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AN EPIDEMIOLOGIC INVESTIGATION OF HEALTH EFFECTS IN AIR
FORCE PERSONNEL F (U) SCIENCE APPLICATIONS
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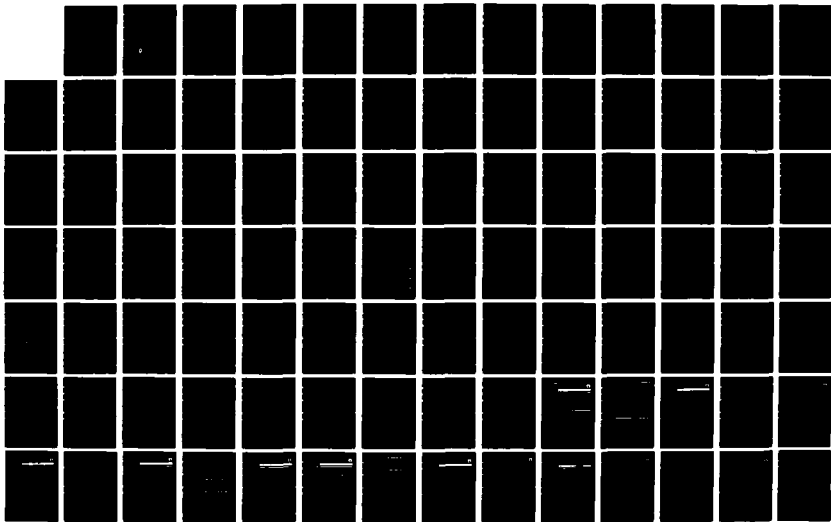
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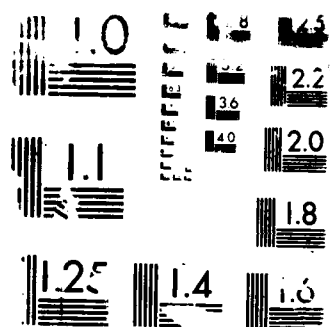
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Air Force Health Study

An Epidemiologic Investigation of Health Effects in Air Force Personnel Following Exposure to Herbicides

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) This report represent the results of the health assessment of the 1,016 Ranch Hands and the 1,293 Comparisons who participated in the 1985 followup examination of the Air Force Health Study. The purpose of the study is to determine whether long-term health effects exist and can be attributed to occupational exposure to herbicides. The result show a subtle but consistent narrowing of medical differences between the two groups since the Baseline study in 1982; however, the Ranch Hands continue to manifest slightly more minor adverse health conditions than the Comparisons. Continued surveillance of these groups is indicated. The report concludes that there is not sufficient evidence to implicate a causal relationship between herbicide exposure and adverse health in the Ranch Hand group.					
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APPENDIX A

Advisory Committee on Special Studies
Relating to the Possible Long-Term Health
Effects of Phenoxy Herbicides and Contaminants

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Relating to the Possible Long-Term Health Effects
of Phenoxy Herbicides and Contaminants**

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APPENDIX B
Questionnaire Methodology

TABLE B-1.

Elements of the Interval Questionnaires

Type	Method	Elements
Participant Interval Questionnaire	In Person	Demographic, educational, occupational, toxic exposures, reproductive experience, medical
Spouse* Interval Questionnaire	By Mail	Comprehensive reproductive history
Baseline Participant Questionnaire	In Person	Demographic, educational, occupational, medical, compliance, toxic exposures, and reproductive experience
Baseline Spouse* Questionnaire	In Person	Comprehensive reproductive history
Telephone Survey	By Telephone	Self-perception of health: current medications, severity of recent illness, absenteeism, income level

*Present, former, or partner.

Participant Interval Questionnaire

4428Sec-1

BEGIN INTERVIEW

-1-

TIME 10-13/
BEGAN AM PM

SECTION 1: INTRODUCTION

This part of the study asks about the health of current and former Air Force Members and their families.

At various points in the questionnaire, we will be using the term "biological" to describe family relationships. For example, we might ask about your "biological" children. When we use this term, we do not mean your step-children or step-parents or people related to you through adoption. We mean people related to you by blood.

You may refuse to answer any question you choose. However, we and the Air Force ask that you answer as many of the questions as you can, so the results will accurately and fully tell your story. I'd also like to emphasize that we need as accurate a picture as you can remember. So when we ask you about the dates of events in your life, please think carefully.

First I have a few background questions to ask you.

1. My records indicate that your date of birth is (DATE OF BIRTH, FROM INFORMATION SHEET, ITEM 1). Is that correct?

Yes 14/
No (CORRECT INFORMATION SHEET, AND GO TO Q.2)....2

2. Do you remember the month and year you were interviewed the last time for this study? We are talking about the interview in your home before you went for your physical exam.

- A. Was it in 1981 or 1982? (RECORD ON INFORMATION SHEET)
- B. What month did the interview take place? (RECORD ON INFORMATION SHEET. IF A CAN'T REMEMBER EXACT MONTH ASK C)
- C. Was it in the Spring, Summer, Fall or Winter? (INTERVIEW, IF SPRING, RECORD ON INFO SHEET AS MARCH IF SUMMER, RECORD ON INFO SHEET AS JUNE IF FALL, RECORD ON INFO SHEET AS SEPTEMBER IF WINTER, RECORD ON INFO SHEET AS DECEMBER)

INTERVIEWER, CONTINUE TO FILL OUT FROM THE RESPONDENT ANY OTHER BLANK OR MISSING INFORMATION FROM THE INFORMATION SHEET. RECORD ON THE INFORMATION SHEET.

DEKES 01-02

-2-

3. INTERVIEWER, ASK A FOR RESPONDENT, THEN ASK B AND C FOR PARENTS

A. RESPONDENT	B. FATHER	C. MOTHER
To which of the following racial or ethnic groups do you belong? (CODE ALL THAT APPLY) (PROBE: What others?)	To which of the following racial or ethnic groups does your biological father belong? (CODE ALL THAT APPLY) (PROBE: What others?)	To which of the following racial or ethnic groups does your biological mother belong? (CODE ALL THAT APPLY) (PROBE: What others?)
English/Welsh.....01 15-16/	English/Welsh.....01 51-52/	English/Welsh.....01 16-17/
Scottish.....02 17-18/	Scottish.....02 53-54/	Scottish.....02 18-19/
German.....03 19-20/	German.....03 55-56/	German.....03 20-21/
Irish.....04 21-22/	Irish.....04 57-58/	Irish.....04 22-23/
Scandinavian.....05 23-24/	Scandinavian.....05 59-60/	Scandinavian.....05 24-25/
Polish.....06 25-26/	Polish.....06 61-62/	Polish.....06 26-27/
Russian.....07 27-28/	Russian.....07 63-64/	Russian.....07 28-29/
Other Slavic.....08 29-30/	Other Slavic.....08 65-66/	Other Slavic.....08 30-31/
Jewish.....09 31-32/	Jewish.....09 67-68/	Jewish.....09 32-33/
French.....10 33-34/	French.....10 69-70/	French.....10 34-35/
Italian.....11 35-36/	Italian.....11 71-72/	Italian.....11 36-37/
Spanish.....12 37-38/	Spanish.....12 73-74/	Spanish.....12 38-39/
Mexican.....13 39-40/	Mexican.....13 75-76/	Mexican.....13 40-41/
Greek.....14 41-42/	Greek.....14 77-78/	Greek.....14 42-43/
American Indian.....15 43-44/	American Indian.....15 79-80/	American Indian.....15 44-45/
Asian.....16 45-46/	Asian.....16 81-82/	Asian.....16 46-47/
African.....17 47-48/	African.....17 83-84/	African.....17 48-49/
Other (SPECIFY)	Other (SPECIFY)	Other (SPECIFY)
.....18 49-50/	18 85-86/	18 50-51/

NAME
CARD
A

5. (continued)

3. Have you served in the military (at all) since (DATE OF LAST INTERVIEW)

Yes.....1 49/
No.....(SKIP TO SECTION 3).....2

4. Are you currently serving in the military?

Yes.....1 50/
No.....2

5. Now, let's talk about any military and specialized training programs that prepared you for a major change in your occupation. Since (DATE OF LAST INTERVIEW), (and besides the formal schooling and job training programs you've told me about), have you participated in any military technical or specialized training programs that prepared you for a major change in your career?

Yes.....(ASK A-E).....1 51/
No.(SKIP TO SECTION 3).....2

1ST PROGRAM	2ND PROGRAM	3RD PROGRAM
A. For what kind of work was your first military training program preparing you?	F. For what kind of work was your second military training program preparing you?	E. For what kind of work was your third military training program preparing you?
B. What is the AFSC for that job?	G. What is the AFSC for that job?	L. What is the AFSC for that job?
C. In what month and year did you start this training?	H. In what month and year did you start this training?	M. In what month and year did you start this training?
D. In what month and year did you complete this training?	I. In what month and year did you complete this training?	N. In what month and year did you complete this training?
CURRENTLY IN TRAINING...1		
E. Have you participated in any other military job training program that prepared you for a major change in your occupation?	J. Have you participated in any other military job training program that prepared you for a major change in your occupation?	O. Have you participated in any other military job training program that prepared you for a major change in your occupation?
Yes...(ASK F)...1 65/ No.....2	Yes...(ASK J)...1 79/ No.....2	Yes...(ASK O)...1 23/ No.....2
24-27/R		

3. While you were on that job, how often (do/did) you wash to remove the (SUNSTAINES) or use protective gear -- would you say all of the time, some of the time, or never?

All of the time.....1 32/
 Some of the time.....2
 Never.....(SKIP TO Q.5).....3

4. Which of the following (do/did) you use on that job?
 (CHECK ALL THAT APPLY)

Air filter.....01 33-34/
 Goggles.....02 35-36/
 Face shield.....03 37-38/
 Special clothing.....04 39-40/
 Washing facilities.....05 41-42/
 Self-contained or supplied
 air breathing apparatus.....06 43-44/
 None.....07 45-46/

5. Did you have another job before the job with (NAME IN Q.1A) but, since (DATE OF LAST INTERVIEW) that lasted 3 months or longer?

Yes.....1 47/
 No.....(SKIP TO Q.21).....2

6. In what month and year did you start that job?

Month Year 48-51/

A. What was the name of your employer?

52-76/

B. Was this a full-time or part-time job?

Full-time.....1 77/
 Part-time.....2

6. (Continued)

6. (Continued)

C. What kind of business was that--what did they make or do there?

10-12/

D. What did you actually do on the job--what were some of your main duties?

13-15/

E. Please look at this card and tell me which number best describes the kind of industry you worked in? (WRITE IN NUMBER)

HAND
CARD
C

ENTER NUMBER, | | | |

16-17/

F. In what month and year did this job end?

Month Year

18-21/

CURRENT JOB:.....(SKIP TO Q.7).....0001

G. What was the main reason you stopped working on your job?

22-23/

11. (Continued)

F. In what month and year did this job end?

Month	Year
1	1

CURRENT JOB.....(SKIP TO Q.12).....0001

G. What was the main reason you stopped working on your job?

48-49/

12. While working at (EMPLOYER) did you come in contact with any of the substances on this card? By contact I mean that you inhaled, tasted, had skin contact with these fibers and chemicals, or were exposed to ionizing or nuclear radiation.
(COME ALL THAT APPLY)

A. In general how many days a month did you come in contact with (SUBSTANCE)?
Less than once a month

Asbestos.....01	50-51/	1	days	95	52-53/
Ionizing or nuclear radiation....02	54-55/	1	days	95	56-57/
Industrial chemicals.....03	58-59/	1	days	95	60-61/
Insecticides or pesticides.....04	62-63/	1	days	95	64-65/
Degreasing chemicals.....05	66-67/	1	days	95	68-69/
Defoliants or herbicides.....06	70-71/	1	days	95	72-73/
None of the above (SKIP TO Q.15).....07	74-75/				

13. While you were on that job, how often did you wash to remove the (SUBSTANCE) or use protective gear -- would you say all of the time, some of the time, or never?

All of the time.....1	76/
Some of the time.....2	
Never.....(SKIP TO Q.15).....3	

14. Which of the following did you use on that job? (COME ALL THAT APPLY)

Air filter.....01	10-11/
Goggles.....02	12-13/
Face shield.....03	14-15/
Special clothing.....04	16-17/
Washing facilities.....05	18-19/
Self-contained or supplied air breathing apparatus.....06	20-21/
None.....07	22-23/

HAND CARD E

15. Did you have another job before job with (NAME IN Q.11A), but since (DATE OF LAST INTERVIEW)?

Yes.....1	24/
No(SKIP TO Q.21).....2	

16. In what month and year did you start that job?

Month	Year
1	1

A. What was the name of your employer?

B. Was this a full-time or part-time job?

Full-time.....1	54/
Part-time.....2	

C. What kind of business was that--what did they make or do there?

55-57/

16. (Continued)

SECTION 4: MILITARY

1. Now I am going to ask you about some of your experience in the military. First, which of the following statements best describes your assignment during the Vietnam War?

A crew member in Vietnam who was on a flying status.....1 45/
 Not a crew member, but flew one or more missions in Vietnam..2
 A crew member, but did not log flying time in Vietnam.....3
 Not a crew member.....4

HAND
CARD
P

2. INTERVIEWER: HAS R SERVED IN MILITARY SINCE LAST INTERVIEW? (IS Q.3 IN SECTION 2, CODED "YES")

YES.....(GO TO Q.3).....1 46/
 NO.....(SKIP TO SECTION 5).....2

3. Since (DATE OF LAST INTERVIEW) have you retired, been discharged or separated from the (BRANCH OF SERVICE FROM INFORMATION SHEET ITEM 3)?

Yes.....(ASK A THROUGH C).....1 47/
 No.....(SKIP TO Q.4).....2

- A. Were you retired, discharged or separated?

Retired.....1 48/
 Discharged/Seperated.....2

- B. In what month and year were you (retired/discharged/separated) from the (BRANCH OF SERVICE FROM INFORMATION SHEET ITEM 3)?

Month Year 49-52/

3. (Continued)

- C. Following your (retirement/separation/discharge) in (DATE IN B.), did you reenter the armed forces?

Yes.....1 53/
 No.....2

4. I would like to ask you the names of all the countries, including the United States, you have been stationed in since (DATE OF LAST INTERVIEW)

When last interviewed you were stationed in (COUNTRY FROM INFORMATION SHEET ITEM 3), and your assignment began in (DATE OF ASSIGNMENT FROM INFORMATION SHEET ITEM 3). Is that correct?

Yes....(ASK B THROUGH K).....1 54/
 No....(CORRECT INFORMATION SHEET, THEN ASK B THROUGH K).....2

4. (Continued)

G. In your job assignments while stationed in (COUNTRY), (do/did) you come in contact with any of the substances on this card? By contact I mean that you inhaled, tasted, had skin contact with these fibers and chemicals, or were exposed to ionizing or nuclear radiation. CODE ALL THAT APPLY

HAND CARD D

asbestos.....01
50-51/
ionizing or nuclear radiation.....02
52-53/
industrial chemicals.....03
54-55/
insecticides or pesticides.....04
56-57/
degreasing chemicals.....05
58-59/
defoliants or herbicides.....06
60-61/
none of the above (SKIP TO K).....07
62-63/

H. In your job assignments while stationed in (COUNTRY), (do/did) you come in contact with any of the substances on this card? By contact I mean that you inhaled, tasted, had skin contact with these fibers and chemicals, or were exposed to ionizing or nuclear radiation. CODE ALL THAT APPLY

HAND CARD D

asbestos.....01
64-65/
ionizing or nuclear radiation.....02
66-67/
industrial chemicals.....03
68-69/
insecticides or pesticides.....04
70-71/
degreasing chemicals.....05
72-73/
defoliants or herbicides.....06
74-75/
none of the above (SKIP TO V).....07
76-77/

I. In your job assignments while stationed in (COUNTRY), (do/did) you come in contact with any of the substances on this card? By contact I mean that you inhaled, tasted, had skin contact with these fibers and chemicals, or were exposed to ionizing or nuclear radiation. CODE ALL THAT APPLY

HAND CARD D

asbestos.....01
10-11/
ionizing or nuclear radiation.....02
12-13/
industrial chemicals.....03
14-15/
insecticides or pesticides.....04
16-17/
degreasing chemicals.....05
18-19/
defoliants or herbicides.....06
20-21/
none of the above (SKIP TO G).....07
22-23/

OFFICE 11 12

-22-

M. In general, how many days a month (do/did) you come in contact with (SUBSTANCE)?

asbestos 24-25/
less than once a month.....95
ionizing or nuclear radiation 26-27/
less than once a month.....95
industrial chemicals 28-29/
less than once a month.....95
insecticides or pesticides 30-31/
less than once a month.....95
degreasing chemicals 32-33/
less than once a month.....95
defoliants or herbicides 34-35/
less than once a month.....95

1. Did you wash to remove the (SUBSTANCES) or did you use protective clothing or gear when stationed in (COUNTRY) all the time, some of the time, or never?
All the time.....1 36/
Some of the time....2
Never.(SKIP TO K)....3

5. In general, how many days a month (do/did) you come in contact with (SUBSTANCE)?

asbestos 37-38/
less than once a month.....95
ionizing or nuclear radiation 39-40/
less than once a month.....95
industrial chemicals 41-42/
less than once a month.....95
insecticides or pesticides 43-44/
less than once a month.....95
degreasing chemicals 45-46/
less than once a month.....95
defoliants or herbicides 47-48/
less than once a month.....95

T. Did you wash to remove the (SUBSTANCES) or did you use protective clothing or gear when stationed in (COUNTRY) all the time, some of the time, or never?
All the time.....1 49/
Some of the time....2
Never.(SKIP TO V)....3

DECK 12

10. In general, how many days a month (do/did) you come in contact with (SUBSTANCE)?

asbestos 50-51/
less than once a month.....95
ionizing or nuclear radiation 52-53/
less than once a month.....95
industrial chemicals 54-55/
less than once a month.....95
insecticides or pesticides 56-57/
less than once a month.....95
degreasing chemicals 58-59/
less than once a month.....95
defoliants or herbicides 60-61/
less than once a month.....95

EE. Did you wash to remove the (SUBSTANCES) or did you use protective clothing or gear when stationed in (COUNTRY) all the time, some of the time, or never?
All the time.....1 62/
Some of the time....2
Never.(SKIP TO G)....3

F. In what month and year did you get married to (NAME)?

ENTER MONTH AND YEAR

MO YR

48-51/

2. Have you stopped living with (NAME)?

Yes.....(ASK A).....1 52/
No.....(SKIP TO C).....2

A. How did this (marriage/relationship) end?

SEPARATION.....1	53/
DIVORCE.....2	
DEATH OF SPOUSE OR PARTNER.....(SEE B-1) THRU SEE G.1).....3	
WAND	
CARD	
G	

B. In what month and year did this occur?

ENTER MONTH AND YEAR: [] [] [] [] 54-577

NO. OF [] [] [] []

C. During this (marriage/relationship), how many times were you living apart from (NAME) for 3 months or more since (DATE OF LAST INTERVIEW)?

ENTER NUMBER OF TIMES: | | | | | 58-59/

MONS.....(SKIP TO 7).....00

D. For how many months did you live apart the (first/next) time?

First time:	60-61/
Second time:	62-63/
Third time:	64-65/
Fourth time:	66-67/

2. (continued)

F. During this (marriage/relationship), [since the (DATE OF LAST INTERVIEW)], did you ever have a problem conceiving a child because of prolonged sterility?

Yes.....1

No.....2

7. And what is (NAME OF SPOUSE/PARTNER)'s present street address?

STREET ADDRESS

Q. And what city, state and zip code does (SPOUSE/PARTNER) live in?

CITY _____ STATE _____ ZIP _____ LOKE _____
 35-54/ 55-56/ 57-61/
 And what is (NAME of SPOUSE/PARTNER)'s present telephone number?
 AREA CODE _____ NUMBER _____ 62-71/

NO PHONE.....!

1. Thinking of all the people you know, who would be the one person who would be most likely to know where (NAME OF SPOUSE/PARTNER) is? ENTER FULL NAME OF PERSON BELOW AND ASK J-N.

BEGIN DECK 15
10-29/
(LAST).

30-44/

(FIRST) _____ (MIDDLE) _____ (LAST) _____

1). What is (PERSON'S) relationship to (NAME OF SPOUSE/PARTNER)?

I. Where does (PFASOM) live?

STREET ADDRESS

CITY	STATE	ZIP	CODE
	10-29/	30-31/	32-36/

2. (Continued)

L. What is (PERSON'S) telephone number?

AREA CODE PHONE NUMBER 37-46/

NO PHONE.....1

M. IF (PERSON) HAS PHONE: In whose name is the phone listed?

(PERSON'S) name.....(SKIP TO M).....1 47/

OTHER.....(SPECIFY BELOW).....2

DON'T KNOW.....3

48-72/

(LAST),

(FIRST) (MIDDLE)

N. INTERVIEWER: HAS A STOPPED LIVING WITH SPOUSE OR PARTNER?
(IS "YES" CODED AT Q.37)

Yes.....1 73/

No.....(SKIP TO Q.10).....2

3. Since (DATE OF LAST INTERVIEW), have you reconciled, married (again) or have you lived together as a partner for 3 months or more with someone to whom you weren't married?

Yes.....(ASK A).....1 74/

No.....(SKIP TO Q.10).....2

A. How many times did you get married or live as a partner with someone for 3 months or more since (DATE OF LAST INTERVIEW)?

RECORD NUMBER OF TIMES: 75/

4. Thinking of (that/the first) relationship since (DATE OF LAST INTERVIEW), did you marry this person?

Yes.....1 76/

No.....2

RECONCILED.....3

4. (Continued)

A. What is the current full name of (this person/your wife)?

10 0

77-78/

(LAST)

(FIRST)

(MIDDLE)

INTERVIEWER: RECORD FULL NAME OF (SPOUSE/PARTNER) ON INFORMATION SHEET, ITEM 07 AND RECORD 108 ABOVE.

BEGIN DECK 17

What was her full maiden name?

10-29/

What was her birthdate? RECORD DATE: 30-35/

MO DA YR

B. In what month and year did you (reconcile/get married to/start living with) (NAME)?

ENTER MONTH AND YEAR: 36-39/

MO YR

C. Have you stopped living with (NAME)?

Yes.....(ASK D-P).....1 40/

No.....(SKIP TO Q.47).....2

D. How did this (marriage/relationship) end?

Separation.....1 41/

Divorce.....2

Death of spouse or partner..(ASK B-M, THEN SKIP TO Q.5)....3

4. (Continued)

E. In what month and year did this occur?

ENTER MONTH AND YEAR:
NO YR

F. During this (marriage/relationship), how many times were you living apart from (NAME) for 3 months or more since (DATE OF LAST INTERVIEW)?

ENTER NUMBER OF TIMES:

OR

None.....(GO TO 1).....00

G. For how many months did you live apart the (first/next) time?

First time: 48-49/
Second time: 50-51/
Third time: 52-53/
Fourth time: 54-55/

H. During this (marriage/relationship), (since the (DATE OF LAST INTERVIEW)), did you ever have a problem conceiving a child because of prolonged separation?

Yes.....1 56/
No.....2

I. And what is (NAME OF SPOUSE/PARTNER)'s present street address?

STREET ADDRESS 57-80/

BEGIN DECK 18

J. And what city, state and zip code does (SPOUSE/PARTNER) live in?

CITY STATE ZIP CODE 32-36/

K. And what is (NAME OF SPOUSE/PARTNER)'s present telephone number?

AREA CODE 37-46/

NO PHONE.....1

4. (Continued)

L. Thinking of all the people you know, either around here or elsewhere, who would be the one person who would be most likely to know where (NAME OF SPOUSE/PARTNER) is? ENTER FULL NAME OF PERSON BELOW AND AGE M-P.

(LAST), 47-65/

(FIRST) (MIDDLE) 66-80/

BEGIN DECK 19

M. What is (PERSON'S) relationship to (NAME OF SPOUSE/PARTNER)?

10-11/

N. Where does (PERSON) live?

STREET ADDRESS APTS 12-36/

CITY STATE ZIP CODE 59-63/

O. What is (PERSON'S) telephone number?

AREA CODE PHONE NUMBER 64-73/

NO PHONE.....1

P. IF (PERSON) HAS PHONE, in whose name is the phone listed?

(PERSON'S) name.....(SKIP TO Q.5).....1 74/

OTHER.....(SPECIFY BELOW).....2

DON'T KNOW.....(SKIP TO Q.5).....6

BEGIN DECK 20

(LAST), 10-34/

(FIRST) (MIDDLE) 10-34/

5. INTERVIEWER: IS THERE A SECOND RELATIONSHIP SINCE THE DATE LAST INTERVIEW? (IS NUMBER OF TIMES RECORDED IN Q.3A EQUAL TO 2 OR MORE?)

YES.....(GO TO Q.4).....1 35/

NO.....(SKIP TO Q.10).....2

6. Thinking of the next relationship since (DATE OF LAST INTERVIEW), did you marry this person?

Yes.....1 36/
No.....2

A. What is the current full name of this person?

(LAST) _____ ID # _____ 37-38/
(FIRST) _____ (MIDDLE) _____

INTERVIEWER: RECORD FULL NAME OF (SPOUSE/PARTNER) ON INFORMATION SHEET, ITEM 07 AND 108 ABOVE.

What was her full maiden name?

_____ 39-58/

What was her birthdate? RECORD DATE: _____ MO DA YR _____ 59-64/

B. In what month and year did you (get married to/start living with) (NAME)?

ENTER MONTH AND YEAR: _____ MO YR _____ 65-66/

C. Have you stopped living with (NAME)?

Yes.....1 69/
No.....2

D. How did this (marriage/relationship) end?

Separation.....1 70/
Divorce.....2
Death of spouse or partner
(ASK B-6, YRMS BEIP
TO Q-7).....3

6. (Continued)

F. In what month and year did this occur?

ENTER MONTH AND YEAR: _____ MO YR _____ 71-74/

F. During this relationship, how many times were you living apart from (NAME) for 3 months or more since (DATE OF LAST INTERVIEW)?

ENTER NUMBER OF TIMES: _____ 75-76/

OR

None.....(GO TO I).....00

G. For how many months did you live apart the (first/next) time?

First time.....1 77-78/
Second time.....1 79-80/
Third time.....1 10-11/
Fourth time.....1 12-13/

H. During this (marriage/relationship), (since the (DATE OF LAST INTERVIEW)), did you ever have a problem conceiving a child because of prolonged separation?

Yes.....1 14/
No.....2

I. And what is (NAME OF SPOUSE/PARTNER)'s present street address?

STREET ADDRESS _____ 15-19/

J. And what city, state and zip code does (SPOUSE/PARTNER) live in?

CITY _____ STATE _____ ZIP CODE _____
40-59/ 60-61/ 62-66/

6. (Continued)

K. And what is (NAME OF SPOUSE/PARTNER)'s present telephone number?

AREA CODE _____ NUMBER _____ 67 16/

NO PHONE.....1

L. Thinking of all the people you know, either around here or elsewhere, who would be the one person who would be most likely to know where (NAME OF SPOUSE/PARTNER) is? ENTER FULL NAME OF PERSON BELOW AND ASK N-P.

BEGIN DECK 22
10-29/

(LAST),

(FIRST)

(MIDDLE)

30-44/

M. What is (PERSON'S) relationship to (NAME OF SPOUSE/PARTNER)?

_____ 45-46/

N. Where does (PERSON) live?

STREET ADDRESS

APT.

47-71/

BEGIN DECK 23

CITY

STATE

10-29/ 30-31/

ZIP CODE

32-36/

O. What is (PERSON'S) telephone number?

AREA CODE _____

PHONE NUMBER _____

37-46/

NO PHONE.....1

P. If (PERSON) HAS PHONE, in whose name is the phone listed?

(PERSON'S) name.....(SKIP TO Q.7).....1 47/

OTHER.....(SPECIFY BELOW).....2

DON'T KNOW.....(SKIP TO Q.7).....3

(LAST),

48-72/

(FIRST)

(MIDDLE)

7. INTERVIEWER: IS THERE A THIRD RELATIONSHIP SINCE THE DATE LAST INTERVIEW? (10 NUMBER OF TIMES REMINDED IN Q.3A EQUAL TO 3 OR MORE?)

