Table 74. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting *Hospitalization Since Discharge From the Army* for Conditions Classified as Cardiovascular Diseases (ICD-9, 390-459), and Odds Ratios, by Type of Condition

	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
Condition (ICD-9 Codes)	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All Circul Dis (390-459)	4.6	362	4.1	300	1.1	1.0-1.3	1.1	1.0-1.3	1.1	0.9-1.3
Rheu Hrt Dis (390-398)	0.1	4	0.1	6	0.6	0.2-2.2	–	–	–	–
Hypertensive Dis (401-405)	0.6	47	0.4	28	1.6	1.0-2.5	1.7	1.0-2.7	1.6	1.0-2.7
Ischem Hrt Dis (410-414)	0.6	49	0.5	37	1.2	0.8-1.9	1.2	0.8-1.9	1.1	0.7-1.8
Acute MI (410)	0.5	38	0.4	27	1.3	0.8-2.1	1.3	0.8-2.1	1.2	0.7-2.0
Angina (413)	0.1	9	0.1	5	1.7	0.6-5.0	–	–	–	–
Pulmonary Circ Dis (415-417)	0.1	11	0.1	4	2.6	0.8-8.0	–	–	–	–
Other Hrt Dis (420-429)	0.6	44	0.7	49	0.8	0.6-1.3	0.8	0.6-1.3	0.9	0.6-1.4
Dysrhythmias (426-427)	0.3	23	0.3	21	1.0	0.6-1.8	1.1	0.6-2.0	–	–
Cerebrovascular Dis (430-438)	0.1	10	0.2	16	0.6	0.3-1.3	0.6	0.3-1.3	–	–
Arterial Vasc Dis (440-448)	0.2	13	0.2	13	0.9	0.4-2.0	1.1	0.5-2.4	–	–
Other Circ Dis (451-459)	2.5	197	2.2	159	1.2	0.9-1.4	1.1	0.9-1.4	1.1	0.9-1.4
Phlebitis (451)	0.1	4	0.1	10	0.4	0.1-1.2	–	–	–	–
Varic veins (454)	0.2	14	0.2	15	0.9	0.4-1.8	0.8	0.4-1.6	–	–
Hemorrhoids (455)	1.8	146	1.5	107	1.3	1.0-1.6	1.2	1.0-1.6	1.2	0.9-1.6

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, cigarette smoking, alcohol use, marital status, and body mass index.

Table 75. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting a *Current Limitation in Some Activity* Due to Conditions Classified as Cardiovascular Diseases (ICD-9, 390-459), and Odds Ratios, by Type of Condition

	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
Condition (ICD-9 Codes)	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All Circul Dis (390-459)	1.0	80	0.8	62	1.2	0.9-1.7	1.2[c]	0.8-1.6	1.2	0.8-1.6
Rheu Hrt Dis (390-398)	0.0	0	<0.1	3	–	–	–	–	–	–
Hypertensive Dis (401-405)	0.3	23	0.2	12	1.8	0.9-3.6	1.5	0.7-3.1	–	–
Ischem Hrt Dis (410-414)	0.1	11	0.1	4	2.6	0.8-8.0	–	–	–	–
Acute MI (410)	0.1	6	0.0	0	–	–	–	–	–	–
Angina (413)	0.1	4	<0.1	2	–	–	–	–	–	–
Pulmonary Circ Dis (415-417)	0.0	0	0.0	0	–	–	–	–	–	–
Other Hrt Dis (420-429)	0.2	18	0.2	14	1.2	0.6-2.4	1.4	0.7-3.0	–	–
Dysrhythmias (426-427)	0.1	4	<0.1	1	–	–	–	–	–	–
Cerebrovascular Dis (430-438)	<0.1	2	0.1	5	–	–	–	–	–	–
Arterial Vasc Dis (440-448)	0.1	5	0.0	0	–	–	–	–	–	–
Other Circ Dis (451-459)	0.3	21	0.3	24	0.8	0.5-1.5	0.8	0.4-1.4	–	–
Phlebitis (451)	<0.1	2	<0.1	3	–	–	–	–	–	–
Varic veins (454)	0.1	5	<0.1	3	–	–	–	–	–	–
Hemorrhoids (455)	0.1	7	0.1	9	0.7	0.3-1.9	–	–	–	–

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, cigarette smoking, alcohol use, marital status, and body mass index.
[c] Standardized for age at entry into Army and primary MOS.

Table 76. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting *Current Use of Physician-Prescribed Medications* for Conditions Classified as Cardiovascular Diseases (ICD-9, 390-459), and Odds Ratios, by Type of Condition

	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
Condition (ICD-9 Codes)	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All Circul Dis (390-459)	5.1	401	4.9	363	1.0	0.9-1.2	1.0	0.9-1.2	1.0	0.9-1.2
Rheu Hrt Dis (390-398)	<0.1	2	<0.1	2	–	–	–	–	–	–
Hypertensive Dis (401-405)	4.4	348	4.3	318	1.0	0.9-1.2	1.0	0.8-1.2	1.0	0.8-1.2
Ischem Hrt Dis (410-414)	0.2	15	0.1	11	1.3	0.6-2.8	1.3	0.6-3.0	–	–
Acute MI (410)	0.1	6	0.1	7	0.8	0.3-2.4	–	–	–	–
Angina (413)	0.1	7	<0.1	3	2.2	0.6-8.4	–	–	–	–
Pulmonary Circ Dis (415-417)	<0.1	1	<0.1	1	–	–	–	–	–	–
Other Hrt Dis (420-429)	0.4	32	0.4	27	1.1	0.7-1.8	1.1	0.6-1.9	1.1	0.6-1.8
Dysrhythmias (426-427)	0.3	20	0.2	18	1.0	0.5-2.0	0.9	0.5-1.8	–	–
Cerebrovascular Dis (430-438)	<0.1	3	<0.1	1	–	–	–	–	–	–
Arterial Vasc Dis (440-448)	0.1	6	<0.1	3	–	–	–	–	–	–
Other Circ Dis (451-459)	0.1	10	0.1	8	1.2	0.5-2.9	–	–	–	–
Phlebitis (451)	<0.1	1	<0.1	2	–	–	–	–	–	–
Varic veins (454)	0.0	0	0.0	0	–	–	–	–	–	–
Hemorrhoids (455)	<0.1	1	<0.1	2	–	–	–	–	–	–

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, cigarette smoking, alcohol use, marital status, and body mass index.

Table 77. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as Cardiovascular Disease (ICD-9, 390-459) as *Other Current Health Problems*, and Odds Ratios, by Type of Condition

	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
Condition (ICD-9 Codes)	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All Circul Dis (390-459)	1.5	120	1.5	107	1.0	0.8-1.4	1.0	0.8-1.4	1.0	0.8-1.4
Rheu Hrt Dis (390-398)	<0.1	2	0.1	6	–	–	–	–	–	–
Hypertensive Dis (401-405)	<0.1	1	0.1	5	–	–	–	–	–	–
Ischem Hrt Dis (410-414)	<0.1	3	<0.1	1	–	–	–	–	–	–
Acute MI (410)	0.0	0	0.0	0	–	–	–	–	–	–
Angina (413)	<0.1	3	<0.1	1	–	–	–	–	–	–
Pulmonary Circ Dis (415-417)	<0.1	1	0.0	0	–	–	–	–	–	–
Other Hrt Dis (420-429)	0.3	22	0.2	13	1.6	0.8-3.1	1.6	0.8-3.3	–	–
Dysrhythmias (426-427)	0.2	14	0.1	7	1.9	0.8-4.6	–	–	–	–
Cerebrovascular Dis (430-438)	0.0	0	0.0	0	–	–	–	–	–	–
Arterial Vasc Dis (440-448)	0.1	6	<0.1	3	–	–	–	–	–	–
Other Circ Dis (451-459)	1.1	86	1.1	81	1.0	0.7-1.3	1.0	0.7-1.3	1.0	0.7-1.3
Phlebitis (451)	0.0	0	<0.1	2	–	–	–	–	–	–
Varic veins (454)	0.1	11	<0.1	2	5.1	1.1-23.1	–	–	–	–
Hemorrhoids (455)	0.8	64	0.1	58	1.0	0.7-1.5	1.0	0.7-1.4	1.0	0.7-1.4

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, cigarette smoking, alcohol use, marital status, and body mass index.

diseases were reported with similar frequencies, or rarely, by both groups as reasons for current limitations in activities, postservice hospitalization, or current medication use.

Fertility Problems

Vietnam veterans were 1.4 times as likely as non-Vietnam veterans to report having had difficulty conceiving a child, and 1.8 times as likely to have experienced this problem with two or more partners (Table 78). Both relative increases are statistically significant and independent of entry characteristics and other potential confounders, including reported medical care in the Army for a sexually transmitted disease. When ORs are examined by time to occurrence of the reported problem, 20% to 30% increases are seen in the two earlier time periods, and an 80% excess is seen in the most recent time period (Table 79).

The questionnaire sought information about treatment-seeking behavior by affected veterans and their partners and about medical diagnoses of the fertility problem. In Table 80 this information is summarized by the source of the problem. All odds ratios are elevated except for the situation where the wife was identified as the source of the fertility problem. The other source-specific odds ratios are statistically greater than 1.0 and varied from 1.3 for veterans who were the source of the problem to 1.6 for those who did not even seek medical help. The source-specific ORs for fertility problems with two or more partners (not shown) are more extreme than those shown in Table 80, with a twofold increase seen for men who did not know the reason for the problem or who did not seek medical care.

Most (83%) physician-diagnosed male fertility problems among both Vietnam and non-Vietnam veterans were coded to azoospermia or oligospermia (ICD-9, 606) (Table 81). The prevalence of these conditions is, however, 30% higher among Vietnam veterans than among non-Vietnam veterans. The same degree of association is seen for scrotal varices and for other and unknown problems.

All veterans who denied having had difficulty conceiving a child were asked whether a physician had ever told them that it would be difficult or impossible for them to father a child. The question was asked to identify men who, at some point, knew they had a fertility problem without having had to try to conceive a child to find out. Vietnam veterans had a slightly higher rate of known male problems relative to non-Vietnam veterans (crude OR = 1.2, Table 82). This slight excess is due to injuries or wounds (5 Vietnam veterans versus 1 non-Vietnam veteran), elective sterilization (13 versus 7), and other and unknown conditions (23 versus 14).

The fertility experience of Vietnam and non-Vietnam veterans, as measured by the total number of reported pregnancies they fathered after assignment to their primary tour of duty as well as pregnancies resulting in a live birth or stillbirth, is shown in Table 83. Both groups of veterans had identical fertility rates (1.9 pregnancies conceived per veteran and 1.6 births per veteran). Moreover, the percent of Vietnam veterans that did not father any children during this time interval (22.9%) was similar to that for other veterans (23.1%).

Injuries

In both groups of veterans, very few injuries (or poisonings) were mentioned in conjunction with current medication use (Table 84). The two subcategories of injuries with adequate numbers for comparison ("fractures, dislocations, and sprains" and "other and unspecified types of injuries and effects of external causes") were both reported less frequently by Vietnam veterans (crude ORs = 0.5 and 0.9, respectively). For most subcategories of injuries,

Table 78. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting They Were *Unable To Conceive a Child Over a Period of a Year or More*, and Odds Ratios, by Number of Sexual Partners With Which They Had This Problem

Number of Partners	Vietnam		Non-Vietnam		Crude Results		Multivariate Results: Model 1[a]		Multivariate Results: Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
One or more	19.8	1567	15.3	1125	1.4	1.3-1.5	1.3	1.2-1.5	1.3	1.2-1.4
Two or more	1.7	131	0.9	67	1.8	1.4-2.5	1.7	1.3-2.3	1.6	1.2-2.2

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education, cigarette smoking, alcohol use, and medical care in the Army for a sexually transmitted disease (ICD-9, 090-099).

