veterans were found to have a BIRLS file under a claim number and another under a social security number. If the record filed under a claim number did not contain the social security number the second file might not be found by the method used by the National Research Council. This would be a particular problem for men with common names. Both of these two records may or may not have recorded the death. Frequently when these cases were encountered in this mortality study, one BIRLS record would have a death date and the other would not. Unfortunately no record was kept of the relative frequency of this problem.

An attempt was made to evaluate the findings of the NRC report using materials that were available in the mortality study. All cases for whom a death certificate was available and for whom the military service history was known were searched for cases where: the social security number on the death certificate did not match the social security number in BIRLS; the name in BIRLS did not match the name on the death certificate; the birth date on BIRLS did not match the birth date (or age) on the death certificate. For 9.5% of all certificates the social security number of the death certificate did not match the social security number in BIRLS; for 51% of those with unmatched social security numbers, the names and/or birth dates did not match.

These data suggest that 4.8% to 9.5% of the deaths known to be in BIRLS might not be found using the methods used by NRC. If we subtract these number from the 11.2% not found by NRC then perhaps 1.7% to 6.6% of Vietnam era veterans may not be in BIRLS.

APPENDIX A-2

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The 9.5% of deaths that might have been lost were arrayed by cause of death and Vietnam service. No differences were seen before these two groups. Therefore we feel that the BIRLS did provide a fairly complete roster of Vietnam era veteran deaths for this study.

APPENDIX B

APPENDIX B-1 (continued)

3. CD Tr # From To MISC Prin. Duty: Unit: (113)

4. CD Tr # From To MISC Prin. Duty: Unit: (113)

5. CD Tr # From To MISC Prin. Duty: Unit: (113)

6. CD Tr # From To MISC Prin. Duty: Unit: (113)

7. CD Tr # From To MISC Prin. Duty: Unit: (113)

8. CD Tr # From To MISC Prin. Duty: Unit: (113)

9. CD Tr # From To MISC Prin. Duty: Unit: (113)

10. CD Tr # From To MISC Prin. Duty: Unit: (113)

11. CD Tr # From To MISC Prin. Duty: Unit: (113)

NOTES:

APPENDIX B-2

Explanation of MOS Codes

The Military Occupational Speciality code at time of discharge was obtained from the military record for all persons in the study. If a man had served in Southeast Asia his MOS and principle duty for each assignment in Vietnam was abstracted. The MOS coding scheme for the Army personnel had changed during the period of service covered by the study. Translation tables were built using materials supplied by the U.S. Army and Joint Service Environmental Support Group. Some codes could not be translated from the materials supplied. Some codes were missing. The codes are more complete for those who served in Vietnam because the description of the principal duties or title made it possible to assign a MOSC at least the 2-digit level.

It was noticed during the review of these codes that for the men who had served in Vietnam the MOS at their first assignment in Vietnam was more descriptive of the type of duties assigned to him during his tour of duty in Vietnam than his MOS at discharge. After consultation with staff at the Environmental Support Group it was decided to use the MOS of the first assignment in Vietnam to characterize the man's duties in Vietnam.

The MOSC for the men with service in Vietnam grouped into three categories, combat, direct support, and indirect, support based on probability of combat. (These are the same groupings used in the Wisconsin Vietnam veterans mortality study.)

The definitions of these groups are:

Combat: Occupations such as infantry, artillery, armor, etc., whose primary duties and objectives involve direct offensive and defensive actions against an armed hostile enemy force.

Direct Support: Occupations whose primary function is the direct support of combat troops and whose duties and objectives may at times involve limited direct and extensive indirect combat with an armed hostile force, such as counterintelligence, logistics, engineering, ordnance disposal, etc.

Indirect Support: Occupations such as musicians, data processing, legal services, food services, etc., whose primary function is indirect support of combat and direct support occupations and whose duties and objectives do not involve direct or indirect contact with an armed hostile force.

Three coding schemes are used for Army personnel: one for enlisted men, one for officers, and another for warrant officers. The coding scheme used by the Marine Corps is different from that of the Army.

ARMY CODES

The coding schemes for both the officers and enlisted men use the first two characters of the code to designate an occupational field (i.e., medical, infantry, intelligence). The first three digits are used to designate an occupational field for army warrant officers.

Army enlisted MOS codes are five characters long. The first two characters represent a career group; the third character, which is alpha, indicates a specialty; the fourth number is the skill level or grade and the fifth represents special qualifications such as "Ranger" or "Special Forces."

An example of an Army MOS and its breakdown is as follows:

MOS = 91B2s - 91 represents the medical career group.
B, the third alpha character, represents the specialty (medical specialist).
2, the fourth character, indicates the grade or rank.
S, the fifth character, indicates special qualification for special forces.

The occupational codes for officers are slightly different in that a three character code is used. For example, 11A indicates infantry officer.

Army Enlisted MOS Divided Into Combat, Direct Support and Indirect Support

Army Combat: 11, 12, 13, 14, 15, 16, 17, 19
Direct Support: 21, 22, 23, 24, 25, 26, 31, 36, 45, 54, 55, 61, 62, 63, 64, 67, 68, 90, 95, 96, 97, 98
Indirect Support: 32, 33, 34, 35, 41, 42, 43, 44, 46, 51, 52, 53, 56, 57, 65, 66, 70, 71, 72, 73, 74, 75, 76, 81, 82, 83, 84, 91, 92, 93, 94, 00, 01, 02, 03, 04, 05, 09

Army Officer MOS Divided Into Combat, Direct Support and Indirect Support

Army Combat: 10, 11, 12, 13, 14, 15, 21, 33
Direct Support : 19, 25, 26, 27, 28, 30, 31, 34, 35, 36, 37, 48, 54, 74, 75, 81, 91, 93, 94, 95
Indirect Support: 00, 40, 41, 42, 43, 44, 45, 46, 49, 51, 52, 53, 55, 56, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70, 71, 72, 73, 82, 92, 97

Marine Codes

The military occupational speciality codes for Marines are similar for officers and enlisted men. They codes are based on a four-digit system. For example: Marine MOS 0311 ,rifleman; MOS 0302 infantry officer.

Marine Enlisted MOS

Divided Into Combat, Direct Support and Indirect Support

Combat: 03, 08, 18, 86, 87, XX

Direct Support: 02, 13, 14, 21, 23, 25, 26, 35, 57, 60, 61, 62,
63, 64, 65, 70, 72, 81, 82, 85, 99

Indirect Support: 01, 04, 11, 15, 28, 30, 31, 33, 34, 40, 41, 43, 44,
46, 55, 58, 59, 68, 73, 80, 84, 88, 89, 90, 98

Marine Officer Mos

Divided into Combat, Direct support, and Indirect Support

Combat: 03, 08, 18, 75

Direct Support: 02, 04, 13, 14, 20, 25, 28, 35, 57, 58, 59, 62, 65,
67, 71, 73, 99

Indirect Support: 01, 15, 25, 28, 30, 31, 32, 33, 34, 40, 41, 43, 44
46, 49, 55, 60, 68, 70

APPENDIX C

A SUMMARY OF TABLES C1-C36

GROUPS	CANCER			MAJOR ORGAN SYSTEMS			CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS			ACCIDENTS, SUICIDE, VIOLENCE AND TRAUMA		
	SITE	OBS	O/R	SELECTED DISEASES	OBS	O/R	SELECTED DISEASES	OBS	O/R	EXTERNAL CAUSES	OBS	O/R
BOTH ARMY AND MARINES				ACCIDENTS, VIOL+TRAUMA	13864	1.03	CARDIAC ARREST	273	1.23	MOTOR VEH ACCIDENTS	4897	1.05
										OTH. TRANS ACC.	610	1.18
										ACC. POISONINGS	581	1.14
BRANCH	ARMY			ACCIDENTS, VIOL+TRAUMA	10984	1.03				MOTOR VEH ACCIDENTS	3884	1.05
										OTH. TRANS ACC.	493	1.36
										ACC. POISONINGS	461	1.15
	MARINES	LUNG	130	1.58								
		NON-HDGRNS LYMPHOMA	35	2.10								
RACE	WHITE			ACCIDENTS, VIOL+TRAUMA	11074	1.02	CARDIAC ARREST	212	1.23	MOTOR VEH ACCIDENTS	4264	1.04
										OTH. TRANS ACC.	548	1.18
										ACC. POISONINGS	464	1.13
	NONWHITE			MUSCULO+CONNECTIVE TIS	14	3.62	ALL OTHER CAUSES	3977	1.03	MOTOR VEH ACCIDENTS	632	1.18
				ACCIDENTS, VIOL+TRAUMA	2790	1.06						
RANK	ENLISTED MEN			ACCIDENTS, VIOL+TRAUMA	3266	1.02	CARDIAC ARREST	249	1.25	MOTOR VEH ACCIDENTS	4757	1.06
										ACC. POISONINGS	568	1.15
										ALL OTH ACC./INJURY	2815	1.05
	OFFICERS	OTH CA	39	1.29			CARDIOPATHY	16	6.21	OTH. TRANS ACC.	114	1.66
COMBAT STATUS	ARMY COMBAT MOSC	UPPER RESP	11	2.35			ALL OTHER CAUSES	4664	1.02	ALL OTH ACC./INJURY	762	1.09
										HOMICIDE	638	1.09
	MARINE COMBAT MOSC			NERVOUS SYS+SENSE ORG	17	2.28	INFLUENZA+PNEUMONIA	18	2.39	HOMICIDE	286	1.24

APPENDIX C

DEATHS FROM CANCERS

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TABLE C-1
DEATHS FROM CANCERS (140-208, 230-239)
ALL CASES

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	21262	21265	1.00	0.239
CA - BUCCAL (140-149)	84	84	1.00	0.009
CA - ESOPHAGUS (150)	51	50	1.02	0.114
CA - STOMACH (151)	105	99	1.06	0.306
CA - INTESTINES & OTHER GI (152-154,158,159)	242	244	0.99	0.000
CA - LIVER, BILE DUCTS (155-156)	40	38	1.06	0.144
CA - PANCREAS (157)	100	105	0.95	0.342
CA - UPPER RESPIRATORY (160-161)	30	31	0.97	0.000
CA - LUNG (162)	762	697	1.09	0.660
CA - BONE (170)	38	41	0.93	0.131
CA - SOFT TISSUES (171)	38	42	0.91	0.157
CA - MELANOMA OF THE SKIN (172)	181	180	1.00	0.175
CA - PROSTATE (185)	35	36	0.96	0.134
CA - TESTIS (186)	116	100	1.16	0.780
CA - BLADDER (188)	13	18	0.74	1.545
CA - KIDNEY (189)	68	78	0.87	0.389
CA - BRAIN (191)	141	143	0.98	0.001
CA - OTHER NERVOUS SYSTEM (192)	54	90	0.60	9.697*
CA - THYROID & ENDOCRINE (193-194)	19	32	0.59	2.696
CA - NON-HODGKINS LYMPHOMA (200,202)	143	150	0.96	0.385
CA - HODGKINS DISEASE (201)	114	96	1.19	0.801
CA - MULTIPLE MYELOMA (203)	20	28	0.72	0.292
CA - LEUKEMIA (204-207)	244	266	0.92	1.437
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	335	324	1.03	0.196