YES.....(GO TO Q.8).....1 73/

NO.....(SKIP TO Q.10).....2

8. Thinking of the next relationship since (DATE OF LAST INTERVIEW), did you marry this person?

Yes.....1 74/

No.....2 10 8

A. What is the current full name of this person?

(LAST)

75-76/

(FIRST)

(MIDDLE)

INTERVIEWER: RETURN FULL NAME OF (SPOUSE/PARTNER) ON INFORMATION SHEET, ITEM 07 AND ID 8 ABOVE.

What was her full maiden name?

BEGIN DECK 24

_____ 10-29/

What was her birthdate? RECORD DATE: _____ 30-35/

MO DA YR

B. In what month and year did you (get married to/start living with) (NAME)?

ENTER MONTH AND YEAR: _____ 36-39/

MO YR

C. Have you stopped living with (NAME)?

Yes.....(ASK D-2).....1 40/

No.....(SKIP TO F).....2

9. (Cont'd)

2. And what happens if you send a message to a wrong phone number?

41/

Depreciation.....1

Divorce.....2

Death of spouse or partner
(AAK 8-9, Year
sale to (A.C.)

RELIM AND ASK N.P.

47-78/

(LAST),

NAME	DATE	TIME	LOCATION	REMARKS
JOHN DOE	10/10/2023	14:30	Room 101	Completed task
JANE SMITH	10/10/2023	15:00	Room 102	Meeting with client
DAVID BROWN	10/10/2023	16:00	Room 103	Training session
EMILY WHITE	10/10/2023	17:00	Room 104	Project review
MICHAEL GREEN	10/10/2023	18:00	Room 105	Team meeting
SARAH BLACK	10/10/2023	19:00	Room 106	Client presentation
CHRISTOPHER GRAY	10/10/2023	20:00	Room 107	Report writing
AMANDA PINK	10/10/2023	21:00	Room 108	Design work
ANTHONY BLUE	10/10/2023	22:00	Room 109	Code review
STEPHANIE YELLOW	10/10/2023	23:00	Room 110	Documentation
NATHAN PURPLE	10/10/2023	00:00	Room 111	System testing
KATHERINE RED	10/10/2023	01:00	Room 112	Deployment prep
LEWIS ORANGE	10/10/2023	02:00	Room 113	Monitoring
HANNAH GREEN	10/10/2023	03:00	Room 114	Incident response
JACOB BLUE	10/10/2023	04:00	Room 115	Post-mortem
CHLOE PURPLE	10/10/2023	05:00	Room 116	Documentation
RYAN RED	10/10/2023	06:00	Room 117	Team meeting
SKYLAR ORANGE	10/10/2023	07:00	Room 118	Client presentation
JUSTIN GREEN	10/10/2023	08:00	Room 119	Report writing
BRYAN BLUE	10/10/2023	09:00	Room 120	Design work
EMMA PURPLE	10/10/2023	10:00	Room 121	Code review
ADAM RED	10/10/2023	11:00	Room 122	Documentation
OLIVIA ORANGE	10/10/2023	12:00	Room 123	System testing
LUKE GREEN	10/10/2023	13:00	Room 124	Deployment prep
SOPIA BLUE	10/10/2023	14:00	Room 125	Monitoring
NOAH PURPLE	10/10/2023	15:00	Room 126	Incident response
ISABELLA RED	10/10/2023	16:00	Room 127	Post-mortem
WILLIAM ORANGE	10/10/2023	17:00	Room 128	Documentation
CHARLOTTE GREEN	10/10/2023	18:00	Room 129	Team meeting
LUCAS BLUE	10/10/2023	19:00	Room 130	Client presentation
HARPER PURPLE	10/10/2023	20:00	Room 131	Report writing
ERIK RED	10/10/2023	21:00	Room 132	Design work
AMARA ORANGE	10/10/2023	22:00	Room 133	Code review
YOUSUF GREEN	10/10/2023	23:00	Room 134	Documentation
ANITA BLUE	10/10/2023	00:00	Room 135	System testing
ADAM PURPLE	10/10/2023	01:00	Room 136	Deployment prep
ANITA RED	10/10/2023	02:00	Room 137	Monitoring
ADAM ORANGE	10/10/2023	03:00	Room 138	Incident response
ANITA GREEN	10/10/2023	04:00	Room 139	Post-mortem
ADAM BLUE	10/10/2023	05:00	Room 140	Documentation
ANITA PURPLE	10/10/2023	06:00	Room 141	Team meeting
ADAM RED	10/10/2023	07:00	Room 142	Client presentation
ANITA ORANGE	10/10/2023	08:00	Room 143	Report writing
ADAM GREEN	10/10/2023	09:00	Room 144	Design work
ANITA BLUE	10/10/2023	10:00	Room 145	Code review
ADAM PURPLE	10/10/2023	11:00	Room 146	Documentation
ANITA RED	10/10/2023	12:00	Room 147	System testing
ADAM ORANGE	10/10/2023	13:00	Room 148	Deployment prep
ANITA GREEN	10/10/2023	14:00	Room 149	Monitoring
ADAM BLUE	10/10/2023	15:00	Room 150	Incident response
ANITA PURPLE	10/10/2023	16:00	Room 151	Post-mortem
ADAM RED	10/10/2023	17:00	Room 152	Documentation
ANITA ORANGE	10/10/2023	18:00	Room 153	Team meeting
ADAM GREEN	10/10/2023	19:00	Room 154	Client presentation
ANITA BLUE	10/10/2023	20:00	Room 155	Report writing
ADAM PURPLE	10/10/2023	21:00	Room 156	Design work
ANITA RED	10/10/2023	22:00	Room 157	Code review
ADAM ORANGE	10/10/2023	23:00	Room 158	Documentation
ANITA GREEN	10/10/2023	00:00	Room 159	System testing
ADAM BLUE	10/10/2023	01:00	Room 160	Deployment prep
ANITA PURPLE	10/10/2023	02:00	Room 161	Monitoring
ADAM RED	10/10/2023	03:00	Room 162	Incident response
ANITA ORANGE	10/10/2023	04:00	Room 163	Post-mortem
ADAM GREEN	10/10/2023	05:00	Room 164	Documentation
ANITA BLUE	10/10/2023	0		

[illegible]

total.....(80 T 6 9).....00

STREET ADDRESS	APT.
10-34/	

CITY	STATE	ZIP	CODE
	35-56/	55-56/	57-61/

D. What is (PERSON'S) telephone number?

AREA CODE	-	PHONE NUMBER
		62-71/

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	71/
(PERSON'S) NAME.....(SKIP TO Q.9).....	
OTHER.....(SPECIFY BELOW).....	
DON'T KNOW.....(SKIP TO Q.9).....	

DON'T KNOW.....(SKIP TO Q.9).....A

BEGIN DECK 27

(LAST),

(FIRST) _____ (MIDDLE) _____

9. INTERVIEWER: IS THERE A FOURTH RELATIONSHIP SINCE THE DATE LAST INTERVIEW? (IS NUMBER OF TIMES RECORDED IN Q. 1A EQUAL TO 4 OR MORE?)

YES.....(GO TO NEXT QUESTIONAIRE).....1 35/
NO.....2

VERIFICATION OF BIOLOGICAL CHILDREN USING CHILDREN'S RECORD FORM

10. INTERVIEWER: ARE CHILDREN LISTED ON CHILDREN'S RECORD FORM?

YES.....(ASK A).....1 36/
NO.....(ASK B).....2

A. I'd like to read information about your (child/children) from our last interview to check our records. As of (DATE OF LAST INTERVIEW), our records show that you have had (NUMBER OF CHILDREN). (READ EACH CHILD'S FULL NAME, SEX, AND BIRTHDATE AND MOTHER'S NAME). Is that correct?

IF INFORMATION IS CORRECT (GO TO Q. 11).....1 37/
IF INFORMATION IS INCORRECT, MAKE CORRECTIONS ON CHILDREN'S RECORD FORM (THEN GO TO Q. 11).....2

B. Our records show that you had not had any children of your own as of (DATE OF LAST INTERVIEW). Is that correct?

IF INFORMATION IS CORRECT (GO TO Q. 12).....1 38/
IF INFORMATION IS INCORRECT, ASK FOR (CHILD/CHILDREN)'S FULL NAME, SEX, BIRTHDATE AND MOTHER'S NAME. RECORD BEGINNING AT LINE 01 ON CHILDREN'S RECORD FORM.....(THEN GO TO Q. 11).....2

11. INTERVIEWER: ANSWER THIS QUESTION FOR EACH CHILD LISTED ON CHILDREN'S RECORD FORM FOR WHICH THERE IS NO DEATH DATA.

What is (NAME OF 1ST CHILD/NAME OF 2ND CHILD, ETC.)'s current age? RECORD ON CHILDREN'S RECORD FORM.

IF DECEASED SINCE LAST INTERVIEW, ASK A-C. OTHERS GO TO Q. 12.

A. When did (CHILD) die? RECORD DAY, MONTH, AND YEAR ON CHILDREN'S RECORD FORM.

B. What was the cause of death? RECORD BELOW.

C. Where is (CHILD)'s death registered? In what city and state? BEGIN LINE 28

CHILD ID: 35-40/ CHILD ID: 60-61/ CHILD ID: 10-11/
CAUSE: 41/ 62/ 12/

REGISTRATION:

(CITY) 42-57/ (CITY) 63-78/ (CITY) 13-28/
(STATE) 58-59/ (STATE) 79-80/ (STATE) 29-30/

12. INTERVIEWER: HAS R BEEN MARRIED OR HAD A PARTNER FOR 3 MONTHS OR MORE SINCE (DATE OF LAST INTERVIEW)?

YES.....(ASK A).....1 31/
NO.....(SKIP TO SECTION 6).....2

A. Has/Have (your wife/any of your partners) become pregnant by you since (DATE OF LAST INTERVIEW)?

Yes.....(ASK B).....1 32/
No.....(SKIP TO Q. 25).....2

B. How many pregnancies (has your wife/have your partners) had with you since (DATE OF LAST INTERVIEW)?

ENTER NUMBER OF PREGNANCIES: 1 1 1 33-34/
(GO TO Q. 13)

14. (continued)

F. Was (CHILD) a twin?

Yes.....1 35/
 No.....2

F. Was (CHILD) premature, full term, or overdue?

Premature.....1 36/
 Full term.....2
 Overdue.....3
 Don't know.....4

G. How old was (NAME OF MOTHER) when (CHILD) was born?

RECORD AGE: 37-39/
 Don't know.....98

H. What is the name and address of the doctor or medical facility who has (CHILD)'s birth registration record? RECORD BELOW

DOCTOR'S NAME OR FACILITY NAME 39/
 STREET ADDRESS

(CITY) (STATE)

INTERVIEWER: RECORD NAME AND ADDRESS ON MEDICAL CONSENT FORM

I. What is the name and address of the doctor or medical facility who has (CHILD)'s current medical record? RECORD BELOW.

DOCTOR'S NAME OR FACILITY NAME 40/
 STREET ADDRESS

(CITY) (STATE)

INTERVIEWER: RECORD NAME AND ADDRESS ON MEDICAL CONSENT FORM

J. What is (CHILD)'s current age? RECORD IN CHILDREN'S RECORD FORM OR SUPPLEMENTARY CHILDREN'S RECORD FORM. IF DECEASED, ASK K-M. OTHERS GO TO Q-15.

14. (continued)

K. When did (CHILD) die? RECORD DAY, MONTH, AND YEAR ON CHILDREN'S RECORD FORM OR SUPPLEMENTARY CHILDREN'S RECORD FORM.

L. What was the cause of death? RECORD BELOW.

M. Where is (CHILD)'s death registered? In what city and state?

(CITY) 42-57/ 58-59/
 (STATE)

15. INTERVIEWER: IS THERE A SECOND PREGNANCY SINCE THE DATE OF LAST INTERVIEW (IS NUMBER OF PREGNANCIES IN 0.128 EQUAL TO 2 OR MORE?)

YES.....(SKIP TO Q.17).....1 60/
 NO.....(SKIP TO Q.25).....2

16. When did that pregnancy end?

RECORD DATE: 61-66/
 MO DA YR

A. How many weeks had (NAME) been pregnant when that happened?

ENTER NUMBER OF WEEKS: 67-68/
 Don't know.....98

IF MISCARRIAGE OR STILLBIRTH, ASK B-C; (OTHERS GO TO D).

B. Did a doctor tell you why this (miscarriage/stillbirth) might have occurred?

Yes.....(ASK C).....1 69/
 No.....(GO TO D).....2

C. What did the doctor say caused the (miscarriage/stillbirth)? RECORD VERBATIM.

70/

11. What is (CHILD)'s current age? Record in CHILDREN'S BLOOD FORM OR SUPPLEMENTARY CHILDREN'S BLOOD FORM. IF DECEASED, ASK R-M. OTHERS GO TO Q.12.

Q. What did the doctor say caused the (miscarriage/stillbirth)?
RECORD VERBATIM.

22. (Continued)

F. Was (CHILD) a twin?

Yes.....1 41/
No.....2

I. Was (CHILD) premature, full term, or overdue?

Premature.....1 44/
Full term.....2
Overdue.....3
Don't know.....6

G. How old was (NAME OF MOTHER) when (CHILD) was born?

RECORD AGE: 1 45-46/
Don't know.....96

H. What is the name and address of the doctor or medical facility who has (CHILD)'s birth registration records? RECORD BELOW

DOCTOR'S NAME OR FACILITY NAME 47/
STREET ADDRESS

(CITY) (STATE)

INTERVIEWER: RECORD NAME AND ADDRESS ON MEDICAL CONSENT FORM

I. What is the name and address of the doctor or medical facility who has (CHILD)'s current medical records? RECORD BELOW

DOCTOR'S NAME OR FACILITY NAME 48/
STREET ADDRESS

(CITY) (STATE)

INTERVIEWER: RECORD NAME AND ADDRESS ON MEDICAL CONSENT FORM

J. What is (CHILD)'s current age? RECORD IN CHILDREN'S RECORD FORM OR SUPPLEMENTARY CHILDREN'S RECORD FORM. IF DECEASED, ASK E-H. OTHERS GO TO Q-23.

K. When did (CHILD) die? RECORD DAY, MONTH, AND YEAR ON CHILDREN'S RECORD FORM.

22. (Continued)

L. What was the cause of death? RECORD BELOW. 49/

M. Where is (CHILD'S) death registered? In what city and state?

(CITY) 50-65/ 66-67/
(STATE)

23. INTERVIEWER: IS THERE A FOURTH PREGNANCY SINCE THE DATE OF LAST INTERVIEW? (IS NUMBER OF PREGNANCIES IN Q.12B EQUAL TO 4 OR MORE?)

YES.....(GO TO NEW QUESTIONNAIRE).....1 68/
NO.....(SKIP TO Q.25).....2

24. When did that pregnancy end?

RECORD DATE: 1 69-74/
MO DA YR

A. How many weeks had (NAME) been pregnant when that happened?

ENTER NUMBER OF WEEKS: 1 75-76/
Don't know.....96

IF MISCARRIAGE, ASK B-C; OTHERS GO TO D.

B. Did a doctor tell why this miscarriage might have occurred?

Yes.....(ASK C).....1 77/
No.....(GO TO D).....2

C. What did the doctor say caused the miscarriage?
RECORD VERBATIM. 78/

D. INTERVIEWER: IS THERE A FOURTH PREGNANCY SINCE DATE OF LAST INTERVIEW? (IS NUMBER OF PREGNANCIES IN Q.12B EQUAL TO 4 OR MORE?)

YES.....(GO TO NEW QUESTIONNAIRE).....1 79/
NO.....2

25. Since (DATE OF LAST INTERVIEW) have you ever tried for a period of one year or more, to conceive a child and were not able to do so?

Yes.....1 10/
No.....2

.....(SKIP TO SECTION 6).....2

26. For how many periods of one year or more did this happen?

One.....1 11/
Two.....2
Three.....3

27. Since (DATE OF LAST INTERVIEW), in what month and year did the first period begin? And in what month and year did it end?

Begin 12-15/ End 16-19/
MO YR MO YR
OR HAS NOT
ENDED.....0000

28. During (PERIOD) what was your wife or partner's first name?

RECORD BELOW.
20-33/
34-35/
ID #

29. How old was (NAME) in (BEGINNING DATE OF PERIOD)?

RECORD AGE: 36-37/

30. During (PERIOD), did either of you see a doctor to discuss any difficulties in conceiving children?

Yes.....1 36/
No.....2

31. CODE "PERIOD 1" AND NAME SELF-ADMINISTERED FORM 1.

There are many reasons that some couples find it difficult or impossible to conceive a child. Please read this card and circle the number on Side A for each reason which applied to you for this period. Side B provides reasons appropriate for your spouse. Circle as many responses as appropriate.

Now please fill out this card and place it in the envelope when you are finished.

32. INTERVIEWER: IS THERE A SECOND PERIOD OF INFERTILITY SINCE DATE OF LAST INTERVIEW? (IS Q.26 CODED "TWO" OR MORE?)

Yes.....1 39/
No.....2

.....(SKIP TO SECTION 6).....2

33. Since (DATE OF LAST INTERVIEW), in what month and year did the second period begin? And in what month and year did it end?

Begin 40-43/ End 44-47/
MO YR MO YR

34. During this second period what was your wife or partner's first name? RECORD BELOW.

48-61/
62-63/
ID #

35. How old was (NAME) in (BEGINNING DATE OF PERIOD)?

RECORD AGE: 64-65/

36. During this second period did either of you see a doctor to discuss any difficulties in conceiving children?

Yes.....1 66/
No.....2

37. CODE "PERIOD 2" AND NAME SELF-ADMINISTERED FORM 1.

There are many reasons that some couples find it difficult or impossible to conceive a child. Please read this card and circle the number on Side A for each reason which applied to you for this period. Side B provides reasons appropriate for your spouse. Circle as many responses as appropriate.

Now please fill out this card and place it in the envelope when you are finished.

38. INTERVIEWER: IS THERE A THIRD PERIOD OF INFERTILITY SINCE DATE OF LAST INTERVIEW? (IS Q.26 CODED "THREE"?)

Yes.....1 67/
No.....2

39. Since (DATE OF LAST INTERVIEW), in what month and year did the next period begin? And in what month and year did it end?

Begin	60-71/	End	72-75/
MO	YR	MO	YR
OR HAS NOT EMUDED.....0000			

40. During (PERIOD) what was your wife or partner's first name? RECORD BELOW.

BEGIN DATE 16									
10-23/	24-25/	26-27/	28/	29/	30/	31/	32/	33/	34/

41. How old was (NAME) in (BEGINNING DATE OF PERIOD)?

RECORD AGE:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

42. During (PERIOD), did either of you see a doctor to discuss any difficulties in conceiving children?

Yes.....1	No.....2

43. CODE "PERIOD 3" AND HAND SELF-ADMINISTERED FORM 1.

There are many reasons that some couples find it difficult or impossible to conceive a child. Please read this card and circle the number on side A for each reason which applied to you for this period. Side B provides reasons appropriate for your spouse. Circle as many responses as appropriate.

Now please fill out this card and place it in the envelope when you are finished.

Section 6: Child and Family Health

Now I would like to ask you some questions about birth defects in your family. By birth defects I mean a physical abnormality present (though not necessarily noticed) at the time of birth. Birth defects range in severity from unusual birthmarks to a missing or misshapen limb. Birth defects can affect any part of the body, including bones, body organs such as kidneys or the heart, reproductive and respiratory systems, blood, and the skin.

1. INTERVIEWER: HAS RESPONDENT HAD ANY BIOLOGICAL CHILDREN?

YES.....(ASK A).....1	29/
NO.....(SKIP TO Q.22).....2	

First, I would like to verify whether (any of) your biological child(ren) have (had) a birth defect.

A. ARE CHILDREN RECORDED ON CHILDREN'S RECORD FORM?

YES.....(ASK B).....1	30/
NO.....(SKIP TO Q.2).....2	

B. FOR EACH CHILD LISTED ON CHILDREN'S RECORD FORM ASK: (Are records indicate that (CHILD)(had)(did not have) a birth defect in 1982, when you were last interviewed. Is this information correct?)

IF INFORMATION IS CORRECT..(GO TO Q.2).....1	31/
IF INFORMATION IS INCORRECT, MAKE CORRECTIONS ON CHILDREN'S RECORD FORM.....(Then go to Q.2).....2	
Don't know.....(GO TO Q.2).....3	

2. FOR EACH CHILD (EXCEPT CHILDREN WHO DIED BEFORE 1982) ASK: Has a(n additional) defect been identified in (CHILD)(since 1982)? RECORD ON CHILDREN'S RECORD FORM OR SUPPLEMENTARY CHILDREN'S RECORD FORM.

3. INTERVIEWER: ASK QUESTIONS 4-20 FOR EACH CHILD, INCLUDING ALL WHO MAY HAVE DIED.

(Now I would like to ask about (NEXT CHILD)).

	1ST CHILD	2ND CHILD
CHILD'S NAME, CHILD'S IUP MOTHER'S IUP	52-53/ 54-55/	49-50/ 51-52/
4. Did (CHILD) ever have a diagnosis... (READ EACH CATEGORY)...	Yes No learning disability.....1 2 34/ physical or motor impairment.....1 2 31/ mental impairment.....1 2 38/	Yes No 1 2 35/ 1 2 34/ 1 2 35/
5. Was (CHILD) ever diagnosed as having cancer?	Yes.....(ASK A & B).....1 39/ No.....(GO TO Q.6).....2	Yes.....1 36/ No.....(GO, 6).....2
A. In what month and year was the diagnosis made?	NO YES 40-43/	NO YES 51-60/
B. What kind of cancer was diagnosed?	Don't know.....B	Don't know.....B
6. INTERVIEWER, HAS ANY DEFECT OR IMPAIRMENT BEEN IDENTIFIED IN (CHILD)? CHECK CHILDREN'S RECORD FORM AND Q's 1, 2, AND 4.	YES.....(GO TO Q.7).....1 45/ NO.....(ASK A).....2	YES.....(GO, 7).....1 47/ NO.....(A).....2
A. INTERVIEWER, IS THERE ANOTHER CHILD?	YES.....(ASK Q.4 AND 5).....1 46/ NO.....(SKIP TO Q.22).....2	YES.....(GO, 4 AND 5).....1 45/ NO.....(GO, 22).....2
7. What kind of (birth defect(s)/ impairment) does/did (CHILD) have? Any others?	47/	46/
8. Did you (or someone else) discuss (CHILD'S) (birth defect(s)/impairment) with a doctor?	Yes.....(GO TO Q.9).....1 48/ No.....(SKIP TO Q.11).....2	Yes.....(GO, 9).....1 45/ No.....(GO, 11).....2