Table 79. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting They Were *Unable To Conceive a Child Over a Period of a Year or More*, and Odds Ratios, by Year of First Occurrence of the Problem Relative to Year of Entry Into the Army

Years Since Entry Into Army	Vietnam		Non-Vietnam		Crude Results		Multivariate Results: Model 1[a]		Multivariate Results: Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
1-6	11.2	881	8.5	625	1.3	1.2-1.5	1.3	1.2-1.5	1.3	1.2-1.5
7-12	6.5	457	5.4	362	1.2	1.1-1.4	1.2	1.0-1.4	1.2	1.0-1.4
≥13	3.1	203	1.6	102	1.8	1.4-2.3	1.7	1.3-2.2	1.7	1.3-2.1

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education, cigarette smoking, alcohol use, and medical care in the Army for a sexually transmitted disease (ICD-9, 090-099).

Table 80. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting They Were *Unable To Conceive a Child Over a Period of a Year or More*, and Odds Ratios, by Physician-Diagnosis of Source of Problem

	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
Source of Problem	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Physician-diagnosed male problem	3.5	276	2.7	199	1.3	1.1-1.6	1.3	1.1-1.6	1.3	1.1-1.6
Physician-diagnosed female problem	4.3	337	4.2	307	1.0	0.9-1.2	1.0	0.9-1.2	1.0	0.9-1.2
Unknown problem	6.9	543	5.1	379	1.4	1.2-1.6	1.4	1.2-1.6	1.3	1.2-1.5
Did not seek medical help	5.2	411	3.3	240	1.6	1.4-1.9	1.5	1.3-1.8	1.5	1.2-1.7

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education, cigarette smoking, alcohol use, and medical care in the Army for a sexually transmitted disease (ICD-9, 090-099).

Table 81. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting They Were Unable To Conceive a Child Over a Period of a Year or More and Who Had a Physician-Diagnosed Infertility Problem, and Odds Ratios, by Type of Infertility Problem

	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
Condition (ICD-9 Codes)[c]	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Azoospermia and oligospermia (606)	2.9	229	2.2	165	1.3	1.1-1.6	1.3	1.1-1.7	1.4	1.1-1.7
Scrotal varices (456.4)	0.1	8	0.1	6	1.2	0.4-3.6	–	–	–	–
Other	0.3	26	0.2	18	1.3	0.7-2.5	1.4	0.8-2.7	–	–
Unknown	0.2	13	0.1	10	1.2	0.5-2.8	–	–	–	–

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education, cigarette smoking, alcohol use, and medical care in the Army for a sexually transmitted disease (ICD-9, 090-099).
[c] Based on response given for first sexual partner if two partners were involved.

Table 82. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting They Had Been Told by a Physician That It Would Be Difficult or Impossible for Them to Father a Child, and Odds Ratios, by Cause of Problem[a]

	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[b]		Model 2[c]	
Cause of Infertility	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Total	1.1	89	0.9	69	1.2	0.9-1.6	1.2	0.9-1.7	1.2	0.8-1.6
Azoospermia	0.5	37	0.5	34	1.0	0.6-1.6	1.0	0.6-1.6	0.9	0.6-1.5
Other disease of genital organs	0.1	6	0.1	8	0.7	0.2-2.0	–	–	–	–
Infectious diseases	<0.1	2	<0.1	3	–	–	–	–	–	–
Scrotal varices	<0.1	1	<0.1	2	–	–	–	–	–	–
Injury or wound	0.1	5	<0.1	1	–	–	–	–	–	–
Elective sterilization	0.2	13	0.1	7	1.7	0.7-4.3	–	–	–	–
Congenital anomalies	<0.1	2	0.0	0	–	–	–	–	–	–
Other	0.1	9	0.1	6	1.4	0.5-3.9	–	–	–	–
Unknown	0.2	14	0.1	8	1.6	0.7-3.9	–	–	–	–

[a] Based on questions B-20 to B-22. Includes some cases diagnosed before enlistment in the Army.
[b] Model 1 contains the six entry characteristics.
[c] Model 2 contains the six entry characteristics and education, cigarette smoking, and alcohol use.

there was a slight excess of hospitalizations among Vietnam veterans (Table 85). None of the excesses, however, was statistically significant at the 0.05 level.

Vietnam veterans were about three times more likely to report "open wounds" and "late effects of injuries, etc." as reasons for current limitations in activities and other current health problems (Tables 86, 87). Examination of the actual responses for the "open wound" and "late effects" subcategories indicated that the excesses are due primarily to war-related injuries. On the basis of responses to the questions about other current health problems (Table 87), superficial injuries (ICD-9, 910-919) show a significant 3.5-fold increase among Vietnam veterans.

The year-of-occurrence pattern for injury-related hospitalizations is shown in Table 88. The ORs are remarkably homogeneous over the three time intervals and indicate little or no differences in the rates for the two groups of veterans.

Other Specific Health Problems

Three other diseases not discussed previously were asked about by name in the questionnaire. These are mononucleosis, anemia, and diabetes. Vietnam veterans reported having been told by a physician that they had each of these conditions more often than did other veterans (Table 89). The strongest association was with anemia (crude OR = 1.6), whereas the excess for diabetes was not statistically significant at the 0.05 level

Results for five other broad ICD-9 categories for which data were derived solely from open-ended medical questions about current medication use, hospitalizations, current limitations in activities, and other current health problems are presented next.

Infectious and parasitic diseases (ICD-9, 001-139)

Very few veterans reported current limitations in activities due to infectious and parasitic diseases, *in toto*, but proportionately more Vietnam veterans than non-Vietnam veterans named mycotic infections as the cause of limitations (crude OR = 2.5, Table 90). Vietnam veterans were slightly less likely to report current use of a prescribed medication for infectious and parasitic diseases (crude OR = 0.9), and, surprisingly, were only slightly more likely to be using a medication for a fungal infection (crude OR = 1.1, Table 91). Vietnam veterans were only slightly more likely to report a postdischarge hospitalization for infectious and parasitic diseases, although they reported far more hospitalizations for malaria (crude OR = 11.9) and mycotic infections (crude OR = 6.0, Table 92). Just over 1% of Vietnam

Table 83. Number of Pregnancies and Births Fathered by Vietnam and Non-Vietnam Veterans, and Crude Ratios (Events per Veteran)[a]

	Vietnam		Non-Vietnam	
Event	No.	Ratio	No.	Ratio
All pregnancies	17028	2.1	15573	2.1
Pregnancies conceived after assignment to primary tour of duty[b]	15028	1.9	13722	1.9
All births[c]	14261	1.8	13240	1.8
Births conceived after assignment to primary tour of duty	12788	1.6	11910	1.6

[a] Men who were never married are included.
[b] Primary tour of duty is either Vietnam, Korea, Germany, or the United States. Veterans with multiple tours are classified according to the preceding order of locations.
[c] Includes reported stillbirths.

Table 84. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting *Current Use of Physician-Prescribed Medications* for Conditions Classified as Injuries or Poisonings (ICD-9, 800-999), and Odds Ratios, by Type of Condition

Type of Injury (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Fractures, dislocations, sprains (800-849)	0.3	24	0.6	42	0.5	0.3-0.9	0.5	0.3-0.9	0.5	0.3-0.9
Intracranial, internal, injury to blood vessels, spine, nerves (850-869, 900-904, 950-957)	0.1	4	<0.1	2	–	–	–	–	–	–
Open wounds (870-897)	0.1	4	0.1	5	–	–	–	–	–	–
Late effects of injuries, etc. (905-909)	<0.1	2	0.0	0	–	–	–	–	–	–
Superficial injury (910-919)	0.1	5	<0.1	1	–	–	–	–	–	–
Other types of injury, burns (920-949)	<0.1	2	<0.1	3	–	–	–	–	–	–
Poisonings and toxic effects of substances (960-989)	<0.1	2	0.0	0	–	–	–	–	–	–
Other & unspec types of injuries and effects of external causes (958-959, 990-999)	0.6	51	0.7	55	0.9	0.6-1.3	0.8	0.6-1.2	0.8	0.6-1.2

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education, alcohol use, and body mass index.

Table 85. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting *Hospitalization Since Discharge From the Army* for Conditions Classified as Injuries or Poisonings (ICD-9, 800-999), and Odds Ratios, by Type of Condition

Type of Injury (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Fractures, dislocations, sprains (800-849)	10.3	815	9.1	670	1.1	1.0-1.3	1.1	1.0-1.2	1.1	1.0-1.2
Intracranial, internal, injury to blood vessels, spine, nerves (850-869, 900-904, 950-957)	1.6	128	1.4	106	1.1	0.9-1.5	1.1	0.8-1.4	1.0	0.8-1.4
Open wounds (870-897)	3.2	254	2.9	212	1.1	0.9-1.3	1.1	0.9-1.3	1.0	0.9-1.3
Late effects of injuries, etc. (905-909)	0.1	4	<0.1	1	–	–	–	–	–	–
Superficial injury (910-919)	0.3	20	0.1	11	1.7	0.8-3.5	1.7	0.8-3.6	–	–
Other types of injury, burns (920-949)	1.6	124	1.3	99	1.2	0.9-1.5	1.1	0.9-1.5	1.1	0.9-1.5
Poisonings and toxic effects of substances (960-989)	0.6	45	0.6	43	1.0	0.6-1.5	0.9	0.5-1.3	0.8	0.5-1.3
Other & unspec types of injuries and effects of external causes (958-959, 990-999)	1.6	128	1.9	141	0.8	0.7-1.1	0.8	0.6-1.0	0.7	0.6-0.9

[a] Model 1 contains the six entry characteristics.

[b] Model 2 contains the six entry characteristics and education, alcohol use, and body mass index.

Table 86. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting a *Current Limitation in Some Activity* Due to Conditions Classified as Injuries or Poisonings (ICD-9, 800-999), and Odds Ratios, by Type of Condition

Type of Injury (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Fractures, dislocations, sprains (800-849)	2.4	194	3.1	230	0.8	0.6-0.9	0.8	0.6-1.0	0.8	0.6-1.0
Intracranial, internal, injury to blood vessels, spine, nerves (850-869, 900-904, 950-957)	0.3	25	0.3	20	1.2	0.6-2.1	1.0	0.5-1.8	–	–
Open wounds (870-897)	1.4	111	0.5	34	3.1	2.1-4.5	2.5	1.7-3.8	2.5	1.7-3.7
Late effects of injuries, etc. (905-909)	0.4	28	0.1	9	2.9	1.4-6.1	2.5	1.2-5.4	–	–
Superficial injury (910-919)	0.1	7	<0.1	1	–	–	–	–	–	–
Other types of injury, burns (920-949)	0.3	20	0.2	16	1.2	0.6-2.2	1.1	0.6-2.2	–	–
Poisonings and toxic effects of substances (960-989)	0.1	4	<0.1	3	–	–	–	–	–	–
Other & unspec types of injuries and effects of external causes (958-959, 990-999)	0.9	71	0.8	62	1.1	0.8-1.5	1.1	0.7-1.5	1.1	0.7-1.5

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education, alcohol use, and body mass index.

Table 87. **Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as Injuries or Poisonings (ICD-9, 800-999) as *Other Current Health Problems*, and Odds Ratios, by Type of Condition**

Type of Injury (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results: Model 1[a]		Multivariate Results: Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Fractures, dislocations, sprains (800-849)	0.9	69	0.7	55	1.2	0.8-1.7	1.2	0.8-1.7	1.2	0.8-1.7
Intracranial, internal, injury to blood vessels, spine, nerves (850-869, 900-904, 950-957)	0.1	8	0.1	4	1.9	0.6-6.2	–	–	–	–
Open wounds (870-897)	0.3	23	0.1	6	3.6	1.5-8.8	3.0	1.2-7.5	–	–
Late effects of injuries, etc. (905-909)	0.1	10	<0.1	3	3.1	0.9-11.3	–	–	–	–
Superficial injury (910-919)	0.2	15	0.1	4	3.5	1.2-10.5	–	–	–	–
Other types of injury, burns (920-949)	0.1	4	0.1	5	–	–	–	–	–	–
Poisonings and toxic effects of substances (960-989)	<0.1	2	<0.1	2	–	–	–	–	–	–
Other & unspec types of injuries and effects of external causes (958-959, 990-999)	0.6	50	0.6	41	1.1	0.7-1.7	1.3	0.8-1.9	1.3	0.8-1.9

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education, alcohol use, and body mass index.