TOTAL NUMBER OF CASES OBSERVED = 24235

EXPECTED NUMBERS ARE BASED UPON 26685 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-2
DEATHS FROM CANCERS (140-208, 230-239)
ALL ARMY

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	17256	17173	1.00	1.631
CA - BUCCAL (140-149)	71	77	0.92	0.060
CA - ESOPHAGUS (150)	46	37	1.24	0.813
CA - STOMACH (151)	88	78	1.12	0.677
CA - INTESTINES & OTHER GI (152-154,158,159)	209	217	0.96	0.062
CA - LIVER, BILE DUCTS (155-156)	34	33	1.04	0.062
CA - PANCREAS (157)	82	94	0.87	0.805
CA - UPPER RESPIRATORY (160-161)	29	25	1.14	0.183
CA - LUNG (162)	632	614	1.03	0.000
CA - BONE (170)	27	33	0.82	0.286
CA - SOFT TISSUES (171)	30	30	0.99	0.008
CA - MELANOMA OF THE SKIN (172)	145	142	1.02	0.118
CA - PROSTATE (185)	30	32	0.92	0.100
CA - TESTIS (186)	90	80	1.12	0.557
CA - BLADDER (188)	9	16	0.56	2.353
CA - KIDNEY (189)	55	63	0.87	0.242
CA - BRAIN (191)	116	120	0.97	0.003
CA - OTHER NERVOUS SYSTEM (192)	43	78	0.55	10.503*
CA - THYROID & ENDOCRINE (193-194)	15	25	0.59	2.312
CA - NON-HODGKINS LYMPHOMA (200,202)	108	133	0.81	2.761
CA - HODGKINS DISEASE (201)	92	79	1.16	0.388
CA - MULTIPLE MYELOMA (203)	18	23	0.77	0.188
CA - LEUKEMIA (204-207)	202	229	0.88	1.809
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	281	273	1.03	0.319

TOTAL NUMBER OF CASES OBSERVED = 19708

EXPECTED NUMBERS ARE BASED UPON 22904 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-3
DEATHS FROM CANCERS (140-208, 230-239)
ALL MARINES

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	4006	4092	0.98	3.831
CA - BUCCAL (140-149)	13	7	1.95	1.038
CA - ESOPHAGUS (150)	5	13	0.39	2.148
CA - STOMACH (151)	17	21	0.82	0.318
CA - INTESTINES & OTHER GI (152-154,158,159)	33	26	1.26	0.632
CA - LIVER, BILE DUCTS (155-156)	6	5	1.21	0.196
CA - PANCREAS (157)	18	11	1.63	0.582
CA - UPPER RESPIRATORY (160-161)	1	6	0.18	2.844
CA - LUNG (162)	130	83	1.58	5.800*
CA - BONE (170)	11	8	1.38	0.051
CA - SOFT TISSUES (171)	8	11	0.71	1.160
CA - MELANOMA OF THE SKIN (172)	36	38	0.94	0.067
CA - PROSTATE (185)	5	4	1.29	0.059
CA - TESTIS (186)	26	20	1.29	0.239
CA - BLADDER (188)	4	2	2.41	0.268
CA - KIDNEY (189)	13	15	0.89	0.210
CA - BRAIN (191)	25	23	1.07	0.005
CA - OTHER NERVOUS SYSTEM (192)	11	12	0.93	0.050
CA - THYROID & ENDOCRINE (193-194)	4	7	0.57	0.384
CA - NON-HODGKINS LYMPHOMA (200,202)	35	17	2.10	6.116*
CA - HODGKINS DISEASE (201)	22	17	1.33	0.679
CA - MULTIPLE MYELOMA (203)	2	4	0.45	0.186
CA - LEUKEMIA (204-207)	42	37	1.14	0.019
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	54	51	1.07	0.053

TOTAL NUMBER OF CASES OBSERVED = 4527

EXPECTED NUMBERS ARE BASED UPON 3781 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-4
DEATHS FROM CANCERS (140-208, 230-239)
ALL WHITE SERVICEMEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	16697	16671	1.00	0.797
CA - BUCCAL (140-149)	64	61	1.05	0.085
CA - ESOPHAGUS (150)	35	40	0.87	0.157
CA - STOMACH (151)	75	75	0.99	0.018
CA - INTESTINES & OTHER GI (152-154,158,159)	193	185	1.04	0.270
CA - LIVER, BILE DUCTS (155-156)	29	22	1.31	0.882
CA - PANCREAS (157)	85	87	0.97	0.072
CA - UPPER RESPIRATORY (160-161)	25	27	0.94	0.071
CA - LUNG (162)	616	565	1.09	0.371
CA - BONE (170)	34	34	0.99	0.018
CA - SOFT TISSUES (171)	34	37	0.92	0.194
CA - MELANOMA OF THE SKIN (172)	176	179	0.98	0.046
CA - PROSTATE (185)	23	33	0.71	1.475
CA - TESTIS (186)	110	90	1.22	1.180
CA - BLADDER (188)	12	14	0.85	0.737
CA - KIDNEY (189)	55	70	0.79	0.856
CA - BRAIN (191)	128	128	1.00	0.014
CA - OTHER NERVOUS SYSTEM (192)	50	81	0.62	8.107*
CA - THYROID & ENDOCRINE (193-194)	15	25	0.59	1.893
CA - NON-HODGKINS LYMPHOMA (200,202)	120	134	0.89	1.436
CA - HODGKINS DISEASE (201)	101	83	1.22	1.001
CA - MULTIPLE MYELOMA (203)	16	24	0.65	0.689
CA - LEUKEMIA (204-207)	212	238	0.89	1.581
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	272	273	0.99	0.027

TOTAL NUMBER OF CASES OBSERVED = 19177

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-5
DEATHS FROM CANCERS (140-208, 230-239)
ALL NON-WHITE SERVICEMEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	4565	4595	0.99	0.723
CA - BUCCAL (140-149)	20	23	0.87	0.103
CA - ESOPHAGUS (150)	16	10	1.65	1.917
CA - STOMACH (151)	30	24	1.27	0.755
CA - INTESTINES & OTHER GI (152-154,158,159)	49	59	0.84	1.008
CA - LIVER, BILE DUCTS (155-156)	11	16	0.70	0.512
CA - PANCREAS (157)	15	18	0.84	0.764
CA - UPPER RESPIRATORY (160-161)	5	4	1.16	0.389
CA - LUNG (162)	146	132	1.11	0.383
CA - BONE (170)	4	7	0.60	0.419
CA - SOFT TISSUES (171)	4	5	0.87	0.007
CA - MELANOMA OF THE SKIN (172)	5	1	3.36	2.582
CA - PROSTATE (185)	12	4	3.21	3.441
CA - TESTIS (186)	6	10	0.61	0.528
CA - BLADDER (188)	1	3	0.29	1.383
CA - KIDNEY (189)	13	8	1.59	0.351
CA - BRAIN (191)	13	15	0.86	0.215
CA - OTHER NERVOUS SYSTEM (192)	4	9	0.44	1.755
CA - THYROID & ENDOCRINE (193-194)	4	7	0.58	0.820
CA - NON-HODGKINS LYMPHOMA (200,202)	23	15	1.50	2.117
CA - HODGKINS DISEASE (201)	13	13	1.03	0.015
CA - MULTIPLE MYELOMA (203)	4	3	1.24	0.408
CA - LEUKEMIA (204-207)	32	28	1.13	0.004
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	63	50	1.25	2.133

TOTAL NUMBER OF CASES OBSERVED = 5058

EXPECTED NUMBERS ARE BASED UPON 5350 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-6
DEATHS FROM CANCERS (140-208, 230-239)
ALL ENLISTED MEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	19962	19937	1.00	0.957
CA - BUCCAL (140-149)	71	75	0.95	0.136
CA - ESOPHAGUS (150)	40	40	1.00	0.150
CA - STOMACH (151)	93	86	1.08	0.392
CA - INTESTINES & OTHER GI (152-154,158,159)	206	214	0.96	0.122
CA - LIVER, BILE DUCTS (155-156)	34	34	1.00	0.029
CA - PANCREAS (157)	80	90	0.89	0.953
CA - UPPER RESPIRATORY (160-161)	29	23	1.24	0.689
CA - LUNG (162)	660	598	1.10	0.785
CA - BONE (170)	34	38	0.89	0.327
CA - SOFT TISSUES (171)	37	37	0.99	0.001
CA - MELANOMA OF THE SKIN (172)	153	153	1.00	0.113
CA - PROSTATE (185)	29	22	1.30	0.564
CA - TESTIS (186)	110	95	1.16	0.932
CA - BLADDER (188)	12	17	0.70	1.612
CA - KIDNEY (189)	57	70	0.81	0.911
CA - BRAIN (191)	117	121	0.97	0.105
CA - OTHER NERVOUS SYSTEM (192)	38	78	0.49	14.323*
CA - THYROID & ENDOCRINE (193-194)	14	30	0.46	4.965*
CA - NON-HODGKINS LYMPHOMA (200,202)	131	131	1.00	0.077
CA - HODGKINS DISEASE (201)	104	87	1.20	0.677
CA - MULTIPLE MYELOMA (203)	14	25	0.55	1.599
CA - LEUKEMIA (204-207)	219	239	0.91	1.280
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	284	287	0.99	0.065

TOTAL NUMBER OF CASES OBSERVED = 22528

EXPECTED NUMBERS ARE BASED UPON 25022 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-7
DEATHS FROM CANCERS (140-208, 230-239)
ALL OFFICERS

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	938	942	1.00	1.654
CA - BUCCAL (140-149)	10	8	1.26	1.260
CA - ESOPHAGUS (150)	8	8	0.99	0.000
CA - STOMACH (151)	7	7	0.96	0.411
CA - INTESTINES & OTHER GI (152-154,158,159)	32	23	1.38	1.664
CA - LIVER, BILE DUCTS (155-156)	5	2	2.22	1.054
CA - PANCREAS (157)	13	13	0.97	0.075
CA - UPPER RESPIRATORY (160-161)	0	7	0.00	6.076*
CA - LUNG (162)	77	64	1.20	0.606
CA - BONE (170)	4	3	1.44	0.335
CA - SOFT TISSUES (171)	1	4	0.26	2.314
CA - MELANOMA OF THE SKIN (172)	25	28	0.88	0.003
CA - PROSTATE (185)	5	8	0.61	0.817
CA - TESTIS (186)	5	5	1.07	0.035
CA - BLADDER (188)	1	0	3.55	0.085
CA - KIDNEY (189)	9	4	2.12	0.712
CA - BRAIN (191)	18	24	0.75	0.002
CA - OTHER NERVOUS SYSTEM (192)	13	11	1.19	0.220
CA - THYROID & ENDOCRINE (193-194)	5	1	5.73	2.120
CA - NON-HODGKINS LYMPHOMA (200,202)	9	21	0.42	2.345
CA - HODGKINS DISEASE (201)	7	10	0.73	0.252
CA - MULTIPLE MYELOMA (203)	4	2	2.06	0.632
CA - LEUKEMIA (204-207)	21	22	0.95	0.013
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	39	30	1.29	4.492*