PLEASE GO ON TO NEXT PAGE ----->

1ST CHILD	2ND CHILD	3RD CHILD	4TH CHILD	5TH CHILD	6TH CHILD
00-07/	00-07/	10-17/	31-37/	48-49/	
00-09/	00-09/	10-17/	35-36/	50-51/	
Yes No	Yes No	Yes No	Yes No	Yes No	
1 2 10/	1 2 10/	1 2 10/	1 2 35/	1 2 51/	
1 2 11/	1 2 11/	1 2 19/	1 2 36/	1 2 52/	
1 2 12/	1 2 12/	1 2 20/	1 2 37/	1 2 53/	
1 2 13/	1 2 13/	1 2 21/	1 2 38/	1 2 54/	
1 2 14/	1 2 14/	1 2 22/	1 2 39/	1 2 55/	
1 2 15/	1 2 15/	1 2 23/	1 2 40/	1 2 56/	
1 2 16/	1 2 16/	1 2 24/	1 2 41/	1 2 57/	
1 2 17/	1 2 17/	1 2 25/	1 2 42/	1 2 58/	
1 2 18/	1 2 18/	1 2 26/	1 2 43/	1 2 59/	
1 2 19/	1 2 19/	1 2 27/	1 2 44/	1 2 60/	
1 2 20/	1 2 20/	1 2 28/	1 2 45/	1 2 61/	
1 2 21/	1 2 21/	1 2 29/	1 2 46/	1 2 62/	
1 2 22/	1 2 22/	1 2 30/	1 2 47/	1 2 63/	
1 2 23/	1 2 23/	1 2 31/	1 2 48/	1 2 64/	
1 2 24/	1 2 24/	1 2 32/	1 2 49/	1 2 65/	
1 2 25/	1 2 25/	1 2 33/	1 2 50/	1 2 66/	
1 2 26/	1 2 26/	1 2 34/	1 2 51/	1 2 67/	
1 2 27/	1 2 27/	1 2 35/	1 2 52/	1 2 68/	
1 2 28/	1 2 28/	1 2 36/	1 2 53/	1 2 69/	
1 2 29/	1 2 29/	1 2 37/	1 2 54/	1 2 70/	
1 2 30/	1 2 30/	1 2 38/	1 2 55/	1 2 71/	
1 2 31/	1 2 31/	1 2 39/	1 2 56/	1 2 72/	
1 2 32/	1 2 32/	1 2 40/	1 2 57/	1 2 73/	
1 2 33/	1 2 33/	1 2 41/	1 2 58/	1 2 74/	
1 2 34/	1 2 34/	1 2 42/	1 2 59/	1 2 75/	
1 2 35/	1 2 35/	1 2 43/	1 2 60/	1 2 76/	
1 2 36/	1 2 36/	1 2 44/	1 2 61/	1 2 77/	
1 2 37/	1 2 37/	1 2 45/	1 2 62/	1 2 78/	
1 2 38/	1 2 38/	1 2 46/	1 2 63/	1 2 79/	
1 2 39/	1 2 39/	1 2 47/	1 2 64/	1 2 80/	
1 2 40/	1 2 40/	1 2 48/	1 2 65/	1 2 81/	
1 2 41/	1 2 41/	1 2 49/	1 2 66/	1 2 82/	
1 2 42/	1 2 42/	1 2 50/	1 2 67/	1 2 83/	
1 2 43/	1 2 43/	1 2 51/	1 2 68/	1 2 84/	
1 2 44/	1 2 44/	1 2 52/	1 2 69/	1 2 85/	
1 2 45/	1 2 45/	1 2 53/	1 2 70/	1 2 86/	
1 2 46/	1 2 46/	1 2 54/	1 2 71/	1 2 87/	
1 2 47/	1 2 47/	1 2 55/	1 2 72/	1 2 88/	
1 2 48/	1 2 48/	1 2 56/	1 2 73/	1 2 89/	
1 2 49/	1 2 49/	1 2 57/	1 2 74/	1 2 90/	
1 2 50/	1 2 50/	1 2 58/	1 2 75/	1 2 91/	
1 2 51/	1 2 51/	1 2 59/	1 2 76/	1 2 92/	
1 2 52/	1 2 52/	1 2 60/	1 2 77/	1 2 93/	
1 2 53/	1 2 53/	1 2 61/	1 2 78/	1 2 94/	
1 2 54/	1 2 54/	1 2 62/	1 2 79/	1 2 95/	
1 2 55/	1 2 55/	1 2 63/	1 2 80/	1 2 96/	
1 2 56/	1 2 56/	1 2 64/	1 2 81/	1 2 97/	
1 2 57/	1 2 57/	1 2 65/	1 2 82/	1 2 98/	
1 2 58/	1 2 58/	1 2 66/	1 2 83/	1 2 99/	
1 2 59/	1 2 59/	1 2 67/	1 2 84/	1 2 100/	
1 2 60/	1 2 60/	1 2 68/	1 2 85/	1 2 101/	
1 2 61/	1 2 61/	1 2 69/	1 2 86/	1 2 102/	
1 2 62/	1 2 62/	1 2 70/	1 2 87/	1 2 103/	
1 2 63/	1 2 63/	1 2 71/	1 2 88/	1 2 104/	
1 2 64/	1 2 64/	1 2 72/	1 2 89/	1 2 105/	
1 2 65/	1 2 65/	1 2 73/	1 2 90/	1 2 106/	
1 2 66/	1 2 66/	1 2 74/	1 2 91/	1 2 107/	
1 2 67/	1 2 67/	1 2 75/	1 2 92/	1 2 108/	
1 2 68/	1 2 68/	1 2 76/	1 2 93/	1 2 109/	
1 2 69/	1 2 69/	1 2 77/	1 2 94/	1 2 110/	
1 2 70/	1 2 70/	1 2 78/	1 2 95/	1 2 111/	
1 2 71/	1 2 71/	1 2 79/	1 2 96/	1 2 112/	
1 2 72/	1 2 72/	1 2 80/	1 2 97/	1 2 113/	
1 2 73/	1 2 73/	1 2 81/	1 2 98/	1 2 114/	
1 2 74/	1 2 74/	1 2 82/	1 2 99/	1 2 115/	
1 2 75/	1 2 75/	1 2 83/	1 2 100/	1 2 116/	
1 2 76/	1 2 76/	1 2 84/	1 2 101/	1 2 117/	
1 2 77/	1 2 77/	1 2 85/	1 2 102/	1 2 118/	
1 2 78/	1 2 78/	1 2 86/	1 2 103/	1 2 119/	
1 2 79/	1 2 79/	1 2 87/	1 2 104/	1 2 120/	
1 2 80/	1 2 80/	1 2 88/	1 2 105/	1 2 121/	
1 2 81/	1 2 81/	1 2 89/	1 2 106/	1 2 122/	
1 2 82/	1 2 82/	1 2 90/	1 2 107/	1 2 123/	
1 2 83/	1 2 83/	1 2 91/	1 2 108/	1 2 124/	
1 2 84/	1 2 84/	1 2 92/	1 2 109/	1 2 125/	
1 2 85/	1 2 85/	1 2 93/	1 2 110/	1 2 126/	
1 2 86/	1 2 86/	1 2 94/	1 2 111/	1 2 127/	
1 2 87/	1 2 87/	1 2 95/	1 2 112/	1 2 128/	
1 2 88/	1 2 88/	1 2 96/	1 2 113/	1 2 129/	
1 2 89/	1 2 89/	1 2 97/	1 2 114/	1 2 130/	
1 2 90/	1 2 90/	1 2 98/	1 2 115/	1 2 131/	
1 2 91/	1 2 91/	1 2 99/	1 2 116/	1 2 132/	
1 2 92/	1 2 92/	1 2 100/	1 2 117/	1 2 133/	
1 2 93/	1 2 93/	1 2 101/	1 2 118/	1 2 134/	
1 2 94/	1 2 94/	1 2 102/	1 2 119/	1 2 135/	
1 2 95/	1 2 95/	1 2 103/	1 2 120/	1 2 136/	
1 2 96/	1 2 96/	1 2 104/	1 2 121/	1 2 137/	
1 2 97/	1 2 97/	1 2 105/	1 2 122/	1 2 138/	
1 2 98/	1 2 98/	1 2 106/	1 2 123/	1 2 139/	
1 2 99/	1 2 99/	1 2 107/	1 2 124/	1 2 140/	
1 2 100/	1 2 100/	1 2 108/	1 2 125/	1 2 141/	
1 2 101/	1 2 101/	1 2 109/	1 2 126/	1 2 142/	
1 2 102/	1 2 102/	1 2 110/	1 2 127/	1 2 143/	
1 2 103/	1 2 103/	1 2 111/	1 2 128/	1 2 144/	
1 2 104/	1 2 104/	1 2 112/	1 2 129/	1 2 145/	
1 2 105/	1 2 105/	1 2 113/	1 2 130/	1 2 146/	
1 2 106/	1 2 106/	1 2 114/	1 2 131/	1 2 147/	
1 2 107/	1 2 107/	1 2 115/	1 2 132/	1 2 148/	
1 2 108/	1 2 108/	1 2 116/	1 2 133/	1 2 149/	
1 2 109/	1 2 109/	1 2 117/	1 2 134/	1 2 150/	
1 2 110/	1 2 110/	1 2 118/	1 2 135/	1 2 151/	
1 2 111/	1 2 111/	1 2 119/	1 2 136/	1 2 152/	
1 2 112/	1 2 112/	1 2 120/	1 2 137/	1 2 153/	
1 2 113/	1 2 113/	1 2 121/	1 2 138/	1 2 154/	
1 2 114/	1 2 114/	1 2 122/	1 2 139/	1 2 155/	
1 2 115/	1 2 115/	1 2 123/	1 2 140/	1 2 156/	
1 2 116/	1 2 116/	1 2 124/	1 2 141/	1 2 157/	
1 2 117/	1 2 117/	1 2 125/	1 2 142/	1 2 158/	
1 2 118/	1 2 118/	1 2 126/	1 2 143/	1 2 159/	
1 2 119/	1 2 119/	1 2 127/	1 2 144/	1 2 160/	
1 2 120/	1 2 120/	1 2 128/	1 2 145/	1 2 161/	
1 2 121/	1 2 121/	1 2 129/	1 2 146/	1 2 162/	
1 2 122/	1 2 122/	1 2 130/	1 2 147/	1 2 163/	
1 2 123/	1 2 123/	1 2 131/	1 2 148/	1 2 164/	
1 2 124/	1 2 124/	1 2 132/	1 2 149/	1 2 165/	
1 2 125/	1 2 125/	1 2 133/	1 2 150/	1 2 166/	
1 2 126/	1 2 126/	1 2 134/	1 2 151/	1 2 167/	
1 2 127/	1 2 127/	1 2 135/	1 2 152/	1 2 168/	
1 2 128/	1 2 128/	1 2 136/	1 2 153/	1 2 169/	
1 2 129/	1 2 129/	1 2 137/	1 2 154/	1 2 170/	
1 2 130/	1 2 130/	1 2 138/	1 2 155/	1 2 171/	
1 2 131/	1 2 131/	1 2 139/	1 2 156/	1 2 172/	
1 2 132/	1 2 132/	1 2 140/	1 2 157/	1 2 173/	
1 2 133/	1 2 133/	1 2 141/	1 2 158/	1 2 174/	
1 2 134/	1 2 134/	1 2 142/	1 2 159/	1 2 175/	
1 2 135/	1 2 135/	1 2 143/	1 2 160/	1 2 176/	
1 2 136/	1 2 136/	1 2 144/	1 2 161/	1 2 177/	
1 2 137/	1 2 137/	1 2 145/	1 2 162/	1 2 178/	
1 2 138/	1 2 138/	1 2 146/	1 2 163/	1 2 179/	
1 2 139/	1 2 139/	1 2 147/	1 2 164/	1 2 180/	
1 2 140/	1 2 140/	1 2 148/	1 2 165/	1 2 181/	
1 2 141/	1 2 141/	1 2 149/	1 2 166/	1 2 182/	
1 2 142/	1 2 142/	1 2 150/	1 2 167/	1 2 183/	
1 2 143/	1 2 143/	1 2 151/	1 2 168/	1 2 184/	
1 2 144/	1 2 144/	1 2 152/	1 2 169/	1 2 185/	
1 2 145/	1 2 145/	1 2 153/	1 2 170/	1 2 186/	
1 2 146/	1 2 146/	1 2 154/	1 2 171/	1 2 187/	
1 2 147/	1 2 147/	1 2 155/	1 2 172/	1 2 188/	
1 2 148/	1 2 148/	1 2 156/	1 2 173/	1 2 189/	
1 2 149/	1 2 149/	1 2 157/	1 2 174/	1 2 190/	
1 2 150/	1 2 150/	1 2 158/	1 2 175/	1 2 191/	
1 2 151/	1 2 151/	1 2 159/	1 2 176/	1 2 192/	
1 2 152/	1 2 152/	1 2 160/	1 2 177/	1 2 193/	
1 2 153/	1 2 153/	1 2 161/	1 2 178/	1 2 194/	
1 2 154/	1 2 154/	1 2 162/	1 2 179/	1 2 195/	
1 2 155/	1 2 155/	1 2 163/	1 2 180/	1 2 196/	
1 2 156/	1 2 156/	1 2 164/	1 2 181/	1 2 197/	
1 2 157/	1 2 157/	1 2 165/	1 2 182/	1 2 198/	
1 2 158/	1 2 158/	1 2 166/	1 2 183/	1 2 199/	
1 2 159/	1 2 159/	1 2 167/	1 2 184/	1 2 200/	
1 2 160/	1 2 160/	1 2 168/	1 2 185/	1 2 201/	

[illegible]

CHILD'S NAME:	1ST CHILD	2ND CHILD
CHILD'S ID #		
MOMENTS TO 7		
13. Did (CHILD'S) doctor say that baby still (CHILD'S) (birth defects)/impairments was/were life-threatening if left untreated (by untreated) mean if (CHILD) did not receive surgery, medication, a special diet, or some other medical intervention.)	Yes.....(ASK A).....1 No.....(ASK A).....2 Don't know.....(ASK A).....3	Yes.....(ASK A).....1 No.....(ASK A).....2 Don't know.....(ASK A).....3
A. INTERVIEWER: IS CHILD UNDER TWO YEARS OLD OR DID CHILD DIE BEFORE HE/SHE WAS TWO YEARS OLD?	Yes.....(SKIP TO Q.20).....1 No.....2	Yes.....(SKIP TO Q.20).....1 No.....2
14. Did (CHILD) ever need help with eating, dressing, bathing, or using the toilet because of a birth defect/impairment? (Help includes someone actually helping rather than just standing by to assist if needed.)	Yes.....1 No.....2	Yes.....1 No.....2
15. Because of a birth defect/impairment, did (CHILD) ever use or need any mechanical or special aids such as a wheelchair, walker, baby braces, artificial limbs, or crutches to carry out everyday activities?	Yes.....1 No.....2	Yes.....1 No.....2
16. Was (CHILD) ever unable to take part at all in ordinary play with other children because of a birth defect/impairment?	Yes.....(GO TO Q.17).....1 No.....(ASK A).....2	Yes.....(GO TO Q.17).....1 No.....(ASK A).....2
A. Was (CHILD) ever limited in the kind or amount of play he/she could do because of his/her birth defect/impairment?	Yes.....1 No.....2	Yes.....1 No.....2

3RD CHILD	4TH CHILD	5TH CHILD	6TH CHILD
63/	45/	55/	61/
.....(ASK A).....1	(ASK A).....1	(ASK A).....1	(ASK A).....1
.....(ASK A).....2	(ASK A).....2	(ASK A).....2	(ASK A).....2
.....(ASK A).....3	(ASK A).....3	(ASK A).....3	(ASK A).....3
.....(0,20).....1	(0,20).....1	(0,20).....1	(0,20).....1
.....2	2	2	2
64/	50/	50/	62/
.....(0,20).....1	(0,20).....1	(0,20).....1	(0,20).....1
.....2	2	2	2
65/	51/	51/	63/
.....1	1	1	1
.....2	2	2	2
66/	52/	50/	64/
.....1	1	1	1
.....2	2	2	2
67/	53/	50/	65/
.....(0,17).....1	(0,17).....1	(0,17).....1	(0,17).....1
.....(ASK A).....2	(ASK A).....2	(ASK A).....2	(ASK A).....2
.....1	1	1	1
.....2	2	2	2

CHILD'S NAME: CHILD'S ID # BIRTH DATE TO 7	1ST CHILD	2ND CHILD
17. Did (CHILD'S) (birth defect(s)/ impairment) ever keep (him/ her) from going to school?	Yes.....(60 TO 0,10).....1 01/	Yes.....(0,10).....1 10/
	No.....(ASK A).....2	No.....(ASK A).....2
A. Did (CHILD) ever have to go to a certain type of school, or be in a special class because of (his/her) (birth defect(s)/impairment)?	Yes.....(60 TO 0,10).....1 00/	Yes.....(0,10).....1 10/
	No.....(ASK B).....2	No.....(ASK B).....2
B. Was (CHILD) ever limited in school attendance or in being able to learn because of (his/her) (birth defect(s)/impairment)?	Yes.....1 01/	Yes.....1 11/
	No.....2	No.....2
18. Because of (his/her) (birth defect(s)/impairment) did (CHILD) ever need a lot more help than other children (CHILD'S) age in going outside, getting to school, going to the store, and other everyday activities (the last)?	Yes.....1 10/	Yes.....1 10/
	No.....2	No.....2
19. Because of a (birth defect/ impairment), did (CHILD) ever need the help of another person for every- day activities such as taking care of the house or yard, doing the laundry, or preparing meals?	Yes.....1 11/	Yes.....1 10/
	No.....2	No.....2
20. Will/Need (CHILD'S) (birth defect(s) (keep/have kept) (him/her) from making on a job for pay?	Yes.....(60 TO 0,21).....1 12/	Yes.....(0,21).....1 10/
	No.....(ASK A).....2	No.....(ASK A).....2
A. Will/Need (CHILD) (be/have been) limited in the kind of work (he/she) could (do/have done) because of (his/her) (birth defect(s))?	Yes.....(60 TO 0,21).....1 11/	Yes.....(0,21).....1 11/
	No.....(ASK B).....2	No.....(ASK B).....2
B. Will/Need (CHILD) (be/have been) limited in the amount of work (he/she) could (do/have done) because of (his/her) (birth defect(s))?	Yes.....1 10/	Yes.....1 12/
	No.....2	No.....2

2ND CHILD	4TH CHILD	5TH CHILD	6TH CHILD
.....1 13/	1 21/	1 20/	1 51/
.....(ASK A).....2	(ASK A).....2	(ASK A).....2	(ASK A).....2
.....1 14/	1 22/	1 30/	1 50/
.....(ASK B).....2	(ASK B).....2	(ASK B).....2	(ASK B).....2
.....1 15/	1 23/	1 31/	1 50/
.....2	2	2	2
.....1 16/	1 24/	1 32/	1 40/
.....2	2	2	2
.....1 17/	1 25/	1 33/	1 41/
.....2	2	2	2
.....1 18/	1 26/	1 34/	1 42/
.....(ASK A).....2	(ASK A).....2	(ASK A).....2	(ASK A).....2
.....1 19/	1 27/	1 35/	1 43/
.....(ASK B).....2	(ASK B).....2	(ASK B).....2	(ASK B).....2
.....1 20/	1 28/	1 36/	1 44/
.....2	2	2	2

CHILD'S NAME:

CHILD'S ID #

CHILD'S ID #

21. INTERVIEWER: DOES HE SPEAK ENGLISH?

(ASK Q. 22)

YES.....(ASK Q. 23).....1 43/

NO.....(ASK Q. 22).....2

22. Did you ever have a birth defect?

Yes.....(ASK A).....1 47/

No.....2

A. What kind of birth defect was it? Any others?

48/

23. Do you have any biological brothers or sisters? Include any brothers or sisters who may have died before the age of 1.

Yes.....(ASK Q. 24).....1 49/

No.....(SKIP TO Q. 25).....2

Don't know.....(SKIP TO Q. 25).....0

3RD CHILD	4TH CHILD	5TH CHILD	6TH CHILD
.....(0,3).....1 54/	(0,3).....1 51/	(0,3).....1 52/	(0,3).....1 53/
.....(0,22).....2	(0,22).....2	(0,22).....2	(0,22).....2

24. Ind any of your biological brothers or sisters ever have a birth defect?

Yes.....(ASK A).....1 54/
 No.....(SKIP TO Q.25).....2
 Don't know.....(SKIP TO Q.25).....0

A. Who had a defect, brothers, sisters, or both?

Brothers.....1 55/
 Sisters.....2
 Both.....3

FOR EACH SIBLING WITH A BIRTH DEFECT, ASK: What kind of birth defect did your (brother/sister) have? Was this sibling a half (brother/sister) or a full (brother/sister)? RECORD BELOW.

Sibling 1 Sibling 2
 DEFECT: 56/ DEFECT: 56/

Half (brother/sister)...1 57/ Half (brother/sister)...1 59/
 Full (brother/sister)...2 Full (brother/sister)...2

Sibling 3 Sibling 4
 DEFECT: 60/ DEFECT: 62/

Half (brother/sister)...1 61/ Half (brother/sister)...1 63/
 Full (brother/sister)...2 Full (brother/sister)...2

25. Now I would like to ask you some questions about your biological parents. Did either your biological mother or biological father ever have a birth defect?

Yes.....(GO TO Q.26).....1 64/
 No.....(SKIP TO Q.28).....2
 Don't know.....(SKIP TO Q.28).....0

26. Which parent had a birth defect?

Mother only.....1 65/
 Father only.....2
 Both parents.....3

SECTION 7: HEALTH

27. What kind of birth defect did your (PARENT) have?

Mothers: 60/ Fathers: 61/

Now I have some different kind of questions.

28. Has anyone near to you died in the last 12 months?

Yes...(ASK A AND B).....1 60/
No.....2

HAND CARD 1

A. What was the person's relationship to you? Please choose as many as apply. CODE ALL THAT APPLY.

- A. Child.....01 69-70/
- B. Parent.....02 71-72/
- C. Spouse/partner.....03 73-74/
- D. Brother or sister.....04 75-76/
- E. Other near relative of you or your spouse/partner.....05 77-78/
- F. Friend.....06 79-80/
- G. Other (SPECIFY) BEGIN DECK 38

07 10-11/

B. What (was the date/were the dates) of the death(s)? What month and year?

ENTER MONTH AND YEAR: 12-15/ MO YR
ENTER MONTH AND YEAR: 16-19/ MO YR
ENTER MONTH AND YEAR: 20-23/ MO YR

1. Now let's talk about health. Compared to other people your age, would you say that your health is . . . (READ (IMMEDIATELY))

Excellent.....1 24/
Good.....2
Fair.....3
Poor.....4

2. Since (DATE OF LAST INTERVIEW) have you had acne on your face, chest or back?

Yes.....1 25/
No.....(SKIP TO Q.8).....2

3. During what year, between (DATE OF LAST INTERVIEW) and now, did you last have acne on your face, chest or back?

RECORD YEAR: 1 1 1 26-27/

4. Think about the (first/next) time you had acne on your face, chest or back between (DATE OF LAST INTERVIEW) and now. When did it start and until when did it last? (PROBE FOR ALL PERIODS OF TIME).

First	Second	Third
Mo Yr	Mo Yr	Mo Yr
28-31/	36-39/	44-47/
to	to	to
Mo Yr	Mo Yr	Mo Yr
32-35/	40-43/	48-51/

U. 4. INTERVIEWER, ASK A FOUR PART TIME IN Q.4

A. Please show me in this diagram where the acne (to/has) located (the [first/next] time). (CIRCLE "YES" OR "NO")

	FIRST TIME		SECOND TIME		THIRD TIME	
	Yes	No	Yes	No	Yes	No
Temples	1 2 52/	1 2 61/	1 2 61/	1 2 61/	1 2 61/	1 2 61/
Eyes or eyelids	1 2 53/	1 2 62/	1 2 62/	1 2 62/	1 2 62/	1 2 62/
Ears	1 2 54/	1 2 63/	1 2 63/	1 2 63/	1 2 63/	1 2 63/
Cheeks	1 2 55/	1 2 64/	1 2 64/	1 2 64/	1 2 64/	1 2 64/
Nose	1 2 56/	1 2 65/	1 2 65/	1 2 65/	1 2 65/	1 2 65/
Forehead	1 2 57/	1 2 66/	1 2 66/	1 2 66/	1 2 66/	1 2 66/
Jaw, Chin	1 2 58/	1 2 67/	1 2 67/	1 2 67/	1 2 67/	1 2 67/
Other	1 2 59/	1 2 68/	1 2 68/	1 2 68/	1 2 68/	1 2 68/
Chest	1 2 60/	1 2 69/	1 2 69/	1 2 69/	1 2 69/	1 2 69/
Back	1 2 60/	1 2 69/	1 2 69/	1 2 69/	1 2 69/	1 2 69/

IF ANY "YES" TO TEMPLES, EYES, EYELIDS OR EARS IN A ABOVE, ASK Q.5
ALL OTHERS SKIP TO Q.6

5. Between (DATE OF LAST INTERVIEW) and now, did you ever consult a doctor or medical facility about the acne on your [temples/eyes/eyelids/ears]?

Yes.....1 79/
No (SKIP TO Q.6).....2

6. What month and year did you last consult a doctor about the acne on your [temples/eyes/eyelids/ears]?

MONTH DECK 39
10-11/

Mo Tr

7. What was the name of the doctor or medical facility you consulted at the time?

Last Name

First Name

OR

Facility Name

A. What is the address of that (doctor/medical facility)?

STREET ADDRESS

CITY

8. What is your blood type?

A.....1
B.....2
O.....3
AB.....4
Don't know.....6

A. Is that positive or negative?

Positive.....1
Negative.....2

9. During the last year, how often, on average, would you say you use aspirin?

More than 4 aspirin a day.....1
4 aspirin a day (2 doses a day).....2
2 aspirin a day (1 dose a day).....3
6-8 aspirin a week (1 dose, 3-4 days/week).....4
4 aspirin a week or less.....5
None.....6

NAME
CARD
L

ANSWERS TO ALL QUESTIONS

10. The next questions deal with your reaction to the sun without the use of suntan lotion. If your skin was exposed to the sunlight for the first time in the summer for a period of 30 minutes would you

- 19/
- Always burn, never tan.....1
- Usually burn, tan with difficulty.....2
- Sometimes burn mildly, tan above average.....3
- Rarely burn, tan with ease.....4

HAND
CARD
M

11. In the summer, once you have already been in the sun several times, what reaction will your skin have the next time you go out in the sun for two or more hours on a bright day? Would you say you get

- 19/
- A painful burn.....1
- A burn.....2
- Some redness only.....3
- No reaction.....4

12. After repeated sun exposures, for example, a two week vacation outdoors, will your skin become . . .

- 20/
- Only freckled or no sunken at all.....1
- Only mildly tanned due to a tendency to peel.....2
- Moderately tanned.....3
- Very brown and deeply tanned.....4

HAND
CARD
M

13. HAND SELF-ADMINISTERED FORM 2. We would like you to tell us all the places you've lived since you were born. Please list all the places you've lived for more than 12 months starting with the first place since birth. Please take your time. It will probably take you 10 minutes or so to fill out this form. Please begin.

14. During any period in your life, did a doctor ever tell you that you had a peptic or stomach ulcer?

- 22/
- Yes.....1
- No.....2

15. During what month and year did a doctor first tell you that you had a peptic or stomach ulcer?

23-26/

Mo. Yr.

16. What is the full name of the doctor who made the diagnosis or the medical facility where the diagnosis was made?

LAST

FIRST

OR

MIDDLE

FACILITY NAME

A. What is the address of that (doctor/medical facility)?

27/

STREET ADDRESS

CITY

(STATE)

17. Do you have a peptic or stomach ulcer now?

Yes.....1

No.....2

18. What month and year did you last consult a doctor for your peptic or stomach ulcer?

29-32/

Mo. Yr.

19. Have you ever during any period in your life had a bleeding ulcer?

Yes.....1

No.....2

20. During what month(s) and year(s) did you have a bleeding ulcer?

FROM		THRU		FROM		THRU	
Mo	Yr	Mo	Yr	Mo	Yr	Mo	Yr
1	14-37/	1	42-45/	1	50-53/		
2		2		2			
3		3		3			
4		4		4			
5		5		5			
6		6		6			
7		7		7			
8		8		8			
9		9		9			
10		10		10			
11		11		11			
12		12		12			

21. Were you ever (during any period in your life) hospitalized for your peptic or stomach ulcer?

Yes.....1 58/
No.....2

22. Have you ever (during any period in your life) had surgery for your peptic or stomach ulcer?

Yes.....1 59/
No.....2

23. Are you currently taking any prescribed medicines for your peptic or stomach ulcer?

Yes.....1 60/
No.....(SKIP TO Q.24).....2

A. What are the names of the medicines you are taking?
(PROB: WHAT OTHERS?)

1) _____ 61-63/
2) _____ 64-66/
3) _____ 67-69/

24. Please indicate which of the following members of your biological family have ever had a peptic or stomach ulcer?

1. Mother.....01	70-71/
2. Father.....02	72-73/
3. Full Mother.....03	74-75/
4. Half Mother.....04	76-77/
5. Full Sister.....05	78-79/
6. Half Sister.....06	80-81/
7. None.....07	12-13/
8. Don't Know.....08	14-15/

25. Do you have or have you recently had sharp upper stomach pain?

Yes.....1 16/
No.....(SKIP TO Q.28).....2

26. Was this pain relieved by food, milk, or antacids?

Yes.....1 17/
No.....2

27. Was this stomach pain awakened you from sleep?

Yes.....1 18/
No.....2

28. Have you vomited blood recently?

Yes.....1 19/
No.....2

29. Have you recently experienced dark tar colored stools or bowel movements?

Yes.....1 20/
No.....2

Now I would like to ask you some questions that deal only with the period of time between (DATE OF LAST INTERVIEW) and now.

INTERVIEWER: ASK A THROUGH G FOR EACH CONDITION LISTED YES.

		A		B	
		Between (DATE OF LAST INTERVIEW) and now, in what month and year did a doctor first tell you that you had (CONDITION)?		What is the full name and address of the doctor who made the diagnosis or the medical facility where the diagnosis was made?	
		Yes	No		
30. Diabetic?	1 2 21/	1 2 21/	1 2 21/		
	SKIP TO Q.31				
	22-23/				
	24/				
	25/				
	26/				
	27/				
	28/				
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	100/				

PLEASE GO ON TO NEXT PAGE

What is the full name and address of the doctor who made the diagnosis or the medical facility where the diagnosis was made?

Between (DATE OF LAST INTERVIEW) and now, in what month and year did a doctor first tell you that you had (CONDITION)?

Since (DATE OF LAST INTERVIEW) has a doctor told you that you had ...

Yes No

1 2 34/ 5/ 6/ 7/ 8/ 9/ 10/ 11/ 12/

Last Name

First Name

OR

Facility Name

Street Address

City State

1 2 34/ 5/ 6/ 7/ 8/ 9/ 10/ 11/ 12/

Last Name

First Name

OR

Facility Name

Street Address

City State

When did you last consult a doctor for (CONDITION)?

What are the names of medicines you are taking? Any others?

What is the full name and address of the doctor or medical facility you last consulted?

1 2 34/ 5/ 6/ 7/ 8/ 9/ 10/ 11/ 12/

Last Name

First Name

OR

Facility Name

Street Address

City State

1 2 34/ 5/ 6/ 7/ 8/ 9/ 10/ 11/ 12/

Last Name

First Name

OR

Facility Name

Street Address

City State

BEGIN DECK 41

C		D		E		F		G	
Do you have (CONDITION) now?		Are you currently taking any prescribed medicines for your (CONDITION)?		What are the names of medicines you are taking? What others?		When did you last consult a doctor for (CONDITION) between (DATE OF LAST INTERVIEW) and now?		What is the full name and address of the doctor or medical facility you last consulted?	
Yes	No	Yes	No						
1	2	10/	1	11	12-17/	18-20/	21-24/	25/	
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		10							
		f							
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		Skip		15-17/		18-20/		21-24/	
		10							
		f		</					

Do you have (CONDITION) any medicines for your (CONDITION)?		What are the names of medicines you are taking? Any others?		When did you last consult a doctor for (CONDITION) between (DATE OF LAST INTERVIEW) and now?		What is the full name and address of the doctor or medical facility you last consulted?	
Yes	No	Yes	No	No	Tr	Last Name	First Name
1	2	1)	2)	1)	2)	1)	2)
3)	4)	5)	6)	7)	8)	9)	10)
Facility Name Street Address City State							
BEGIN DECK 42							
1	2	3)	4)	5)	6)	7)	8)
9)	10)	11)	12)	13)	14)	15)	16)
Facility Name Street Address City State							

Since (DATE OF LAST INTERVIEW) has a doctor told you that you had ...		Between (DATE OF LAST INTERVIEW) and now, in what month and year did a doctor first tell you that you had (CONDITION)?		What is the full name and address of the doctor who made the diagnosis or the medical facility where the diagnosis was made?	
Yes	No	No	Tr	Last Name	First Name
1	2	3)	4)	5)	6)
7)	8)	9)	10)	11)	12)
Facility Name Street Address City State					
36. Repetition					
1	2	3)	4)	5)	6)
7)	8)	9)	10)	11)	12)
Facility Name Street Address City State					
37. Circumstances of the illness					
1	2	3)	4)	5)	6)
7)	8)	9)	10)	11)	12)
Facility Name Street Address City State					

A		B	
Since (DATE OF LAST INTERVIEW) has a doctor told you that you had ...	Between (DATE OF LAST INTERVIEW) and now, in what month and year did a doctor first tell you that you had (CONDITION)?	What is the full name and address of the doctor who made the diagnosis or the medical facility where the diagnosis was made?	
Yes	No		
1	2 39/		
SKIP	No		
TO	60-63/		
0-39			
		Last Name	
		First Name	
		OR	
		Facility Name	
		Street Address	
		City	
		State	
		Last Name	
		First Name	
		OR	
		Facility Name	
		Street Address	
		City	
		State	

C		D	
Do you have (CONDITION) now?	When did you last consult a doctor for (CONDITION) between (DATE OF LAST INTERVIEW) and now?	What is the full name and address of the doctor or medical facility you last consulted?	
Yes	No		
1	2 37/		
SKIP	No		
TO	38-41/		
0			
		Last Name	
		First Name	
		OR	
		Facility Name	
		Street Address	
		City	
		State	
		Last Name	
		First Name	
		OR	
		Facility Name	
		Street Address	
		City	
		State	

Do you have (CONDITION) now?		Are you cur- rently taking any prescribed medicines for your (CONDITION)?		When did you last consult a doctor for (CONDITION) between (DATE you are taking what other?		What is the full name and address of the doctor or medical facility you last consulted			
Yes	No	Yes	No	1) _____ Skip TO F	2) _____ Skip TO F	No	Yr	Last Name	ST
1	2	3	4	5) _____ Skip TO F	6) _____ Skip TO F	7) _____ Skip TO F	8) _____ Skip TO F	9) _____ Skip TO F	10) _____ Skip TO F
First Name OR Facility Name Street Address City State									

Since (DATE OF LAST INTERVIEW) has a doctor told you that you had ...