Table 88. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting *Hospitalizations Due to Conditions Classified as Injuries or Poisonings (ICD-9, 800-999)*, and Odds Ratios, by Year of Hospitalization Relative to Year of Entry Into the Army

Years Since Entry Into Army	Vietnam		Non-Vietnam		Crude Results		Multivariate Results: Model 1[a]		Multivariate Results: Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
1-6	6.4	508	5.7	422	1.1	1.0-1.3	1.1	1.0-1.3	1.1	1.0-1.3
7-12	6.6	491	6.1	422	1.1	1.0-1.2	1.0	0.9-1.2	1.0	0.9-1.2
≥13	5.5	381	5.1	329	1.0	0.9-1.2	1.0	0.8-1.1	0.9	0.8-1.1

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education, alcohol use, and body mass index.

Table 89. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Selected Diseases Asked About by Name, and Odds Ratios

Disease	Vietnam		Non-Vietnam		Crude Results		Multivariate Results: Model 1[a]		Multivariate Results: Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Mononucleosis[c]	2.4	191	1.8	130	1.4	1.1-1.7	1.4	1.1-1.7	1.4	1.1-1.7
Anemia[c]	5.7	455	3.7	275	1.6	1.3-1.8	1.5	1.3-1.8	1.5	1.3-1.8
Diabetes[d]	1.9	147	1.4	102	1.3	1.0-1.7	1.2	0.9-1.6	1.2	0.9-1.6

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, cigarette smoking, and alcohol use.
[c] Physician-diagnosed after discharge from the Army.
[d] First diagnosis after year of entry into the Army.

Table 90. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting a *Current Limitation in Some Activity* Due to Conditions Classified as Infectious or Parasitic Diseases (ICD-9, 001-139), and Odds Ratios, by Type of Disease

Type of Disease (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All infect & parasit dis (001-139)	0.3	22	0.2	16	1.3	0.7-2.4	1.2	0.6-2.4	–	–
Intest infect dis (001-009)	<0.1	2	<0.1	3	–	–	–	–	–	–
Tuberculosis (010-018)	<0.1	2	<0.1	2	–	–	–	–	–	–
Other bacter dis (020-041)	0.0	0	0.0	0	–	–	–	–	–	–
Viral dis (045-079)	<0.1	3	0.1	4	–	–	–	–	–	–
Malaria (084)	<0.1	3	0.0	0	–	–	–	–	–	–
Rickett & other arthropodborne dis (080-083, 085-088)	0.0	0	<0.1	1	–	–	–	–	–	–
Venereal dis (090-099)	<0.1	1	<0.1	1	–	–	–	–	–	–
Mycoses (110-118)	0.1	8	<0.1	3	2.5	0.7-9.4	–	–	–	–
All other infect & parasit dis	<0.1	3	<0.1	2	–	–	–	–	–	–

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education.

Table 91. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting *Current Use of Physician-Prescribed Medications* for Conditions Classified as Infectious or Parasitic Diseases (ICD-9, 001-139), and Odds Ratios, by Type of Disease

Type of Disease (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All infect & parasit dis (001-139)	0.5	39	0.5	39	0.9	0.6-1.4	0.8	0.5-1.3	0.9	0.5-1.4
Intest infect dis (001-009)	0.1	4	0.1	6	0.6	0.2-2.2	–	–	–	–
Tuberculosis (010-018)	<0.1	2	<0.1	2	–	–	–	–	–	–
Other bacter dis (020-041)	0.1	5	<0.1	3	–	–	–	–	–	–
Viral dis (045-079)	<0.1	3	0.1	6	–	–	–	–	–	–
Malaria (084)	0.0	0	<0.1	1	–	–	–	–	–	–
Rickett & other arthropodborne dis (080-083, 085-088)	0.0	0	0.0	0	–	–	–	–	–	–
Venereal dis (090-099)	<0.1	3	<0.1	2	–	–	–	–	–	–
Mycoses (110-118)	0.2	18	0.2	15	1.1	0.6-2.2	1.0	0.5-2.0	–	–
All other infect & parasit dis	0.1	5	0.1	4	–	–	–	–	–	–

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education.

Table 92. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting *Hospitalization Since Discharge From the Army* for Conditions Classified as Infectious or Parasitic Diseases (ICD-9, 001-139), and Odds Ratios, by Type of Disease

Type of Disease (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All infect & parasit dis (001-139)	2.4	187	2.1	156	1.1	0.9-1.4	1.0	0.8-1.3	1.0	0.8-1.3
Intest infect dis (001-009)	0.5	38	0.5	40	0.9	0.6-1.4	0.8	0.5-1.2	0.8	0.5-1.2
Tuberculosis (010-018)	<0.1	3	0.1	8	0.3	0.1-1.3	–	–	–	–
Other bacter dis (020-041)	0.2	16	0.4	33	0.4	0.2-0.8	0.5	0.2-0.8	–	–
Viral dis (045-079)	0.6	47	0.7	55	0.8	0.5-1.2	0.7	0.5-1.1	0.7	0.5-1.1
Malaria (084)	0.6	51	0.1	4	11.9	4.3-33.0	10.7	3.8-29.9	10.7	3.8-30.0
Rickett & other arthropodborne dis (080-083, 085-088)	<0.1	3	<0.1	2	–	–	–	–	–	–
Venereal dis (090-099)	0.1	4	0.1	6	0.6	0.2-2.2	–	–	–	–
Mycoses (110-118)	0.2	13	<0.1	2	6.0	1.4-26.8	–	–	–	–
All other infect & parasit dis	0.2	15	0.1	8	1.7	0.7-4.1	–	–	–	–

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education.

veterans and 0.6% of other veterans reported an infectious or parasitic disease as an other current health problem (crude OR = 1.9, Table 93). The most commonly mentioned infection here was some type of mycosis (prevalence in Vietnam veterans = 0.5%, crude OR = 2.7). Vietnam veterans also reported malaria and intestinal infections more frequently as other current health problems.

Endocrine, nutritional, metabolic diseases and immunity disorders (ICD-9, 240-279)

This class of conditions was reported at about the same frequency among Vietnam and non-Vietnam veterans (Table 94). However, Vietnam veterans said they were hospitalized for thyroid problems significantly more often than other veterans (crude OR = 2.9). Consistent with the finding shown in Table 89, diabetes was responsible for more frequent use of medication and more limitations in activities and hospitalizations among Vietnam veterans. Only three reported problems were classified as immune disorders (ICD-9, 279), all among Vietnam veterans. These conditions were given in response to the question about other current health problems, and the actual responses were "susceptible to upper respiratory illness," "easy to get colds in bronchitis," and "low immunity to infection."

Diseases of the blood and blood-forming organs (ICD-9, 280-289)

Very few reported health problems were classified in this category (Table 95). Although anemia was reported significantly more often by Vietnam veterans when it was asked about by name (Table 89), it was not responsible for higher-than-expected rates of current medication use, hospitalization, or current limitations in activities.

Diseases of the respiratory system (ICD-9, 460-519)

Vietnam veterans reported a history of respiratory diseases with about the same frequency as did non-Vietnam veterans (Table 96). This was also true for major subcategories, such as acute respiratory problems and chronic obstructive pulmonary disease. The multivariate results from Model 2 are adjusted for cigarette smoking habits, and they are generally similar to the crude results.

Diseases of the musculoskeletal system and connective tissue (ICD-9, 710-739 and V48-V49)

Vietnam veterans were somewhat more likely to report these conditions than were non-Vietnam veterans, independent of the source of the report or the type of musculoskeletal condition (Table 97). None of the excesses, however, was statistically significant after the results were adjusted for entry characteristics. The same pattern is seen for conditions coded to the supplementary classification codes V48, V49 (Table 98). The increased reporting of those problems as reasons for current limitations in activities is, however, statistically significant (crude OR = 1.5).

Symptoms, Signs, and Ill-Defined Conditions

Vietnam veterans tended to report health problems that were classified as symptoms, signs, or ill-defined conditions more often than non-Vietnam veterans (Tables 99-102). Higher-than-expected rates are seen for most of the subcategories examined, notably for headaches, nervousness, and the class of "general symptoms" (ICD-9, 780). The elevated rate of symptoms involving the cardiovascular system (ICD-9, 785) as a reason for hospitalization (crude OR = 2.5, Table 100) is due to increased reporting of rapid heart beat, palpitations, and swollen lymph glands. The most striking differences between the two

Table 93. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as Infectious or Parasitic Diseases (ICD-9, 001-139) as *Other Current Health Problems*, and Odds Ratios, by Type of Disease

Type of Disease (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All infect & parasit dis (001-139)	1.1	90	0.6	44	1.9	1.3-2.7	2.0	1.4-3.0	2.0	1.4-3.0
Intest infect dis (001-009)	0.1	9	0.1	4	2.1	0.6-6.8	–	–	–	–
Tuberculosis (010-018)	<0.1	3	0.1	5	–	–	–	–	–	–
Other bacter dis (020-041)	0.1	6	<0.1	1	–	–	–	–	–	–
Viral dis (045-079)	0.2	18	0.2	17	1.0	0.5-1.9	1.0	0.5-2.0	–	–
Malaria (084)	0.2	13	0.0	0	–	–	–	–	–	–
Rickett & other arthropodborne dis (080-083, 085-088)	<0.1	1	0.0	0	–	–	–	–	–	–
Venereal dis (090-099)	0.0	0	<0.1	2	–	–	–	–	–	–
Mycoses (110-118)	0.5	41	0.2	14	2.7	1.5-5.0	2.9	1.5-5.4	2.9	1.5-5.4
All other infect & parasit dis	<0.1	2	<0.1	1	–	–	–	–	–	–

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education.

Table 94. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *Endocrine, Nutritional, or Metabolic Diseases, or Immunity Disorders* (ICD-9, 240-279), and Odds Ratios, by Type of Disease and Source of Report

Type of Disease (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
				Current Medication Use						
All endoc, nutrit, metab dis & immune dis (240-279)	1.5	116	1.3	98	1.1	0.8-1.4	1.0	0.8-1.4	1.0	0.8-1.4
Dis thyroid gland (240-246)	0.2	19	0.3	21	0.8	0.5-1.6	0.9	0.5-1.6	–	–
Diabetes mellitus (250)	0.7	53	0.5	34	1.5	0.9-2.2	1.3	0.8-2.0	1.3	0.8-2.0
All other endoc, nutrit, metab dis & immune dis	0.6	45	0.6	45	0.9	0.6-1.4	0.9	0.6-1.4	0.9	0.6-1.4
				Hospitalization Since Discharge						
All endoc, nutrit, metab dis & immune dis (240-279)	1.0	78	0.9	64	1.1	0.8-1.6	1.1	0.8-1.5	1.1	0.8-1.6
Dis thyroid gland (240-246)	0.2	19	0.1	6	2.9	1.2-7.4	3.1	1.2-7.9	–	–
Diabetes mellitus (250)	0.4	34	0.3	19	1.7	0.9-2.9	1.4	0.8-2.5	1.4	0.8-2.5
All other endoc, nutrit, metab dis & immune dis	0.3	25	0.5	39	0.6	0.4-1.0	0.6	0.4-1.0	0.6	0.4-1.1

Table 94. **Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *Endocrine, Nutritional, or Metabolic Diseases, or Immunity Disorders* (ICD-9, 240-279), and Odds Ratios, by Type of Disease and Source of Report — Continued**

Type of Disease (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
				Current Limitation in Some Activity						
All endoc, nutrit, metab dis & immune dis (240-279)	0.4	34	0.4	26	1.2	0.7-2.0	1.1	0.6-1.8	1.0	0.6-1.7
Dis thyroid gland (240-246)	<0.1	2	0.0	0	—	—	—	—	—	—
Diabetes mellitus (250)	0.2	14	0.1	10	1.3	0.6-2.9	—	—	—	—
All other endoc, nutrit, metab dis & immune dis	0.2	18	0.2	16	1.0	0.5-2.1	1.0	0.5-2.0	—	—
				Other Current Health Problem						
All endoc, nutrit, metab dis & immune dis (240-279)	0.9	71	1.0	73	0.9	0.7-1.3	0.9	0.6-1.2	0.8	0.6-1.2
Dis thyroid gland (240-246)	0.1	5	<0.1	2	—	—	—	—	—	—
Diabetes mellitus (250)	<0.1	1	<0.1	3	—	—	—	—	—	—
All other endoc, nutrit, metab dis & immune dis	0.8	65	0.9	68	0.9	0.6-1.2	0.9	0.6-1.3	0.8	0.6-1.2

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, cigarette smoking, and alcohol use.