TOTAL NUMBER OF CASES OBSERVED = 1256

EXPECTED NUMBERS ARE BASED UPON 1405 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-8
DEATHS FROM CANCERS (140-208, 230-239)
ALL ARMY ENLISTED MEN IN VIETNAM, COMBAT MOSC VS. NON-COMBAT MOSC

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	4972	4947	1.01	0.752
CA - BUCCAL (140-149)	14	16	0.87	0.177
CA - ESOPHAGUS (150)	10	8	1.23	0.382
CA - STOMACH (151)	25	18	1.42	2.074
CA - INTESTINES & OTHER GI (152-154,158,159)	39	49	0.79	1.713
CA - LIVER, BILE DUCTS (155-156)	9	8	1.17	0.247
CA - PANCREAS (157)	11	17	0.64	1.720
CA - UPPER RESPIRATORY (160-161)	11	5	2.35	4.264*
CA - LUNG (162)	135	122	1.11	0.911
CA - BONE (170)	6	8	0.72	0.483
CA - SOFT TISSUES (171)	6	10	0.59	1.404
CA - MELANOMA OF THE SKIN (172)	26	43	0.61	4.971*
CA - PROSTATE (185)	3	5	0.56	0.763
CA - TESTIS (186)	28	28	1.00	0.004
CA - BLADDER (188)	2	2	1.02	0.012
CA - KIDNEY (189)	11	13	0.88	0.050
CA - BRAIN (191)	30	29	1.05	0.065
CA - OTHER NERVOUS SYSTEM (192)	10	9	1.06	0.083
CA - THYROID & ENDOCRINE (193-194)	1	4	0.24	2.144
CA - NON-HODGKINS LYMPHOMA (200,202)	33	28	1.16	0.507
CA - HODGKINS DISEASE (201)	25	28	0.88	0.174
CA - MULTIPLE MYELOMA (203)	3	3	1.00	0.008
CA - LEUKEMIA (204-207)	55	54	1.02	0.012
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	57	68	0.84	1.409

TOTAL NUMBER OF CASES OBSERVED = 5522

EXPECTED NUMBERS ARE BASED UPON 12767 OBSERVATIONS IN COMPARISON GROUP

*** P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM**

TABLE C-9
DEATHS FROM CANCERS (140-208, 230-239)
ALL ENLISTED MARINES IN VIETNAM, COMBAT MOSC VS. NON-COMBAT MOSC

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	1743	1740	1.00	0.468
CA - BUCCAL (140-149)	4	2	2.06	0.105
CA - ESOPHAGUS (150)	2	1	2.33	0.581
CA - STOMACH (151)	8	2	3.74	4.343*
CA - INTESTINES & OTHER GI (152-154,158,159)	6	10	0.60	1.806
CA - LIVER, BILE DUCTS (155-156)	4	1	3.46	0.670
CA - PANCREAS (157)	4	5	0.75	0.306
CA - UPPER RESPIRATORY (160-161)	0	1	0.00	0.857
CA - LUNG (162)	23	31	0.74	2.270
CA - BONE (170)	4	5	0.87	0.047
CA - SOFT TISSUES (171)	0	4	0.00	3.900*
CA - MELANOMA OF THE SKIN (172)	14	13	1.06	0.010
CA - PROSTATE (185)	1	2	0.53	0.377
CA - TESTIS (186)	10	12	0.82	0.106
CA - BLADDER (188)	0	1	0.00	0.598
CA - KIDNEY (189)	4	4	1.11	0.088
CA - BRAIN (191)	9	9	0.98	0.040
CA - OTHER NERVOUS SYSTEM (192)	5	2	2.48	1.521
CA - THYROID & ENDOCRINE (193-194)	1	0	2.52	0.000
CA - NON-HODGKINS LYMPHOMA (200,202)	17	12	1.43	0.863
CA - HODGKINS DISEASE (201)	8	11	0.73	0.383
CA - MULTIPLE MYELOMA (203)	0	0	0.00	0.199
CA - LEUKEMIA (204-207)	18	15	1.17	0.469
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	13	14	0.92	0.160

TOTAL NUMBER OF CASES OBSERVED = 1898

EXPECTED NUMBERS ARE BASED UPON 2341 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-10
SELECTED CAUSES OF DEATH BY ORGAN SYSTEM
ALL CASES

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	859	938	0.92	1.998
INFECTIVE & PARASITIC DISEASES (000-136)	146	177	0.82	2.831
CANCERS (140-209, 230-239)	2973	2971	1.00	0.252
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	157	193	0.81	2.256
BLOOD & BLOOD-FORMING ORGANS (280-289)	40	50	0.81	1.835
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	194	207	0.94	0.256
CIRCULATORY DISEASES (390-458)	4225	4319	0.98	1.538
RESPIRATORY DISEASES (460-519)	468	500	0.94	0.350
DIGESTIVE DISEASES (520-577)	1170	1202	0.97	0.654
GENITOURINARY DISEASES (580-629)	93	124	0.75	5.411*
SKIN & SUBCUTANEOUS TISSUES (680-709)	10	15	0.69	0.229
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	36	27	1.34	1.203
ACCIDENTS, VIOLENCE & TRAUMA (E800-989)	13864	13514	1.03	14.758*

TOTAL NUMBER OF CASES OBSERVED = 24235				
EXPECTED NUMBERS ARE BASED UPON 26685 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				

TABLE C-11
 SELECTED CAUSES OF DEATH BY ORGAN SYSTEM
 ALL ARMY

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	709	778	0.91	2.314
INFECTIVE & PARASITIC DISEASES (000-136)	127	159	0.80	3.473
CANCERS (140-209, 230-239)	2452	2535	0.97	1.631
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	135	159	0.85	1.790
BLOOD & BLOOD-FORMING ORGANS (280-289)	32	47	0.68	3.429
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	167	176	0.95	0.222
CIRCULATORY DISEASES (390-458)	3578	3655	0.98	1.468
RESPIRATORY DISEASES (460-519)	406	435	0.93	0.232
DIGESTIVE DISEASES (520-577)	1001	1008	0.99	0.161
GENITOURINARY DISEASES (580-629)	80	104	0.77	4.288*
SKIN & SUBCUTANEOUS TISSUES (680-709)	8	11	0.76	0.040
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	29	19	1.55	1.694
ACCIDENTS, VIOLENCE & TRAUMA (E800-989)	10984	10623	1.03	18.154*

TOTAL NUMBER OF CASES OBSERVED = 19708				
EXPECTED NUMBERS ARE BASED UPON 22904 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				

**TABLE C-12
SELECTED CAUSES OF DEATH BY ORGAN SYSTEM
ALL MARINES**

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	150	160	0.94	0.000
INFECTIVE & PARASITIC DISEASES (000-136)	19	19	1.02	0.080
CANCERS (140-209, 230-239)	521	436	1.20	3.688
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	22	33	0.66	0.527
BLOOD & BLOOD-FORMING ORGANS (280-289)	8	2	3.22	1.538
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	27	31	0.86	0.034
CIRCULATORY DISEASES (390-458)	647	663	0.98	0.089
RESPIRATORY DISEASES (460-519)	62	65	0.95	0.176
DIGESTIVE DISEASES (520-577)	169	194	0.87	1.588
GENITOURINARY DISEASES (580-629)	13	19	0.67	1.265
SKIN & SUBCUTANEOUS TISSUES (680-709)	2	4	0.50	0.409
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	7	8	0.87	0.040
ACCIDENTS, VIOLENCE & TRAUMA (8800-989)	2880	2891	1.00	0.057

TOTAL NUMBER OF CASES OBSERVED = 4527				
EXPECTED NUMBERS ARE BASED UPON 3781 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				

TABLE C-13
SELECTED CAUSES OF DEATH BY ORGAN SYSTEM
ALL WHITE SERVICEMEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	553	618	0.90	1.909
INFECTIVE & PARASITIC DISEASES (000-136)	105	119	0.88	0.404
CANCERS (140-209, 230-239)	2480	2507	0.99	0.822
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	111	125	0.89	0.585
BLOOD & BLOOD-FORMING ORGANS (280-289)	27	28	0.98	0.108
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	149	157	0.95	0.086
CIRCULATORY DISEASES (390-458)	3360	3413	0.98	0.711
RESPIRATORY DISEASES (460-519)	332	356	0.93	0.054
DIGESTIVE DISEASES (520-577)	888	859	1.03	0.166
GENITOURINARY DISEASES (580-629)	68	86	0.79	2.497
SKIN & SUBCUTANEOUS TISSUES (680-709)	8	10	0.80	0.004
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	22	23	0.96	0.014
ACCIDENTS, VIOLENCE & TRAUMA (800-989)	11074	10877	1.02	6.269*

TOTAL NUMBER OF CASES OBSERVED = 19177				
EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				

TABLE C-14
SELECTED CAUSES OF DEATH BY ORGAN SYSTEM
ALL NON-WHITE SERVICEMEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	306	320	0.96	0.250
INFECTIVE & PARASITIC DISEASES (000-136)	41	58	0.71	4.313*
CANCERS (140-209, 230-239)	493	463	1.06	0.723
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	46	67	0.68	2.467
BLOOD & BLOOD-FORMING ORGANS (280-289)	13	22	0.59	2.995
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	45	50	0.90	0.263
CIRCULATORY DISEASES (390-458)	865	906	0.95	1.138
RESPIRATORY DISEASES (460-519)	136	145	0.94	0.548
DIGESTIVE DISEASES (520-577)	282	343	0.82	5.168*
GENITOURINARY DISEASES (580-629)	25	38	0.67	3.432
SKIN & SUBCUTANEOUS TISSUES (680-709)	2	5	0.44	0.785
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	14	4	3.62	4.668*
ACCIDENTS, VIOLENCE & TRAUMA (E800-989)	2790	2637	1.06	11.619*

TOTAL NUMBER OF CASES OBSERVED = 5058				
EXPECTED NUMBERS ARE BASED UPON 5350 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				