Between (DATE OF LAST INTERVIEW) and now, in what month and year did a doctor first tell you that you had (CONJUNCTION)?

Yes No

42. A respiratory condition other than pneumonia? (SPECIFY) _____ 11/

1 2 10/ SKIP TO 0.43

43. Any other major condition? 1 2 11/ SKIP TO 0.44

(SPECIFY) _____ 10/

What is the full name and address of the doctor who made the diagnosis or the medical facility where the diagnosis was made?

Last Name 10/

First Name

OR

Facility Name

Street Address

City State

Last Name 23/

First Name

OR

Facility Name

Street Address

City State

45. At any time since (DATE OF LAST INTERVIEW) has a doctor told you that you had cancer?

Yes.....1 10/

No....(SKIP TO 0.49).....2

46. Did the doctor tell you that this was a skin cancer or a systemic (body) cancer?

Skin cancer only.....1 11/

Systemic cancer only.....(SKIP TO 0.48).....2

BOTH SKIN AND SYSTEMIC CANCER.....3

SKIN CANCER ONLY

47. Please look at this chart and tell me where each of your skin cancers (if/when) located.

INTERVIEWER, INDICATE THE ANATOMICAL CODE FOR EACH SITE BEING REPORTED.

SITE NUMBER

1 2 3

SITE CODE

13-15/ 16-17/ 18-19/

HEAD
C AND
J

CODES:

(01) Scalp or forehead
(02) Eye lid
(03) Ear
(04) Nose
(05) Head or Neck, Not Otherwise Specified
(06) Cheek, chin or jaw
(07) Neck or Supraclavicular
(08) Ventrals
(09) Trunk, Front
(10) Trunk, Back
(11) Trunk, Not Otherwise Specified
(12) Arm
(13) Hand

(14) Arm or Hand, Not Otherwise Specified
(15) Genital
(16) Leg
(17) Foot
(18) Leg or Foot, Not Otherwise Specified
(19) Mouth, Not Otherwise Specified
(20) Upperlip, Not Otherwise Specified
(21) Lowerlip, Not Otherwise Specified
(22) Lip, Not Otherwise Specified

Do you have any medicines for your (CONDITION)?

Yes No Yes No

What are the names of medicines you are taking? What others?

When did you last consult a doctor for (CONDITION) between (DATE OF LAST INTERVIEW) and now?

What is the full name and address of the doctor or medical facility you last consulted?

1 2 3/ 1 2 3/ 1 2 3/

SKIP TO 10 10 10

15-17/ 16-17/ 18-19/

First Name Last Name

Facility Name

Street Address

City State

PRIM CAM'28 ONLY

[illegible]

48. (Continued)

SYSTEMIC (BODY) CANCER (ONLY)

48.

BODY PART 1
A. In what part of your body (its/was) cancer located?
(RECORD VERBATIM)
26-45/

B. What kind of cancer was it?
46/

C. In what month and year was cancer of the (BODY PART) first diagnosed?
Mo. Yr.
47-50/

BODY PART 2
A. In what part of your body (its/was) cancer located?
(RECORD VERBATIM)
51-70/

B. What kind of cancer was it?
71/

C. In what month and year was cancer of the (BODY PART) first diagnosed?
Mo. Yr.
72-75/

BODY PART 3
A. In what part of your body (its/was) cancer located?
(RECORD VERBATIM)
10-29/

B. What kind of cancer was it?
30/

C. In what month and year was cancer of the (BODY PART) first diagnosed?
Mo. Yr.
31-34/

BODY PART 1

D. What is the full name and address of the doctor or the medical facility where the diagnosis was made?

Last Name 35/
First Name

OR

Facility Name

Street Address

City

State

E. What treatments or medicines (do/did) you take for cancer of the (BODY PART)?
CODE ALL THAT APPLY

Radiation.....1 36/
Chemotherapy.....2 37/
Surgery.....3 38/
Other (SPECIFY)....4 39/

NONE.....0

BODY PART 2

D. What is the full name and address of the doctor or the medical facility where the diagnosis was made?

Last Name 40/
First Name

OR

Facility Name

Street Address

City

State

E. What treatments or medicines (do/did) you take for cancer of the (BODY PART)?
CODE ALL THAT APPLY

Radiation.....1 41/
Chemotherapy.....2 42/
Surgery.....3 43/
Other (SPECIFY)....4 44/

NONE.....0

BODY PART 3

D. What is the full name and address of the doctor or the medical facility where the diagnosis was made?

Last Name 45/
First Name

OR

Facility Name

Street Address

City

State

E. What treatments or medicines (do/did) you take for cancer of the (BODY PART)?
CODE ALL THAT APPLY

Radiation.....1 46/
Chemotherapy.....2 47/
Surgery.....3 48/
Other (SPECIFY)....4 49/

NONE.....0

BUDY PART I

SURGEARY	MD	YR
		58-61/

OTHER	MD	YR
		62-65/

Mo..(SKIP TO
Q-49).....266/

ANNEX PART 2

SURGERY	MO	YR
		73-78/
OTHER	MO	YR
		10-13/

NO. (SKIP TO
Q.49).....214/

ONLY PART 3

SURGERY			MO			YR
23-26/						
OTHER			MO			YR
27-30/						

NO..(SKIP TO
Q.49).....231/

A. Thinking about the period between (DATE OF LAST INTERVIEW) and now, in what month and year was your leukemia diagnosed?

No. _____ Vr. _____

3. What is the name and address of the doctor of the medical facility where the diagnosis was made?

1981

[illegible]

c

Facility Name

Street Address

1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1080 1081 1082 1083 1084 1085 1086 1087 1088 1089 1090 1091 1092 1093 1094 1095 1096 1097 1098 1099 1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1120 1121 1122 1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135 1136 1137 1138 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167 1168 1169 1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199 1200 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1291 1292 1293 1294 1295 1296 1297 1298 1299 1300 1301 1302 1303 1304 1305 1306 1307 1308 1309 1310 1311 1312 1313 1314 1315 1316 1317 1318 1319 1320 1321 1322 1323 1324 1325 1326 1327 1328 1329 1330 1331 1332 1333 1334 1335 1336 1337 1338 1339 1340 1341 1342 1343 1344 1345 1346 1347 1348 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1369 1370 1371 1372 1373 1374 1375 1376 1377 1378 1379 1380 1381 1382 1383 1384 1385 1386 1387 1388 1389 1390 1391 1392 1393 1394 1395 1396 1397 1398 1399 1400 1401 1402 1403 1404 1405 1406 1407 1408 1409 1410 1411 1412 1413 1414 1415 1416 1417 1418 1419 1420 1421 1422 1423 1424 1425 1426 1427 1428 1429 1430 1431 1432 1433 1434 1435 1436 1437 1438 1439 1440 1441 1442 1443 1444 1445 1446 1447 1448 1449 1450 1451 1452 1453 1454 1455 1456 1457 1458 1459 1460 1461 1462 1463 1464 1465 1466 1467 1468 1469 1470 1471 1472 1473 1474 1475 1476 1477 1478 1479 1480 1481 1482 1483 1484 1485 1486 1487 1488 1489 1490 1491 1492 1493 1494 1495 1496 1497 1498 1499 1500 1501 1502 1503 1504 1505 1506 1507 1508 1509 1510 1511 1512 1513 1514 1515 1516 1517 1518 1519 1520 1521 1522 1523 1524 1525 1526 1527 1528 1529 1530 1531 1532 1533 1534 1535 1536 1537 1538 1539 1540 1541 1542 1543 1544 1545 1546 1547 1548 1549 1550 1551 1552 1553 1554 1555 1556 1557 1558 1559 1560 1561 1562 1563 1564 1565 1566 1567 1568 1569 1570 1571 1572 1573 1574 1575 1576 1577 1578 1579 1580 1581 1582 1583 1584 1585 1586 1587 1588 1589 1590 1591 1592 1593 1594 1595 1596 1597 1598 1599 1600 1601 1602 1603 1604 1605 1606 1607 1608 1609 1610 1611 1612 1613 1614 1615 1616 1617 1618 1619 1620 1621 1622 1623 1624 1625 1626 1627 1628 1629 1630 1631 1632 1633 1634 1635 1636 1637 1638 1639 1640 1641 1642 1643 1644 1645 1646 1647 1648 1649 1650 1651 1652 1653 1654 1655 1656 1657 1658 1659 1660 1661 1662 1663 1664 1665 1666 1667 1668 1669 1670 1671 1672 1673 1674 1675 1676 1677 1678 1679 1680 1681 1682 1683 1684 1685 1686 1687 1688 1689 1690 1691 1692 1693 1694 1695 1696 1697 1698 1699 1700 1701 1702 1703 1704 1705 1706 1707 1708 1709 1710 1711 1712 1713 1714 1715 1716 1717 1718 1719 1720 1721 1722 1723 1724 1725 1726 1727 1728 1729 1730 1731 1732 1733 1734 1735 1736 1737 1738 1739 1740 1741 1742 1743 1744 1745 1746 1747 1748 1749 1750 1751 1752 1753 1754 1755 1756 1757 1758 1759 1760 1761 1762 1763 1764 1765 1766 1767 1768 1769 1770 1771 1772 1773 1774 1775 1776 1777 1778 1779 1780 1781 1782 1783 1784 1785 1786 1787 1788 1789 1790 1791 1792 1793 1794 1795 1796 1797 1798 1799 1800 1801 1802 1803 1804 1805 1806 1807 1808 1809 1810 1811 1812 1813 1814 1815 1816 1817 1818 1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833

10. What treatments or medicines have you taken for leucemia since (DATE OF LAST INTERVIEW)?

18-40/
41-43/
44-46/

For the period between (DATE OF LAST INTERVIEW) and now, during what month and year did you first receive (EACH TREATMENT OR MEDICINE IN (1)?

	Mo.	Tr.	
TREATMENT 1	1	1	47-502
TREATMENT 2	1	1	51-547
TREATMENT 3	1	1	55-587

50. (Continued)

E. During what month and year was the last consultation with the doctor or medical facility you last consulted about (COMBILION)?

F. What is the name and address of the doctor or medical facility you last consulted about (COMBILION)?

G. During what month and year did you last consult (COMBILION)?

10-16/ Mo. Yr. 11/ Mo. Yr. 10-21/ Mo. Yr.

Last Name _____
 First Name _____
 Facility Name _____
 Street Address _____
 City _____ State _____

10-23/ Mo. Yr. 20/ Mo. Yr. 21-30/ Mo. Yr.

Last Name _____
 First Name _____
 Facility Name _____
 Street Address _____
 City _____ State _____

A. 1000 LAMP

50. Since (DATE OF LAST CONSULTATION) have you had . . .

Did you discuss (COMBILION) with a doctor? Yes No

What was the diagnosis? What is the doctor's name and address?

Did you discuss (COMBILION) with a doctor? Yes No

What was the diagnosis? What is the doctor's name and address?

5. Skin that was extra sensitive or seemed to hurt for no reason? 1 2 31/ 32-33/ 34-35/ 36-37/

Site Code 32-33/ Site Code 34-35/ Site Code 36-37/

Last Name _____
 First Name _____
 Facility Address _____
 City _____ State _____

QUESTIONS FOR Q.50

- COMBILION: (01) Scalp or forehead (16) Arm or hand, Not Otherwise Specified
 (02) Eye lid (17) Chin or jaw (18) Leg or foot, Not Otherwise Specified
 (03) Ear (19) Neck or back of neck (19) Side, Not Otherwise Specified
 (04) Nose (20) Shoulder, Not Otherwise Specified
 (05) Head or neck, Not Otherwise Specified (21) Upper lip, Not Otherwise Specified
 (06) Cheek, chin or jaw (22) Lower lip, Not Otherwise Specified
 (07) Neck or back of neck (23) Arm (23) Not Otherwise Specified
 (08) Forearm (24) Back, Not Otherwise Specified
 (09) Wrist, Front (25) Hand, Not Otherwise Specified
 (10) Wrist, Back (26) Head

ASK A THROUGH J FOR EACH YES

38. (Continued)

E. During what month and year did you last consult a physician about your condition?

Mo. Tr. 41-42/ 43/ 44-45/ 46-47/ 48-49/ 50-51/ 52-53/ 54-55/ 56-57/ 58-59/ 60-61/ 62-63/ 64-65/ 66-67/ 68-69/ 70-71/ 72-73/ 74-75/ 76-77/ 78-79/ 80-81/ 82-83/ 84-85/ 86-87/ 88-89/ 90-91/ 92-93/ 94-95/ 96-97/ 98-99/ 100-101/ 102-103/ 104-105/ 106-107/ 108-109/ 110-111/ 112-113/ 114-115/ 116-117/ 118-119/ 120-121/ 122-123/ 124-125/ 126-127/ 128-129/ 130-131/ 132-133/ 134-135/ 136-137/ 138-139/ 140-141/ 142-143/ 144-145/ 146-147/ 148-149/ 150-151/ 152-153/ 154-155/ 156-157/ 158-159/ 160-161/ 162-163/ 164-165/ 166-167/ 168-169/ 170-171/ 172-173/ 174-175/ 176-177/ 178-179/ 180-181/ 182-183/ 184-185/ 186-187/ 188-189/ 190-191/ 192-193/ 194-195/ 196-197/ 198-199/ 200-201/ 202-203/ 204-205/ 206-207/ 208-209/ 210-211/ 212-213/ 214-215/ 216-217/ 218-219/ 220-221/ 222-223/ 224-225/ 226-227/ 228-229/ 230-231/ 232-233/ 234-235/ 236-237/ 238-239/ 240-241/ 242-243/ 244-245/ 246-247/ 248-249/ 250-251/ 252-253/ 254-255/ 256-257/ 258-259/ 260-261/ 262-263/ 264-265/ 266-267/ 268-269/ 270-271/ 272-273/ 274-275/ 276-277/ 278-279/ 280-281/ 282-283/ 284-285/ 286-287/ 288-289/ 290-291/ 292-293/ 294-295/ 296-297/ 298-299/ 300-301/ 302-303/ 304-305/ 306-307/ 308-309/ 310-311/ 312-313/ 314-315/ 316-317/ 318-319/ 320-321/ 322-323/ 324-325/ 326-327/ 328-329/ 330-331/ 332-333/ 334-335/ 336-337/ 338-339/ 340-341/ 342-343/ 344-345/ 346-347/ 348-349/ 350-351/ 352-353/ 354-355/ 356-357/ 358-359/ 360-361/ 362-363/ 364-365/ 366-367/ 368-369/ 370-371/ 372-373/ 374-375/ 376-377/ 378-379/ 380-381/ 382-383/ 384-385/ 386-387/ 388-389/ 390-391/ 392-393/ 394-395/ 396-397/ 398-399/ 400-401/ 402-403/ 404-405/ 406-407/ 408-409/ 410-411/ 412-413/ 414-415/ 416-417/ 418-419/ 420-421/ 422-423/ 424-425/ 426-427/ 428-429/ 430-431/ 432-433/ 434-435/ 436-437/ 438-439/ 440-441/ 442-443/ 444-445/ 446-447/ 448-449/ 450-451/ 452-453/ 454-455/ 456-457/ 458-459/ 460-461/ 462-463/ 464-465/ 466-467/ 468-469/ 470-471/ 472-473/ 474-475/ 476-477/ 478-479/ 480-481/ 482-483/ 484-485/ 486-487/ 488-489/ 490-491/ 492-493/ 494-495/ 496-497/ 498-499/ 500-501/ 502-503/ 504-505/ 506-507/ 508-509/ 510-511/ 512-513/ 514-515/ 516-517/ 518-519/ 520-521/ 522-523/ 524-525/ 526-527/ 528-529/ 530-531/ 532-533/ 534-535/ 536-537/ 538-539/ 540-541/ 542-543/ 544-545/ 546-547/ 548-549/ 550-551/ 552-553/ 554-555/ 556-557/ 558-559/ 560-561/ 562-563/ 564-565/ 566-567/ 568-569/ 570-571/ 572-573/ 574-575/ 576-577/ 578-579/ 580-581/ 582-583/ 584-585/ 586-587/ 588-589/ 590-591/ 592-593/ 594-595/ 596-597/ 598-599/ 600-601/ 602-603/ 604-605/ 606-607/ 608-609/ 610-611/ 612-613/ 614-615/ 616-617/ 618-619/ 620-621/ 622-623/ 624-625/ 626-627/ 628-629/ 630-631/ 632-633/ 634-635/ 636-637/ 638-639/ 640-641/ 642-643/ 644-645/ 646-647/ 648-649/ 650-651/ 652-653/ 654-655/ 656-657/ 658-659/ 660-661/ 662-663/ 664-665/ 666-667/ 668-669/ 670-671/ 672-673/ 674-675/ 676-677/ 678-679/ 680-681/ 682-683/ 684-685/ 686-687/ 688-689/ 690-691/ 692-693/ 694-695/ 696-697/ 698-699/ 700-701/ 702-703/ 704-705/ 706-707/ 708-709/ 710-711/ 712-713/ 714-715/ 716-717/ 718-719/ 720-721/ 722-723/ 724-725/ 726-727/ 728-729/ 730-731/ 732-733/ 734-735/ 736-737/ 738-739/ 740-741/ 742-743/ 744-745/ 746-747/ 748-749/ 750-751/ 752-753/ 754-755/ 756-757/ 758-759/ 760-761/ 762-763/ 764-765/ 766-767/ 768-769/ 770-771/ 772-773/ 774-775/ 776-777/ 778-779/ 780-781/ 782-783/ 784-785/ 786-787/ 788-789/ 790-791/ 792-793/ 794-795/ 796-797/ 798-799/ 800-801/ 802-803/ 804-805/ 806-807/ 808-809/ 810-811/ 812-813/ 814-815/ 816-817/ 818-819/ 820-821/ 822-823/ 824-825/ 826-827/ 828-829/ 830-831/ 832-833/ 834-835/ 836-837/ 838-839/ 840-841/ 842-843/ 844-845/ 846-847/ 848-849/ 850-851/ 852-853/ 854-855/ 856-857/ 858-859/ 860-861/ 862-863/ 864-865/ 866-867/ 868-869/ 870-871/ 872-873/ 874-875/ 876-877/ 878-879/ 880-881/ 882-883/ 884-885/ 886-887/ 888-889/ 890-891/ 892-893/ 894-895/ 896-897/ 898-899/ 900-901/ 902-903/ 904-905/ 906-907/ 908-909/ 910-911/ 912-913/ 914-915/ 916-917/ 918-919/ 920-921/ 922-923/ 924-925/ 926-927/ 928-929/ 930-931/ 932-933/ 934-935/ 936-937/ 938-939/ 940-941/ 942-943/ 944-945/ 946-947/ 948-949/ 950-951/ 952-953/ 954-955/ 956-957/ 958-959/ 960-961/ 962-963/ 964-965/ 966-967/ 968-969/ 970-971/ 972-973/ 974-975/ 976-977/ 978-979/ 980-981/ 982-983/ 984-985/ 986-987/ 988-989/ 990-991/ 992-993/ 994-995/ 996-997/ 998-999/ 1000-1001/ 1002-1003/ 1004-1005/ 1006-1007/ 1008-1009/ 1010-1011/ 1012-1013/ 1014-1015/ 1016-1017/ 1018-1019/ 1020-1021/ 1022-1023/ 1024-1025/ 1026-1027/ 1028-1029/ 1030-1031/ 1032-1033/ 1034-1035/ 1036-1037/ 1038-1039/ 1040-1041/ 1042-1043/ 1044-1045/ 1046-1047/ 1048-1049/ 1050-1051/ 1052-1053/ 1054-1055/ 1056-1057/ 1058-1059/ 1060-1061/ 1062-1063/ 1064-1065/ 1066-1067/ 1068-1069/ 1070-1071/ 1072-1073/ 1074-1075/ 1076-1077/ 1078-1079/ 1080-1081/ 1082-1083/ 1084-1085/ 1086-1087/ 1088-1089/ 1090-1091/ 1092-1093/ 1094-1095/ 1096-1097/ 1098-1099/ 1100-1101/ 1102-1103/ 1104-1105/ 1106-1107/ 1108-1109/ 1110-1111/ 1112-1113/ 1114-1115/ 1116-1117/ 1118-1119/ 1120-1121/ 1122-1123/ 1124-1125/ 1126-1127/ 1128-1129/ 1130-1131/ 1132-1133/ 1134-1135/ 1136-1137/ 1138-1139/ 1140-1141/ 1142-1143/ 1144-1145/ 1146-1147/ 1148-1149/ 1150-1151/ 1152-1153/ 1154-1155/ 1156-1157/ 1158-1159/ 1160-1161/ 1162-1163/ 1164-1165/ 1166-1167/ 1168-1169/ 1170-1171/ 1172-1173/ 1174-1175/ 1176-1177/ 1178-1179/ 1180-1181/ 1182-1183/ 1184-1185/ 1186-1187/ 1188-1189/ 1190-1191/ 1192-1193/ 1194-1195/ 1196-1197/ 1198-1199/ 1200-1201/ 1202-1203/ 1204-1205/ 1206-1207/ 1208-1209/ 1210-1211/ 1212-1213/ 1214-1215/ 1216-1217/ 1218-1219/ 1220-1221/ 1222-1223/ 1224-1225/ 1226-1227/ 1228-1229/ 1230-1231/ 1232-1233/ 1234-1235/ 1236-1237/ 1238-1239/ 1240-1241/ 1242-1243/ 1244-1245/ 1246-1247/ 1248-1249/ 1250-1251/ 1252-1253/ 1254-1255/ 1256-1257/ 1258-1259/ 1260-1261/ 1262-1263/ 1264-1265/ 1266-1267/ 1268-1269/ 1270-1271/ 1272-1273/ 1274-1275/ 1276-1277/ 1278-1279/ 1280-1281/ 1282-1283/ 1284-1285/ 1286-1287/ 1288-1289/ 1290-1291/ 1292-1293/ 1294-1295/ 1296-1297/ 1298-1299/ 1300-1301/ 1302-1303/ 1304-1305/ 1306-1307/ 1308-1309/ 1310-1311/ 1312-1313/ 1314-1315/ 1316-1317/ 1318-1319/ 1320-1321/ 1322-1323/ 1324-1325/ 1326-1327/ 1328-1329/ 1330-1331/ 1332-1333/ 1334-1335/ 1336-1337/ 1338-1339/ 1340-1341/ 1342-1343/ 1344-1345/ 1346-1347/ 1348-1349/ 1350-1351/ 1352-1353/ 1354-1355/ 1356-1357/ 1358-1359/ 1360-1361/ 1362-1363/ 1364-1365/ 1366-1367/ 1368-1369/ 1370-1371/ 1372-1373/ 1374-1375/ 1376-1377/ 1378-1379/ 1380-1381/ 1382-1383/ 1384-1385/ 1386-1387/ 1388-1389/ 1390-1391/ 1392-1393/ 1394-1395/ 1396-1397/ 1398-1399/ 1400-1401/ 1402-1403/ 1404-1405/ 1406-1407/ 1408-1409/ 1410-1411/ 1412-1413/ 1414-1415/ 1416-1417/ 1418-1419/ 1420-1421/ 1422-1423/ 1424-1425/ 1426-1427/ 1428-1429/ 1430-1431/ 1432-1433/ 1434-1435/ 1436-1437/ 1438-1439/ 1440-1441/ 1442-1443/ 1444-1445/ 1446-1447/ 1448-1449/ 1450-1451/ 1452-1453/ 1454-1455/ 1456-1457/ 1458-1459/ 1460-1461/ 1462-1463/ 1464-1465/ 1466-1467/ 1468-1469/ 1470-1471/ 1472-1473/ 1474-1475/ 1476-1477/ 1478-1479/ 1480-1481/ 1482-1483/ 1484-1485/ 1486-1487/ 1488-1489/ 1490-1491/ 1492-1493/ 1494-1495/ 1496-1497/ 1498-1499/ 1500-1501/ 1502-1503/ 1504-1505/ 1506-1507/ 1508-1509/ 1510-1511/ 1512-1513/ 1514-1515/ 1516-1517/ 1518-1519/ 1520-1521/ 1522-1523/ 1524-1525/ 1526-1527/ 1528-1529/ 1530-1531/ 1532-1533/ 1534-1535/ 1536-1537/ 1538-1539/ 1540-1541/ 1542-1543/ 1544-1545/ 1546-1547/ 1548-1549/ 1550-1551/ 1552-1553/ 1554-1555/ 1556-1557/ 1558-1559/ 1560-1561/ 1562-1563/ 1564-1565/ 1566-1567/ 1568-1569/ 1570-1571/ 1572-1573/ 1574-1575/ 1576-1577/ 1578-1579/ 1580-1581/ 1582-1583/ 1584-1585/ 1586-1587/ 1588-1589/ 1590-1591/ 1592-1593/ 1594-1595/ 1596-1597/ 1598-1599/ 1600-1601/ 1602-1603/ 1604-1605/ 1606-1607/ 1608-1609/ 1610-1611/ 1612-1613/ 1614-1615/ 1616-1617/ 1618-1619/ 1620-1621/ 1622-1623/ 1624-1625/ 1626-1627/ 1628-1629/ 1630-1631/ 1632-1633/ 1634-1635/ 1636-1637/ 1638-1639/ 1640-1641/ 1642-1643/ 1644-1645/ 1646-1647/ 1648-1649/ 1650-1651/ 1652-1653/ 1654-1655/ 1656-1657/ 1658-1659/ 1660-1661/ 1662-1663/ 1664-1665/ 1666-1667/ 1668-1669/ 1670-1671/ 1672-1673/ 1674-1675/ 1676-1677/ 1678-1679/ 1680-1681/ 1682-1683/ 1684-1685/ 1686-1687/ 1688-1689/ 1690-1691/ 1692-1693/ 1694-1695/ 1696-1697/ 1698-1699/ 1700-1701/ 1702-1703/ 1704-1705/ 1706-1707/ 1708-1709/ 1710-1711/ 1712-1713/ 1714-1715/ 1716-1717/ 1718-1719/ 1720-1721/ 1722-1723/ 1724-1725/ 1726-1727/ 1728-1729/ 1730-1731/ 1732-1733/ 1734-1735/ 1736-1737/ 1738-1739/ 1740-1741/ 1742-1743/ 1744-1745/ 1746-1747/ 1748-1749/ 1750-1751/ 1752-1753/ 1754-1755/ 1756-1757/ 1758-1759/ 1760-1761/ 1762-1763/ 1764-1765/ 1766-1767/ 1768-1769/ 1770-1771/ 1772-1773/ 1774-1775/ 1776-1777/ 1778-1779/ 1780-1781/ 1782-1783/ 1784-1785/ 1786-1787/ 1788-1789/ 1790-1791/ 1792-1793/ 1794-1795/ 1796-1797/ 1798-1799/ 1800-1801/ 1802-1803/ 1804-1805/ 1806-1807/ 1808-1809/ 1810-1811/ 1812-1813/ 1814-1815/ 1816-1817/ 1818-1819/ 1820-1821/ 1822-1823/ 1824-1825/ 1826-1827/ 1828-1829/ 1830-1831/ 1832-1833/ 1834-1835/ 1836-1837/ 1838-1839/ 1840-1841/ 1842-1843/ 1844-1845/ 1846-1847/ 1848-1849/ 1850-1851/ 1852-1853/ 1854-1855/ 1856-1857/ 1858-1859/ 1860-1861/ 1862-1863/ 1864-1865/ 1866-1867/ 1868-1869/ 1870-1871/ 1872-1873/ 1874-1875/ 1876-1877/ 1878-1879/ 1880-1881/ 1882-1883/ 1884-1885/ 1886-1887/ 1888-1889/ 1890-1891/ 1892-1893/ 1894-1895/ 1896-1897/ 1898-1899/ 1900-1901/ 1902-1903/ 1904-1905/ 1906-1907/ 1908-1909/ 1910-1911/ 1912-1913/ 1914-1915/ 1916-1917/ 1918-1919/ 1920-1921/ 1922-1923/ 1924-1925/ 1926-1927/ 1928-1929/ 1930-1931/ 1932-1933/ 1934-1935/ 1936-1937/ 1938-1939/ 1940-1941/ 1942-1943/ 1944-1945/ 1946-1947/ 1948-1949/ 1950-1951/ 1952-1953/ 1954-1955/ 1956-1957/ 1958-1959/ 1960-1961/ 1962-1963/ 1964-1965/ 1966-1967/ 1968-1969/ 1970-1971/ 1972-1973/ 1974-1975/ 1976-1977/ 1978-1979/ 1980-1981/ 1982-1983/ 1984-1985/ 1986-1987/ 1988-1989/ 1990-1991/ 1992-1993/ 1994-1995/ 1996-1997/ 1998-1999/ 2000-2001/ 2002-2003/ 2004-2005/ 2006-2007/ 2008-2009/ 2010-2011/ 2012-2013/ 2014-2015/ 2016-2017/ 2018-2019/ 2020-2021/ 2022-2023/ 2024-2025/ 2026-2027/ 2028-2029/ 2030-2031/ 2032-2033/ 2034-2035/ 2036-2037/ 2038-2039/ 2040-2041/ 2042-2043/ 2044-2045/ 2046-2047/ 2048-2049/ 2050-2051/ 2052-2053/ 2054-2055/ 2056-2057/ 2058-2059/ 2060-2061/ 2062-2063/ 2064-2065/ 2066-2067/ 2068-2069/ 2070-2071/ 2072-2073/ 2074-2075/ 2076-2077/ 2078-2079/ 2080-2081/ 2082-2083/ 2084-2085/ 2086-2087/ 2088-2089/ 2090-2091/ 2092-2093/ 2094-2095/ 2096-2097/ 2098-2099/ 2100-2101/ 2102-2103/ 2104-2105/ 2106-2107/ 2108-2109/ 2110-2111/ 2112-2113/ 2114-2115/ 2116-2117/ 2118-2119/ 2120-2121/ 2122-2123/ 2124-2125/ 2126-2127/ 2128-2129/ 2130-2131/ 2132-2133/ 2134-2135/ 2136-2137/ 2138-2139/ 2140-2141/ 2142-2143/ 2144-2145/ 2146-2147/ 2148-2149/ 2150-2151/ 2152-2153/ 2154-2155/ 2156-2157/ 2158-2159/ 2160-2161/ 2162-2163/ 2164-2165/ 2166-2167/ 2168-2169/ 2170-2171/ 2172-2173/ 2174-2175/ 2176-2177/ 2178-2179/ 2180-2181/ 2182-2183/ 2184-2185/ 2186-2187/ 2188-2189/ 2190-2191/ 2192-2193/ 2194-2195/ 2196-2197/ 2198-2199/ 2200-2201/ 2202-2203/ 2204-2205/ 2206-2207/ 2208-2209/ 2210-2211/ 2212-2213/ 2214-2215/ 2216-2217/ 2218-2219/ 2220-2221/ 2222-2223/ 2224-2225/ 2226-2227/ 2228-2229/ 2230-2231/ 2232-2233/ 2234-2235/ 2236-2237/ 2238-2239/ 2240-2241/ 2242-2243/ 2244-2245/ 2246-2247/ 2248-2249/ 2250-2251/ 2252-2253/ 2254-2255/ 2256-2257/ 2258-2259/ 2260-2261/ 2262-2263/ 2264-2265/ 2266-2267/ 2268-2269/ 2270-2271/ 2272-2273/ 2274-2275/ 2276-2277/ 2278-2279/ 2280-2281/ 2282-2283/ 2284-2285/ 2286-2287/ 2288-2289/ 2290-2291/ 2292-2293/ 2294-2295/ 2296-2297/ 2298-2299/ 2300-2301/ 2302-2303/ 2304-2305/ 2306-2307/ 2308-2309/ 2310-2311/ 2312-2313/ 2314-2315/ 2316-2317/ 2318-2319/ 2320-2321/ 2322-2323/ 2324-2325/ 2326-2327/ 2328-2329/ 2330-2331/ 2332-2333/ 2334-2335/ 2336-2337/ 2338-2339/ 2340-2341/ 2342-2343/ 2344-2345/ 2346-2347/ 2348-2349/ 2350-2351/ 2352-2353/ 2354-2355/ 2356-2357/ 2358-2359/ 2360-2361/ 2362-2363/ 2364-2365/ 2366-2367/ 2368-2369/ 2370-2371/ 2372-2373/ 2374-2375/ 2376-2377/ 2378-2379/ 2380-2381/ 2382-2383/ 2384-2385/ 2386-2387/ 2388-2389/ 2390-2391/ 2392-2393/ 2394-2395/ 2396-2397/ 2398-2399/ 2400-2401/ 2402-2403/ 2404-2405/ 2406-2407/ 2408-2409/ 2410-2411/ 2412-2413/ 2414-2415/ 2416-2417/ 2418-2419/ 2420-2421/ 2422-2423/ 2424-2425/ 2426-2427/ 2428-2429/