Table 95. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *Diseases of the Blood or Blood-Forming Organs* (ICD-9, 280-289), and Odds Ratios, by Type of Disease and Source of Report

Type of Disease (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
				Current Medication Use						
All dis blood & blood-form organs (280-289)	0.1	4	0.1	11	0.3	0.1-1.1	–	–	–	–
Anemias (280-285)	0.0	0	0.1	5	–	–	–	–	–	–
All other dis blood & blood-form organs	0.1	4	0.1	6	0.6	0.2-2.2	–	–	–	–
				Hospitalization Since Discharge						
All dis blood & blood-form organs (280-289)	0.2	13	0.2	16	0.8	0.4-1.6	0.8	0.4-1.7	–	–
Anemias (280-285)	0.1	5	0.1	4	–	–	–	–	–	–
All other dis blood & blood-form organs	0.1	8	0.2	12	0.6	0.3-1.5	–	–	–	–

Table 95. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *Diseases of the Blood or Blood-Forming Organs* (ICD-9, 280-289), and Odds Ratios, by Type of Disease and Source of Report – Continued

Type of Disease (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results: Model 1[a]		Multivariate Results: Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
				Current Limitation in Some Activity						
All dis blood & blood-form organs (280-289)	<0.1	3	0.0	0	–	–	–	–	–	–
Anemias (280-285)	0.0	0	0.0	0	–	–	–	–	–	–
All other dis blood & blood-form organs	<0.1	3	0.0	0	–	–	–	–	–	–
				Other Current Health Problem						
All dis blood & blood-form organs (280-289)	0.1	8	0.1	6	1.2	0.4-3.6	–	–	–	–
Anemias (280-285)	<0.1	1	<0.1	3	0.3	0.0-3.0	–	–	–	–
All other dis blood & blood-form organs	0.1	7	<0.1	3	2.2	0.6-8.4	–	–	–	–

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, cigarette smoking, and alcohol use.

Table 96. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *Respiratory Diseases* (ICD-9, 460-519), and Odds Ratios, by Type of Condition and Source of Report

Type of Condition (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
				Current Medication Use						
All dis resp sys (460-519)	2.1	164	2.1	153	1.0	0.8-1.2	1.0	0.8-1.3	1.1	0.8-1.3
Dis upper resp tract (460-466, 470-478)	1.3	105	1.3	96	1.0	0.8-1.3	1.1	0.8-1.4	1.1	0.8-1.5
Pneum & influenza (480-487)	0.1	9	0.2	12	0.7	0.3-1.7	–	–	–	–
Chronic obstr pul dis (490-496)	0.6	45	0.6	41	1.0	0.7-1.6	1.1	0.7-1.7	1.1	0.7-1.8
All other resp dis	0.2	12	0.1	9	1.2	0.5-2.9	–	–	–	–
				Hospitalization Since Discharge						
All dis resp sys (460-519)	5.4	428	5.3	392	1.0	0.9-1.2	0.9	0.8-1.1	0.9	0.8-1.1
Dis upper resp tract (460-466, 470-478)	2.8	223	2.9	215	1.0	0.8-1.2	0.9	0.8-1.1	0.9	0.8-1.1
Pneum & influenza (480-487)	1.7	132	1.7	126	1.0	0.8-1.2	0.9	0.7-1.1	0.9	0.7-1.1
Chronic obstr pul dis (490-496)	0.3	23	0.3	20	1.1	0.6-1.9	1.2	0.6-2.2	–	–
All other resp dis	0.7	58	0.6	41	1.3	0.9-2.0	1.2	0.8-1.8	1.1	0.7-1.7

Table 96. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *Respiratory Diseases* (ICD-9, 460-519), and Odds Ratios, by Type of Condition and Source of Report – Continued

Type of Condition (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results: Model 1[a]		Multivariate Results: Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Current Limitation in Some Activity										
All dis resp sys (460-519)	0.8	63	0.8	57	1.0	0.7-1.5	1.0	0.7-1.5	1.0	0.7-1.5
Dis upper resp tract (460-466, 470-478)	0.2	15	0.2	14	1.0	0.5-2.1	1.0	0.5-2.0	–	–
Pneum & influenza (480-487)	<0.1	2	0.1	6	–	–	–	–	–	–
Chronic obstr pul dis (490-496)	0.4	32	0.4	28	1.1	0.6-1.8	1.1	0.6-1.8	1.1	0.6-1.8
All other resp dis	0.2	14	0.1	9	1.4	0.6-3.3	–	–	–	–
Other Current Health Problem										
All dis resp sys (460-519)	3.1	248	3.0	220	1.0	0.9-1.3	1.0	0.9-1.3	1.0	0.9-1.3
Dis upper resp tract (460-466, 470-478)	1.9	154	2.0	146	1.0	0.8-1.2	1.0[c]	0.8-1.3	1.0[c]	0.8-1.3
Pneum & influenza (480-487)	0.2	12	0.2	12	0.9	0.4-2.1	–	–	–	–
Chronic obstr pul dis (490-496)	0.7	56	0.6	46	1.1	0.8-1.7	1.1	0.7-1.6	1.1	0.7-1.6
All other resp dis	0.4	31	0.3	20	1.4	0.8-2.5	1.3	0.7-2.3	1.3	0.7-2.3

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, and cigarette smoking.
[c] Standardized for age at entry into Army.

Table 97. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *Diseases of the Musculoskeletal System or Connective Tissue (ICD-9, 710-739)*, and Odds Ratios, by Type of Condition and Source of Report

Type of Condition (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
				Current Medication Use						
Arthropathies (710-719)	1.0	83	0.7	52	1.5	1.1-2.1	1.4	1.0-2.0	1.4	1.0-2.0
Dorsopathies (720-724)	1.0	76	0.7	50	1.4	1.0-2.0	1.4	0.9-2.0	1.3	0.9-1.9
Rheumatism (725-729)	0.8	65	0.6	47	1.3	0.9-1.9	1.2	0.8-1.7	1.2	0.8-1.7
Osteopathies (730-739)	<0.1	1	0.0	0	–	–	–	–	–	–
				Hospitalization Since Discharge						
Arthropathies (710-719)	0.9	74	0.7	50	1.4	1.0-2.0	1.4	0.9-2.0	1.4	0.9-2.0
Dorsopathies (720-724)	2.8	224	2.7	202	1.0	0.9-1.3	1.0	0.8-1.3	1.0	0.8-1.2
Rheumatism (725-729)	1.1	88	1.2	87	0.9	0.7-1.3	0.9	0.6-1.2	0.8	0.6-1.1
Osteopathies (730-739)	0.8	63	0.8	60	1.0	0.7-1.4	0.9	0.6-1.3	0.9	0.6-1.3

Table 97. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *Diseases of the Musculoskeletal System or Connective Tissue (ICD-9, 710-739)*, and Odds Ratios, by Type of Condition and Source of Report – Continued

Type of Condition (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
				Current Limitation in Some Activity						
Arthropathies (710-719)	1.8	142	1.5	113	1.2	0.9-1.5	1.1	0.9-1.4	1.1	0.9-1.4
Dorsopathies (720-724)	3.4	268	3.4	251	1.0	0.8-1.2	1.0	0.8-1.2	0.9	0.8-1.1
Rheumatism (725-729)	1.5	117	1.3	93	1.2	0.9-1.5	1.1	0.9-1.5	1.1	0.8-1.5
Osteopathies (730-739)	0.7	53	0.6	47	1.0	0.7-1.6	1.0	0.7-1.6	1.0	0.7-1.6
				Other Current Health Problem						
Arthropathies (710-719)	1.6	129	1.4	102	1.2	0.9-1.5	1.1	0.9-1.5	1.1	0.9-1.5
Dorsopathies (720-724)	1.4	110	1.3	94	1.1	0.8-1.4	1.1	0.9-1.5	1.2	0.9-1.5
Rheumatism (725-729)	1.3	101	1.0	71	1.3	1.0-1.8	1.3	0.9-1.7	1.2	0.9-1.7
Osteopathies (730-739)	0.3	23	0.4	31	0.7	0.4-1.2	0.7	0.4-1.2	0.7	0.4-1.2

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics and education, cigarette smoking, and body mass index.

Table 98. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *Musculoskeletal Problems (V48, V49)*, and Odds Ratios, by Source of Report Within the Questionnaire

	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
Source of Report	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
Current medication use	0.1	9	0.1	5	1.7	0.6-5.0	–	–	–	–
Hospitalization since discharge	0.6	47	0.5	34	1.3	0.8-2.0	1.1	0.7-1.7	1.1	0.7-1.7
Current limitation in some activity	2.0	159	1.3	98	1.5	1.2-2.0	1.4	1.1-1.8	1.4	1.1-1.8
Other current health problem	0.4	35	0.5	39	0.8	0.5-1.3	0.8	0.5-1.3	0.8	0.5-1.3

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, cigarette smoking, alcohol use, and current employment status.

Table 99. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting *Current Use of Physician-Prescribed Medications* for Problems Classified as Symptoms, Signs, or Ill-Defined Conditions (ICD-9, 780-799, except 782.1), and Odds Ratios, by Type of Problem

Type of Problem (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All symptoms, signs, ill-defined cond[c] (780-782.0,782.2-799)	3.1	248	2.3	173	1.3	1.1-1.6	1.3	1.0-1.6	1.2	1.0-1.5
Gen symptoms (780)	1.0	77	0.6	41	1.8	1.2-2.6	1.7	1.2-2.5	1.6	1.1-2.4
Disturb skin sensat (782.0)	<0.1	1	0.0	0	–	–	–	–	–	–
Headache (784.0)	0.3	24	0.2	14	1.6	0.8-3.1	1.6	0.8-3.2	–	–
Symptoms involv cardiovas sys (785)	0.1	5	0.1	7	0.7	0.2-2.1	–	–	–	–
Sympt involv resp sys & other chest sympt (786)	0.1	10	0.1	9	1.0	0.4-2.5	–	–	–	–
Sympt involv diges sys (787)	0.1	5	0.1	5	0.9	0.3-3.2	–	–	–	–
Nervousness (799.2)	1.0	76	0.8	62	1.1	0.8-1.6	1.1	0.8-1.5	1.0	0.7-1.5
Residual[c]	0.9	69	0.7	55	1.2	0.8-1.7	1.1	0.8-1.6	1.0	0.7-1.5

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, cigarette smoking, alcohol use, and current employment status.
[c] Category also includes uncodable, "don't know," and "refused" responses.

Table 100. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting *Hospitalization Since Discharge From the Army* for Problems Classified as Symptoms, Signs, or Ill-Defined Conditions (ICD-9, 780-799, except 782.1), and Odds Ratios, by Type of Problem

Type of Problem (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All symptoms, signs, ill-defined cond[c] (780-782.0,782.2-799)	4.2	330	3.0	218	1.4	1.2-1.7	1.4	1.1-1.6	1.3	1.1-1.6
Gen symptoms (780)	1.1	88	0.8	57	1.4	1.0-2.0	1.5	1.1-2.1	1.5	1.1-2.2
Disturb skin sensat (782.0)	0.1	6	<0.1	3	–	–	–	–	–	–
Headache (784.0)	0.3	26	0.2	16	1.5	0.8-2.8	1.5	0.8-2.9	–	–
Symptoms involv cardiovas sys (785)	0.3	24	0.1	9	2.5	1.2-5.3	2.6	1.2-5.7	–	–
Sympt involv resp sys & other chest sympt (786)	0.6	46	0.5	36	1.2	0.8-1.8	1.1	0.7-1.7	1.1	0.7-1.7
Sympt involv diges sys (787)	0.1	10	0.1	6	1.5	0.6-4.3	–	–	–	–
Nervousness (799.2)	0.6	49	0.4	31	1.5	0.9-2.3	1.3	0.8-2.1	1.2	0.7-1.9
Residual[c]	1.1	90	0.9	69	1.2	0.9-1.7	1.1	0.8-1.5	1.1	0.8-1.5

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, cigarette smoking, alcohol use, and current employment status.
[c] Category also includes uncodable, "don't know," and "refused" responses.