TABLE C-15
 SELECTED CAUSES OF DEATH BY ORGAN SYSTEM
 ALL ENLISTED MEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	823	884	0.93	1.082
INFECTIVE & PARASITIC DISEASES (000-136)	137	166	0.83	2.404
CANCERS (140-209, 230-239)	2566	2592	0.99	0.984
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	145	177	0.82	1.949
BLOOD & BLOOD-FORMING ORGANS (280-289)	36	46	0.78	2.089
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	178	191	0.93	0.262
CIRCULATORY DISEASES (390-458)	3738	3796	0.98	0.576
RESPIRATORY DISEASES (460-519)	444	470	0.95	0.297
DIGESTIVE DISEASES (520-577)	1077	1100	0.98	0.435
GENITOURINARY DISEASES (580-629)	82	117	0.70	6.726*
SKIN & SUBCUTANEOUS TISSUES (680-709)	9	14	0.66	0.277
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	27	24	1.13	0.082
ACCIDENTS, VIOLENCE & TRAUMA (E800-989)	13266	12953	1.02	12.871*

TOTAL NUMBER OF CASES OBSERVED = 22528				
EXPECTED NUMBERS ARE BASED UPON 25022 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				

**TABLE C-16
SELECTED CAUSES OF DEATH BY ORGAN SYSTEM
ALL OFFICERS**

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	27	37	0.74	1.823
INFECTIVE & PARASITIC DISEASES (000-136)	9	8	1.15	0.031
CANCERS (140-209, 230-239)	318	307	1.04	1.654
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	7	12	0.60	1.383
BLOOD & BLOOD-FORMING ORGANS (280-289)	4	4	0.98	0.002
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	11	9	1.16	0.028
CIRCULATORY DISEASES (390-458)	338	370	0.91	2.309
RESPIRATORY DISEASES (460-519)	19	20	0.93	0.000
DIGESTIVE DISEASES (520-577)	71	71	1.00	0.006
GENITOURINARY DISEASES (580-629)	6	5	1.23	0.032
SKIN & SUBCUTANEOUS TISSUES (680-709)	0	1	0.00	1.319
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	6	2	2.72	1.488
ACCIDENTS, VIOLENCE & TRAUMA (E800-989)	440	403	1.09	0.692

TOTAL NUMBER OF CASES OBSERVED = 1256				
EXPECTED NUMBERS ARE BASED UPON 1405 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				

TABLE C-17
SELECTED CAUSES OF DEATH BY ORGAN SYSTEM
ALL ARMY ENLISTED MEN IN VIETNAM, COMBAT MOSC VS. NON-COMBAT MOSC

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	216	205	1.05	0.372
INFECTIVE & PARASITIC DISEASES (000-136)	30	37	0.82	1.193
CANCERS (140-209, 230-239)	550	575	0.96	0.752
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	41	32	1.29	1.378
BLOOD & BLOOD-FORMING ORGANS (280-289)	10	9	1.18	0.104
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	47	46	1.01	0.001
CIRCULATORY DISEASES (390-458)	796	842	0.95	2.439
RESPIRATORY DISEASES (460-519)	108	107	1.01	0.067
DIGESTIVE DISEASES (520-577)	243	270	0.90	1.824
GENITOURINARY DISEASES (580-629)	26	18	1.44	1.780
SKIN & SUBCUTANEOUS TISSUES (680-709)	2	2	0.99	0.008
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	10	5	2.08	2.745
ACCIDENTS, VIOLENCE & TRAUMA (E800-989)	3443	3374	1.02	3.295

TOTAL NUMBER OF CASES OBSERVED = 5522				
EXPECTED NUMBERS ARE BASED UPON 12767 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				

TABLE C-18
SELECTED CAUSES OF DEATH BY ORGAN SYSTEM
ALL ENLISTED MARINES IN VIETNAM, COMBAT MOSC VS. NON-COMBAT MOSC

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	63	77	0.82	1.387
INFECTIVE & PARASITIC DISEASES (000-136)	7	13	0.55	1.186
CANCERS (140-209, 230-239)	155	158	0.98	0.468
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	9	7	1.25	0.059
BLOOD & BLOOD-FORMING ORGANS (280-289)	0	6	0.00	5.000*
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	17	7	2.28	4.479*
CIRCULATORY DISEASES (390-458)	175	193	0.91	1.376
RESPIRATORY DISEASES (460-519)	28	16	1.70	1.963
DIGESTIVE DISEASES (520-577)	67	52	1.29	2.187
GENITOURINARY DISEASES (580-629)	2	5	0.41	1.709
SKIN & SUBCUTANEOUS TISSUES (680-709)	1	1	1.04	0.005
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	4	1	3.79	1.613
ACCIDENTS, VIOLENCE & TRAUMA (800-989)	1370	1362	1.01	0.586

TOTAL NUMBER OF CASES OBSERVED = 1898

EXPECTED NUMBERS ARE BASED UPON 2341 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-19
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL CASES

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-5989)	19936	19883	1.00	0.222
HYPERTENSIVE DISEASE (400-404)	61	77	0.80	1.284
ACUTE MYOCARDIAL INFARCTION (410)	123	141	0.87	0.716
OTHER ISCHEMIC HEART DISEASE (411-414)	1059	1116	0.95	2.088
CARDIOMYOPATHY (425)	142	126	1.13	1.820
CARDIAC ARREST (427.2)	273	222	1.23	4.805*
CEREBROVASCULAR DISEASES (430-438)	520	518	1.00	0.006
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	142	139	1.02	0.334
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	133	127	1.05	0.494
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	196	183	1.07	0.413
UPPER RESPIRATORY (460-466, 500-508)	7	10	0.68	1.207
INFLUENZA & PNEUMONIA (470-486)	254	258	0.98	0.002
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	52	56	0.93	0.029
OTHER RESPIRATORY (490, 493, 510-519)	95	96	0.99	0.020
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	80	70	1.15	0.496
CIRRHOSIS - ALCOHOLIC (571.0)	424	405	1.05	0.005
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	449	480	0.94	0.228
DISEASES OF PANCREAS (577)	80	94	0.85	1.050
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	209	235	0.89	1.390

TOTAL NUMBER OF CASES OBSERVED = 24235

EXPECTED NUMBERS ARE BASED UPON 26685 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-20
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL ARMY

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	16061	16023	1.00	0.236
HYPERTENSIVE DISEASE (400-404)	50	67	0.74	1.584
ACUTE MYOCARDIAL INFARCTION (410)	102	112	0.91	0.325
OTHER ISCHEMIC HEART DISEASE (411-414)	877	949	0.92	3.182
CARDIOMYOPATHY (425)	113	95	1.19	1.827
CARDIAC ARREST (427.2)	229	194	1.18	3.006
CEREBROVASCULAR DISEASES (430-438)	436	437	1.00	0.178
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	126	126	1.00	0.142
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	111	109	1.02	0.458
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	170	148	1.15	1.210
UPPER RESPIRATORY (460-466, 500-508)	5	10	0.49	1.988
INFLUENZA & PNEUMONIA (470-486)	227	230	0.98	0.007
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	46	53	0.87	0.033
OTHER RESPIRATORY (490, 493, 510-519)	82	76	1.08	0.085
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	60	55	1.09	0.138
CIRRHOSIS - ALCOHOLIC (571.0)	374	337	1.11	0.277
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	390	421	0.93	0.332
DISEASES OF PANCREAS (577)	67	74	0.90	0.440
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	182	191	0.95	0.383

TOTAL NUMBER OF CASES OBSERVED = 19708

EXPECTED NUMBERS ARE BASED UPON 22904 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-21
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL MARINES

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	3881	3876	1.00	0.009
HYPERTENSIVE DISEASE (400-404)	10	10	1.00	0.128
ACUTE MYOCARDIAL INFARCTION (410)	21	24	0.89	0.090
OTHER ISCHEMIC HEART DISEASE (411-414)	178	162	1.10	1.060
CARDIOMYOPATHY (425)	26	30	0.86	0.005
CARDIAC ARREST (427.2)	43	28	1.54	1.942
CEREBROVASCULAR DISEASES (430-438)	79	82	0.96	0.114
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	15	11	1.40	1.272
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	21	15	1.40	0.234
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	25	30	0.83	0.426
UPPER RESPIRATORY (460-466, 500-508)	2	0		0.754
INFLUENZA & PNEUMONIA (470-486)	30	33	0.91	0.050
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	9	3	2.60	0.433
OTHER RESPIRATORY (490, 493, 510-519)	10	18	0.55	1.909
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	19	16	1.22	0.323
CIRRHOSIS - ALCOHOLIC (571.0)	56	74	0.76	1.677
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	61	60	1.01	0.002
DISEASES OF PANCREAS (577)	11	13	0.87	0.331
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	30	43	0.70	2.249

TOTAL NUMBER OF CASES OBSERVED = 4527

EXPECTED NUMBERS ARE BASED UPON 3781 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-22
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL WHITE SERVICEMEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (0-398, 580-989)	15967	15991	1.00	0.126
HYPERTENSIVE DISEASE (400-404)	28	40	0.70	1.090
ACUTE MYOCARDIAL INFARCTION (410)	100	107	0.94	0.172
OTHER ISCHEMIC HEART DISEASE (411-414)	842	885	0.95	2.102
CARDIOMYOPATHY (425)	93	71	1.30	2.629
CARDIAC ARREST (427.2)	212	173	1.23	4.616*
CEREBROVASCULAR DISEASES (430-438)	372	369	1.01	0.034
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	116	110	1.05	0.351
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	89	88	1.01	0.206
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	131	132	0.99	0.007
UPPER RESPIRATORY (460-466, 500-508)	6	8	0.74	0.842
INFLUENZA & PNEUMONIA (470-486)	167	177	0.94	0.031
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	40	50	0.81	0.456
OTHER RESPIRATORY (490, 493, 510-519)	59	60	0.98	0.010
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	62	51	1.21	0.677
CIRRHOSIS - ALCOHOLIC (571.0)	320	287	1.11	0.513
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	342	358	0.96	0.029
DISEASES OF PANCREAS (577)	60	52	1.14	0.480
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	171	168	1.02	0.008

TOTAL NUMBER OF CASES OBSERVED = 19177

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-23
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL NON-WHITE SERVICEMEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-8989)	3977	3869	1.03	5.124*
HYPERTENSIVE DISEASE (400-404)	38	35	1.10	0.011
ACUTE MYOCARDIAL INFARCTION (410)	22	32	0.69	1.463
OTHER ISCHEMIC HEART DISEASE (411-414)	212	234	0.91	0.312
CARDIOMYOPATHY (425)	47	58	0.81	0.104
CARDIAC ARREST (427.2)	61	49	1.25	0.452
CEREBROVASCULAR DISEASES (430-438)	140	151	0.93	0.861
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	26	31	0.83	0.083
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	41	37	1.11	0.227
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	63	52	1.21	0.891
UPPER RESPIRATORY (460-466, 500-508)	1	4	0.26	1.772
INFLUENZA & PNEUMONIA (470-486)	87	88	0.99	0.004
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	9	9	1.06	0.011
OTHER RESPIRATORY (490, 493, 510-519)	37	34	1.09	0.001
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	20	20	1.00	0.025
CIRRHOSIS - ALCOHOLIC (571.0)	105	117	0.89	0.745
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	112	125	0.90	0.334
DISEASES OF PANCREAS (577)	18	42	0.43	8.649*
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	42	73	0.58	5.999*