50. (Continued)

0

1

2

From (DATE OF LAST
INITIALS) and name.
During what month
and year(s) was the
(CONDITION) most
intense?

Yes No

10-11-64/ 10-11-64/ 10-11-64/

10

SHIP

10

5

Last Name _____

14/

First Name _____

ON

15/

Facility Name _____

Street Address _____

City _____ State _____



50. (Continued)

N.

During what month and
year was that?

11-12-70 11-12-70

No.

Yr.

Last Name _____

21/

First Name _____

ON

22-23/

Facility Name _____

Street Address _____

City _____ State _____

11-12-70/ 11-12-70/ 11-12-70/

10

SHIP

10

0.31

Last Name _____

14/

First Name _____

ON

15/

Facility Name _____

Street Address _____

City _____ State _____



J.

During what month and
year did you last consult
(name page 1)?

11-12-70 11-12-70

No.

Yr.

Last Name _____

21/

First Name _____

ON

22-23/

Facility Name _____

Street Address _____

City _____ State _____

Last Name _____

30/

First Name _____

ON

31-32/

Facility Name _____

Street Address _____

City _____ State _____

ASK A THROUGH J FOR EACH YES

A.	B.	C.
Thinking about the period between (DATE OF LAST INTERVIEW) and now, when did you first notice (CONDITION)?	Which limbs or muscles were affected?	Do you still have (CONDITION)?
Yes No		Yes No

31. Aside from injury, since (DATE OF LAST INTERVIEW) have you had . . .

1. Persistent deep burning sensations in any of your limbs	Yes No	1 2 3/	40-41/

PLEASE GO ON TO NEXT PAGE

2. Persistent aches and pains in any of your limbs	Yes No	1 2 3/	40-41/

31. (Continued)

Between (DATE OF LAST INTERVIEW) and now, during what month and year (s) was the (CONDITION) most intense?

Did you see a doctor for (CONDITION)?

What was the diagnosis?

What is the name and address of the doctor who made the diagnosis or the medical facility where the diagnosis was made?

Yes No

Mo. Yr. 51-52/ 1 2 34/ 51/

10 10 2

Mo. Yr. 53-54/ 60/

Last Name First Name ON

Facility Name

Street Address

City State



Mo. Yr. 57-58/ 1 2 34/ 52/

10 10 2

Mo. Yr. 59-60/ 51/

Last Name First Name ON

Facility Name

Street Address

City State



31. (Continued)

During what month and year was that?

What is the name and address of the doctor or medical facility you last consulted about (CONDITION)?

During what month and year did you last consult (NAME FROM 11)?

BEGIN DATA 51

Mo. Yr. 55-56/ 51/ 10-13/

Last Name First Name ON

Facility Name

Street Address

City State

Mo. Yr. 56-57/ 50/ 10-22/

Last Name First Name ON

Facility Name

Street Address

City State

ASK A THROUGH J FOR EACH YES

	A.	B.	C.
	Thinking about the period between (DATE OF LAST INTERVIEW) and now, when did you first notice (CONDITION)?	Which limbs or muscles were affected?	Do you still have (CONDITION)?
52. Aside from injury, since (DATE OF LAST INTERVIEW) have you had . . .	Yes	No	

	20-29/	30-39/	40-49/	50-59/	60-69/	70-79/	80-89/	90-99/
1. A reduction in grip strength	1	2	3	4	5	6	7	8
	No.	Yr.						

PLEASE GO ON TO NEXT PAGE

52. (Continued)

0 Did you see a doctor for (CONDITION)? Yes No

1 From (DATE OF LAST INTERVIEW) and now, during what month and year(s) was the (CONDITION) most intense?

2 What was the diagnosis?

3 What is the name and address of the doctor or medical facility you last consulted about (CONDITION)?

4 During what month and year did you last consult (about (CONDITION))?

Mo. Yr. 31-34/

Mo. Yr. 35-38/

Mo. Yr. 39-42/

Mo. Yr. 43-46/

Mo. Yr. 47-50/

Mo. Yr. 51-54/

Mo. Yr. 55-58/

Mo. Yr. 59-62/

Mo. Yr. 63-66/

Mo. Yr. 67-70/

Mo. Yr. 71-74/

Mo. Yr. 75-78/

Mo. Yr. 79-82/

Mo. Yr. 83-86/

Mo. Yr. 87-90/

Mo. Yr. 91-94/

Mo. Yr. 95-98/

Mo. Yr. 99-02/

Mo. Yr. 03-06/

Mo. Yr. 07-10/

Mo. Yr. 11-14/

Mo. Yr. 15-18/

Mo. Yr. 19-22/

Mo. Yr. 23-26/

Last Name

First Name

Facility Name

Street Address

City

State

Mo. Yr. 41/

Mo. Yr. 42-45/

Mo. Yr. 46/

Mo. Yr. 47-50/

Mo. Yr. 51-54/

Mo. Yr. 55-58/

Mo. Yr. 59-62/

Mo. Yr. 63-66/

Mo. Yr. 67-70/

Mo. Yr. 71-74/

Mo. Yr. 75-78/

Mo. Yr. 79-82/

Mo. Yr. 83-86/

Mo. Yr. 87-90/

Mo. Yr. 91-94/

Mo. Yr. 95-98/

Mo. Yr. 99-02/

Mo. Yr. 03-06/



53. (besides the prescribed medicines you told me about) are you currently taking any (other) prescribed medicines?

Yes.....(ASK A).....1 51/
No....(SKIP TO SECTION 8)....2

A. For what conditions are the medicines? What other conditions?

1) _____ 52/
2) _____
3) _____

SECTION 8: HEALTH HABITS

The next set of questions refers to smoking habits.

1. Have you ever smoked at least as many as 5 packs of cigarettes, that is, 100 cigarettes, during your entire life?

Yes.....1 53/
No.....(SKIP TO 0.22).....2

2. Do you now smoke cigarettes?

Yes.....1 54/
No.....(SKIP TO 0.11).....2

CURRENT CIGARETTE SMOKER SECTION

3. On average, how many cigarettes do you smoke a day?

INTERVIEWER: IF R ANSWERS BY GIVING NUMBER OF PACKS OF CIGARETTES, RECORD VERBATIM. THEN MULTIPLY THE NUMBER OF PACKS BY 20 AND ENTER THE NUMBER OF CIGARETTES SMOKED.

ENTER NUMBER OF CIGARETTES PER DAY: [] [] 55-56/
(IF NOT EVERY DAY) 0 [] [] PER MONTH 57-58/

OR

(IF NOT EVERY DAY) 0 [] [] PER YEAR 59-60/

4. For how many years have you been smoking (NUMBER IN 0-3) (cigarettes per day/per month/per year)?

Less than 2 years.....01 61-62/
2-5 years.....02
6-10 years.....02
11-15 years.....03
16-20 years.....04
21-25 years.....05
26-30 years.....06
31-35 years.....08
36-40 years.....09
More than 40 years.....10

HAND
CARD
B

5. What brand of cigarettes do you usually smoke? (IF MORE THAN ONE BRAND OR NO REGULAR BRAND MENTIONED ABOVE, WHICH ONE DO YOU SMOKE THE MOST?)

ENTER BRAND _____ OFFICE USE
No regular brand.....996

6. For how long now have you been smoking this particular brand?

ENTER DATE: 66-67/
OR WEEKS: 68-69/
OR MONTHS: 70-71/
OR YEARS: 72-73/

7. What type of cigarettes are they? Are they . . . (NAME EACH PAIR TOGETHER)

A. Filter tip of.....1 74/
Non filter tip?.....2
B. Regular size.....1 75/
King size of.....2
100 millimeter?.....3

8. Now I am going to show you a diagram of different size cigarettes. Please look at the picture of the (KIND OF CIGARETTE IN 0-7A AND 0-7B). Now, considering your style of smoking--for example, how long you usually leave the cigarette in an ashtray or just hold it in your hand--tell me the number which indicates how much of the cigarette you actually smoke.

Section 1.....1 76/
Section 2.....2
Section 3.....3
Section 4.....4

HAND
CARD
S

9. During the period when you were smoking the most heavily on a regular basis, about how many cigarettes did you usually smoke in a day?

ENTER NUMBER: PER DAY 77-78/
(IF NOT EVERY DAY) 0 PER MONTH 79-80/
OR
(IF NOT EVERY DAY) 0 PER YEAR 10-11/
REG. IN USE 52

A. When was that?

FROM 12-15/
NO Yr
TO 16-19/
NO Yr

10. When you smoke cigarettes, how deeply do you usually inhale? Would you say:

- As deeply into the chest as possible.....1 20/
 Only partly into the chest.....2
 As far back as the throat.....3
 Well back into the mouth, or.....4
 Just puff and don't really draw it in at all.....5
 I DON'T KNOW.....6

HAND
CARD
T

SKIP TO Q-22

FORMER CIGARETTE SMOKER SECTION

11. How long has it been since you smoked cigarettes fairly regularly (RECORD NUMBER)

- ENTER DATE: 21-22/
 OR WEEKS: 23-24/
 OR MONTHS: 25-26/
 OR YEARS: 27-28/
 NEVER SMOKED REGULARLY.....(SKIP TO Q-22).....1 29/

12. On the average, about how many cigarettes a day were you smoking at that time?

INTERVIEWER: IF A ANSWER BY GIVING NUMBER OF PACKS OF CIGARETTES, RECORD VERBATIM. THEN MULTIPLY THE NUMBER OF PACKS BY 20 AND ENTER THE NUMBER OF CIGARETTES SMOKED.

- ENTER NUMBER OF CIGARETTES PER DAY: 30-31/
 (IF NOT EVERY DAY:) 0 PER MONTH 32-33/
 OR
 (IF NOT EVERY DAY:) 0 PER YEAR 34-35/

13. How long had you been smoking (NUMBER IN Q-12) (cigarettes per day/week/month)?

- Less than 2 years.....01 36-37/
 2-5 years.....02
 6-10 years.....03
 11-15 years.....04
 16-20 years.....05
 21-25 years.....06
 26-30 years.....07
 31-35 years.....08
 36-40 years.....09
 More than 40 years.....10

HAND
CARD
R

14. You mentioned that you have not smoked regularly for (TIME IN Q-11). Did you ever stay off cigarettes for a longer period of time?

- Yes.....1 38/
 No.....(SKIP TO Q-16).....2

15. How long did you stay off cigarettes at that time?

- ENTER DATE: 39-40/
 OR WEEKS: 41-42/
 OR MONTHS: 43-44/
 OR YEARS: 45-46/

16. What brand of cigarettes did you usually smoke just before you stopped smoking cigarettes regularly? (IF MORE THAN ONE BRAND OR NO REGULAR BRAND MENTIONED, ASK: Which one did you smoke the most?)

OFFICE USE

- ENTER BRAND:
 No regular brand.....996 47-49/

17. For how long did you smoke this particular brand?

ENTER DAYS: [] [] [] 50-51/
 OR WEEKS: [] [] [] 52-53/
 OR MONTHS: [] [] [] 54-55/
 OR YEARS: [] [] [] 56-57/

18. What type of cigarettes were they?

CORE ONE
 A. Filter tip or.....1 58/
 Non-filter tip?.....2
 CORE ONE
 B. Regular size.....1 59/
 King size of.....2
 100 Millimeter?.....3

19. Now I am going to show you a diagram of different size cigarettes. Please look at the picture of the (KING OF CIGARETTES IN 0.16A AND 0.16B). Now, considering your style of smoking--for example, how long you usually leave the cigarette in an ashtray or just hold it in your hand--tell me the number which indicates how much of the cigarette you actually smoked.

Section 1.....1 60/
 Section 2.....2
 Section 3.....3
 Section 4.....4

RAND
 CARD
 8

20. During the period when you were smoking the most heavily on a regular basis, about how many cigarettes did you usually smoke in a day?

ENTER NUMBER: [] [] [] PER DAY 63-62/
 (IF NOT EVERY DAY:) 0 [] [] PER MONTH 63-64/
 OR
 (IF NOT EVERY DAY:) 0 [] [] PER YEAR 65-66/

A. When was that?

FROM
 [] [] [] []
 No Yr 67-70/
 TO
 [] [] [] []
 No Yr 71-74/

21. When you smoked cigarettes, how deeply did you usually inhale? Would you say:

As deeply into the chest as possible.....1 75/
 Only partly into the chest.....2
 As far back as the throat 3
 Well back into the mouth, or.....4
 Just puff and don't really draw it in at all.....5
 DON'T KNOW.....8

RAND
 CARD
 T

CURRENT PIPE SMOKER SECTION

22. During your entire life, have you smoked at least as many as 50 pipefuls of tobacco?

Yes.....1 76/
 No.....(SKIP TO 0.35).....2

23. Do you now smoke a pipe?

Yes.....1 77/

No.....(SKIP TO Q.28).....2

24. About how many average sized pipefuls of tobacco do you usually smoke in a day?

ENTER NUMBER OF PIPEFULS OF TOBACCO PER DAY: 78-79/
BRAIN DECK 53
(IF NOT EVERY DAY,) 0 PER MONTH 10-11/

OR
(IF NOT EVERY DAY,) 0 PER YEAR 12-13/

25. For how many years have you been smoking (NUMBER IN Q.24) (pipefuls per day/per month/per year)?

- Less than 2 years.....01 14-15/
- 2-5 years.....02
- 6-10 years.....02
- 11-15 years.....03
- 16-20 years.....04
- 21-25 years.....05
- 26-30 years.....06
- 31-35 years.....08
- 36-40 years.....09
- More than 40 years.....10

HAND
CARD
R

26. During the period when you were smoking the most heavily, about how many pipefuls of tobacco did you usually smoke in a day?

ENTER NUMBER: PER DAY 16-17/
(IF NOT EVERY DAY,) 0 PER MONTH 18-19/
OR
(IF NOT EVERY DAY,) 0 PER YEAR 20-21/

26. (Continued)

A. When was that?

FROM
 22-25/
Mo Yr

TO
 26-29/
Mo Yr

27. When you smoke a pipe, how deeply do you usually inhale? Would you say:

- As deeply into the chest as possible.....1 30/
- Only partly into the chest.....2
- As far back as the throat.....3
- Well back into the mouth, or.....4
- Just puff and don't really draw it in at all.....5
- DON'T KNOW.....R

HAND
CARD
T

(SKIP TO Q.35)

FORMER PIPE SMOKE SECTION

28. How long has it been since you smoked a pipe fairly regularly? (RECORD NUMBER)

- ENTER DAYS: 31-32/
- OR WEEKS: 33-34/
- OR MONTHS: 35-36/
- OR YEARS: 37-38/
- NEVER SMOKED REGULARLY.....(SKIP TO Q.35).....1 39/

29. On the average, about how many pipefuls of tobacco a day were you smoking at that time?

ENTER NUMBER OF PIPEFULS OF TOBACCO PER DAY: 40-41/
(IF NOT EVERY DAY,) 0 PER MONTH 42-43/
OR
(IF NOT EVERY DAY,) 0 PER YEAR 44-45/

10. How long did you smoke (NUMBER IN Q.29) (pipefuls of tobacco per day/week/month)?

- Less than 2 years.....01 46-47/
- 2-5 years.....02
- 6-10 years.....03
- 11-15 years.....04
- 16-20 years.....05
- 21-25 years.....06
- 26-30 years.....07
- 31-35 years.....08
- 36-40 years.....09
- 40 or more years.....10

HAND
CAND
T

CURRENT CIGAR SMOKER SECTION

34. When you smoked a pipe, how deeply did you usually inhale? Would you say:

- As deeply into the chest as possible.....1 71/
- Only partly into the chest.....2
- As far back as the throat.....3
- Well back into the mouth, or.....4
- Just puff and don't really draw it in at all.....5
- DON'T KNOW.....6

35. During your entire life have you smoked at least as many as 50 cigars?

- Yes.....1 72/
- No.....(SKIP TO Q.51).....2

36. Do you now smoke cigars?

- Yes.....1 73/
- No.....(SKIP TO Q.42).....2

37. On average, about how many cigars a day do you now smoke?

ENTER NUMBER OF CIGARS PER DAY:
(IF NOT EVERY DAY) 0 PER MONTH
OR
(IF NOT EVERY DAY) 0 PER YEAR

74-75/
76-77/
78-79/

10. How long did you smoke (NUMBER IN Q.29) (pipefuls of tobacco per day/week/month)?

- Less than 2 years.....01 46-47/
- 2-5 years.....02
- 6-10 years.....03
- 11-15 years.....04
- 16-20 years.....05
- 21-25 years.....06
- 26-30 years.....07
- 31-35 years.....08
- 36-40 years.....09
- 40 or more years.....10

31. You mentioned that you have not smoked regularly for (TIME IN Q.30). Did you ever not smoke a pipe for a longer period of time?

- Yes.....1 46/
- No.....(SKIP TO Q.33).....2

32. How long did you not smoke a pipe at that time?

- ENTER DAYS: 49-50/
- OR WEEKS: 51-52/
- OR MONTHS: 53-54/
- OR YEARS: 55-56/

33. During the period when you were smoking the most heavily on a regular basis, about how many pipefuls of tobacco did you usually smoke in a day?

- ENTER NUMBER: PER DAY 57-58/
- (IF NOT EVERY DAY) 0 PER MONTH 59-60/
- OR
(IF NOT EVERY DAY) 0 PER YEAR 61-62/

A. When was that?

- FROM 63-66/
- TO 67-70/

18. For how many years have you been smoking (8 in 0-17) cigars per day/per month/per year?

less than 2 years.....01 10-11/
 2-5 years.....02
 6-10 years.....03
 11-15 years.....04
 16-20 years.....05
 21-25 years.....06
 26-30 years.....07
 31-35 years.....08
 36-40 years.....09
 More than 40 years.....10

NAME
(CARD)
R

19. During the period when you were smoking the most heavily on a regular basis, about how many cigars did you usually smoke in a day.

ENTER NUMBER: PER DAY
 (IF NOT EVERY DAY) 0 PER MONTH
 OR
 (IF NOT EVERY DAY) 0 PER YEAR

A. When was that?

FROM
 NO YR
 TO
 NO YR

18-21/

22-25/

40. When you smoke cigars, how deeply do you usually inhale? Would you say:

As deeply into the chest as possible.....1 26/
 Only partly into the chest.....2
 As far back as the throat.....3
 Well back into the mouth, of.....4
 Just puff and don't really draw it in at all.....5
 DON'T KNOW.....9

NAME
(CARD)
T

41. What type of cigars do you usually smoke?

Filter tip or.....1 CODE ONE 21/
 Non-filter tip.....2

A. Now I am going to show you a diagram of different size cigars. Please look at the picture of the label of CIGAR 10 0-41). Now considering your style of smoking--for example, how long you usually leave the cigar in an ashtray or just hold it in your hand--tell me the number which indicates how much of the cigar you actually smoke.

Section 1.....1 28/
 Section 2.....2
 Section 3.....3
 Section 4.....4

NAME
(CARD)
U

SKIP TO Q-51

FORMER CIGAR SMOKER SECTION

42. How long has it been since you smoked cigars fairly regularly?

ENTER DAYS: 29 30/
 OR WEEKS: 31 32/
 OR MONTHS: 33 34/
 OR YEARS: 35 36/
 NEVER SMOKED REGULARLY.....(SKIP TO Q-51).....17

43. On the average, about how many cigars a day were you smoking at that time?

ENTER NUMBER OF CIGARS PER DAY: 10 19/

(IF NOT EVERY DAY) 0 PER MONTH 40-41/

OR

(IF NOT EVERY DAY) 0 PER YEAR 42-43/

44. For how long did you smoke (NUMBER PER DAY IN 0.43) cigars per day?

Less than 2 years.....01 44-45/

2-5 years.....02

6-10 years.....03

11-15 years.....04

16-20 years.....05

21-25 years.....06

26-30 years.....07

31-35 years.....08

36-40 years.....09

More than 40 years.....10

HAND
CARD
U

45. You mentioned that you have not smoked regularly for (TIME IN 0.42). Did you ever stay off cigars for a longer period of time?

Yes.....1 46/

No.....(SKIP TO 0.47).....2

46. How long did you stay off cigars at that time?

ENTER DAYS:

47-48/

OR WEEKS:

49-50/

OR MONTHS:

51-52/

OR YEARS:

53-54/

47. What type of cigars did you usually smoke just before you stopped smoking cigars regularly?

Filter tip or..... 55/

Non filter tip.....2

48. Now I am going to show you a diagram of different wire cigars. Please look at the picture of the (KIND OF CIGAR IN 0.47). Now, considering your style of smoking—for example, how long you usually leave the cigar in an ashtray or just hold it in your hand—tell me the number which indicates how much of the cigar you actually smoke.

Section 1.....1 56/

Section 2.....2

Section 3.....3

Section 4.....4

HAND
CARD
U

49. During the period when you were smoking the most on a regular basis, about how many cigars did you usually smoke in a day?

ENTER NUMBER: PER DAY 57-58/

(IF NOT EVERY DAY) 0 PER MONTH 59-60/

OR

(IF NOT EVERY DAY) 0 PER YEAR 61-62/

A. When was that?

FROM

63-66/

Mo Yr

TO

67-70/

Mo Yr

50. When you smoked a cigar, how deeply did you usually inhale? Would you say,

As deeply into the chest as possible.....1 71/
 Only partly into the chest.....2
 As far back as the throat.....3
 Well back into the mouth, or.....4
 Just puff and don't really draw it in at all.....5
 I DON'T KNOW.....6

HAND
CARD
T

51. INTERVIEWER: DOES R CURRENTLY HAVE A SPOUSE OR PARTNER? (IS ANY "NO" CODED IN SECTION 5, Q's 2, 6C or 8C?)

YES.....1 72/
 NO.....(SKIP TO Q.53).....2

52. Does your (spouse/partner) smoke regularly any of the following?

	YES	NO	DON'T KNOW
Cigarettes	1	2	0
Cigars	1	2	0
Pipe	1	2	0

53. Approximately how much smoke is there in the air in your home?

A lot.....1 76/
 A little.....2
 None.....(SKIP TO Q.56).....3

54. Approximately how many hours a week are you exposed to this smoke in your home?

10 hours or less.....1 77/
 11 to 15 hours.....2
 16 to 20 hours.....3
 21 to 25 hours.....4
 26 or more hours.....5

HAND
CARD
V

55. For how many years have you been exposed to smoke in this way? (CHECK ONLY ONE)

Less than 1 year.....01 78-79/
 1 to 4 years.....02
 5 to 10 years.....03
 11 to 15 years.....04
 16 to 20 years.....05
 21 to 30 years.....06
 More than 30 years.....07
 Don't know.....98

HAND
CARD
W

56. INTERVIEWER: DOES R WORK? (IS "YES" CODED AT SEC 2, Q. 4 OR "CURRENT JOB" CODED AT SEC 3, Q. 1F?)

Yes.....1 10/
 No.....(SKIP TO Q.62).....2

A. Approximately how much smoke is there in the air in the transportation you take to and from work (For example, your car, the train, the bus, etc.)?