Table 101. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting a *Current Limitation in Some Activity* for Problems Classified as Symptoms, Signs, or Ill-Defined Conditions (ICD-9, 780-799, except 782.1), and Odds Ratios, by Type of Problem

Type of Problem (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All symptoms, signs, ill-defined cond[c] (780-782.0,782.2-799)	2.4	191	1.5	110	1.6	1.3-2.1	1.6	1.2-2.0	1.6	1.2-2.0
Gen symptoms (780)	0.7	54	0.3	23	2.2	1.3-3.6	2.3	1.4-3.8	2.4	1.4-4.0
Disturb skin sensat (782.0)	0.2	18	0.1	9	1.9	0.8-4.1	1.9	0.8-4.3	–	–
Headache (784.0)	0.2	16	0.1	4	3.7	1.2-11.1	–	–	–	–
Symptoms involv cardiovas sys (785)	<0.1	3	0.1	4	–	–	–	–	–	–
Sympt involv resp sys & other chest sympt (786)	0.4	28	0.4	31	0.8	0.5-1.4	0.8	0.5-1.3	0.9	0.5-1.5
Sympt involv diges sys (787)	<0.1	1	0.0	0	–	–	–	–	–	–
Nervousness (799.2)	0.5	37	0.3	23	1.5	0.9-2.5	1.4	0.8-2.4	1.2	0.7-2.1
Residual[c]	0.4	34	0.2	16	2.0	1.1-3.6	1.9	1.0-3.5	1.7	0.9-3.2

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, cigarette smoking, alcohol use, and current employment status.
[c] Category also includes uncodable, "don't know," and "refused" responses.

Table 102. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Problems Classified as Symptoms, Signs, or Ill-Defined Conditions (ICD-9, 780-799, except 782.1) as *Other Current Health Problems*, and Odds Ratios, by Type of Problem

Type of Problem (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All symptoms, signs, ill-defined cond[c] (780-782.0,782.2-799)	5.1	407	2.5	182	2.1	1.8-2.6	2.1[d]	1.8-2.6	2.1[d]	1.8-2.6
Gen symptoms (780)	1.3	102	0.5	38	2.5	1.7-3.7	2.5	1.7-3.6	2.5	1.7-3.7
Disturb skin sensat (782.0)	0.4	33	0.2	13	2.4	1.2-4.5	2.3	1.2-4.5	–	–
Headache (784.0)	0.4	32	0.1	9	3.3	1.6-6.9	3.2	1.5-6.9	–	–
Symptoms involv cardiovas sys (785)	0.4	30	0.2	15	1.9	1.0-3.5	1.9	1.0-3.5	–	–
Sympt involv resp sys & other chest sympt (786)	1.0	79	0.6	47	1.6	1.1-2.3	1.6	1.1-2.4	1.6	1.1-2.3
Sympt involv diges sys (787)	0.3	20	0.1	6	3.1	1.2-7.7	3.4	1.3-8.8	–	–
Nervousness (799.2)	0.7	59	0.3	19	2.9	1.7-4.9	2.6	1.5-4.5	2.4	1.4-4.2
Residual[c]	1.0	78	0.6	45	1.6	1.1-2.3	1.5	1.0-2.2	1.5	1.0-2.3

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, cigarette smoking, alcohol use, and current employment status.
[c] Category also includes uncodable, "don't know," and "refused" responses.
[d] Standardized for primary MOS.

groups of veterans were the results for other current health problems (Table 102). Nervousness and gastrointestinal ailments are greatly in excess here and not elsewhere. Within the general symptom category (ICD-9, 780), Vietnam veterans reported virtually every specific constituent symptom more often than did other veterans (Table 103). A notable exception is seizures (ICD-9, 780.3), for which there is no difference between the groups. Health problems seen in excess here and not previously discussed included unexplained fever (crude OR=3.2), fatigue (crude OR=2.0), and excessive sweating (crude OR=3.3).

Supplementary classification codes (ICD-9, VO1-V82)

Most responses classified in this ICD-9 category concerned nonspecific musculoskeletal problems (*e.g.*, "back problem") and various types of medical care utilization, such as tests, examinations, procedures, and observation. Results for musculoskeletal problems were already discussed (Table 98). Postdischarge hospitalization rates for medical tests, examinations, and the like were analyzed separately, and the crude OR was 1.1.

3.5 SPECIAL ANALYSES FOR SELECTED HEALTH OUTCOMES

Health outcomes examined in the first two parts of this section are listed in Table 104. They are limited to those conditions asked about by name and to other outcomes that showed an appreciable excess in the overall Vietnam/non-Vietnam comparisons. Outcomes are grouped into three categories: inservice health problems, postservice general health outcomes (*e.g.*, employment status and perceived health), and postservice specific health conditions. Outcomes analyzed in the remainder of this section are a subset of those given in Table 104, with some minor modifications.

3.5.1 Race, Age at Enlistment, and Enlistment Status Subgroups

Detailed tables of results by race, by age at enlistment, and by enlistment status are in Appendix H (Tables H-1 to H-33), and the findings are summarized here. In general, there was a consistent pattern of uniformly elevated outcome-specific ORs across the various race, age at enlistment, and enlistment status strata, indicating that health outcomes associated with Vietnam service were not differentially reported by particular subgroups of Vietnam veterans.

3.5.2 Components of the Vietnam Experience

Health outcomes associated with various components of the Vietnam experience are summarized in Table 105. Detailed results are given in Appendix H (Tables H-34 to H-99). Combat exposure, whether defined by duty MOS, type of unit, or self-assessment, was associated with a particular subset of outcomes. Inservice health problems associated with all measures of combat exposure included malaria, mycoses, and open wounds. In addition, combat exposure defined by type of unit and duty MOS was positively associated with inservice skin infections and hearing loss and was negatively associated with sexually transmitted infections. Postservice health conditions positively related to all measures of combat exposure were hearing loss, symptoms associated with PTSD, and current limitations in activities or other current health problems due to open wounds. Additionally, migraine, hearing loss, neurologic symptoms, gastrointestinal ulcers, and hypertension were positively associated with self-assessed combat exposure, independent of perceived herbicide exposure. In fact, the associations with self-reported combat exposure persisted when analyses were confined to men with no reported herbicide exposure (Table H-98).

Table 103. Percent and Number of Vietnam and Non-Vietnam Veterans Reporting Conditions Classified as *General Symptoms (ICD-9, 780)* Responsible for Current Use of a Physician-Prescribed Medication or Hospitalization Since Discharge From the Army or Current Limitation in Some Activity or Other Current Health Problem, and Odds Ratios, by Type of Symptom

Type of Symptom (ICD-9 Codes)	Vietnam		Non-Vietnam		Crude Results		Multivariate Results			
							Model 1[a]		Model 2[b]	
	%	No.	%	No.	OR	95% CI	OR	95% CI	OR	95% CI
All general symptoms (780.0-780.9)	3.7	291	2.0	145	1.9	1.6-2.3	1.9	1.5-2.3	1.9	1.5-2.3
Coma & stupor (780.0)	0.1	4	0.1	5	–	–	–	–	–	–
Hallucinations (780.1)	0.1	8	0.0	0	–	–	–	–	–	–
Blackout, fainting (780.2)	0.4	30	0.3	20	1.4	0.8-2.5	1.3	0.7-2.3	1.2	0.7-2.3
Seizures NOS (780.3)	0.3	26	0.3	25	1.0	0.6-1.7	1.0	0.6-1.7	1.0	0.6-1.8
Dizziness (780.4)	0.6	48	0.3	24	1.9	1.1-3.0	1.8	1.1-2.9	1.9	1.1-3.2
Sleep problems (780.5)	0.6	47	0.3	20	2.2	1.3-3.7	2.1	1.2-3.7	2.1	1.2-3.7
Fever NOS (780.6)	0.2	17	0.1	5	3.2	1.2-8.6	–	–	–	–
Malaise & fatigue (780.7)	1.0	76	0.5	35	2.0	1.4-3.0	2.1	1.4-3.2	2.2	1.4-3.3
Excessive sweating (780.8)	0.2	14	0.1	4	3.3	1.1-9.9	–	–	–	–
Other gen'l sympt (780.9)	0.4	31	0.2	13	2.2	1.2-4.2	2.0	1.0-4.0	–	–

[a] Model 1 contains the six entry characteristics.
[b] Model 2 contains the six entry characteristics, education, cigarette smoking, alcohol use, and current employment status.

Table 104. Health Outcomes Examined in Appendix H

A. Inservice Health Problems
1. Intestinal infections (ICD-9, 001-009)
2. Malaria
3. Sexually transmitted diseases (ICD-9, 090-099)
4. Mycotic infections (ICD-9, 110-118)
5. Skin infections (ICD-9, 680-686)
6. Open wounds (ICD-9, 870-897)
7. Hearing loss (ICD-9, 388.1, 389)

B. Postdischarge - General Outcomes
8. Unemployed at time of interview
9. Averaged 90 or more alcoholic drinks per month during lifetime (among current or ex-regular drinkers)
10. Perceived health status = "Fair" or "Poor" at time of interview
11. Current use of three or more prescribed medications
12. Unable to go to work because a health problem or impairment

C. Postdischarge - Specific Conditions
* 13. Chloracne
* 14. Excessive hair growth
* 15. Skin conditions other than chloracne (all reported conditions with onset during or after active duty in Army)
* 16. Four or more neurological symptoms experienced during past 4 weeks
17. Migraine (ICD-9, 346) as a reason for current medication use, hospitalization, current limitation in an activity, or other current health problem
18. Hearing loss (ICD-9, 388.1, 389) as a reason for a current limitation in some activity or other current health problem
* 19. Esophageal ulcer
* 20. Gastric or duodenal ulcer
* 21. Cirrhosis, or other chronic liver disease (ICD-9, 571) from question A-35B
* 22. Hepatitis
23. Enlarged liver (ICD-9, 789.1) from question A-35B
* 24. Symptoms compatible with post-traumatic stress disorder experienced during past 6 months
25. Use of marijuana (no hard drugs) during past year
26. Use of hard drugs during past year
* 27. Urinary tract problems (all reported conditions)
* 28. Cancer (conditions coded to ICD-9, 140-208)
* 29. Benign tumors, growths, cysts (all reported conditions)
* 30. Hypertension
* 31. Tried unsuccessfully to conceive a child over a period of a year or more
32. Open wounds or late effects of injuries (ICD-9, 870-897, 905-909) as a reason for a current limitation in an activity or other current health problem
33. Symptoms, signs, ill-defined conditions as a reason for current medication use, hospitalization, current limitation in an activity, or other current health problem+

* Condition was asked about, by name, in the questionnaire.
+ Includes responses coded to ICD-9, 780-782.0, 782.2-799 as well as uncodable, "don't know," and "refused" responses.

Table 105. Selected Health Outcomes Associated With Various Components of the Vietnam Experience[a]

Component		Health Outcome	Nature of Association
Self-reported combat exposure	Inservice:	Malaria Mycoses Open wounds	Prevalence of reported conditions increased with increasing level of reported combat exposure
	Postservice:	Four or more neurologic symptoms (past 4 weeks) Migraine Hearing loss Gastrointestinal ulcers PTSD-like symptoms Hypertension Current limitation or other current health problem due to open wounds, etc.	
Type of unit/duty MOS	Inservice:	Malaria Sexually transmitted infections[b] Mycoses Open wounds Skin infections[c] Hearing loss[c]	Prevalence of reported condition higher in men who were in combat units and/or had a tactical MOS compared with men who were in support units or had a nontactical MOS (see footnote for exceptions)
	Postservice:	Hearing loss PTSD-like symptoms Current limitations or other current health problem due to open wounds, etc.	