TOTAL NUMBER OF CASES OBSERVED = 5058

EXPECTED NUMBERS ARE BASED UPON 5350 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-24
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL ENLISTED MEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	18653	18612	1.00	0.154
HYPERTENSIVE DISEASE (400-404)	54	71	0.76	1.581
ACUTE MYOCARDIAL INFARCTION (410)	107	120	0.89	0.696
OTHER ISCHEMIC HEART DISEASE (411-414)	912	969	0.94	2.040
CARDIOMYOPATHY (425)	127	120	1.06	0.579
CARDIAC ARREST (427.2)	249	200	1.25	4.845*
CEREBROVASCULAR DISEASES (430-438)	475	470	1.01	0.004
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	124	119	1.04	0.303
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	116	112	1.04	0.165
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	181	171	1.06	0.487
UPPER RESPIRATORY (460-466, 500-508)	7	10	0.70	1.029
INFLUENZA & PNEUMONIA (470-486)	245	239	1.02	0.156
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	48	55	0.88	0.280
OTHER RESPIRATORY (490, 493, 510-519)	89	91	0.98	0.054
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	72	66	1.09	0.113
CIRRHOSIS - ALCOHOLIC (571.0)	396	372	1.06	0.174
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	414	429	0.97	0.010
DISEASES OF PANCREAS (577)	74	89	0.83	1.126
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	185	214	0.86	2.085

TOTAL NUMBER OF CASES OBSERVED = 22528

EXPECTED NUMBERS ARE BASED UPON 25022 OBSERVATIONS IN COMPARISON GROUP

*** P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM**

**TABLE C-25
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL OFFICERS**

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	930	916	1.02	0.024
HYPERTENSIVE DISEASE (400-404)	7	3	2.23	0.284
ACUTE MYOCARDIAL INFARCTION (410)	16	19	0.85	0.521
OTHER ISCHEMIC HEART DISEASE (411-414)	108	111	0.97	0.014
CARDIOMYOPATHY (425)	16	3	6.21	9.622*
CARDIAC ARREST (427.2)	15	22	0.69	0.511
CEREBROVASCULAR DISEASES (430-438)	27	34	0.79	0.575
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	15	22	0.67	0.293
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	12	15	0.80	0.277
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	11	13	0.88	0.247
UPPER RESPIRATORY (460-466, 500-508)	0	0	0.00	0.079
INFLUENZA & PNEUMONIA (470-486)	12	15	0.80	0.278
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	2	1	2.61	0.198
OTHER RESPIRATORY (490, 493, 510-519)	6	5	1.33	0.060
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	7	3	2.74	2.123
CIRRHOSIS - ALCOHOLIC (571.0)	25	18	1.40	0.409
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	28	30	0.92	0.079
DISEASES OF PANCREAS (577)	5	3	1.75	0.270
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	14	18	0.77	0.159

TOTAL NUMBER OF CASES OBSERVED = 1256

EXPECTED NUMBERS ARE BASED UPON 1405 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-26
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL ARMY ENLISTED MEN IN VIETNAM, COMBAT MOSC VS. NON-COMBAT MOSC

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	4664	4595	1.02	4.556*
HYPERTENSIVE DISEASE (400-404)	11	14	0.81	0.405
ACUTE MYOCARDIAL INFARCTION (410)	22	20	1.10	0.204
OTHER ISCHEMIC HEART DISEASE (411-414)	179	206	0.87	2.436
CARDIOMYOPATHY (425)	35	26	1.34	2.067
CARDIAC ARREST (427.2)	52	56	0.93	0.391
CEREBROVASCULAR DISEASES (430-438)	107	115	0.93	0.599
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	36	25	1.43	2.950
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	21	31	0.67	2.512
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	41	50	0.83	1.199
UPPER RESPIRATORY (460-466, 500-508)	1	2	0.57	0.260
INFLUENZA & PNEUMONIA (470-486)	61	64	0.95	0.130
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	9	10	0.94	0.017
OTHER RESPIRATORY (490, 493, 510-519)	24	24	1.00	0.096
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	9	17	0.53	3.029
CIRRHOSIS - ALCOHOLIC (571.0)	108	96	1.13	1.470
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	88	103	0.85	1.814
DISEASES OF PANCREAS (577)	18	19	0.94	0.025
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	36	50	0.71	2.874

TOTAL NUMBER OF CASES OBSERVED = 5522

EXPECTED NUMBERS ARE BASED UPON 12767 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-28
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL CASES

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	10373	10734	0.97	15.535*
MOTOR VEH ACCIDENTS (E810-E827)	4897	4643	1.05	9.355*
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	610	517	1.18	9.730*
ACC. POISONINGS (E850-E877)	581	508	1.14	6.349*
ALL OTH ACC./INJURY (E880-E949, E970-E989)	2917	2788	1.05	3.313
SUICIDE (E950-E959)	2543	2735	0.93	9.851*
HOMICIDE (E960-E969)	2314	2310	1.00	0.009

TOTAL NUMBER OF CASES OBSERVED = 24235

EXPECTED NUMBERS ARE BASED UPON 26685 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-29
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL ARMY

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	8728	9097	0.96	18.774*
MOTOR VEH ACCIDENTS (E810-E827)	3884	3693	1.05	7.502*
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	493	361	1.36	19.394*
ACC. POISONINGS (E850-E877)	461	399	1.15	5.068*
ALL OTH ACC./INJURY (E880-E949, E970-E989)	2323	2202	1.05	2.761
SUICIDE (E950-E959)	2003	2152	0.93	6.633*
HOMICIDE (E960-E969)	1816	1804	1.01	0.004

TOTAL NUMBER OF CASES OBSERVED = 19708

EXPECTED NUMBERS ARE BASED UPON 22904 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-30
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL MARINES

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	1647	1638	1.01	0.040
MOTOR VEH ACCIDENTS (E810-E827)	1011	948	1.07	1.778
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	117	156	0.75	3.551
ACC. POISONINGS (E850-E877)	120	109	1.10	1.289
ALL OTH ACC./INJURY (E880-E949, E970-E989)	593	585	1.01	0.523
SUICIDE (E950-E959)	542	583	0.93	3.321
HOMICIDE (E960-E969)	497	507	0.98	0.163

TOTAL NUMBER OF CASES OBSERVED = 4527

EXPECTED NUMBERS ARE BASED UPON 3781 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

**TABLE C-31
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL WHITE SERVICEMEN**

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	8109	8312	0.98	6.487*
MOTOR VEH ACCIDENTS (E810-E827)	4264	4107	1.04	4.169*
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	548	463	1.18	8.333*
ACC. POISONINGS (E850-E877)	464	411	1.13	4.414*
ALL OTH ACC./INJURY (E880-E949, E970-E989)	2341	2253	1.04	1.745
SUICIDE (E950-E959)	2247	2442	0.92	9.974*
HOMICIDE (E960-E969)	1204	1189	1.01	0.015

TOTAL NUMBER OF CASES OBSERVED = 19177

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-32
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL NON-WHITE SERVICEMEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	2269	2422	0.94	11.547*
MOTOR VEH ACCIDENTS (E810-E827)	632	536	1.18	9.172*
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	62	54	1.15	1.446
ACC. POISONINGS (E850-E877)	117	97	1.21	2.054
ALL OTH ACC./INJURY (E880-E949, E970-E989)	575	536	1.07	1.936
SUICIDE (E950-E959)	295	293	1.01	0.309
HOMICIDE (E960-E969)	1108	1120	0.99	0.112

TOTAL NUMBER OF CASES OBSERVED = 5058

EXPECTED NUMBERS ARE BASED UPON 5350 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-33
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL ENLISTED MEN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	9264	9586	0.97	13.473*
MOTOR VEH ACCIDENTS (E810-E827)	4757	4492	1.06	10.730*
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	420	417	1.01	0.257
ACC. POISONINGS (E850-E877)	568	495	1.15	6.427*
ALL OTH ACC./INJURY (E880-E949, E970-E989)	2815	2673	1.05	4.457*
SUICIDE (E950-E959)	2428	2586	0.94	7.965*
HOMICIDE (E960-E969)	2276	2277	1.00	0.023

TOTAL NUMBER OF CASES OBSERVED = 22528

EXPECTED NUMBERS ARE BASED UPON 25022 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-34
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL OFFICERS

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	816	846	0.96	0.753
MOTOR VEH ACCIDENTS (E810-E827)	113	102	1.11	0.389
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	114	69	1.66	4.156*
ACC. POISONINGS (E850-E877)	13	7	1.81	0.935
ALL OTH ACC./INJURY (E880-E949, E970-E989)	76	91	0.83	1.195
SUICIDE (E950-E959)	96	121	0.79	1.996
HOMICIDE (E960-E969)	28	13	2.22	3.109

TOTAL NUMBER OF CASES OBSERVED = 1256

EXPECTED NUMBERS ARE BASED UPON 1405 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

TABLE C-35
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL ARMY ENLISTED MEN IN VIETNAM, COMBAT MOSC VS. NON-COMBAT MOSC

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	2081	2151	0.97	3.433
MOTOR VEH ACCIDENTS (E810-E827)	1205	1217	0.99	0.088
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	93	119	0.78	4.189*
ACC. POISONINGS (E850-E877)	153	142	1.08	0.746
ALL OTH ACC./INJURY (E880-E949, E970-E989)	762	696	1.09	4.694*
SUICIDE (E950-E959)	590	613	0.96	0.684
HOMICIDE (E960-E969)	638	583	1.09	3.924*

TOTAL NUMBER OF CASES OBSERVED = 5522

EXPECTED NUMBERS ARE BASED UPON 12767 OBSERVATIONS IN COMPARISON GROUP

*** P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM**

TABLE C-36
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL ENLISTED MARINES IN VIETNAM, COMBAT MOSC VS. NON-COMBAT MOSC

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	528	536	0.98	0.586
MOTOR VEH ACCIDENTS (E810-E827)	466	496	0.94	0.573
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	34	32	1.05	0.036
ACC. POISONINGS (E850-E877)	67	53	1.26	2.116
ALL OTH ACC./INJURY (E880-E949, E970-E989)	289	276	1.05	0.758
SUICIDE (E950-E959)	228	274	0.83	4.599*
HOMICIDE (E960-E969)	286	230	1.24	7.034*

TOTAL NUMBER OF CASES OBSERVED = 1898

EXPECTED NUMBERS ARE BASED UPON 2341 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