A lot.....1 11/
 A little.....2
 None.....(SKIP TO Q.59).....3

57. Approximately how many hours a week are you exposed to this smoke?

10 hours or less.....1 12/
11 to 15 hours.....2
16 to 20 hours.....3
21 to 25 hours.....4
26 or more hours.....5

HAND
CARD
V

58. For how many years have you been exposed to this smoke?

Less than 1 year.....01 13-14/
1 to 4 years.....02
5 to 10 years.....03
11 to 15 years.....04
16 to 20 years.....05
21 to 30 years.....06
More than 30 years.....07
Don't know.....99

HAND
CARD
W

59. Approximately how much smoke is there in the air where you work?

A lot.....1 15/
A little.....2
None.....(SKIP TO Q-62)....3

60. Approximately how many hours a week are you exposed to this smoke?

10 hours or less.....1 16/
11 to 15 hours.....2
16 to 20 hours.....3
21 to 25 hours.....4
26 or more hours.....5

HAND
CARD
V

61. For how many years have you been exposed to this smoke at work?

Less than 1 year.....01 17-18/
1 to 4 years.....02
5 to 10 years.....03
11 to 15 years.....04
16 to 20 years.....05
21 to 30 years.....06
More than 30 years.....07

HAND
CARD
W

62. There are some questions that are asked in survey research that are difficult to ask directly because many people think they are too personal. While it is understandable that people feel this way, there is a real need for the information for the population as a whole. We now have a way that makes it possible for people to give information, without telling anyone about their own situation. Let me show you how this works; we will use the next question I have here as an example. HAND A CARD X. As you see, there are two questions on the card. One deals with the "real" question that the research is concerned with, the other is completely unrelated. Both questions can be answered "yes" or "no." One of the two questions is selected by chance and you answer it. (I'll show you how that works in a minute). I do not know which question you are answering. When all the questionnaires have been tallied, the researchers can tell how many people have smoked marijuana, but they have no way of knowing whether it was you or any other person in particular who has smoked marijuana.

HAND
CARD
X

HAND A COIN

It is very simple, as you will see. You will flip the coin. The question you will answer is selected by chance. In no way can a truthful answer prove harmful to you. There is no identifying information that can link you to your answers.

Please take the coin that you have been handed and flip it now. Don't tell me which side came up. If the coin shows heads, please answer only question 1. If the coin shows tails, please answer only question 2. I won't look to see if the coin comes up heads or tails; and you don't tell me which question you are answering. Just tell me if your answer is "yes" or "no".

Yes.....1 19/
No.....2
Don't know.....8

A. Now let's do that again, using the next question. HAND B CARD Y. Flip the coin again. If the coin turns up heads, please answer only question 1. If the coin comes up tails, please answer only question number 2. Don't tell me the question. Is your answer "yes" or "no"?

HAND
CARD
Y

Yes.....1 20/
No.....2
Don't know.....8

61. Have you ever been arrested for a felony?

Yes..... 21/
No.....(SKIP TO Q.64).....2

A. Have you ever been convicted of a felony?

Yes..... 22/
No.....(SKIP TO Q.64).....2

B. How many felonies have you been convicted of?

ENTER NUMBER: 11

C. What month and year were you convicted of this/your first) felony?

11 11 11 11
Mo. Yr.

D. (In what charge were you convicted?

29-30/

E. INTERVIEWER: HAS A EVER BEEN CONVICTED OF A SECOND FELONY? (IS A IN Q.66B EQUAL TO 2 OR MORE?)

Yes..... 31/
No.....(SKIP TO Q.64).....2

F. What month and year were you convicted of this/your first) felony?

11 11 11 11
Mo. Yr.

G. (In what charge were you convicted?

36-37/

63. (Continued)

H. INTERVIEWER: HAS A EVER BEEN CONVICTED OF A THIRD FELONY? (IS A IN Q.66B EQUAL TO 3 OR MORE?)

Yes.....(GO TO NEW Q.68).....1 38/
No.....2

Next, I'd like some information about drinking alcoholic beverages.

64. Have you had any alcoholic beverages, including beer, wine, or liquor, since (DATE OF LAST INTERVIEW)?

Yes.....1 39/
No.....(SKIP TO SECTION 9).....2

65. Since (DATE OF LAST INTERVIEW) have you had a drink of beer?

Yes.....1 40/
No.....(SKIP TO Q.71).....2

66. How long has it been since your last drink of beer?

Today.....01 41-42/
1-7 days ago.....02
8-14 days ago.....03
15-30 days ago.....04
1 month ago.....05
2-3 months ago.....06
4-6 months ago.....07
7-12 months ago.....08
More than 1 year ago.....09

HAND CARD 2

67. As you think back over the period of time between (DATE OF LAST INTERVIEW) and now, about how many cans or bottles of beer would you drink on a typical day when you drank beer?

ENTER NUMBER OF CANS OR BOTTLES: 11 43-44/

68. Again, thinking back over the period of time between (DATE OF LAST INTERVIEW) and now, about how regularly did you drink beer? PROBE IF NECESSARY. It's sometimes hard to remember. Just give me your best guess.

More often than once a day.....01 45-46/
Every day.....02
5 or 6 days a week.....03
3 or 4 days a week.....04
1 or 2 days a week.....05
Less often than once a week.....06
IF CANNOT DECIDE/Don't know.....98

HAND
CARD
AA

69. How large were the cans or bottles that you usually drank?

Standard 12 oz. cans or bottles.....1 47/
16 oz. (half quart) cans or bottles.....2
32 oz. (full quart) cans or bottles.....3
Less than 12 oz. cans or bottles.....4
More than 32 oz. cans or bottles.....5
Don't drink cans or bottles of beer.....6

HAND
CARD
BB

70. During the last 12 months that you drank since (DATE OF LAST INTERVIEW), how often did you have 8 or more cans of beer in a single day (3 quarts or more)?

Every day or nearly every day.....01 48-49/
3-4 times a week.....02
Once or twice a week.....03
1-3 times a month.....04
7-11 times a year.....05
3-6 times a year.....06
Once or twice a year.....07
Never.....08

HAND
CARD
CC

71. Since (DATE OF LAST INTERVIEW) have you had a drink of wine?

Yes.....1 50/
No.....(SKIP TO Q.76).....2

72. How long has it been since your last drink of wine?

Today.....01 51-52/
1-7 days ago.....02
8-14 days ago.....03
15-30 days ago.....04
1 month ago.....05
2-3 months ago.....06
4-6 months ago.....07
7-12 months ago.....08
More than 1 year ago.....09

HAND
CARD
E

73. As you think back over the period of time between (DATE OF LAST INTERVIEW) and now, about how many glasses of wine would you drink on a typical day when you drank wine?

ENTER NUMBER OF GLASSES: | | | 53-54/

74. Again, thinking back over the period of time between (DATE OF LAST INTERVIEW) and now, about how regularly did you drink wine? PROBE IF NECESSARY. It's sometimes hard to remember. Just give me your best guess.

More often than once a day.....1 55/
Every day.....2
5 or 6 days a week.....3
3 or 4 days a week.....4
1 or 2 days a week.....5
Less often than once a week.....6
IF CANNOT DECIDE/ Don't know.....8

HAND
CARD
AA

75. During the last 12 months that you drank since (DATE OF LAST INTERVIEW), how often did you have 8 or more glasses of wine in a single day (more than a fifth)?

Every day or nearly every day.....01 56-57/
 3-4 times a week.....02
 Once or twice a week.....03
 1-3 times a month.....04
 7-11 times a year.....05
 3-6 times a year.....06
 Once or twice a year.....07
 Never.....08

HAND
CARD
CC

76. Since (DATE OF LAST INTERVIEW) have you had a drink containing liquor, such as whiskey, vodka, gin, brandy, etc.?

Yes.....1 58/
 No...(SKIP TO Q.82).....2

77. How long has it been since your last drink of hard liquor?

Today.....01 59-60/
 1-7 days ago.....02
 8-14 days ago.....03
 15-30 days ago.....04
 1 month ago.....05
 2-3 months ago.....06
 4-6 months ago.....07
 7-12 months ago.....08
 More than 1 year ago.....09

HAND
CARD
2

78. As you think back over the period of time between (DATE OF LAST INTERVIEW) and now, about how many drinks of hard liquor would you drink on a typical day in which you drank hard liquor?

ENTER NUMBER OF DRINKS: 61-62/

79. Again, thinking back over the period of time between (DATE OF LAST INTERVIEW) and now, about how regularly did you drink hard liquor? PROBE IF NECESSARY: It's sometimes hard to remember. Just give me your best guess.

More often than once a day.....1 63/
 Every day.....2
 5 or 6 days a week.....3
 3 or 4 days a week.....4
 1 or 2 days a week.....5
 Less often than once a week.....6
 IF CANNOT DECIDE: Don't know.....8

HAND
CARD
AA

80. About how many ounces of hard liquor are there in the drinks that you usually drink?

One ounce (one shot).....1 64/
 1.5 ounces (one jigger).....2
 2 ounces (2 shots).....3
 3 ounces (2 jiggers or 3 shots).....4
 4 ounces (4 shots).....5
 5 or more ounces (3 or more jiggers).....6
 Don't know.....8

HAND
CARD
DD

81. During the last 12 months that you drank since (DATE OF LAST INTERVIEW), how often did you have 8 or more drinks of hard liquor in a single day (a half pint or more)?

Every day or nearly every day.....01 65-66/
 3-4 times a week.....02
 Once or twice a week.....03
 1-3 times a month.....04
 7-11 times a year.....05
 3-6 times a year.....06
 Once or twice a year.....07
 Never.....08

HAND
CARD
CC

82. Have you had a drink of beer, wine or hard liquor in the last 12 months?

Yes.....1 63/

No.....(SKIP TO SECTION 9).....2

83. About how often during the past 12 months did you drink enough to feel high -- that is, happier or more carefree than usual, maybe a little flushed or dizzy, but not drunk, for more than 24 hours in a row?

5 or more times.....01 68-69/

4 times.....02

3 times.....03

2 times.....04

Once.....05

Never in the past year, but sometime before that.....06

Never in my life.....07

NAME
(AND
RE

84. Now I would like to ask you some questions about experiences that many people have had with drinking. During the past year. . .

Yes No

- A. Have you felt aggressive or angry while drinking?.....1 2 70/
- B. Have you gotten into a heated argument while drinking?.....1 2 71/
- C. Have you gotten into a fight while drinking?.....1 2 72/
- D. Have you deliberately tried to cut down or quit drinking, but didn't manage to do so?.....1 2 73/
- E. Were you afraid you might be an alcoholic or that you might become one?.....1 2 74/
- F. Once you started drinking, was it difficult for you to stop before you became completely intoxicated?.....1 2 75/
- G. Have you awakened the next day not being able to remember things you had done while drinking?.....1 2 76/
- H. Have you often taken a drink the first thing when you got up in the morning?.....1 2 77/
- I. Have your hands shaken a lot the morning after drinking?.....1 2 78/
- J. Have you sometimes gotten drunk when drinking by yourself?.....1 2 79/
- K. Have you sometimes kept on drinking after promising yourself not to?.....1 2 80/

85. INTERVIEWER: HAS HE MISSED THE PAST YEAR?

YES...(ASK A THROUGH F).....1 10/

NO...(SKIP TO 0-86).....2

During the past year:

Yes No

A. Have you stayed away from work because of a hangover?.....1 2 11/

B. Have you gotten drunk when on the job?.....1 2 12/

C. Have you lost a job, or nearly lost one, because of drinking?.....1 2 13/

D. Has drinking led to your quitting a job?.....1 2 14/

E. Has drinking hurt your chances for promotion or release or a better job?.....1 2 15/

86. When you were growing up, do you think your father drank occasionally, drank frequently, had a drinking problem, or didn't he drink?

Drank occasionally.....1 16/

Drank frequently.....2

Had a drinking problem.....3

Didn't drink.....4

DON'T KNOW.....8

87. When you were growing up, do you think your mother drank occasionally, drank frequently, had a drinking problem, or didn't she drink?

Drank occasionally.....1 17/

Drank frequently.....2

Had a drinking problem.....3

Didn't drink.....4

DON'T KNOW.....8

SECTION 9: RECREATION, LEISURE, AND PHYSICAL ACTIVITIES

Now we would like you to answer some questions about your leisure time activities.

INTERVIEWER: HAND R SELF-ADMINISTERED FORM 3.

Listed below are a series of Leisure Time and Physical Activities. Related activities are grouped under general headings. 1) Please read the list and circle number 1 for each activity you have performed in the last 12 months, and circle number 2 for those you have not. 2) Check which months you performed these activities. 3) Record the average number of days per month you performed these activities, and 4) Record how many hours and minutes you performed these activities, on an average day.

1. Have you participated three or more times in (READ EACH ITEM)?

	Yes	No	
Scuba diving	1	2	18/
Auto, boat, or motorcycle racing	1	2	19/
Skydiving	1	2	20/
Mountain climbing	1	2	21/
Hang gliding	1	2	22/
Plane racing or plane acrobatics, not including flight training or any assignments for the Armed Forces	1	2	23/
Surf board riding	1	2	24/
Sailing long distance in small sailing craft	1	2	25/
Skiing fast down a high mountain slope	1	2	26/

2. INTERVIEWER: HAS R ANSWERED "YES" TO ANY QUESTIONS ON SELF-ADMINISTERED FORM 3 AND TO Q.1 ABOVE?

YES.....1 27/
NO.....(SKIP TO SECTION 11).....2

FOR EACH SUBSTANCE CIRCLE YES, AND A THROUGH D:

3. Have any of the recreation, leisure, and/or physical activities you've participated in since (DATE OF LAST INTERVIEW) brought you in contact with any of the following substances . . .

A

SINCE (DATE OF LAST INTERVIEW), for how many years did you continue to come in contact with (SUBSTANCE)?

IN CONTACT WITH (SUBSTANCE)?

YES NO

asbestos?.....1 2 28/ MONTH YEAR 29-32/ 33-34/ years

industrial chemicals?.....1 2 35/ MONTH YEAR 36-39/ 40-41/ years

insecticides or pesticides?.....1 2 42/ MONTH YEAR 43-46/ 47-48/ years

degreasing chemicals?.....1 2 49/ MONTH YEAR 50-53/ 54-55/ years

defoliant or herbicides?.....1 2 56/ MONTH YEAR 57-60/ 61-62/ years

x-ray or nuclear radiation?.....1 2 63/ MONTH YEAR 64-67/ 68-69/ years

1. (Continued)

C
Since (DATE OF LAST INTERVIEW), how many days per year did you come in contact with (SUBSTANCE)?

70-72/
DAYS

BEGIN DATE 57

10-12/
DAYS

21-23/
DAYS

32-34/
DAYS

43-45/
DAYS

54-56/
DAYS

D
In the days you came in contact with (SUBSTANCE) how often did you use protective clothing or gear or wash to remove (SUBSTANCE)?--all of the time, some of the time, or never?

73/

All of the time (ASK E)...1
Some of the time (ASK F)...2
Never.....3

13/

All of the time (ASK E)...1
Some of the time (ASK E)...2
Never.....3

24/

All of the time (ASK E)...1
Some of the time (ASK E)...2
Never.....3

35/

All of the time (ASK E)...1
Some of the time (ASK E)...2
Never.....3

46/

All of the time (ASK E)...1
Some of the time (ASK E)...2
Never.....3

57/

All of the time (ASK E)...1
Some of the time (ASK E)...2
Never.....3

E
Which of the following did you use?

NAME (CARD E)

CIRCLE ALL THAT APPLY.

air filter.....1	74/
goggles.....2	75/
face shield.....3	76/
special clothing.....4	77/
washing facilities.....5	78/
Self contained or supplied air breathing apparatus.....6	79/
None.....0	80/
air filter.....1	14/
goggles.....2	15/
face shield.....3	16/
special clothing.....4	17/
washing facilities.....5	18/
Self contained or supplied air breathing apparatus.....6	19/
None.....0	20/
air filter.....1	25/
goggles.....2	26/
face shield.....3	27/
special clothing.....4	28/
washing facilities.....5	29/
Self contained or supplied air breathing apparatus.....6	30/
None.....0	31/
air filter.....1	36/
goggles.....2	37/
face shield.....3	38/
special clothing.....4	39/
washing facilities.....5	40/
Self contained or supplied air breathing apparatus.....6	41/
None.....0	42/
air filter.....1	47/
goggles.....2	48/
face shield.....3	49/
special clothing.....4	50/
washing facilities.....5	51/
Self contained or supplied air breathing apparatus.....6	52/
None.....0	53/
air filter.....1	58/
goggles.....2	59/
face shield.....3	60/
special clothing.....4	61/
washing facilities.....5	62/
Self contained or supplied air breathing apparatus.....6	63/
None.....0	64/

INTERVIEWER: NAME & SELF-ADMINISTERED FORM 4
AND GENERAL PURPOSE ANSWER SHEET

The Jenkins Activity Survey asks questions about aspects of behavior that have been found helpful in medical diagnosis. Each person is different, so there are no "right" or "wrong" answers.

For each question, choose the answer that is true for you. In your answer sheet, fill in the circle below the letter of your answer. Use a black lead pencil, and make your marks heavy and dark. Mark only one answer for each question. If you change your mind, erase the old mark completely.

SECTION 11. INCOME

Now I have some questions about your income.

1. Please tell me which letter on this card best represents the total household income in 1984 before taxes or other deductions for all people in your household, not including income. This amount should include wages, net income from business, interest, dividends, pensions, and any other money income. Tell me the letter that comes closest.

- A. \$5,000 - \$9,999.....01
- B. \$10,000 - \$14,999.....02
- C. \$15,000 - \$19,999.....03
- D. \$20,000 - \$24,999.....04
- E. \$25,000 - \$29,999.....05
- F. \$30,000 - \$34,999.....06
- G. \$35,000 - \$39,999.....07
- H. \$40,000 - \$44,999.....08
- I. \$45,000 - \$49,999.....09
- J. \$50,000 - \$54,999.....10
- K. \$55,000 - \$59,999.....11
- L. \$60,000 - \$64,999.....12
- M. \$65,000 - \$69,999.....13
- N. \$70,000 - \$74,999.....14
- O. \$75,000 - \$79,999.....15
- P. \$80,000 - \$84,999.....16
- Q. \$85,000 - \$89,999.....17
- R. \$90,000 - \$94,999.....18
- S. \$95,000 - \$99,999.....19
- T. \$100,000 or more.....20

HARD
CARD
FF

2. Did you earn any income from any job during 1984? Do not include income from retirement plans or pensions.

Yes.....(ASK A).....1

No.....(SKIP TO Q.3).....2

A. In which of these groups did your earnings from jobs in 1984 fall - that is, before taxes or other deductions? Tell me the letter that comes closest.

- A. \$5,000 - \$9,999.....01
- B. \$10,000 - \$14,999.....02
- C. \$15,000 - \$19,999.....03
- D. \$20,000 - \$24,999.....04
- E. \$25,000 - \$29,999.....05
- F. \$30,000 - \$34,999.....06
- G. \$35,000 - \$39,999.....07
- H. \$40,000 - \$44,999.....08
- I. \$45,000 - \$49,999.....09
- J. \$50,000 - \$54,999.....10
- K. \$55,000 - \$59,999.....11
- L. \$60,000 - \$64,999.....12
- M. \$65,000 - \$69,999.....13
- N. \$70,000 - \$74,999.....14
- O. \$75,000 - \$79,999.....15
- P. \$80,000 - \$84,999.....16
- Q. \$85,000 - \$89,999.....17
- R. \$90,000 - \$94,999.....18
- S. \$95,000 - \$99,999.....19
- T. \$100,000 or more.....20

HARD
CARD
FF

3. INTERVIEWER:

RECORD
TIME
FNUH

INTERVIEWER REMARKS

INTERVIEWER: Please complete these remarks as soon as you have finished the questionnaire.

1. Length of the interview: _____
(Section 1, p.1 through Section 12) _____ MINUTES _____ 75-77/

2. Date of the interview: _____
MONTH DAY YEAR _____ 10-15/

3. Race of Respondent: _____
White.....1 16/
Black.....2
Other.....3

4. In general, what was the respondent's attitude toward the interview?
Friendly and interested.....1 17/
Cooperative but not particularly interested.....2
Impatient and restless.....3
Hostile.....4

5. In general, was the respondent's understanding of the questions....
Good?.....1 18/
Fair?.....2
Poor?.....3

6. List the question that confused, angered, or caused discomfort to the respondent or questions that you feel the respondent did not answer truthfully. EXPLAIN.

NAME.....0 19/
SECTION QUESTION
A. 20-21/ 22-24/
B. 25-26/ 27-29/
C. 30-31/ 32-34/
Describe Problem: _____ 35/

7. List questions with skip errors, questions that were confusing to you, or questions that otherwise didn't work. EXPLAIN

NAME.....0 36/
SECTION QUESTION
A. 37-38/ 39-41/
B. 42-43/ 44-46/
C. 47-48/ 49-51/
Describe Problem: _____ 52/

8. Please record your Interviewer ID #: _____ 53-58/

9. Please sign your name: _____

MURC
 4428
 5/65

AIR FORCE HEALTH SURVEY
 TRANSMITTAL FORM

Complete this form and enclose a copy with each case mailed to Chicago

Int. ID #	Int. Name	Date Mailed

QUANTITY ENCLOSURE	if not enclosed, explain

Information Sheet	_____
Children's Record Form	_____
Supplementary Children's Record Form	_____
Questionnaire	_____
Self-Administered Form 1	_____
Self-Administered Form 2	_____
Self-Administered Form 3	_____
Medical Consent Form	_____

Date received in Chicago	_____	FOR OFFICE USE ONLY	CIRCLE ONE
		All required forms present	Yes No

APPENDIX C*

Physical Examination Methodology

*Original forms were color coded; limited photocopy quality.

CASE NUMBER	NAME:	GROUP #																																																																							
DATE OF BIRTH:																																																																									
<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>0</td> <td rowspan="3" style="vertical-align: middle; text-align: center;">TODAY'S DATE</td> <td>NO</td><td>JAN</td><td>FEB</td><td>MAR</td><td>APR</td><td>MAY</td><td>JUN</td><td>JUL</td><td>AUG</td><td>SEP</td><td>OCT</td><td>NOV</td><td>DEC</td> </tr> <tr> <td colspan="10"></td> <td>DAY</td><td>30</td><td>20</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td colspan="10"></td> <td>YR</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td> </tr> </table>				1	2	3	4	5	6	7	8	9	0	TODAY'S DATE	NO	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC											DAY	30	20	10	9	8	7	6	5	4	3	2	1											YR	35	36	37	38	39	40	41	42	43	44	45	46
1	2	3		4	5	6	7	8	9	0	TODAY'S DATE	NO	JAN		FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC																																																
										DAY		30	20		10	9	8	7	6	5	4	3	2	1																																																	
										YR		35	36	37	38	39	40	41	42	43	44	45	46																																																		
FORM AFHS-1 HISTORY																																																																									

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FAMILY HISTORY — PLEASE BLACKEN THE CIRCLE FOR ANY FAMILY MEMBER THAT HAS HAD ANY OF THE FOLLOWING.

REVIEWER'S COMMENTS	BLOOD RELATIVES →	NONE	MOTHER	FATHER	SISTER	BROTHER	CHILD
	DIABETES	☐	☐	☐	☐	☐	☐
	EPILEPSY	☐	☐	☐	☐	☐	☐
	CANCER	☐	☐	☐	☐	☐	☐
	HIGH BLOOD PRESSURE	☐	☐	☐	☐	☐	☐
	HEART DISEASE	☐	☐	☐	☐	☐	☐
	STROKE	☐	☐	☐	☐	☐	☐
	ALLERGY	☐	☐	☐	☐	☐	☐
	STOMACH TROUBLE	☐	☐	☐	☐	☐	☐
	NERVOUS TROUBLE	☐	☐	☐	☐	☐	☐
	BLOOD DISEASE	☐	☐	☐	☐	☐	☐
	DEFORMITIES	☐	☐	☐	☐	☐	☐
	ARTHRITIS	☐	☐	☐	☐	☐	☐
	OTHER FAMILIAL DIS.	☐	☐	☐	☐	☐	☐

→ PLEASE LIST HERE.

CURRENT FAMILY STATUS

FATHER:	LIVING-AGE	DEAD-AGE	CONDITION OF HEALTH? ☐ EXCELLENT ☐ GOOD ☐ FAIR ☐ POOR	
			CAUSE OF DEATH?	
MOTHER:	LIVING-AGE	DEAD-AGE	CONDITION OF HEALTH? ☐ EXCELLENT ☐ GOOD ☐ FAIR ☐ POOR	
			CAUSE OF DEATH?	
BROTHERS	LIVING	AGES		
NUMBER	DEAD	CAUSES		
SISTERS	LIVING	AGES		
NUMBER	DEAD	CAUSES		

ARE YOU MARRIED? ☐ NO OF YEARS WIFE'S AGE HEALTH OF WIFE? ☐ EXCELLENT ☐ GOOD ☐ FAIR ☐ POOR

IF WIFE IS DEAD PLEASE GIVE AGE, YEAR AND CAUSE OF DEATH

CHILDREN: BOYS' AGES GIRLS' AGES ALL HEALTHY? ☐ ANY DEAD? ☐ ANY BIRTH DEFECTS? ☐

DO YOU HAVE ANY PHYSICAL OR NERVOUS COMPLAINTS?	DO YOU HAVE ANY ALLERGIES OR SEVERE REACTIONS TO MEDICINES, FOODS, PLANTS, CHEMICALS, ETC?
YES ☐ NO ☐ EXPLAIN	YES ☐ NO ☐ PLEASE DESCRIBE

PERSONAL HISTORY

YES	NO	YES	NO	YES	NO
☒ SKIN TROUBLE	☒	☒ HEPATITIS	☒	☒ ARTHRITIS	☒
☒ ACNE	☒	☒ WORMS	☒	☒ SCLERODERMA	☒
☒ EXCESS HAIR GROWTH	☒	☒ COLITIS	☒	☒ RHEUMATIC FEVER	☒
☒ OTHER SKIN TROUBLE	☒	☒ HEMORRHOIDS	☒	☒ CANCER OR TUMOR	☒
		☒ KIDNEY STONES	☒	☒ VARICOSE VEINS	☒
		☒ KIDNEY TROUBLE	☒	☒ PHLEBITIS	☒
		☒ BLADDER TROUBLE	☒	☒ HERNIA (RUPTURE)	☒
		☒ PROSTATE TROUBLE	☒	☒ ANEMIA	☒
☒ CATARACTS	☒	☒ SYPHILIS	☒	☒ POLIO	☒
☒ TONSILLITIS	☒	☒ GONORRHEA	☒	☒ MUMPS	☒
☒ SINUSITIS	☒	☒ FAINTING	☒	☒ MALARIA	☒
☒ GOITER	☒	☒ FITS OR CONVULSIONS	☒	☒ GOUT	☒
☒ HAY FEVER	☒	☒ DEPRESSION	☒	☒ DIABETES	☒
☒ ASTHMA	☒	☒ NERVOUS BREAKDOWN	☒	☒ MEASLES	☒
☒ BRONCHITIS	☒	☒ PARALYSIS	☒	☒ DYSENTERY	☒
☒ PLEURISY	☒	☒ MUSCLE PAIN	☒		
☒ PNEUMONIA	☒	☒ MUSCLE WEAKNESS	☒		
☒ TUBERCULOSIS	☒	☒ NUMBNESS	☒		
☒ HEART TROUBLE	☒	☒ LOSS OF SENSATION	☒		
☒ STOMACH TROUBLE	☒	☒ LOSS OF SEX DRIVE	☒		
☒ ULCERS	☒	☒ RHEUMATOID ARTHRITIS	☒		
☒ GALLSTONES	☒	☒ SEVERE ARTHRITIS	☒		
☒ JAUNDICE	☒	☒ SYSTEMIC LUPUS	☒		
☒ LIVER TROUBLE	☒	☒ ERYTHEMATOSIS	☒		

← BLACKEN THE ☒ CIRCLE NEXT TO ANY OF THESE CONDITIONS THAT YOU NOW HAVE OR HAVE HAD IN THE PAST. OTHERWISE BLACKEN ☒.