Table 105. Selected Health Outcomes Associated With Various Components of the Vietnam Experience[a] — Continued

Component		Health Outcome	Nature of Association
Midpoint of Vietnam tour	Inservice:	Open wounds (1968-69)	
	Postservice:	Excessive hair growth (1968-69; 1970-73) Liver conditions (1968-69; 1970-73) PTSD-like symptoms (1968-69; 1970-73) Current marijuana use (1968-69; 1970-73) Current hard drug use (1968-69; 1970-73) Current limitation or other current health problem due to open wounds, etc. (1968-69)	Prevalence of reported conditions higher in men who were in Vietnam in the indicated time period compared with men who were there in 1965-67
Inservice use of marijuana or hard drugs	Inservice:	Sexually transmitted infections Hearing loss[d]	Prevalence of reported conditions higher in men who used marijuana and/or hard drugs in Vietnam compared with men who did not report use of any drugs (see footnotes for exceptions)
	Postservice:	Unemployed at interview[d] Heavy alcohol use (lifetime) Three or more prescribed medications[d] Four or more neurologic symptoms (past 4 weeks)[d] Hepatitis PTSD-like symptoms[d] Current marijuana use Current hard drug use Symptoms, signs, and ill-defined conditions[d]	

[a] See detailed tables in Appendix H for supporting data.
[b] Prevalence lower in men who were in combat units or tactical MOSs.
[c] Association with duty MOS but not type of unit.
[d] Association with hard drug use but not marijuana use.

Certain outcomes were reported more frequently by Vietnam veterans who served in Vietnam after 1967. Open wounds (including those affecting current health status) were reported most often by veterans who served there during 1968-69, which corresponds to the period of heaviest fighting. Symptoms compatible with PTSD were more likely to be reported by men who served in Vietnam after 1967 than by those who were there before that time. Excessive hair growth and liver conditions were also reported more often by veterans serving in Vietnam after 1967. Finally, men who served in Vietnam during the period 1970-1973 were twice as likely as those serving during 1965-1967 to report current marijuana use and almost three times as likely to report current use of hard drugs.

Vietnam veterans who said they used illicit drugs while in the Army were more likely than nonusers to report certain inservice and postservice health outcomes. For example, inservice drug users reported a higher prevalence of sexually transmitted diseases (inservice), current drug use, and heavy alcohol consumption, and were more likely to be currently unemployed. We examined the relationships between inservice drug use and these same outcomes among non-Vietnam veterans to see if they exhibited similar patterns. Indeed, inservice drug use among non-Vietnam veterans was associated with the same health outcomes found among Vietnam veterans (Table H-99).

Self-reported herbicide exposure is positively associated with several inservice health problems: intestinal infections, malaria, hearing loss, and open wounds. Moreover, self-reported herbicide exposure is positively related to nearly every postservice health outcome examined here (Tables H-67 to H-97). The strength of the association varied from outcome to outcome but, in general, there were strong associations for general social and health measures (*e.g.*, "fair" or "poor" perceived health, unemployment, medication use, unable to go to work because of a health problem) and for those conditions that have previously been linked with dioxin-containing products (*e.g.*, skin conditions, neurologic symptoms and enlarged liver). Noteworthy, also, is the strong relationship between self-reported herbicide exposure and symptoms associated with PTSD, independent of self-assessed combat exposure (Table H-88). Furthermore, the prevalence of experiencing 5 or more of the 15 psychological symptoms during the past 6 months was also positively associated with the herbicide exposure index after the results were adjusted for self-reported combat exposure—the ORs from Model 1 being 2.3, 4.2, and 4.9 for the low, moderate, and high herbicide exposure groups, respectively (reference group = no reported herbicide exposure). Outcomes exhibiting little or no relationship with self-reported herbicide exposure are sexually transmitted diseases (inservice) and open wounds and late effects of injuries affecting current health status.

3.5.3 Odds Ratios Based on the Secondary Comparison Group

Odds ratios for 20 selected outcomes, with all Vietnam veterans compared with men who had tours of duty in Germany or Korea, are shown in Appendix I. Also presented (mainly for completeness) are corresponding results, with veterans who had no foreign service used as the comparison group. For each outcome examined, the OR based on the Germany/Korea comparison group is similar to the original OR based on all non-Vietnam veterans. Thus the original findings are supported by alternate analyses in which the referent group is probably more comparable to the study group.

3.5.4 Odds Ratios for Veterans Who Initially Refused To Be Interviewed or Were Hard To Locate

The distribution of interviewed veterans by initial refusal status and extent of tracing effort is shown in Table 106. About 12% of veterans were located by the Equifax home office, and about 10% had to be traced by using the additional resources of the Equifax field staff. Only a small fraction of interviewed veterans had initially refused, thereby limiting the usefulness of this group for making inferences, except for the more common outcomes.

For 2 of the 20 outcomes examined (*i.e.*, "fair" or "poor" perceived health and neurologic symptoms), both Vietnam and non-Vietnam veterans who were the hardest to locate had the highest reporting rate (Appendix J). In general, there is no systematic tendency for the ORs based on the hard-to-locate or refusal subgroups to be higher (or lower) than those for the main group of veterans. Some exceptions did occur; for example, for cirrhosis of the liver and difficulty conceiving children, the ORs increased with increased tracing efforts, and for excessive hair growth, the ORs decreased with increased efforts. Further, ORs were higher (although not necessarily statistically significant) among the initial refusals for the following outcomes: current use of three or more medications, excessive hair growth current marijuana use, and urinary tract problems. The ensemble of results, however, provides some assurance that our inability to interview all veterans selected for study did not seriously bias the main findings.

3.5.5 Odds Ratios for Vietnam Veterans According To Whether They Reported Volunteering for Vietnam Duty

Odds ratios comparing Vietnam veterans who said they did, or did not, volunteer to serve in Vietnam with all non-Vietnam veterans are shown in Appendix K for 20 outcomes. Rates for every outcome were higher for men who reported volunteering for Vietnam than for nonvolunteers. However, for most outcomes, the increased prevalences were not large enough to produce an appreciable difference in the ORs for these two subgroups of Vietnam veterans. The exceptions were neurological symptoms, current use of marijuana, and symptoms compatible with PTSD, for which Vietnam volunteers had statistically significantly higher ORs than nonvolunteers.

3.5.6 Odds Ratios by Characteristics of the Interviewers

ORs stratified by sex, race, age, and educational level of the interviewers are shown in Appendix L for each of 20 outcomes. The results indicate a uniformity in the magnitudes of the ORs across these variables for each outcome. The one possible exception is esophageal

Table 106. Number and Percent of Interviewed Vietnam and Non-Vietnam Veterans, by Level of Tracing Effort and Initial Refusal Status

	Vietnam		Non-Vietnam	
	No.	%	No.	%
Tracing Effort				
RTI only	6188	78.1	5665	78.9
Equifax home office	960	12.1	930	12.6
Equifax field offices	776	9.8	769	10.4
Refusal Status				
No[a]	7696	97.1	7029	95.5
Yes[b]	228	2.9	335	4.5

[a] Veteran agreed to be interviewed at the initial contact.
[b] Veteran initially refused to be interviewed and later consented.

ulcer for which there appears to be some variability in the ORs among subgroups of interviewers. On the whole, however, there is no evidence that interviewer characteristics exerted far-reaching effects on the results.

Assessment of results (not shown here) for each of 25 interviewers who had interviewed at least 200 veterans identified one person whose data yielded consistently small ORs for eight of nine outcomes examined. This interviewer's contribution to the total interviewed population was, however, only 1.3%.

3.6 REPORTING OF MULTIPLE HEALTH PROBLEMS

Reporting of multiple health problems by individual veterans was assessed to determine if a select subgroup might account for the excess prevalence of many conditions among Vietnam veterans. These analyses were confined to the 17 physician-diagnosed diseases asked about by name and listed in Table 2. The number of these conditions reported by each veteran was tallied, and the relative frequency of a given number of "Yes" responses was examined for each cohort (Table 107). Vietnam veterans tended to report a history of multiple diseases more often than did non-Vietnam veterans. For example, 7% of Vietnam veterans reported having had 4 or more of the 17 diseases compared with 3.6% of non-Vietnam veterans.

To examine the effect of multiple disease reporting, we recomputed 4 crude ORs for each of the 17 diseases, excluding men (both Vietnam veterans and other veterans) who reported (1) 5 or more diseases (out of 17), (2) 4 or more, (3) 3 or more, and (4) 2 or more. Table 108 shows the resulting ORs without confidence intervals, since the main objective here is to see if the magnitudes of the point estimates approach 1.0 as more and more "multiple reporters" are excluded from the data. For some conditions (*e.g.*, anemia, mononucleosis, other liver conditions, ulcers, urinary tract problems, and hypertension), the ORs approach unity. For other diseases (*e.g.*, chloracne, other skin conditions, diabetes, hepatitis, cirrhosis, and liver abscess), the ORs remain elevated. Thus, the overall findings for those 17 diseases are not accounted for by the undue influence of a subgroup of men reporting multiple conditions.

3.7 RELATIONSHIP BETWEEN PSYCHOLOGICAL SYMPTOMS AND OTHER HEALTH OUTCOMES

To assess whether increased reporting of physical conditions by Vietnam veterans is related to the higher prevalence of psychological symptoms in this group, we conducted two alternate analyses. In the first analysis, we excluded all veterans (Vietnam and non-Vietnam)

Table 107. Percent and Number of Vietnam and Non-Vietnam Veterans Saying "Yes" to 0, 1, 2, 3, 4, or 5 or more of the 17 Questions Concerning Physician-Diagnosed Conditions[a]

Number of "Yes" Responses[b]	Vietnam		Non-Vietnam	
	%	No.	%	No.
0	31.1	2463	39.8	2927
1	32.5	2571	33.6	2472
2	19.9	1576	16.1	1186
3	9.7	768	6.9	507
4	4.2	333	2.4	180
≥5	2.7	213	1.2	92

[a] See Table 2 for a listing of the 17 conditions.
[b] Lifetime prevalence.

Table 108. Crude Odds Ratios for the 17 Physician-Diagnosed Conditions for All Veterans and for 4 Subgroups Based on Different Exclusion Criteria[a]

Condition[b]	All Veterans	Veterans Reporting <5 of 17 Conditions	Veterans Reporting <4 of 17 Conditions	Veterans Reporting <3 of 17 Conditions	Veterans Reporting <2 of 17 Conditions
Chloracne	3.6	4.4	4.0	6.2	4.3
Other skin conditions	1.8	1.8	1.7	1.7	1.7
Anemia	1.6	1.5	1.4	1.4	1.0
Mononucleosis	1.4	1.3	1.1	0.9	0.8
Diabetes	1.4	1.4	1.3	1.2	2.2
Cancer	1.0	0.9	0.9	0.6	0.4
Benign tumors, growths, cysts	1.1	1.1	1.0	1.0	0.9
Cirrhosis	1.5	1.1	1.2	1.4	[c]
Hepatitis	1.3	1.3	1.2	1.3	1.5
Porphyria	0.9	0.3	—	—	—
Liver abscess	2.0	3.1	1.9	2.0	—
Other liver conditions	1.5	1.5	1.5	1.3	0.9
Esophageal ulcer	1.8	1.3	1.2	1.2	0.4
Gastric ulcer	1.3	1.3	1.2	1.2	1.2
Duodenal ulcer	1.1	0.9	0.9	0.9	0.6
Urinary tract problems	1.2	1.1	1.1	1.0	0.9
Hypertension	1.3	1.3	1.2	1.1	1.0

[a] See Table 107 for the numbers of Vietnam and non-Vietnam veterans excluded in each subgroup.
[b] Lifetime prevalence.
[c] No cases reported in one or both groups.

who reported symptoms compatible with PTSD and recomputed ORs for selected outcomes. In the second analysis, we excluded all men who experienced 3 or more of the 15 psychological symptoms "often" or "very often." Four types of outcomes were chosen for these analyses: (1) certain physician-diagnosed diseases asked about by name; (2) various current somatic symptoms; (3) some general indicators of current health status; and (4) two other physical conditions asked about by name.