APPENDIX D

APPENDIX D

DEATHS IN CALIFORNIA, MASSACHUSETTS, NEW YORK, WISCONSIN AND WEST VIRGINIA USING ALL U.S. VETERANS AS COMPARISON GROUP

DEATHS IN CALIFORNIA

- TABLE D-1: DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA
- TABLE D-2: DEATHS FROM CANCERS
- TABLE D-3: DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY,
RESPIRATORY AND DIGESTIVE SYSTEMS
- TABLE D-4: SELECTED CAUSES OF DEATH BY ORGAN SYSTEM

DEATHS IN MASSACHUSETTS

- TABLE D-5: DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA
- TABLE D-6: DEATHS FROM CANCERS
- TABLE D-7: DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY,
RESPIRATORY AND DIGESTIVE SYSTEMS
- TABLE D-8: SELECTED CAUSES OF DEATH BY ORGAN SYSTEM

DEATHS IN NEW YORK

- TABLE D-9 : DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA
- TABLE D-10: DEATHS FROM CANCERS
- TABLE D-11: DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY,
RESPIRATORY AND DIGESTIVE SYSTEMS
- TABLE D-12: SELECTED CAUSES OF DEATH BY ORGAN SYSTEM

DEATHS IN WISCONSIN

- TABLE D-13: DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA
- TABLE D-14: DEATHS FROM CANCERS
- TABLE D-15: DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY,
RESPIRATORY AND DIGESTIVE SYSTEMS
- TABLE D-16: SELECTED CAUSES OF DEATH BY ORGAN SYSTEM

DEATHS IN WEST VIRGINIA

- TABLE D-17: DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA
- TABLE D-18: DEATHS FROM CANCERS
- TABLE D-19: DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY,
RESPIRATORY AND DIGESTIVE SYSTEMS
- TABLE D-20: SELECTED CAUSES OF DEATH BY ORGAN SYSTEM

DEATHS IN CALIFORNIA USING NON-VIETNAM
SERVICE VETERANS WHO DIED IN CALIFORNIA AS COMPARISON GROUP

TABLE D-21: DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA

TABLE D-22: DEATHS FROM CANCERS

TABLE D-23: DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY,
RESPIRATORY AND DIGESTIVE SYSTEMS

TABLE D-24: SELECTED CAUSES OF DEATH BY ORGAN SYSTEM

**TABLE D-1
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL WHITE SERVICEMEN WHO DIED IN CALIFORNIA**

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	795	851	0.93	8.622*
MOTOR VEH ACCIDENTS (E810-E827)	446	446	1.00	0.001
OTH. TRANSPORT. ACC. (E800-E807,E830-E845)	54	51	1.06	0.301
ACC. POISONINGS (E850-E877)	97	45	2.17	52.662*
ALL OTH ACC./INJURY (E880-E949,E970-E989)	197	242	0.81	9.686*
SUICIDE (E950-E959)	280	262	1.07	1.480
HOMICIDE (E960-E969)	158	130	1.22	5.518*

TOTAL NUMBER OF CASES OBSERVED = 2027

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-2
DEATHS FROM CANCERS (140-208, 230-239)
ALL WHITE SERVICEMEN WHO DIED IN CALIFORNIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	1782	1765	1.01	1.623
CA - BUCCAL (140-149)	7	5	1.33	0.135
CA - ESOPHAGUS (150)	5	5	1.01	0.056
CA - STOMACH (151)	10	8	1.22	0.141
CA - INTESTINES & OTHER GI (152-154,158,159)	11	20	0.56	2.815
CA - LIVER, BILE DUCTS (155-156)	2	2	0.97	0.008
CA - PANCREAS (157)	9	9	0.98	0.001
CA - UPPER RESPIRATORY (160-161)	2	3	0.60	0.280
CA - LUNG (162)	67	58	1.16	0.525
CA - BONE (170)	4	4	1.01	0.000
CA - SOFT TISSUES (171)	3	4	0.67	0.520
CA - MELANOMA OF THE SKIN (172)	18	19	0.97	0.001
CA - PROSTATE (185)	0	3	0.00	3.374
CA - TESTIS (186)	17	10	1.72	4.545*
CA - BLADDER (188)	1	2	0.62	0.468
CA - KIDNEY (189)	5	7	0.68	0.850
CA - BRAIN (191)	13	13	1.00	0.014
CA - OTHER NERVOUS SYSTEM (192)	2	8	0.26	4.092*
CA - THYROID & ENDOCRINE (193-194)	2	3	0.60	0.625
CA - NON-HODGKINS LYMPHOMA (200,202)	9	14	0.66	1.155
CA - HODGKINS DISEASE (201)	10	9	1.11	0.082
CA - MULTIPLE MYELOMA (203)	5	3	1.69	1.969
CA - LEUKEMIA (204-207)	25	24	1.05	0.008
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	18	29	0.62	4.159*

TOTAL NUMBER OF CASES OBSERVED = 2027

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-3
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN CALIFORNIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	1684	1705	0.99	1.266
HYPERTENSIVE DISEASE (400-404)	3	5	0.66	0.234
ACUTE MYOCARDIAL INFARCTION (410)	5	12	0.42	3.928*
OTHER ISCHEMIC HEART DISEASE (411-414)	100	86	1.17	1.584
CARDIOMYOPATHY (425)	12	7	1.64	2.609
CARDIAC ARREST (427.2)	6	15	0.39	5.540*
CEREBROVASCULAR DISEASES (430-438)	36	37	0.97	0.098
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	9	10	0.91	0.160
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	6	9	0.70	1.146
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	15	14	1.04	0.212
UPPER RESPIRATORY (460-466, 500-508)	2	1	2.43	0.118
INFLUENZA & PNEUMONIA (470-486)	17	18	0.93	0.028
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	6	5	1.24	0.032
OTHER RESPIRATORY (490, 493, 510-519)	4	7	0.55	1.148
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	5	5	0.95	0.000
CIRRHOSIS - ALCOHOLIC (571.0)	48	29	1.67	9.414*
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	45	37	1.23	1.482
DISEASES OF PANCREAS (577)	12	6	2.08	7.322*
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	12	19	0.63	1.961

TOTAL NUMBER OF CASES OBSERVED = 2027

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

*** P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM**

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-4
DEATHS FROM DISEASES OF SELECTED ORGAN SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN CALIFORNIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-759,780-796)	59	64	0.93	0.213
INFECTIVE & PARASITIC DISEASES (000-136)	3	11	0.26	6.010*
CANCERS (140-209, 230-239)	245	262	0.93	1.639
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	3	13	0.23	7.646*
BLOOD & BLOOD-FORMING ORGANS (280-289)	3	3	1.09	0.023
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	13	16	0.82	0.303
CIRCULATORY DISEASES (390-458)	314	342	0.92	3.206
RESPIRATORY DISEASES (460-519)	32	38	0.84	0.879
DIGESTIVE DISEASES (520-577)	116	88	1.32	8.491*
GENITOURINARY DISEASES (580-629)	4	10	0.42	2.394
SKIN & SUBCUTANEOUS TISSUES (680-709)	1	1	0.97	0.000
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	2	3	0.66	0.306
ACCIDENTS, VIOLENCE & TRAUMA (E800-E989)	1232	1177	1.05	8.307*

TOTAL NUMBER OF CASES OBSERVED = 2027				
EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				
ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP				

TABLE D-6
DEATHS FROM CANCERS (140-208, 230-239)
ALL WHITE SERVICEMEN WHO DIED IN MASSACHUSETTS

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	251	245	1.02	1.204
CA - BUCCAL (140-149)	0	1	0.00	0.700
CA - ESOPHAGUS (150)	1	0	2.43	0.804
CA - STOMACH (151)	1	1	1.04	0.002
CA - INTESTINES & OTHER GI (152-154,158,159)	1	2	0.44	0.729
CA - LIVER, BILE DUCTS (155-156)	0	0	0.00	0.269
CA - PANCREAS (157)	0	1	0.00	1.015
CA - UPPER RESPIRATORY (160-161)	0	0	0.00	0.204
CA - LUNG (162)	5	6	0.84	0.152
CA - BONE (170)	0	1	0.00	0.503
CA - SOFT TISSUES (171)	2	1	3.81	4.089*
CA - MELANOMA OF THE SKIN (172)	0	3	0.00	2.543
CA - PROSTATE (185)	0	0	0.00	0.369
CA - TESTIS (186)	2	1	1.40	0.226
CA - BLADDER (188)	0	0	0.00	0.148
CA - KIDNEY (189)	2	1	2.46	1.717
CA - BRAIN (191)	2	2	1.14	0.029
CA - OTHER NERVOUS SYSTEM (192)	0	1	0.00	1.163
CA - THYROID & ENDOCRINE (193-194)	2	0	5.95	7.982*
CA - NON-HODGKINS LYMPHOMA (200,202)	3	2	1.59	0.606
CA - HODGKINS DISEASE (201)	1	1	0.81	0.041
CA - MULTIPLE MYELOMA (203)	0	0	0.00	0.262
CA - LEUKEMIA (204-207)	1	3	0.29	1.745
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	3	4	0.84	0.097

TOTAL NUMBER OF CASES OBSERVED = 277

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-7
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN MASSACHUSETTS

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-5989)	227	238	0.95	3.950*
HYPERTENSIVE DISEASE (400-404)	0	0	0.00	0.476
ACUTE MYOCARDIAL INFARCTION (410)	2	1	1.68	0.580
OTHER ISCHEMIC HEART DISEASE (411-414)	13	10	1.27	0.843
CARDIOMYOPATHY (425)	0	1	0.00	0.974
CARDIAC ARREST (427.2)	3	2	1.41	0.382
CEREBROVASCULAR DISEASES (430-438)	5	5	1.07	0.020
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	0	1	0.00	1.322
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	0	1	0.00	1.158
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	2	2	1.17	0.046
UPPER RESPIRATORY (460-466, 500-508)	0	0	0.00	0.118
INFLUENZA & PNEUMONIA (470-486)	2	2	0.84	0.059
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	0	1	0.00	0.546
OTHER RESPIRATORY (490, 493, 510-519)	3	1	3.69	5.600*
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	1	1	1.49	0.156
CIRRHOSIS - ALCOHOLIC (571.0)	2	4	0.56	0.669
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	9	4	2.10	5.086*
DISEASES OF PANCREAS (577)	1	1	1.59	0.211
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	7	2	3.21	10.245*

TOTAL NUMBER OF CASES OBSERVED = 277

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

**TABLE D-8
DEATHS FROM DISEASES OF SELECTED ORGAN SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN MASSACHUSETTS**