REVIEWER'S COMMENTS.

LIST THE AVERAGE FOR EACH OF THE FOLLOWING DURING THE LAST 90 DAYS.

	PER DAY
HOURS WORKED PER DAY	NUMBER CIGARETTES
HOURS SLEEP PER NIGHT	ALCOHOLIC DRINKS
DAYS WORKED PER WEEK	CUPS COFFEE
DAYS VACATION PER YEAR	CHEWING TOBACCO
	SNUFF

FOR THE PAST 90 DAYS OR MORE.

DID YOU TAKE REGULAR EXERCISE?	
WHAT IS YOUR USUAL WEIGHT?	LBS
WHAT IS THE MOST YOU EVER WEIGHED?	LBS
AT WHAT AGE?	
HAVE YOU RECENTLY LOST OR GAINED WEIGHT?	
IF SO, HOW MUCH? (+/-)	LBS

PAST HISTORY

PLEASE LIST PREVIOUS OPERATIONS, INJURIES, AND SERIOUS ILLNESSES, INCLUDING THOSE INDICATED ABOVE

YEAR	DESCRIPTION OF OPERATION, INJURY, OR SERIOUS ILLNESS

DO NOT MARK IN THIS SPACE

PLEASE BLACKEN THE CIRCLE IF YOU HAVE HAD REPEATED CASES OF ANY OF THE FOLLOWING IN THE PAST YEAR.

YES	NO
☒	☒
☒	☒
☒	☒
☒	☒

SPECIFY

WHEN WAS YOUR LAST PHYSICAL EXAM?

ANY ABNORMALITY FOUND?

YES NO

ARE YOU UNDER ANY MEDICAL TREATMENT NOW?

YES NO

DID YOU TAKE ANY MEDICATIONS OR TREATMENT NOW OR OCCASIONALLY

YES NO

PLEASE DESCRIBE

YOUR PERSONAL PHYSICIAN

NAME

STREET ADDRESS

CITY STATE & ZIP

CASE NUMBER		NAME OF PARTICIPANT	
	B		
PAGE OF		FORM AFHS-2B	EXPOSURE HISTORY DETAILS

FOR EACH YES EXPOSURE AT THE END OF FORM AFHS-2A PLEASE FILL OUT ONE OF THE FOLLOWING BLOCKS
USE ADDITIONAL SHEETS IF NECESSARY

TYPE OF EXPOSURE COAL TAR ETC					WAS EXPOSURE RECEIVED ON THE JOB?		YES	NO
IF ON THE JOB EXPOSURE JOB TITLE								
IF NOT ON THE JOB EXPOSURE HOW EXPOSURE RECEIVED								
CHECK FREQUENCY OF EXPOSURE THAT BEST FITS YOUR EXPERIENCE		DAILY	WEEKLY	MONTHLY	YEARLY	IN WHAT YEAR(S) WERE YOU EXPOSED?		

TYPE OF EXPOSURE COAL TAR ETC					WAS EXPOSURE RECEIVED ON THE JOB?		YES	NO
IF ON THE JOB EXPOSURE JOB TITLE								
IF NOT ON THE JOB EXPOSURE HOW EXPOSURE RECEIVED								
CHECK FREQUENCY OF EXPOSURE THAT BEST FITS YOUR EXPERIENCE		DAILY	WEEKLY	MONTHLY	YEARLY	IN WHAT YEAR(S) WERE YOU EXPOSED?		

TYPE OF EXPOSURE COAL TAR ETC					WAS EXPOSURE RECEIVED ON THE JOB?		YES	NO
IF ON THE JOB EXPOSURE JOB TITLE								
IF NOT ON THE JOB EXPOSURE HOW EXPOSURE RECEIVED								
CHECK FREQUENCY OF EXPOSURE THAT BEST FITS YOUR EXPERIENCE		DAILY	WEEKLY	MONTHLY	YEARLY	IN WHAT YEAR(S) WERE YOU EXPOSED?		

TYPE OF EXPOSURE COAL TAR ETC					WAS EXPOSURE RECEIVED ON THE JOB?		YES	NO
IF ON THE JOB EXPOSURE JOB TITLE								
IF NOT ON THE JOB EXPOSURE HOW EXPOSURE RECEIVED								
CHECK FREQUENCY OF EXPOSURE THAT BEST FITS YOUR EXPERIENCE		DAILY	WEEKLY	MONTHLY	YEARLY	IN WHAT YEAR(S) WERE YOU EXPOSED?		

CASE NUMBER		NAME:		GROUP #	
		DATE OF BIRTH:			
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0		TODAY'S DATE MO JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC DAY 30 20 10 3 3 7 5 4 3 2 1 YR 35 36 37 38 39 90 91 92 93 94 95 96			
		FORM AFHS-3A			
		PHYSICAL EXAMINATION			



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GENERAL APPEARANCE

	APPEARANCE VS STATED AGE	APPEARANCE OF ILLNESS OR DISTRESS	HAIR DISTRIBUTION
WELL NOURISHED	YOUNGER THAN	YES	NORMAL
OBESE	OLDER THAN		
UNDER-NOURISHED	SAME AS	NO	ABNORMAL

Y N COMMENT

DESCRIBE ANY ABNORMAL HAIR DISTRIBUTION:

NOTE: FILL IN VITAL SIGNS WITH "0"s IF REFUSED.

VITAL SIGNS

HEIGHT CM	WEIGHT (UNDRESSED) KG	TEMPERATURE ORAL °F	SITTING BLOOD PRESSURE NONDOMINANT ARM, HEART LEVEL		PULSE RATE	VPBs PER MINUTE	PULSE IS: REGULAR IRREGULAR IRREGULARLY IRREGULAR
			SYSTOLIC	DIASTOLIC			
0 0 0	50 0 0	97 0 0	0 0 0	0 0 0	0 0 0	0 0	DESCRIBE ANY IRREGULARITIES: Y N COMMENT
1 1 1	60 1 1	98 1 1	1 1 1	1 1 1	1 1 1	1 1	
2 2 2	70 2 2	99 2 2	2 2 2	2 2	2 2 2	2 2	
3 3 3	80 3 3	100 3 3	3 3	3 3	3 3 3	3 3	
4 4 4	90 4 4	101 4 4	4 4	4 4	4 4	4 4	
5 5 5	100 5 5	102 5 5	5 5	5 5	5 5	5 5	
6 6 6	110 6 6	103 6 6	6 6	6 6	6 6	6 6	
7 7 7	120 7 7	104 7 7	7 7	7 7	7 7	7 7	
8 8 8	8 8	8 8	8 8	8 8	8 8	8 8	
9 9 9	9 9	9 9	9 9	9 9	9 9	9 9	

EYES

	FUNDUSCOPIC				EXTERNAL	
	YES	NO	YES	NO	YES	NO
NORMAL	Y	N	Y	N	Y	N
ABNORMAL		Y	Y	N	Y	N
		N	Y	N	Y	N
		N	Y	N	Y	N
REFUSED	Y	N	Y	N	Y	N
	Y	N	Y	N	Y	N
	Y	N	Y	N	Y	N

IF SIGNS - HEMORRHAGES, EXUDATES, OR PAPILLODEMA

Y N COMMENT

ENT

☐ NORMAL YES NO
☐ ABNORMAL ☐ RIGHT TYMPANIC MEMBRANE INTACT
☐ ABNORMAL ☐ LEFT TYMPANIC MEMBRANE INTACT
☐ REFUSED ☐ NASAL ULCERATIONS

☐ COMMENT

DESCRIBE ABNORMALITY

NECK

☐ NORMAL THYROID GLAND LEFT RIGHT
☐ ABNORMAL ☐ PALPABLE ☐ NODULES PAROTID GLAND ENLARGEMENT
☐ ABNORMAL ☐ ENLARGED ☐ TENDERNESS CAROTID PULSE ABSENT
☐ REFUSED ☐ CAROTID BRUIT PRESENT

☐ COMMENT

DESCRIBE ABNORMALITY

THORAX AND LUNGS

☐ NORMAL
☐ ABNORMAL
☐ REFUSED YES NO
☐ ASYMMETRICAL EXPANSION
☐ HYPERRESONANCE
☐ DULLNESS
☐ WHEEZES
☐ RALES NOTE LOCATION
 IN BOX BELOW

CHEST CIRCUMFERENCE (CM)
AT NIPPLE LEVEL

EXPIRATION		INSPIRATION	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

DESCRIBE ABNORMALITY:

☐ COMMENT

HEART

☐ NORMAL YES NO
☐ ABNORMAL HEART SOUNDS NORMAL
☐ ABNORMAL DISPLACEMENT OF APICAL IMPULSE
☐ ABNORMAL PRECORDIAL THRUST
☐ REFUSED

ABNORMAL HEART SOUND(S)
 NO S1 S2 S3 S4
 YES Y Y Y Y

MURMUR CHEST AREA
 NO SYSTOLIC AORTIC PULMONIC APEX MITRAL
 YES DIASTOLIC Y Y Y Y COMMENT

DESCRIBE ANY ENLARGEMENT, IRREGULARITY OF RATE, MURMUR, OR THRILL.

CASE NUMBER		NAME:		GROUP #	
		DATE OF BIRTH:			
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9		TODAY'S DATE MO DAY YR JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 30 20 10 9 8 7 6 5 4 3 2 1 35 36 37 38 39 90 91 92 93 94 95 96			
		FORM AFHS-38			
		PHYSICAL EXAMINATION (CONTINUED)			

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ABDOMEN

☐ NORMAL ☐ ABNORMAL ☐ REFUSED	YES NO ☐ ☐ HEPATOMEGALY ☐ ☐ SPLENOMEGALY ☐ ☐ TENDERNESS LIVER ☐ ☐ TENDERNESS SPLEEN ☐ ☐ OTHER TENDERNESS ☐ ☐ OTHER MASS	CM <table border="1"> <tr> <td rowspan="2">WAIST MEASUREMENT</td> <td>100 200 300</td> </tr> <tr> <td>10 20 30 40 50 60 70 80 90</td> </tr> <tr> <td rowspan="2">LIVER SPAN</td> <td>10 20 30</td> </tr> <tr> <td>0 1 2 3 4 5 6 7 8 9</td> </tr> </table>	WAIST MEASUREMENT	100 200 300	10 20 30 40 50 60 70 80 90	LIVER SPAN	10 20 30	0 1 2 3 4 5 6 7 8 9
	WAIST MEASUREMENT	100 200 300						
10 20 30 40 50 60 70 80 90								
LIVER SPAN	10 20 30							
	0 1 2 3 4 5 6 7 8 9							
		Y N COMMENT						

DESCRIBE ABNORMALITY:

EXTREMITIES

☐ NORMAL ☐ ABNORMAL ☐ REFUSED	YES NO ☐ ☐ PITTING EDEMA ☐ ☐ NON-PITTING EDEMA ☐ ☐ ABSENCE (SPECIFY IN BOX BELOW)	YES NO ☐ ☐ CLUBBING OF NAILS ☐ ☐ VARICOSITIES ☐ ☐ LOSS OF HAIR ON TOES RIGHT ☐ ☐ LOSS OF HAIR ON TOES LEFT
	Y N COMMENT	

DESCRIBE EDEMA, SIGNS OF VASCULAR INSUFFICIENCY, OR ABSENCE OF PART OR ALL OF EXTREMITY:

PERIPHERAL PULSES

	NORMAL	DIMINISHED	ABSENT	REFUSED
RADIAL	☐	☐	☐	☐
FEMORAL	☐	☐	☐	☐
POPLITEAL	☐	☐	☐	☐
DORSALIS PEDIS	☐	☐	☐	☐
POSTERIOR TIBIAL	☐	☐	☐	☐

COMMENTS: Y N

MUSCULOSKELETAL

- ☐ NORMAL
☐ ABNORMAL
☐ REFUSED

**STRAIGHT LEG
RAISING**

- ☐ NORMAL
☐ ABNORMAL

☐ ☐ COMMENT

MUSCLES

PRESENT ABSENT

☐	☐	WEAKNESS
☐	☐	TENDERNESS
☐	☐	ATROPHY
☐	☐	ABNORMAL CONSISTENCY

SPINE

PRESENT ABSENT

☐	☐	SCOLIOSIS
☐	☐	KYPHOSIS
☐	☐	PELVIC TILT
☐	☐	DECREASED RANGE OF MOTION
☐	☐	TENDERNESS

**TENDERNESS
LEVEL**

☐ CERVICAL ☐ THORACIC ☐ LUMBAR ☐ SACRAL

COMMENTS:

GENITOURINARY/RECTAL/HERNIA

☐ NORMAL

☐ ABNORMAL

☐ REFUSED

☐ ☐ COMMENT

YES NO

- ☐ ☐ RT INGUINAL HERNIA
☐ ☐ LT INGUINAL HERNIA
☐ ☐ VARICOCELE
☐ ☐ HEMORRHOIDS

YES NO

- ☐ ☐ PROSTATIC ENLARGEMENT
☐ ☐ EPIDIDYMIS
☐ ☐ RECTAL MASS
☐ ☐ SCROTAL MASS
0 1 2 3 4 5 6 7 8 9
(DIAMETER-CM)

TESTES

	NORM.	ABS.	ENGL.	ATROPH.
LEFT	☐	☐	☐	☐
RIGHT	☐	☐	☐	☐

COMMENTS:

LYMPH NODES

☐ NORMAL

☐ ABNORMAL

☐ REFUSED

CERVICAL
OCCIPITAL
SUPRACLAVICULAR
AXILLARY
EPITROCHLEAR
INGUINAL
FEMORAL

NON PALPABLE ENLARGED TENDER HARD FIXED CONFLUENT

☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐

OTHER TESTS ORDERED

☐ YES

☐ NO

DESCRIBE:

☐ ☐ COMMENT

PRINTED NAME OF EXAMINING PHYSICIAN

SIGNATURE

CASE NUMBER

NAME

GROUP

DATE OF BIRTH:



TODAY'S DATE

MO	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DAY	30	29	31	30	31	30	31	31	30	31	30	31
YR	35	36	37	38	39	40	41	42	43	44	45	46

FORM AFHS-4

DERMATOLOGIC EXAMINATION AND BIOPSY

VERSION 10.0 RVW SCF 325

SKIN

BLACKEN CIRCLE IF LESION IS OBSERVED

REFUSED EXAMINATION

INDICATE TYPE AND LOCATION OF LESION ON ATTACHED ANATOMICAL CHART

YES	NO	YES	NO
☐	COMEDONES	☐	PALMAR KERATOSES
☐	ACNEFORM LESIONS	☐	ACTINIC KERATOSES
☐	ACNEFORM SCARS	☐	PETECHIAE
☐	DEPIGMENTATION	☐	ECCHYMOSES
☐	INCLUSION CYSTS	☐	CONJUNCTIVAL ABNORMALITY
☐	ECZEMA RHOMBOIDALIS	☐	ORAL MUCOSAL ABNORMALITY
☐	HYPERPIGMENTATION	☐	FINGER NAIL ABNORMALITY
☐	JAUNDICE	☐	TOE NAIL ABNORMALITY
☐	SPIDER ANGIOMATA	☐	DERMATOGRAPHIA
☐	PALMAR ERYTHEMA	☐	SUSPECTED BASAL CELL CARCINOMA
☐	SUSPECTED MELANOMA	☐	SUSPECTED SQUAMOUS CELL CARCINOMA

BIOPSY

YES	NO	YES	NO
☐	SKIN BIOPSY PERFORMED	☐	CONSENT FORM OBTAINED

BIOPSY LOCATION(S):

BIOPSY DIAGNOSIS:

PHYSICAL FEATURES

EYE COLOR		HAIR COLOR	SKIN COLOR
BROWN	GREY	100	0 1 2 3 4 5 6 7 8 9 10
HAZEL	BLUE	10 20 30 40 50 60 70 80 90	
GREEN		0 1 2 3 4 5 6 7 8 9	

PRINTED NAME OF EXAMINING PHYSICIAN

SIGNATURE

CASE NUMBER		NAME:		GROUP #	
		DATE OF BIRTH:			

1	2	3	4	5	6	7	8	9	0
1	2	3	4	5	6	7	8	9	0
1	2	3	4	5	6	7	8	9	0
1	2	3	4	5	6	7	8	9	0
1	2	3	4	5	6	7	8	9	0

TODAY'S	MO	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE	DAY	30	20	10	3	3	7	6	5	4	3	2	1
	YR	95	96	97	98	99	90	91	92	93	94	95	96

FORM AFHS-5
NEUROLOGICAL EXAMINATION

VERSION 10 DRW SCF 585

HEAD AND NECK

YES NO ☐ ☐ NORMAL TO PALPATION/INSPECTION ☐ ☐ ASYMMETRY ☐ ☐ DEPRESSION ☐ ☐ SCAR	NECK RANGE OF MOTION ☐ NORMAL ☐ ABNORMAL ☐ REFUSAL	YES NO ☐ ☐ DECREASED LEFT ☐ ☐ DECREASED RIGHT ☐ ☐ DECREASED FORWARD ☐ ☐ DECREASED BACKWARD

MOTOR SYSTEM

HANDEDNESS ☐ LEFT ☐ RIGHT ☐ REFUSED	GAIT ☐ NORMAL ☐ ABNORMAL ☐ REFUSED	YES NO ☐ ☐ BROAD BASED ☐ ☐ SMALL STEPPED ☐ ☐ ATAXIC ☐ ☐ OTHER (SPECIFY)	ASSOCIATED MOVEMENT ARM SWING ☐ NORMAL ☐ ABNORMAL LEFT ☐ ABNORMAL RIGHT

MUSCLE STATUS

	NORMAL		ABNORMAL		INCREASED		DECREASED	
	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT
BULK	☐	☐	☐	☐	☐	☐	☐	☐
TONE UPPER EXTREMITIES	☐	☐	☐	☐	☐	☐	☐	☐
LOWER EXTREMITIES	☐	☐	☐	☐	☐	☐	☐	☐
STRENGTH DISTAL WRIST EXTENSORS	☐	☐	☐	☐	☐	☐	☐	☐
ANKLE/TOE FLEXORS	☐	☐	☐	☐	☐	☐	☐	☐
PROXIMAL DELTOIDS	☐	☐	☐	☐	☐	☐	☐	☐
HIP FLEXORS	☐	☐	☐	☐	☐	☐	☐	☐
☐ REFUSED								

ABNORMAL MOVEMENTS

TICS, CHOREAS, FASCICULATIONS

☐ NO ☐ YES → ① ② ③ ④

TENDERNESS

☐ NO ☐ YES → ① ② ③ ④

TREMOR

☐ NO ☐ YES →

EXTREMITY

LOWER LEFT	UPPER LEFT	LOWER RIGHT	UPPER RIGHT
☐	☐	☐	☐
☐	☐	☐	☐
☐	☐	☐	☐
☐	☐	☐	☐
☐	☐	☐	☐

☐ RESTING NORMAL

☐ RESTING ABNORMAL

☐ ESSENTIAL NORM.

☐ ESSENTIAL AB

☐ INTENTION NORM

☐ INTENTION AB

OTHER →

COORDINATION

☐ REFUSED

	NORMAL		ABNORMAL		
	LEFT	RIGHT	LEFT	RIGHT	BOTH
EQUILIBRATORY (ROMBERG)	☐	☐	☐	☐	☐
FINGER - NOSE - FINGER	☐	☐	☐	☐	☐
HEEL - KNEE - SHIN	☐	☐	☐	☐	☐
RAPIDLY ALTERNATING MOVEMENTS	☐	☐	☐	☐	☐
PRONATION/SUPINATION OF HANDS	☐	☐	☐	☐	☐
RAPID PATTING	☐	☐	☐	☐	☐

DEEP TENDON REFLEXES

① = ABSENT, 1 = SLUGGISH, 2 = ACTIVE, 3 = VERY ACTIVE, 4 = TRANSIENT CLONUS, 5 = SUSTAINED CLONUS

	LEFT					RIGHT				
	①	②	③	④	⑤	①	②	③	④	⑤
BICEPS	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
TRICEPS	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
PATELLAR	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
ACHILLES	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BABINSKI	☐ PRESENT ☐ ABSENT					☐ PRESENT ☐ ABSENT				

SKILLED ACTS

SPEECH ARTICULATION, APHASIA, AGNOSIA

☐ NORMAL ☐ GROSSLY ABNORMAL

☐ DYSARTHRIA

☐ APHASIA

☐ AGNOSIA

MENINGEAL IRRITATION AND SENSORY SYSTEM

STRAIGHT LEG RAISING

LIGHT TOUCH

PIN PRICK

VIBRATION AT ANKLE 128 HZ

POSITION (GREAT TOE)

COMMENT

NORMAL

LEFT

RIGHT

BOTH

— ABNORMAL —

NERVE STATUS (TENDERNESS, TUMORS, ETC.):

CRANIAL NERVES

LEFT	RIGHT		LEFT	RIGHT	
☐	☐	SENSE OF SMELL	☐	☐	CLENCH JAW SYMMETRIC
☐	☐	PRESENT	☐	☐	CLENCH JAW DEVIATED
☐	☐	ABSENT	☐	☐	
☐	☐		☐	☐	SENSORY NORMAL
☐	☐		☐	☐	SENSORY ABNORMAL
☐	☐	II	☐	☐	CORNEAL REFLEX NORMAL
☐	☐	FUNDUS	☐	☐	CORNEAL REF EX ABNORMAL
☐	☐	NORMAL	☐	☐	
☐	☐	ABNORMAL	☐	☐	VII
☐	☐	DISK PALLOR/ATROPHY	☐	☐	SMILE NORMAL
☐	☐	EXUDATE	☐	☐	SMILE ABNORMAL
☐	☐	PAPILDEMA	☐	☐	
☐	☐	HEMORRHAGE	☐	☐	PALPEBRAL FISSURE NORMAL
☐	☐	FIELDS NORMAL (TO CONFRONTATION)	☐	☐	PALPEBRAL FISSURE ABNORMAL
☐	☐	FIELDS ABNORMAL	☐	☐	
☐	☐	III, IV, VI	☐	☐	IX, XI PALATE AND UVULA
☐	☐	PUPILS ☐ EQUAL ☐ UNEQUAL	☐	☐	MOVEMENT NORMAL
☐	☐	DIFFERENCE (MM) → ① ② ③ ④ ⑤	☐	☐	MOVEMENT DEVIATED
☐	☐	EYE MOVEMENT NORMAL	☐	☐	PALATAL REFLEX NORMAL
☐	☐	EYE MOVEMENT ABNORMAL	☐	☐	PALATAL REFLEX ABNORMAL
☐	☐	NYSTAGMUS ABSENT	☐	☐	
☐	☐	NYSTAGMUS ROTARY	☐	☐	XII
☐	☐	NYSTAGMUS VERTICAL	☐	☐	TONGUE PROTRUDED IN MIDLINE
☐	☐	NYSTAGMUS HORIZONTAL	☐	☐	ATROPHY OF TONGUE
☐	☐	PTOSIS PRESENT	☐	☐	
☐	☐	PTOSIS ABNORMAL	☐	☐	
☐	☐	PUPIL SHAPE/POSITION	☐	☐	
☐	☐	ROUND	☐	☐	
☐	☐	OTHER	☐	☐	
☐	☐	LIGHT REACTION NORMAL	☐	☐	
☐	☐	LIGHT REACTION ABNORMAL	☐	☐	
☐	☐	EYEBALL POSITION NORMAL	☐	☐	
☐	☐	EYEBALL POSITION ABNORMAL	☐	☐	
			MENTAL STATUS (ALERT, CLEAR, COOPERATIVE, ETC.) GROSS ABNORMALITIES? ☐ NO ☐ YES SPECIFY		

PRINTED NAME OF EXAMINING PHYSICIAN

SIGNATURE

YES NO

ADDITIONAL COMMENTS ENTERED ON FORM AFHS 7

CASE NUMBER

NAME
DATE OF BIRTH:TODAY'S
DATE

MO	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DAY	30	20	10	9	8	7	6	5	4	3	2	1
YR	35	36	37	38	39	40	41	42	43	44	45	46

FORM AFHS-6

HALSTEAD NEUROPSYCHOLOGICAL TEST BATTERY

VERSION 1.0 URW SCF 885

TRAILS A

100	200	300	400	500
10	20	30	40	50
60	70	80	90	
0	1	2	3	4
5	6	7	8	9

TRAILS B

100	200	300	400	500
10	20	30	40	50
60	70	80	90	
0	1	2	3	4
5	6	7	8	9

LOGICAL
MEMORY

IMMEDIATE

10	20
0	1
2	3
4	5
6	7
8	9

30' DELAY

10	20
0	1
2	3
4	5
6	7
8	9

MEMORY
FOR
DESIGNS

IMMEDIATE

10	20
0	1
2	3
4	5
6	7
8	9

30' DELAY

10	20
0	1
2	3
4	5
6	7
8	9

CATEGORIES

ONE

0	1	2	3	4	5	6	7	8
10	20	30	40					
0	1	2	3	4	5	6	7	8

TWO

10	20	30	40
0	1	2	3
4	5	6	7
8	9		

THREE

10	20	30	40
0	1	2	3
4	5	6	7
8	9		

FOUR

10	20	30	40
0	1	2	3
4	5	6	7
8	9		

FIVE

10	20	30	40
0	1	2	3
4	5	6	7
8	9		

SIX

10	20	30	40
0	1	2	3
4	5	6	7
8	9		

SEVEN

10	20
0	1
2	3
4	5
6	7
8	9

TOTAL

100	10	20
0	1	2
30	40	
50	60	
70	80	
90	90	

TPT

BOTH

MIN	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SEC	0	1	2	3	4	5	6	7	8	9	10	20	30	40	50	

MEMORY

0	1	2	3	4	5
6	7	8	9	10	

TOTAL

DOMINANT

MIN	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SEC	0	1	2	3	4	5	6	7	8	9	10	20	30	40	50	

LOC

0	1	2	3	4	5
6	7	8	9	10	

MIN SEC

NON DOMINANT

MIN	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SEC	0	1	2	3	4	5	6	7	8	9	10	20	30	40	50	

SEASHORE RHYTHM

CORRECT

10	20	30
0	1	2
3	4	5
6	7	8
9		

RANK

1	2	3	4	5	6	7	8	9	10

SPEECH PERCEPTION

OF ERRORS

10	20	30	40	50	60
0	1	2	3	4	5
6	7	8	9		

GRIP STRENGTH

DOMINANT

10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

TAPPING

DOMINANT

10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

DOMINANT IS

LEFT

RIGHT

NON
DOMINANT

10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

NON
DOMINANT

10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

IMPAIRMENT INDEX

0	1	2	3	4	5	6	7	8	9	10

PRINTED NAME OF EXAMINER

SIGNATURE

CASE NUMBER						NAME OF PARTICIPANT			
					B	LAST	FIRST	MI	
CONTINUATION OF FORM AFHS- _____						FORM AFHS-7			CONTINUATION

USE THIS FORM TO RECORD COMMENTS, OBSERVATIONS, OR PHYSICAL FINDINGS FOR WHICH THERE IS INADEQUATE SPACE ON THE OPTICAL MARK SENSE FORMS. PLEASE INDICATE THE ORGAN SYSTEM, IF APPROPRIATE, IN EACH COMMENT BLOCK.

ORGAN SYSTEM:
COMMENTS

ORGAN SYSTEM:
COMMENTS

ORGAN SYSTEM:
COMMENTS

ORGAN SYSTEM:
COMMENTS

PRINTED NAME OF EXAMINING PHYSICIAN

SIGNATURE	DATE

CASE NUMBER

NAME
DATE OF BIRTH

GROUP #

TODAY'S
DATE

MO	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DAY	30	28	31	30	31	30	31	31	30	31	30	31
YR	85	86	87	88	89	90	91	92	93	94	95	96

FORM AFHS-8

VIETNAM COMBAT INDEX

VERSION 10 URW SCF 888

INSTRUCTIONS

INSTRUCTIONS ARE INCLUDED WITH EACH QUESTION. BELOW IS AN EXAMPLE OF THE CORRECT WAY TO ANSWER EACH QUESTION.