When men with PTSD-like symptoms were excluded, outcome-specific ORs showed little or no change in magnitude (Table 109). However, after veterans with three or more psychological symptoms were excluded, most ORs exhibited an appreciable shift toward unity, with the exception of the OR for chloracne, which increased markedly (from 4.4 to 8.5), and the OR for "nervousness," which decreased only slightly (from 1.6 to 1.4). Thus, men reporting a certain level of psychological symptomatology accounted for part of the increased reporting of physical health outcomes by Vietnam veterans. The results for chloracne suggest that Vietnam veterans reporting less than three psychological symptoms were responsible for most of the overall increased reporting of this condition.

3.8 HEALTH PROBLEMS PERCEIVED TO BE RELATED TO AGENT ORANGE

Late in the interview, Vietnam veterans were asked if they had ever had a health problem that they thought might have been caused by exposure to Agent Orange (question H-09A). Sixteen percent (1,304 men) said they had, 24% responded "Don't know," or they "Refused" to answer it, and 60% said "No." When asked the name of the health problems

they thought were related to Agent Orange, those 1,304 men reported 2,057 conditions (Table 110). Virtually every major ICD-9 category was represented among their responses, with skin conditions and the "symptoms, signs, ill-defined, and unknown conditions" category accounting for over half (56%) of all reported conditions.

Next, we assessed the possible association between the response to the Agent Orange health problem question (question H-09A) and the reporting of 22 selected outcomes comprising physician-diagnosed conditions, symptoms, and general health indicators. The crude percent of veterans reporting each outcome was computed within three subgroups of Vietnam veterans defined by their response to the Agent Orange health problem question (Table 111). Vietnam veterans who said "No" to the Agent Orange health problem question

Table 109. Crude Odds Ratios for Selected Outcomes for All Veterans, for Veterans Without Symptoms Compatible With PTSD, and for Veterans With Less Than 3 of the 15 Psychological Symptoms

Outcome	All Veterans	Veterans Without PTSD Symptom Complex[a]	Veterans With <3 Symptoms[b]
Physician-Diagnosed Conditions:			
Chloracne	4.4	4.0	8.5
Other skin conditions	1.9	1.8	1.6
Cancer	1.0	0.9	0.9
Benign tumors, growths, cysts	1.1	1.1	1.0
Cirrhosis	1.5	1.4	1.1
Hepatitis	1.5	1.4	1.3
Other liver conditions	1.5	1.4	1.1
Esophageal ulcer	1.8	1.7	1.3
Gastric or duodenal ulcer	1.3	1.2	1.1
Urinary tract problems	1.2	1.1	1.0
Diabetes	1.3	1.3	1.2
Hypertension	1.3	1.3	1.2
Current Symptoms:			
Fatigue[c]	2.2	1.8	1.1
Nervousness[d]	1.6	1.4	1.4
Four or more neurological symptoms	2.1	1.8	1.4
Stomach problems[e]	2.3	2.3	1.6
GI symptoms[f]	1.9	1.5	1.2
General Health:			
Poor/fair perceived health	1.9	1.7	1.5
Use of 3 or more prescribed medications	1.4	1.2	1.0
Limitation in some activity	1.3	1.2	1.0
Other:			
Problem conceiving a child	1.4	1.3	1.2
Excessive hair growth	2.1	1.9	1.5

[a] Excluded are 836 Vietnam veterans and 214 non-Vietnam veterans.
[b] Excluded are 2821 Vietnam veterans and 1178 non-Vietnam veterans.
[c] Based on responses to open-ended questions about current medication use, current health-related limitations, and other current health problems that were coded to ICD-9, 780.7.
[d] Based on responses to open-ended questions about current medication use, current health-related limitations, and other current health problems that were coded to ICD-9, 799.2.
[e] Based on responses to open-ended questions about current medication use, current health-related limitations, and other current health problems that were coded to ICD-9, 535-537.
[f] Based on responses to open-ended questions about current medication use, current health-related limitations, and other current health problems that were coded to ICD-9, 306.4, 787, 789, V47.3.

were similar to non-Vietnam veterans in their reporting of the 22 outcomes. However, Vietnam veterans who said "Yes" to the Agent Orange health problem question reported a substantially higher frequency of each of these outcomes than other veterans. Vietnam veterans who responded "Don't know" or who "Refused" to answer the Agent Orange health problem question were midway between the "No" and "Yes" subgroups in the frequency of reporting the 22 outcomes.

We attempted a limited assessment of the contribution that perceived relationship to Agent Orange exposure made to increased disease reporting among Vietnam veterans. Of all the conditions that were asked about by name, four were selected for review: chloracne, excessive hair growth, gastrointestinal ulcers, and hypertension. These were chosen to represent conditions with varying prevalences among non-Vietnam veterans and varying degrees of association with Vietnam service. Each condition was cross-classified according to whether or not it was given in response to the "Yes/No" question early in the interview (Section A) and whether or not it was "volunteered" later in response to the open-ended

Table 110. Distribution of Agent Orange-Related Health Problems Among Vietnam Veterans, by Major ICD-9 Category

Disease Category (ICD-9 Codes)	Number of Conditions	Percent
Infectious and Parasitic Diseases (001-139)	68	3.3
Malignant Neoplasms (140-208)	26	1.3
Benign and Unspecified Neoplasms (210-239)	83	4.0
Endocrine, Nutritional, Metabolic Diseases and Immunity Disorders (240-279)	22	1.1
Mental Disorders (290-319)	79	3.8
Diseases of Nervous System and Sense Organs (320-389)	94	4.6
Diseases of Circulatory System (390-459)	33	1.6
Diseases of Respiratory System (460-519)	75	3.6
Diseases of Digestive System (520-579)	99	4.8
Diseases of Urinary System (580-599)	28	1.4
Diseases of Genital Organs (600-629)	53	2.6
Diseases of Skin (680-709, 782.1)	746	36.3
Chloracne, acne NOS (692.2, 706.1)	66	3.2
Hair loss (704.0)	51	2.5
Rash (782.1)	347	16.9
Nonspecific skin conditions (709.8, 709.9)	137	6.7
Diseases of Musculoskeletal System and Connective Tissue (710-739)	84	4.1
Symptoms, Signs, Ill-Defined, and Unknown Conditions (780-782.0, 782.2-799)	409	19.9
Dizziness (780.4)	22	1.1
Numbness, tingling in extremities (782.0)	44	2.1
Headache (784.0)	60	2.9
Shortness of breath (786.0)	23	1.1
Nervousness (799.2)	92	4.5
Injuries and Poisonings (800-999)	52	2.5
Supplementary Classification (V01-V82)	51	2.5
All Other Categories	55	2.7
Total	2057	100.0

Agent Orange health problem questions in Section H. Altogether, 111 Vietnam veterans reported chloracne in response to the early "Yes/No" question, but only 39 of them said that they thought it was caused by Agent Orange (Table 112). On the other hand, of the 6[illegible] men who volunteered chloracne as an Agent Orange-related health problem, 27 had not reported it earlier in the interview. Excessive hair growth was reported by 384 men in response to the "Yes/No" question, but only one man said, later, that he thought it was caused by Agent Orange. Only 31 of the 1,088 men who reported a gastrointestinal ulcer claimed that it was caused by Agent Orange. Conversely, 24 of 55 men who reported Agent Orange-related ulcers had not reported ulcers in Section A. Although 2,080 Vietnam veterans reported hypertension in Section A, only 21 of them said, later, that they thought it was caused by

Table 111. Percent of Vietnam and Non-Vietnam Veterans Reporting Various Outcomes, With Vietnam Veterans Subdivided by Their Response to the Question About an Agent Orange-Related Health Problem

Outcome	Non-Vietnam Veterans	Vietnam Veterans		
		No (N=4711)	DK/RE[a] (N=1894)	Yes (N=1304)
Physician-Diagnosed Conditions:				
Chloracne	0.3	0.2	1.1	5.[illegible]
Other skin conditions	19.7	21.0	39.8	56.1
Cancer	1.4	0.8	1.6	3.[illegible]
Benign tumors, growths, cysts	17.1	15.1	22.4	28.[illegible]
Cirrhosis	0.5	0.4	0.5	2.[illegible]
Hepatitis	3.3	3.6	5.5	7.[illegible]
Other liver conditions	1.8	1.6	3.2	6.[illegible]
Esophageal ulcer	0.7	0.6	1.6	2.7
Gastric or duodenal ulcer	9.8	8.1	17.2	21.[illegible]
Urinary tract problems	13.7	11.5	19.9	24.[illegible]
Diabetes	1.4	1.2	2.3	3.[illegible]
Hypertension	20.3	20.4	31.3	34.7
Current Symptoms:				
Fatigue[b]	0.4	0.3	1.6	1.[illegible]
Nervousness[c]	1.2	0.7	2.5	5.[illegible]
Four or more neurological symptoms	9.2	7.6	27.9	39.1
Stomach problems[d]	0.6	0.9	2.0	2.7
GI symptoms[e]	0.6	0.7	1.5	1.[illegible]
General Health:				
Poor/fair perceived health	11.1	10.2	27.2	42.[illegible]
Use of 3 or more prescribed medications	2.2	1.5	4.0	7.[illegible]
Limitation in some activity	21.5	17.2	35.8	47.[illegible]
Other:				
Problem conceiving a child	15.5	16.7	23.4	27.[illegible]
Excessive hair growth	2.4	2.3	7.3	10.[illegible]

[a] "Don't know" and "refused" responses.
[b] Based on responses to open-ended questions about current medication use, current health-related limitations, and other current health problems that were coded to ICD-9, 780.7.
[c] Based on responses to open-ended questions about current medication use, current health-related limitations, and other current health problems that were coded to ICD-9, 799.2.
[d] Based on responses to open-ended questions about current medication use, current health-related limitations, and other current health problems that were coded to ICD-9, 535-537.
[e] Based on responses to open-ended questions about current medication use, current health-related limitations, and other current health problems that were coded to ICD-9, 306.4, 787, 789, V47.3.

Table 112. Distribution of Vietnam Veterans by Their Responses to Direct Questions About Selected Conditions, and Whether They Attributed These Conditions to Agent Orange[a]

Agent Orange-Related?	Direct Question[b]		
	Yes	No	Total
	Chloracne		
Yes	39	27	66
No	72	7771	7843
Total	111	7798	7909
	Excessive Hair Growth		
Yes	1	0	1
No	383	7525	7908
Total	384	7525	7909
	Gastrointestinal Ulcers		
Yes	31	24	55
No	1057	6797	7854
Total	1088	6821	7909
	Hypertension		
Yes	21	1	22
No	2059	5828	7887
Total	2080	5829	7909

[a] Excludes 15 men who, during the interview, said they had not served in Vietnam.
[b] Lifetime prevalence.

Agent Orange. These data suggest that (1) the increased reporting of these 4 conditions is not accounted for by cases that have a perceived relationship to Agent Orange, and (2) there is an inconsistency in the responses of some Vietnam veterans, whereby the presence of certain diseases is denied in one section of the questionnaire and admitted to in a later section.

4. DISCUSSION

As a group, Vietnam veterans appear to be similar to other Vietnam-era veterans with respect to socioeconomic status indicators such as attained education, family income, employment characteristics, and marital status. Further, the two groups differed only slightly in cigarette smoking habits and alcohol use. On the other hand, Vietnam veterans reported having, or having had, many different kinds of health problems more often than did non-Vietnam veterans. The health outcomes the Vietnam veterans reported in excess included history of various physician-diagnosed diseases (*e.g.*, chloracne, hepatitis, hypertension), various somatic symptoms present at the time of the interview (*e.g.*, headaches, dizziness, stomach ailments), each of 15 psychological symptoms experienced in the past 6 months, illicit drug use in the past year, current use of prescribed medications, current limitations in activities, and perceived "fair" or "poor" current health status. At the same time, there was little or no difference in the reporting of cancer (all sites combined), benign neoplasms, respiratory diseases, and musculoskeletal problems.

Distinguishing characteristics of the increased reporting of health problems by Vietnam veterans are the following: (1) the increased reporting occurred for virtually all diseases and symptoms asked about by name; (2) it extended to a multitude of symptoms and ill-defined health problems volunteered in responses to open-ended questions; (3) it was present in all racial subgroups, in both draftees and volunteers, and in both younger and older recruits; and (4) it was strongly associated with the extent of self-reported herbicide exposure in Vietnam. The strength of the associations between the different types of health outcomes and Vietnam service varied from "weak" for many of the diseases asked about by name to "strong" for certain symptoms, self-rated health, and history of physician-diagnosed chloracne. The scope of this excess reporting is noteworthy, and the findings should be interpreted cautiously.