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	9	9	1.04	0.015
INFECTIVE & PARASITIC DISEASES (000-136)	1	2	0.59	0.272
CANCERS (140-209, 230-239)	26	32	0.82	1.212
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	2	2	1.27	0.107
BLOOD & BLOOD-FORMING ORGANS (280-289)	0	0	0.00	0.403
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	3	2	1.34	0.254
CIRCULATORY DISEASES (390-458)	39	41	0.95	0.119
RESPIRATORY DISEASES (460-519)	7	4	1.59	1.542
DIGESTIVE DISEASES (520-577)	18	11	1.67	4.892*
GENITOURINARY DISEASES (580-629)	0	1	0.00	1.086
SKIN & SUBCUTANEOUS TISSUES (680-709)	0	0	0.00	0.150
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	0	0	0.00	0.308
ACCIDENTS, VIOLENCE & TRAUMA (800-989)	172	173	0.99	0.024

TOTAL NUMBER OF CASES OBSERVED = 277				
EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				
ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP				

TABLE D-9
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL WHITE SERVICEMEN WHO DIED IN NEW YORK

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	334	253	1.32	46.536*
MOTOR VEH ACCIDENTS (E810-E827)	137	188	0.73	18.820*
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	17	21	0.82	0.615
ACC. POISONINGS (E850-E877)	31	19	1.65	7.811*
ALL OTH ACC./INJURY (E880-E949, E970-E989)	106	101	1.05	0.267
SUICIDE (E950-E959)	70	109	0.64	16.492*
HOMICIDE (E960-E969)	51	55	0.94	0.272

TOTAL NUMBER OF CASES OBSERVED = 746

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-10
DEATHS FROM CANCERS (140-208, 230-239)
ALL WHITE SERVICEMEN WHO DIED IN NEW YORK

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	667	668	1.00	0.007
CA - BUCCAL (140-149)	0	1	0.00	1.395
CA - ESOPHAGUS (150)	2	1	2.79	2.215
CA - STOMACH (151)	2	2	0.87	0.042
CA - INTESTINES & OTHER GI (152-154,158,159)	10	5	1.87	3.865*
CA - LIVER, BILE DUCTS (155-156)	1	1	1.71	0.239
CA - PANCREAS (157)	3	2	1.38	0.315
CA - UPPER RESPIRATORY (160-161)	1	0	2.16	0.661
CA - LUNG (162)	15	12	1.23	0.652
CA - BONE (170)	0	1	0.00	1.428
CA - SOFT TISSUES (171)	1	1	0.70	0.121
CA - MELANOMA OF THE SKIN (172)	1	7	0.15	5.045*
CA - PROSTATE (185)	0	0	0.00	0.453
CA - TESTIS (186)	1	4	0.23	2.476
CA - BLADDER (188)	0	0	0.00	0.335
CA - KIDNEY (189)	1	2	0.63	0.231
CA - BRAIN (191)	6	5	1.21	0.219
CA - OTHER NERVOUS SYSTEM (192)	0	3	0.00	3.147
CA - THYROID & ENDOCRINE (193-194)	0	1	0.00	0.817
CA - NON-HODGKINS LYMPHOMA (200,202)	7	5	1.37	0.633
CA - HODGKINS DISEASE (201)	6	4	1.60	1.326
CA - MULTIPLE MYELOMA (203)	0	1	0.00	0.593
CA - LEUKEMIA (204-207)	12	10	1.26	0.595
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	10	9	1.14	0.124

TOTAL NUMBER OF CASES OBSERVED = 746

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-11
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN NEW YORK

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	589	652	0.90	47.769*
HYPERTENSIVE DISEASE (400-404)	1	1	0.91	0.006
ACUTE MYOCARDIAL INFARCTION (410)	3	2	1.26	0.143
OTHER ISCHEMIC HEART DISEASE (411-414)	35	23	1.54	6.607*
CARDIOMYOPATHY (425)	6	3	2.37	4.190*
CARDIAC ARREST (427.2)	6	5	1.21	0.196
CEREBROVASCULAR DISEASES (430-438)	15	12	1.23	0.602
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	2	3	0.68	0.299
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	3	3	1.11	0.023
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	12	4	2.68	11.912*
UPPER RESPIRATORY (460-466, 500-508)	0	0	0.00	0.309
INFLUENZA & PNEUMONIA (470-486)	6	6	0.99	0.000
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	1	1	0.98	0.000
OTHER RESPIRATORY (490, 493, 510-519)	1	2	0.46	0.607
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	2	2	1.16	0.052
CIRRHOSIS - ALCOHOLIC (571.0)	29	9	3.17	37.872*
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	20	10	1.95	8.301*
DISEASES OF PANCREAS (577)	6	2	3.20	7.472*
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	9	6	1.63	2.107

TOTAL NUMBER OF CASES OBSERVED = 746

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

*** P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM**

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-12
DEATHS FROM DISEASES OF SELECTED ORGAN SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN NEW YORK

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-59,780-96)	54	23	2.34	39.423*
INFECTIVE & PARASITIC DISEASES (000-136)	12	4	2.78	12.564*
CANCERS (140-209, 230-239)	79	78	1.01	0.006
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	3	4	0.80	0.139
BLOOD & BLOOD-FORMING ORGANS (280-289)	0	1	0.00	1.209
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	7	6	1.18	0.185
CIRCULATORY DISEASES (390-458)	106	94	1.13	1.862
RESPIRATORY DISEASES (460-519)	7	10	0.67	1.135
DIGESTIVE DISEASES (520-577)	64	27	2.35	46.341*
GENITOURINARY DISEASES (580-629)	1	3	0.35	1.179
SKIN & SUBCUTANEOUS TISSUES (680-709)	0	0	0.00	0.385
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	1	1	1.08	0.002
ACCIDENTS, VIOLENCE & TRAUMA (E800-E989)	412	494	0.83	47.099*

TOTAL NUMBER OF CASES OBSERVED = 746

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-13
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL WHITE SERVICEMEN WHO DIED IN WISCONSIN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	100	108	0.93	1.105
MOTOR VEH ACCIDENTS (E810-E827)	105	78	1.34	12.196*
OTH. TRANSPORT. ACC. (E800-E807,E830-E845)	4	9	0.45	2.762
ACC. POISONINGS (E850-E877)	4	8	0.50	2.071
ALL OTH ACC./INJURY (E880-E949,E970-E989)	45	42	1.06	0.194
SUICIDE (E950-E959)	49	45	1.08	0.314
HOMICIDE (E960-E969)	7	23	0.31	11.870*

TOTAL NUMBER OF CASES OBSERVED = 314				
EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				
ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP				

TABLE D-14
DEATHS FROM CANCERS (140-208, 230-239)
ALL WHITE SERVICEMEN WHO DIED IN WISCONSIN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	280	281	1.00	0.037
CA - BUCCAL (140-149)	0	1	0.00	0.619
CA - ESOPHAGUS (150)	1	0	3.32	1.590
CA - STOMACH (151)	0	1	0.00	0.968
CA - INTESTINES & OTHER GI (152-154,158,159)	3	2	1.31	0.219
CA - LIVER, BILE DUCTS (155-156)	0	0	0.00	0.229
CA - PANCREAS (157)	1	1	1.13	0.011
CA - UPPER RESPIRATORY (160-161)	0	0	0.00	0.229
CA - LUNG (162)	5	5	0.96	0.014
CA - BONE (170)	0	1	0.00	0.548
CA - SOFT TISSUES (171)	3	1	5.11	9.287*
CA - MELANOMA OF THE SKIN (172)	2	3	0.69	0.264
CA - PROSTATE (185)	0	0	0.00	0.198
CA - TESTIS (186)	5	2	2.86	5.557*
CA - BLADDER (188)	0	0	0.00	0.131
CA - KIDNEY (189)	1	1	1.36	0.092
CA - BRAIN (191)	3	2	1.46	0.422
CA - OTHER NERVOUS SYSTEM (192)	0	1	0.00	1.338
CA - THYROID & ENDOCRINE (193-194)	0	0	0.00	0.336
CA - NON-HODGKINS LYMPHOMA (200,202)	2	2	0.93	0.012
CA - HODGKINS DISEASE (201)	2	2	1.32	0.154
CA - MULTIPLE MYELOMA (203)	0	0	0.00	0.276
CA - LEUKEMIA (204-207)	4	4	1.01	0.000
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	2	4	0.54	0.789

TOTAL NUMBER OF CASES OBSERVED = 314

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-15
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN WISCONSIN

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	278	274	1.02	0.599
HYPERTENSIVE DISEASE (400-404)	0	0	0.00	0.452
ACUTE MYOCARDIAL INFARCTION (410)	2	1	1.78	0.677
OTHER ISCHEMIC HEART DISEASE (411-414)	6	10	0.61	1.603
CARDIOMYOPATHY (425)	2	1	1.81	0.727
CARDIAC ARREST (427.2)	3	2	1.42	0.350
CEREBROVASCULAR DISEASES (430-438)	6	5	1.16	0.133
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	3	1	2.41	2.450
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	1	1	0.86	0.024
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	2	2	1.02	0.000
UPPER RESPIRATORY (460-466, 500-508)	0	0	0.00	0.132
INFLUENZA & PNEUMONIA (470-486)	1	3	0.39	0.956
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	1	0	2.29	0.650
OTHER RESPIRATORY (490, 493, 510-519)	2	1	2.19	1.272
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	0	1	0.00	0.807
CIRRHOSIS - ALCOHOLIC (571.0)	4	4	1.01	0.001
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	1	4	0.23	2.612
DISEASES OF PANCREAS (577)	0	1	0.00	0.784
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	2	2	0.85	0.051

TOTAL NUMBER OF CASES OBSERVED = 314

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-17
DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-E989)
ALL WHITE SERVICEMEN WHO DIED IN WEST VIRGINIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	113	108	1.05	0.617
MOTOR VEH ACCIDENTS (E810-E827)	57	55	1.04	0.099
OTH. TRANSPORT. ACC. (E800-E807, E830-E845)	5	6	0.81	0.217
ACC. POISONINGS (E850-E877)	5	5	0.92	0.039
ALL OTH ACC./INJURY (E880-E949, E970-E989)	40	30	1.33	3.713
SUICIDE (E950-E959)	20	33	0.60	6.218*
HOMICIDE (E960-E969)	14	16	0.86	0.319