We begin our discussion of the results by reviewing key features of the study design, analytic methods, and data quality.

4.1 STUDY GROUP

4.1.1 Definition of Veterans To Be Studied

A major strength of the VES is the set of stringent criteria defining the study group. These criteria delineated a very large subgroup of the entire population of military personnel stationed in Vietnam (*i.e.*, male Army enlisted personnel with one term of service). At the same time, the criteria made it possible to maximize the similarity of the comparison group. Although we may never fully understand how men were chosen for duty in Vietnam (versus other locations), the selection criteria used here probably yielded the highest degree of comparability between "exposed" and "nonexposed" groups possible in an observational study such as this. Further, restriction of the comparison group to men who had served foreign tours other than in Vietnam supported the results.

Another strength of the study is the use of random samples of Vietnam and non-Vietnam veterans and the avoidance of self-selected groups of veterans. Further, the sample sizes were large enough to detect an increased risk as small as 40% for outcomes occurring at a prevalence of 2% or more (Table 1). Twofold excesses could be detected for outcomes with

a prevalence of 0.5% or greater (Table 1). These features make it possible to draw conclusions that are applicable to the entire population of veterans having the characteristics of our sample.

4.1.2 Effect of Nonresponse

The overall participation rate was very high and of the same magnitude for Vietnam and non-Vietnam veterans. In relation to other interview surveys, the response rate was exceptional and was probably due to various factors: (1) heightened publicity surrounding issues involving the health of Vietnam-era veterans, (2) use of a "list" sample whereby individuals are selected and contacted by name, (3) use of an introductory letter, on CDC letterhead, signed by the Director, CDC, emphasizing the importance of the study, and (4) the contractors' intensive efforts at locating and contacting veterans.

Although nonrespondents did differ from respondents with respect to certain demographic and military characteristics that may be associated with health status, these differences prevailed in both cohorts and were similar in magnitude. Thus, Vietnam nonrespondents were not more different from their respondent peers than other nonrespondents were from their respondent peers. To gain some insight into the unknown health experience of nonparticipants, we examined the prevalence of selected outcomes within subgroups of Vietnam and non-Vietnam veterans who were the hardest to locate or who had initially refused the interview. Veterans who were hardest to locate reported higher rates of certain outcomes, but, in general, this occurred in both groups of veterans, and, therefore, ORs changed very little. The totality of findings indicated that hard-to-locate Vietnam veterans were as different from their easy-to-locate peers (for most health outcomes) as hard-to-locate non-Vietnam veterans were from their peers. These data suggest that excluding veterans who were never interviewed was not likely to have seriously biased the results unless the nonparticipant group was proportionately much larger in one of the cohorts, and it was not.

4.2 VALIDITY OF DATA

4.2.1 Information From Military Records

Information collected from military personnel records and used in most of the analyses included place of service (duty location), date of birth, year of enlistment, enlistment status (drafted, volunteered), primary MOS, and score on the GT test taken at induction. Since military records were considered the official source of data documenting key events in a veteran's military life, we accepted them as a valid source of data. The GT test score was the only variable with missing values, but the scores for only 169 veterans were unknown (Table G-1).

The primary variable for the purpose of the VES is place of service (Vietnam, non-Vietnam). During the interview, 15 men whom we had classified as Vietnam veterans denied that they had ever served there, and 15 other men whom we had classified as non-Vietnam veterans mentioned, during the interview, that they *had* served in Vietnam. This degree of misclassification (0.2%), however, is not likely to have had any appreciable effect on our estimates of differential risk.

4.2.2 Covariates From the Interview

Covariates obtained from the interview and used in many analyses included race, education, cigarette smoking habits, alcohol use, and marital status. There were relatively

few missing values for these variables, the largest number being 193 (1.3%) for the average number of alcoholic drinks consumed per month (Table F-1). Furthermore, the proportion of missing values was similar for Vietnam and non-Vietnam veterans. We can make several observations about how well we measured these variables. First, many of the variables are relatively simple items and almost all veterans should have easily understood them. Second, although items such as the average number of cigarettes smoked per day and the average number of alcoholic beverages drunk per month may have been more difficult for respondents to recall, we grouped individual values into a few broad categories for analysis, thus reducing the possible effects of reporting errors. Finally, we can think of no reason to suspect that the two cohorts of veterans would report these types of data differently.

Information collected on the use of illicit drugs while in the Army, frequency of various combat experiences, and perceived exposure to herbicides in Vietnam may be more problematic. Although the levels of "Don't know" and "Refused" responses for illicit drug use were relatively low (Table E-6), the possibility that some users said "No" cannot be dismissed. To improve the quality of the drug use information, interviewers reminded veterans about the assurance of confidentiality just before these questions were asked. Although the self-reported level of combat exposure may not be an entirely valid measure of this component of the Vietnam experience, it was found to be related to other indicators of the potential for combat derived from military records. Thus, self-reported combat exposure was higher among men who held a tactical MOS, who were assigned to combat units in Vietnam, or who served in Vietnam during 1968-69, the period of heaviest casualties. Furthermore, there is internal consistency between levels of self-reported combat activity and veterans' reports of having received medical care in the Army for an open wound.

Self-reported exposure to herbicides in Vietnam was never intended to serve as a proxy measure of actual exposure; instead, it was to serve as an indicator of veterans' perceptions of their possible exposure, given the existing level of concern about this issue (Holden, 1979). That self-reported herbicide exposure may not be valid information is suggested by the findings from a recent study in which current dioxin body burdens in Vietnam and non-Vietnam veterans were assessed (Centers for Disease Control, in press). Among Vietnam veterans, there was no correlation between average serum dioxin levels and perceived exposure to herbicides in Vietnam.

4.2.3 Health Outcomes

Perhaps the most serious concern in the VES interview is the quality of information on health outcomes. Previous investigators have noted the methodological limitation of population surveys in which people are asked to report health characteristics (Bradburn *et al.*, 1987; Cannell, 1977; Meltzer and Hochstim, 1970). The most problematic type of health outcome for us may be the prior diagnosis of a specific disease, such as chloracne or cirrhosis of the liver, since the quality of the response depends on the clarity of the communication between the doctor and the patient, and the accuracy of the veteran's recall. On the other hand, information on outcomes such as somatic symptoms, emotional states, self-rated health status, and limitations in activities can only be obtained by asking the person, and then accepting the responses as his perceptions or feelings.

Another issue is whether outcome data obtained from one group of veterans are any more valid than those from the other group. We have already seen that there were no appreciable

interviewer-cohort effects. However, selective reporting by one or both groups of veterans was a possibility. Among the possible explanations for selective reporting (*i.e.*, overreporting) by Vietnam veterans are these:

Increased medical care utilization. If Vietnam veterans were more health-conscious and consulted doctors more often than non-Vietnam veterans, they had more chances of being told that they had various diseases, of having medications prescribed, and of being hospitalized. Our questionnaire did not elicit an adequate assessment of medical care utilization, so we do not have direct evidence on this issue. On the other hand, since early 1978, thousands of Vietnam veterans have sought medical attention at VA medical facilities because of their concern about possible adverse health effects of exposure to Agent Orange (Young *et al.*, 1985). Further, the increased prevalence of psychological symptoms among Vietnam veterans seen in our data may suggest their increased utilization of health services in view of previous reports of such an association (Hoeper *et al.*, 1980; Shapiro *et al.*, 1984; Tessler *et al.*, 1976).

Heightened awareness of present health status. Vietnam veterans may be more aware of somatic symptoms and bodily sensations as a result of continuing publicity about the health hazards of Agent Orange. Such media attention may have aroused feelings of ill-health and amplified minor discomfort or dysfunction in oversensitized veterans.

Enhanced recall of past health history. Vietnam veterans may have a better memory of their health history because of their unique military experience and because of the extensive media attention that has been focused on them since at least 1978. A motivating factor for enhanced recall could be the expectation that something may be in it for them. One particular event that may have influenced the responses of Vietnam veterans was a class action suit brought in 1979 by thousands of Vietnam veterans against several chemical companies that manufactured Agent Orange (Holden, 1979). The suit claimed that exposure to the herbicide in Vietnam caused health problems for the veterans and their families. In May 1984 (about 1 year before interviewing for the VES began), an out-of-court settlement was reached in which seven chemical companies agreed to create a $180 million fund for affected veterans and their families (Fox, 1984). Even though the VES is unrelated to that suit, the prospect of remuneration for health problems could have been an incentive to report any altered state of health (however slight) when questioned in detail in our interview. That this may have been a factor in the selective reporting of outcomes is suggested by the consistently strong association between a large, heterogeneous set of health outcomes and the veterans' belief that they were exposed to herbicides in Vietnam. Another possible reason for enhanced recall of health problems is the anticipation of compensation from the VA for certain medical conditions.

Attitudinal factors. Vietnam veterans may have reported a variety of health outcomes more frequently than other veterans as a way of expressing (1) feelings of alienation; (2) perceptions of their military service as a cause of problems with employment, education, goals; (3) anger toward the government that sent them to an unpopular and undeclared war; (4) resentment toward their peers who did not serve in Vietnam; or (5) disappointment with the generally unsympathetic societal response to their participation in the war.

These factors are probably interrelated, and it is difficult to assess their individual or combined influence on the results presented here. That there may be inconsistencies in the reporting of health outcomes by some Vietnam veterans are suggested by the results presented in Section 3.8.

4.3 ANALYTIC METHODS

4.3.1 Odds Ratio Versus Risk Ratio

The odds ratio was used in most analyses to summarize the strength of the association between a particular health outcome and the Vietnam experience. Most outcomes evaluated had a low enough prevalence that the odds ratio closely approximated the risk ratio or prevalence ratio. For example, 2.9% of Vietnam veterans and 1.1% of non-Vietnam veterans reported having been treated during military service for an intestinal infection (Table 12); the odds ratio and the risk ratio for this outcome were 2.6. A few outcomes, however, were reported by more than 10% of veterans; for these outcomes, the odds ratio may slightly overestimate the risk or prevalence ratio. However, even for hypertension, one of the most commonly reported health outcomes (reported by 25.4% of Vietnam veterans and 20.3% of non-Vietnam veterans), the difference between the crude odds ratio and the crude risk ratio was modest (1.34 versus 1.25). Thus, with few exceptions, odds ratios presented here can be viewed as reasonable estimates of risk ratios or prevalence ratios.

4.3.2 Multiple Comparisons

The association between the Vietnam experience and health was evaluated for many different outcomes. As suggested by Rothman (1986), we did not adjust for "multiple comparisons." Instead, we emphasized confidence intervals rather than tests of statistical significance and reported "positive" as well as "negative" results. Moreover, we observed a pattern in which a disproportionate number of odds ratios were greater than unity. This pattern is not likely to be due to chance or to the large number of comparisons made.

4.3.3 Choice of Multivariate Modeling Strategy

The primary goal of our analyses was to evaluate the effects of the Vietnam experience on subsequent health. Our modeling strategy, modified from that suggested by Greenberg and Kleinbaum (1985), was designed to obtain valid estimates of relative risk by controlling for extraneous variables and to identify subgroups that might be at different risks for a particular health outcome. In epidemiologic terms, we identified statistical interaction (or effect modification) and controlled for confounding. Our modeling strategy emphasized a relatively simple model (Model 1), in which possible effect modification and confounding by six entry characteristics were evaluated, and a second model (Model 2), in which additional covariates were selected for each outcome on the basis of *a priori* considerations.

We did not attempt to identify a "best" model for each outcome. Thus, *a priori* confounders remained in the models regardless of statistical significance; statistical interaction (or product) terms were removed unless they were statistically significant at the 0.01 level; and tests for interaction were performed only when the number of cases was sufficient to allow a reasonably stable estimate of the interaction term. The potential gain in precision and parsimony associated with a "best" model might have required presentation of a different "final" model for nearly every outcome. This greatly increased complexity would have overshadowed the gain in parsimony, given the large number of health outcomes