TOTAL NUMBER OF CASES OBSERVED = 254

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-18
DEATHS FROM CANCERS (140-208, 230-239)
ALL WHITE SERVICEMEN WHO DIED IN WEST VIRGINIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	224	222	1.01	0.183
CA - BUCCAL (140-149)	2	1	2.62	1.928
CA - ESOPHAGUS (150)	0	0	0.00	0.423
CA - STOMACH (151)	2	1	2.17	1.290
CA - INTESTINES & OTHER GI (152-154,158,159)	2	2	0.85	0.048
CA - LIVER, BILE DUCTS (155-156)	0	0	0.00	0.261
CA - PANCREAS (157)	0	1	0.00	1.036
CA - UPPER RESPIRATORY (160-161)	1	0	3.47	1.668
CA - LUNG (162)	8	7	1.13	0.110
CA - BONE (170)	1	1	1.95	0.459
CA - SOFT TISSUES (171)	0	1	0.00	0.504
CA - MELANOMA OF THE SKIN (172)	0	2	0.00	2.525
CA - PROSTATE (185)	1	0	3.17	1.396
CA - TESTIS (186)	2	1	1.69	0.577
CA - BLADDER (188)	0	0	0.00	0.162
CA - KIDNEY (189)	1	1	1.07	0.006
CA - BRAIN (191)	2	2	1.11	0.022
CA - OTHER NERVOUS SYSTEM (192)	0	1	0.00	1.093
CA - THYROID & ENDOCRINE (193-194)	0	0	0.00	0.339
CA - NON-HODGKINS LYMPHOMA (200,202)	0	2	0.00	1.799
CA - HODGKINS DISEASE (201)	1	1	0.92	0.007
CA - MULTIPLE MYELOMA (203)	0	0	0.00	0.274
CA - LEUKEMIA (204-207)	3	3	0.93	0.015
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	4	3	1.17	0.101

TOTAL NUMBER OF CASES OBSERVED = 254

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-19
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN WEST VIRGINIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	204	213	0.96	2.640
HYPERTENSIVE DISEASE (400-404)	0	1	0.00	0.552
ACUTE MYOCARDIAL INFARCTION (410)	0	1	0.00	1.441
OTHER ISCHEMIC HEART DISEASE (411-414)	14	11	1.26	0.782
CARDIOMYOPATHY (425)	2	1	2.07	1.065
CARDIAC ARREST (427.2)	3	2	1.41	0.384
CEREBROVASCULAR DISEASES (430-438)	13	5	2.76	14.218*
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	1	1	0.70	0.132
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	1	1	0.88	0.015
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	2	2	1.19	0.058
UPPER RESPIRATORY (460-466, 500-508)	0	0	0.00	0.111
INFLUENZA & PNEUMONIA (470-486)	2	2	0.84	0.057
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	0	1	0.00	0.632
OTHER RESPIRATORY (490, 493, 510-519)	2	1	2.44	1.657
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	0	1	0.00	0.653
CIRRHOSIS - ALCOHOLIC (571.0)	7	4	1.89	2.938
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	3	5	0.64	0.626
DISEASES OF PANCREAS (577)	0	1	0.00	0.671
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	0	2	0.00	2.097

TOTAL NUMBER OF CASES OBSERVED = 254

EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP

*** P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM**

ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP

TABLE D-20
DEATHS FROM DISEASES OF SELECTED ORGAN SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN WEST VIRGINIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28,290-315,740-759,780-796)	6	8	0.74	0.558
INFECTIVE & PARASITIC DISEASES (000-136)	0	2	0.00	1.634
CANCERS (140-209, 230-239)	30	32	0.93	0.185
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	1	2	0.61	0.242
BLOOD & BLOOD-FORMING ORGANS (280-289)	0	0	0.00	0.386
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	2	2	0.94	0.008
CIRCULATORY DISEASES (390-458)	57	44	1.29	5.239*
RESPIRATORY DISEASES (460-519)	5	5	1.08	0.033
DIGESTIVE DISEASES (520-577)	11	11	0.98	0.003
GENITOURINARY DISEASES (580-629)	1	1	0.85	0.025
SKIN & SUBCUTANEOUS TISSUES (680-709)	0	0	0.00	0.111
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	0	0	0.00	0.287
ACCIDENTS, VIOLENCE & TRAUMA (E800-989)	141	146	0.96	0.648

TOTAL NUMBER OF CASES OBSERVED = 254				
EXPECTED NUMBERS ARE BASED UPON 21335 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				
ALL U.S. VETERANS WITH NO VIETNAM SERVICE USED AS COMPARISON GROUP				

TABLE D-21
 DEATHS FROM ACCIDENTS, SUICIDES AND TRAUMA (E800-989)
 ALL WHITE SERVICEMEN WHO DIED IN CALIFORNIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-799)	796	823	0.97	0.532
MOTOR VEH ACCIDENTS (E810-827)	446	449	0.99	0.074
OTH. TRANSPORT. ACC. (E800-807, E830-845)	54	55	0.98	0.001
ACC. POISONINGS (E850-877)	97	91	1.06	0.485
ALL OTH ACC./INJURY (E880-949, E970-989)	196	156	1.26	4.203*
SUICIDE (E950-959)	280	305	0.92	1.515
HOMICIDE (E960-969)	158	147	1.07	0.125

TOTAL NUMBER OF CASES OBSERVED = 2027

EXPECTED NUMBERS ARE BASED UPON 2080 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

NON-VIETNAM SERVICE VETERANS WHO DIED IN CALIFORNIA USED AS COMPARISON GROUP

TABLE D-22
DEATHS FROM CANCERS (140-208, 230-239)
ALL WHITE SERVICEMEN WHO DIED IN CALIFORNIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-136,210-228,240-E989)	1782	1767	1.01	0.966
CA - BUCCAL (140-149)	7	3	2.15	0.740
CA - ESOPHAGUS (150)	5	2	2.73	0.634
CA - STOMACH (151)	10	6	1.72	0.435
CA - INTESTINES & OTHER GI (152-154,158,159)	11	26	0.42	4.141*
CA - LIVER, BILE DUCTS (155-156)	2	3	0.71	0.078
CA - PANCREAS (157)	9	8	1.12	0.105
CA - UPPER RESPIRATORY (160-161)	2	0	9.00	0.352
CA - LUNG (162)	67	49	1.38	2.017
CA - BONE (170)	4	3	1.32	0.016
CA - SOFT TISSUES (171)	3	5	0.56	0.722
CA - MELANOMA OF THE SKIN (172)	18	26	0.70	0.161
CA - PROSTATE (185)	0	5	0.00	3.898*
CA - TESTIS (186)	17	6	2.87	5.384*
CA - BLADDER (188)	1	2	0.48	1.236
CA - KIDNEY (189)	5	8	0.63	0.999
CA - BRAIN (191)	13	17	0.78	0.254
CA - OTHER NERVOUS SYSTEM (192)	2	3	0.76	0.260
CA - THYROID & ENDOCRINE (193-194)	2	8	0.24	3.154
CA - NON-HODGKINS LYMPHOMA (200,202)	9	17	0.52	1.675
CA - HODGKINS DISEASE (201)	10	7	1.43	0.316
CA - MULTIPLE MYELOMA (203)	5	3	1.62	1.037
CA - LEUKEMIA (204-207)	25	29	0.85	0.649
OTH CA (163,173-4,187,190,195-9,208-9,230-9)	18	24	0.74	2.013

TOTAL NUMBER OF CASES OBSERVED = 2027

EXPECTED NUMBERS ARE BASED UPON 2080 OBSERVATIONS IN COMPARISON GROUP

* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM

NON-VIETNAM SERVICE VETERANS WHO DIED IN CALIFORNIA USED AS COMPARISON GROUP

TABLE D-23
DEATHS FROM SELECTED DISEASES OF THE CIRCULATORY, RESPIRATORY AND DIGESTIVE SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN CALIFORNIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (000-398, 580-E989)	1684	1711	0.98	0.560
HYPERTENSIVE DISEASE (400-404)	4	6	0.70	0.200
ACUTE MYOCARDIAL INFARCTION (410)	4	5	0.74	1.136
OTHER ISCHEMIC HEART DISEASE (411-414)	98	100	0.98	0.189
CARDIOMYOPATHY (425)	12	10	1.18	0.454
CARDIAC ARREST (427.2)	6	3	1.99	1.851
CEREBROVASCULAR DISEASES (430-438)	34	36	0.93	0.058
DIS OF ARTERIES, ARTERIOLES, CAPILLARIES (440-448)	10	8	1.31	0.005
DIS OF VEINS, LYMPHATICS & OTHERS (450-458)	6	11	0.53	0.762
OTH HEART DISEASES (420-424, 426-427.1, 427.3-429)	14	10	1.43	2.156
UPPER RESPIRATORY (460-466, 500-508)	2	1	3.59	0.014
INFLUENZA & PNEUMONIA (470-486)	18	17	1.05	0.011
CHRONIC BRONCHITIS & EMPHYSEMA (491-492)	6	1	8.88	2.447
OTHER RESPIRATORY (490, 493, 510-519)	4	4	1.01	0.003
DIS OF ESOPHAGUS, STOMACH, DUODENUM (530-537)	5	5	1.06	0.354
CIRRHOSIS - ALCOHOLIC (571.0)	53	46	1.14	0.302
CIRRHOSIS - OTHER/UNSPECIFIED (571.8, 571.9)	43	41	1.06	0.001
DISEASES OF PANCREAS (577)	12	3	3.96	4.740*
OTH DIGESTIVE DISEASES (520-529, 540-570, 572-576)	12	10	1.24	0.014

TOTAL NUMBER OF CASES OBSERVED = 2027

EXPECTED NUMBERS ARE BASED UPON 2080 OBSERVATIONS IN COMPARISON GROUP

*** P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM**

NON-VIETNAM SERVICE VETERANS WHO DIED IN CALIFORNIA USED AS COMPARISON GROUP

TABLE D-24
DEATHS FROM SELECTED ORGAN SYSTEMS
ALL WHITE SERVICEMEN WHO DIED IN CALIFORNIA

CAUSE	OBSERVED	EXPECTED	O/E	M-H CHI-SQUARE
ALL OTHER CAUSES (210-28, 290-315, 740-759, 780-796)	59	50	1.19	1.097
INFECTIVE & PARASITIC DISEASES (000-136)	3	18	0.17	6.259*
CANCERS (140-209, 230-239)	245	260	0.94	0.966
ENDOCRINE, NUTRITIONAL & METABOLIC (240-279)	3	25	0.12	11.714*
BLOOD & BLOOD-FORMING ORGANS (280-289)	3	1	2.12	0.659
NERVOUS SYSTEMS & SENSE ORGANS (320-389)	13	20	0.66	0.019
CIRCULATORY DISEASES (390-458)	314	304	1.03	0.135
RESPIRATORY DISEASES (460-519)	32	25	1.28	0.200
DIGESTIVE DISEASES (520-577)	116	103	1.12	0.462
GENITOURINARY DISEASES (580-629)	4	10	0.41	0.282
SKIN & SUBCUTANEOUS TISSUES (680-709)	1	5	0.19	1.937
MUSCULOSKELETAL & CONNECTIVE TISSUES (710-738)	2	3	0.65	0.629
ACCIDENTS, VIOLENCE & TRAUMA (800-989)	1232	1204	1.02	0.591

TOTAL NUMBER OF CASES OBSERVED = 2027				
EXPECTED NUMBERS ARE BASED UPON 2080 OBSERVATIONS IN COMPARISON GROUP				
* P<0.05 FOR CHI-SQUARE WITH 1 DEGREE OF FREEDOM				
NON-VIETNAM SERVICE VETERANS WHO DIED IN CALIFORNIA USED AS COMPARISON GROUP				