EXAMPLE DO YOU PLAN TO DO ANY OF THE FOLLOWING NEXT WEEK? PLEASE BLACKEN EITHER "YES" OR "NO"

YES NO

- ☒ VISIT A RELATIVE
☒ GO TO A MUSEUM
☒ GO TO A MOVIE

I WILL VISIT A RELATIVE
AND GO TO A MOVIE NEXT
WEEK)

AIRCRAFT

PLEASE INDICATE WHETHER YOU SERVED OR FLEW IN ANY OF THE FOLLOWING AIRCRAFT WHILE IN VIETNAM. DO NOT INCLUDE TRANSPORTATION TO OR FROM VIETNAM)

	YES	NO	YES	NO	YES	NO
WERE YOU EVER A CREW MEMBER?	☒	☒ F-4	☒	☒ C-7	☒	☒ C-130
	☒	☒ F-5	☒	☒ C-54	☒	☒ C-118
	☒	☒ F-105	☒	☒ C-119	☒	☒ C-123
	☒	☒ B-52	☒	☒ C-123	☒	☒ C-130
	☒	☒ B-66	☒	☒ C-130	☒	☒ C-130

EXPERIENCES

BELOW IS A LIST OF DIFFERENT COMBAT ROLES AND FLYING EXPERIENCES THAT AIRCRAFT PERSONNEL HAD DURING THE VIETNAM WAR. FOR EACH STATEMENT PLEASE BLACKEN THE CIRCLE IF YOU HAD THAT EXPERIENCE DURING THE VIETNAM WAR OR THE "NO" IF YOU DID NOT. PLEASE BLACKEN EITHER "YES" OR "NO" FOR EACH EXPERIENCE.

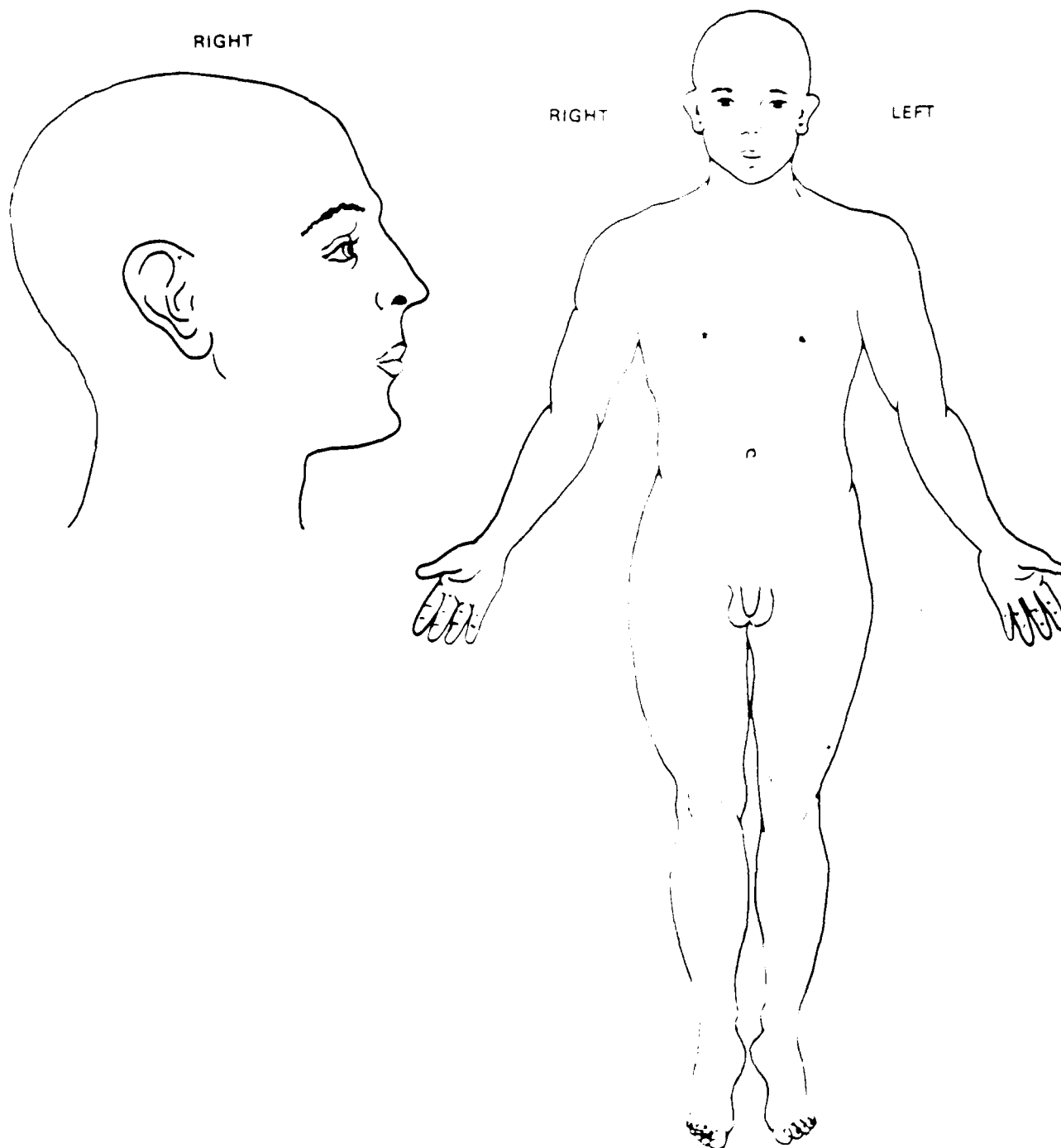
YES NO

- ☒ ☒ RECEIVED COMBAT PAY
☒ ☒ CRASH LANDED, BAILED OUT, OR SHOT DOWN
☒ ☒ RECEIVED SNIPER OR SAPPER FIRE IN OR AROUND BASE
☒ ☒ MOVED KILLED OR WOUNDED PERSONNEL
☒ ☒ SERVED AS A FORWARD AIR CONTROLLER (FAC)
☒ ☒ FLEW IN THE SAME AIRCRAFT WHEN FELLOW CREWMEMBER WAS WOUNDED OR KILLED
☒ ☒ FLEW IN THE SAME FORMATION OR ON THE SAME SORTIE WHEN A FELLOW CREWMEMBER WAS WOUNDED OR KILLED

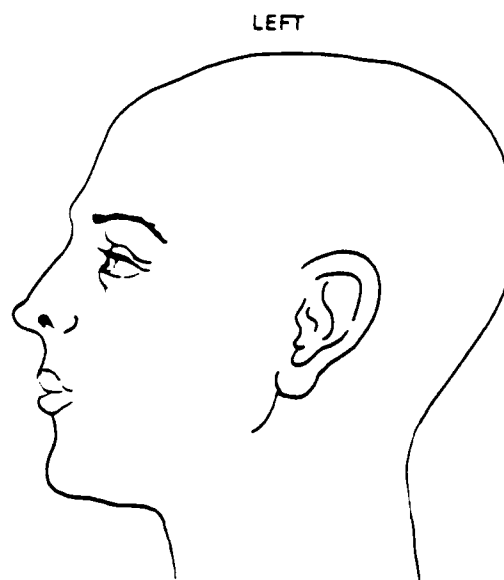
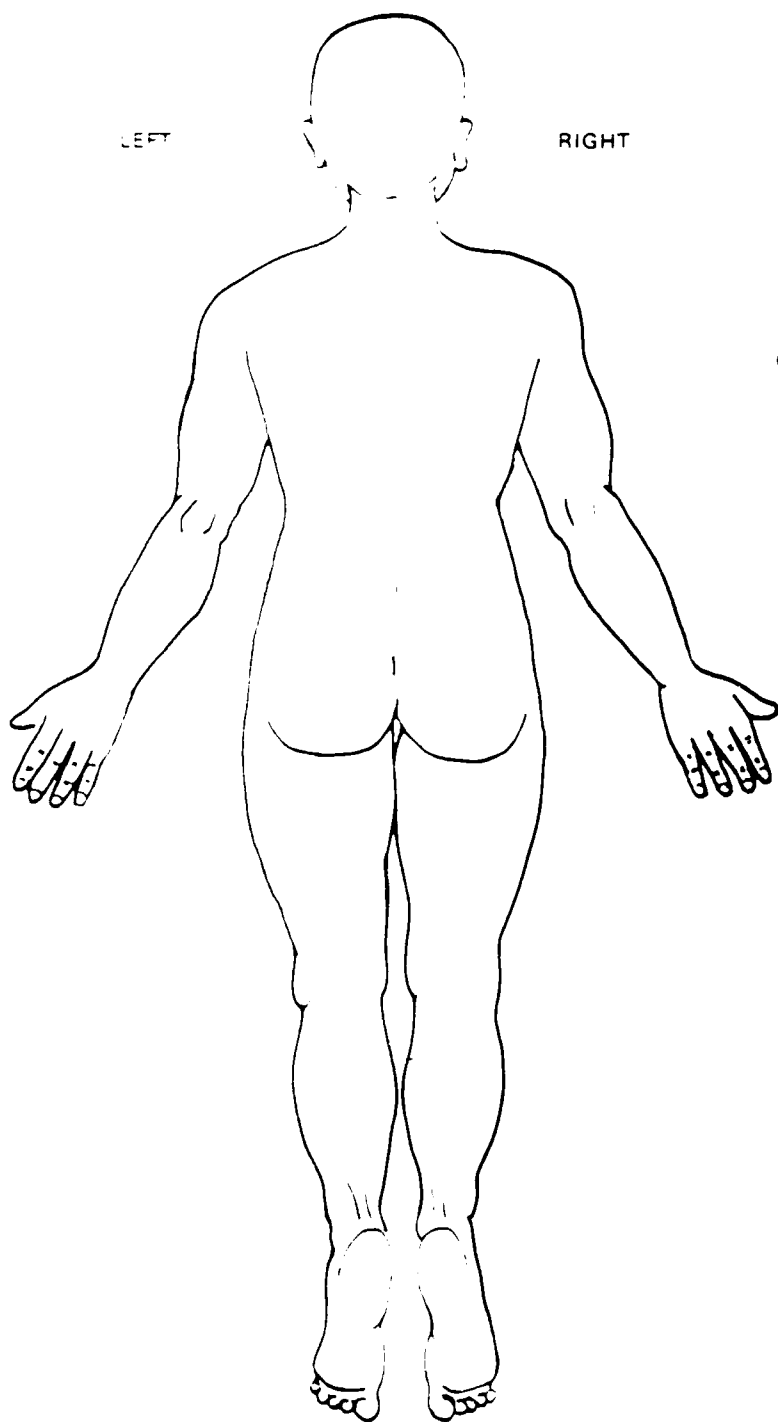
YES NO

- ☒ ☒ FLEW IN AN AIRCRAFT THAT SUSTAINED BATTLE DAMAGE
☒ ☒ RECEIVED NOCTURNAL FLIGHT TRAINING
☒ ☒ FIRE AT HOME BASE OR CAMP
☒ ☒ ENCOUNTERED MINES OR LANDMINE TRAPS
☒ ☒ KILLED VC OR NVA IN A BOMBING RUN
☒ ☒ WOUNDED
☒ ☒ HAD A CLOSE FRIEND KILLED IN ACTION
☒ ☒ ENGAGED VC OR NVA IN A FREIGHT
☒ ☒ CAPTURED BY THE ENEMY

CASE NUMBER		LAST	FIRST	MI	
B		NAME OF PARTICIPANT			
ATTACHMENT TO FORM		FORM AFHS-9 ANATOMICAL CHART			
AFHS-_____					



(OVER)



PRINTED NAME OF EXAMINING PHYSICIAN

SIGNATURE

DATE

CASE NUMBER				NAME OF PARTICIPANT			LAST		FIRST		MI				
B															
DATE ECG RECORDED				MO				DAY				YR			
ECG TECHNICIAN INITIALS				FORM AFHS-10				ELECTROCARDIOGRAM REPORT							



12-LEAD SCALAR ELECTROCARDIOGRAM		
	NORMAL	COMMENTS
	ABNORMAL	
	RBBB	
	LBBB	
	NON-SPECIFIC T-WAVE CHANGES	
	TACHYCARDIA	
	BRADYCARDIA	
	ARRHYTHMIA	

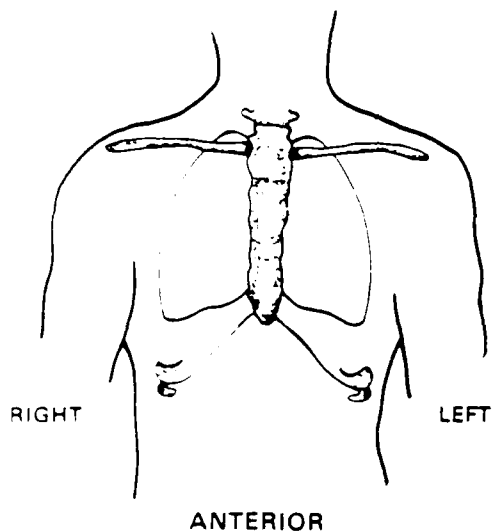
PARTICIPANT COMPLIANCE WITH 4-HOUR ABSTINENCE YES _____ No _____

RHYTHM STRIP
INTERPRETATION OF ARRHYTHMIA

PRINTED NAME OF CARDIOLOGIST

SIGNATURE	DATE

CASE NUMBER				NAME OF PARTICIPANT			
			B	LAST	FIRST	MI	
DATE OF X RAY				FORM AFHS-11			
MO	DAY	YR	PA CHEST X-RAY EXAMINATION				
X RAY TECHNICIAN INITIALS							

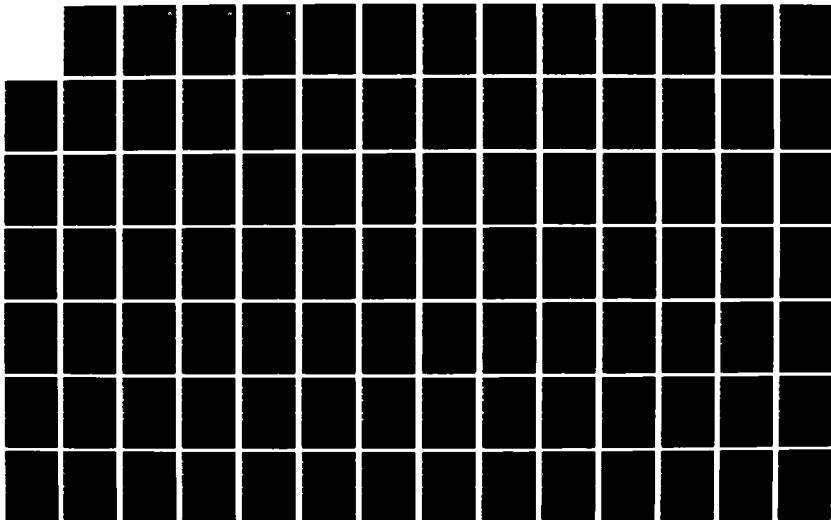


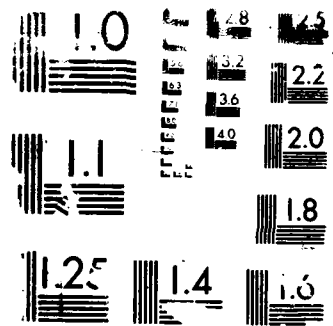
PLEASE MARK THE LOCATION OF ANY SUSPECTED ABNORMALITY(IES) WITH AN ENCIRCLED NUMBER AND DESCRIBE BELOW.

INTERPRETATION OF PA CHEST FILM		
☐	NORMAL	☒ ABNORMAL
COMMENTS:		

PRINTED NAME OF RADIOLOGIST

AD-A189 556 AN EPIDEMIOLOGIC INVESTIGATION OF HEALTH EFFECTS IN AIR 2/5
FORCE PERSONNEL F (U) SCIENCE APPLICATIONS
INTERNATIONAL CORP MCLEAN VA G D LATHROP ET AL
UNCLASSIFIED 01 OCT 87 USAFSAM-TR-87-27-VOL-2 F/G 6/11 ML





RESOLUTION TEST CHART

CASE NUMBER				NAME OF PARTICIPANT			
			B	LAST FIRST MI			
DATE OF DIAGNOSIS		MO	DAY	YR	FORM AFHS-16A		
OUTBRIEFING CONDUCTED		YES	NO	DIAGNOSTIC SUMMARY (MEDICAL)			

CHECK ONE

ICD 9 CM CODE	PRE EXISTING	NEWLY DIAGNOSED	DIAGNOSES BASED ON PHYSICAL EXAMS, ECG, DOPPLER, CHEST X-RAY, SKIN TESTS, AND LABORATORY STUDIES

COMMENTS:

PRINTED NAME OF DIAGNOSTICIAN

SIGNATURE

APPENDIX D

Study Selection and Participation Bias

TELEPHONE QUESTIONNAIRE

1. Compared to other people your age, would you say that your health is:

Excellent.....1
Good.....2
Fair.....3
Poor.....4

-
2. Are you currently taking prescribed medicines for any illness or condition?

Yes.....1 (ANSWER A) No.....2 (GO TO QUESTION 3)

- A. For what illness or condition are you taking prescribed medicines?

-
3. Within the last six months, did illness or injury keep you from going to work or from holding a job? Please do not count work around the house as a job.

Yes.....1 (ANSWER A and B) No.....2 (GO TO QUESTION 4)

- A. How many days or weeks did you miss from work within the past six months?

Days Missed |____|____|____|

OR

Weeks Missed |____|____|____|

Not Able to Work at all.....995

- B. What illnesses or conditions caused you to miss work or prevented you from holding a job?

4. Do you need the help of another person, or use of special equipment, to take care of personal needs such as eating, bathing, dressing, or getting up or around the house? [By "special equipment" we mean anything you use to help yourself, like a wheelchair, railing, walker, cane or other device, which is not usually used by most people.]

Yes.....1 (ANSWER A and B) No.....2 (GO TO QUESTION 5)

- A. Is this help required because of a condition you've already mentioned, or because of some other health condition?

Another condition.....1 (ANSWER B) Condition.....2 (GO TO
already mentioned QUESTION 5)

- B. What illness or condition is that?

5. Now on to a different subject. Did you earn any income from any job in 1984?

Yes.....1 (ANSWER A) No.....2 (DO NOT ANSWER A)

- A. What was your income in 1984?

Less than \$20,000.....1
\$20,000 to \$40,000.....2
More than \$40,000.....3

NAME _____
CASE ID | _ | _ | _ | _ | _ |
PHONE # (_) _____

**Correlation Matrix of 26 Variables at Baseline,
as Determined by 1,154 Nonblack Comparisons**

	D	V	S	H	B	U	P	N	S	R	P	G	E	P	I	C	N	C	A	C	A	T	T	S	G
	B	B	K	M	U	S	U	C	E	B	U	L	C	C	L	Q	N	H	L	O	L	4	E	S	G
	P	C	I	P	N	G	L	V	M	C	L	U	G	A	A	S	V	O	K	P	A	S	D	T	
			N	I	D		S	E	E		M	C		T			A	L	P	R		T	P		
							E		N									H	O						
																		O	S						
TRILL	.06	-.08	.01	.02	.02	.02	.02	.02	.02	.05	.02	.04	.01	-.10	-.01	-.01	.02	.08	-.01	-.06	-.07	.03	<.01	-.08	.14
DEP	<.01	.03	.09	.06	.02	-.04	.05	-.02	<.01	.03	<.01	.20	-.10	-.03	.03	.15	-.09	.23	.08	-.01	<.01	<.01	-.19	.12	.16
WBC				.07	-.04	-.09	.12	.05	.02	.15	.07	.12	-.05	.24	-.18	.04	-.07	.06	.15	.10	.10	.05	.14	<.01	
SKIN				.06	-.01	.03	.06	.03	.05	.02	-.04	.06	-.04	.06	-.07	.01	.06	<.01	.04	.10	.06	.04	.02	.03	<.01
MPID					-.04	-.04	.02	-.04	.03	.04	.02	.12	-.03	-.01	-.18	.05	.01	.10	.06	-.01	-.03	.03	.01	.10	.03
HIN						.22	.02	-.02	-.01	.01	<.01	.02	-.02	-.04	.07	-.03	.01	.03	-.04	-.15	-.06	<.01	-.09	.06	-.09
USG						<.01	-.02	-.02	-.02	.06	.09	.11	.03	-.08	<.01	-.05	.01	.07	<.01	-.12	.01	.02	-.11	-.02	-.07
PULSE								<.01	.08	<.01	-.06	.11	-.10	.06	-.04	.05	.06	.05	.07	-.08	-.02	.04	.05	.08	-.01
NCVE									-.06	.08	.12	-.06	.04	.05	.07	-.10	.30	.02	<.01	-.02	-.01	.02	.02	-.10	-.08
SEMN										-.02	-.10	.05	-.04	.04	<.10	-.02	.01	<.01	<.01	.03	-.08	<.01	<.01	.11	.02
RBC							.08	-.03	<.01		.07	.08	-.03	<.01	-.10	.05	.10	.13	.07	-.11	.01	.20	.02	-.20	-.08
FULM							.01	<.01	-.07			.01	<.01	-.07	-.03	-.10	.14	<.01	-.04	-.04	.07	-.03	.06	-.02	-.02
GLJC												.07		.03	-.05	.06	.10	.17	.12	-.05	-.02	.05	-.23	.13	.09
EGG												.01		.01	-.06	.03	-.02	-.07	.03	-.01	.03	.02	-.07	-.08	
PLAT														-.03	<.01	-.02	.07	.05	.09	-.05	.08	.02	.08	<.01	
IQ															-.06	-.07	-.04	-.08	.02	<.01	-.18	-.06	-.09	-.04	
ONS																-.13	.03	.04	.05	.01	-.03	.04	.12	.15	
NCVA																	<.01	-.04	-.06	-.04	.07	.08	-.06	-.02	
CHOL																		.03	<.01	-.03	.06	-.05	.18	.09	
ALKPHDS																			-.03	-.01	-.06	-.04	.13	.21	
COFRO																				-.22	-.06	.08	.02	.05	
ALA																					-.12	-.03	-.04	-.03	
T4																						.04	.07	.02	
TEST																							-.13	<.01	
SED																								.06	

Correlation Matrix of 20 Variables at First Followup, as Determined by 1,293 Comparisons

D-4

APPENDIX E
Statistical Methods

RUN: Initial screening models:

Model A - all main effects

Model B = Model A + all 2 way interactions

Model C = Model B + all 3 way interactions involving exposure group (E)

TEST: compare C with B for 3 way interactions: Is p value > 0.05 for the global test of all 3 way interactions AND p value > 0.05 for each individual 3 way interaction? (i.e., can all 3 way interactions be dropped?)

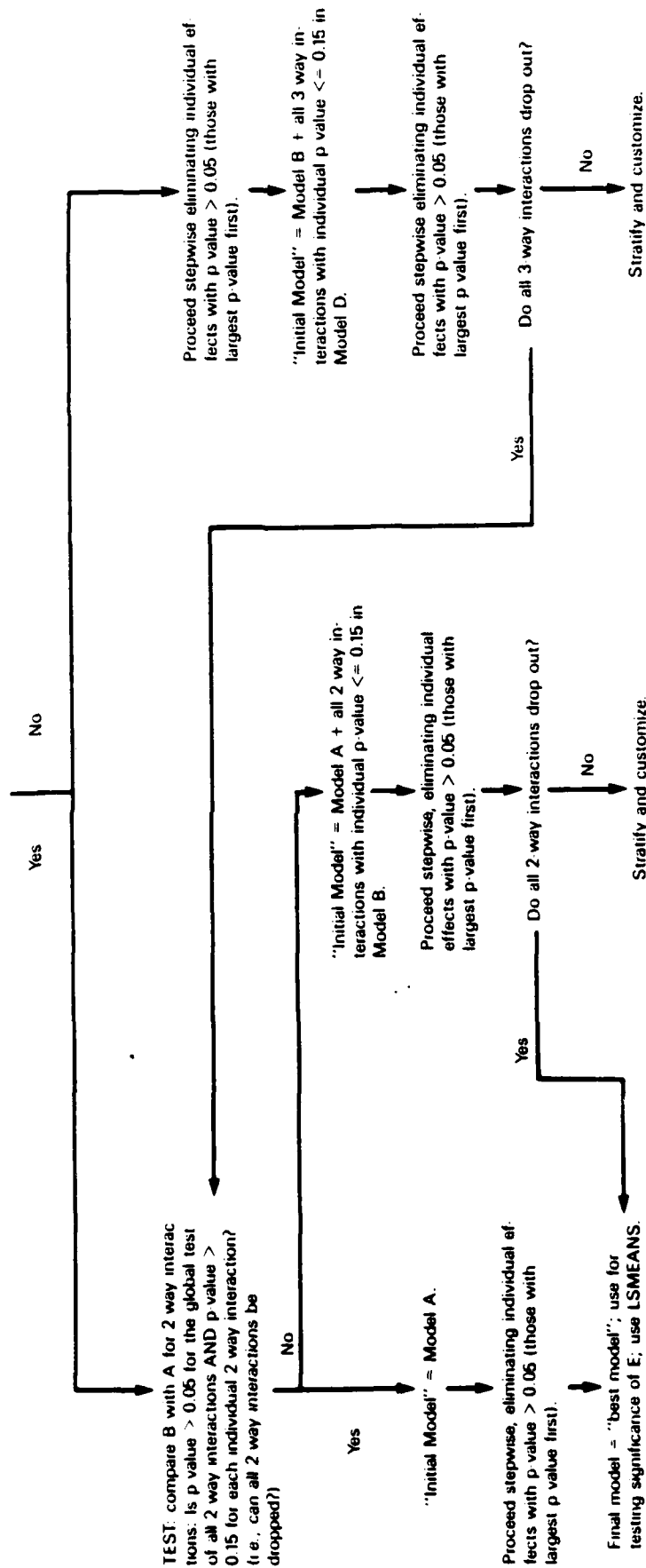


Figure E-1.
Modeling Strategy

Continuous Dependent Variable:

Use SAS® general linear models (GLM) procedure and follow the chart.

Dichotomous Dependent Variable:

Use BMDP®-LR (logistic regression) with MLR option, and follow the chart.
If the number of covariates is huge, use ACE option for Models A, B, C.

Polychotomous Dependent Variable:

Use BMDP®-4F (log-linear model) adding "delta" = 0.1 to each cell, and follow the chart. Use LAMB and COV options for parameter estimates when "best model" found.

APPENDIX F
Exposure Index

TABLE F-1.

**Herbicide Orange Equivalent Gallons and
Ranch Hand Manning by Month**

Mo./Yr.	Gallons Sprayed	Pilot (Occ. 1)	Navigator (Occ. 2)	Officer- Other (Occ. 3)	Enlisted Flyer (Occ. 4)	Enlisted- Other (Occ. 5)
10/61	0	0	0	0	0	0
11/61	0	5	11	1	6	14
12/61	0	9	2	1	7	20
01/62	191,426	14	2	1	7	23
02/62	324,216	14	2	1	7	23
03/62	191,426	15	2	1	7	20
04/62	0	16	2	1	6	14
05/62	0	15	3	1	6	13
06/62	0	12	2	0	5	7
07/62	0	13	2	0	5	4
08/62	0	11	2	0	5	5
09/62	334,126	12	2	0	5	6
10/62	334,126	9	1	0	5	6
11/62	0	10	0	0	5	5
12/62	90,879	8	0	0	4	5
01/63	0	9	0	0	5	4
02/63	0	7	1	0	5	4
03/63	0	12	1	0	5	6
04/63	0	12	1	0	5	6
05/63	0	10	1	0	5	7
06/63	174,024	10	1	0	4	7
07/63	259,150	11	1	0	8	6
08/63	0	8	0	0	8	4
09/63	0	10	1	1	9	4
10/63	339,588	7	1	1	9	6
11/63	377,172	6	1	1	10	6
12/63	942,630	5	1	1	6	6
01/64	121,454	7	1	1	7	5
02/64	363,758	5	1	0	7	4
03/64	755,312	8	1	0	5	4
04/64	56799	9	1	0	6	2
05/64	152,271	10	2	0	5	2
06/64	612,709	7	3	0	5	2
07/64	282,789	9	3	0	6	3
08/64	777,669	9	3	0	5	3
09/64	1,413,945	8	3	0	4	2
10/64	1,413,945	9	3	0	4	2
11/64	1,413,945	11	3	0	4	1
12/64	1,413,945	10	3	0	6	1
01/65	1,296,116	11	4	0	6	1
02/65	1,437,510	12	5	0	6	1
03/65	730,538	13	4	1	6	1

TABLE F-1. (continued)

**Herbicide Orange Equivalent Gallons and
Ranch Hand Manning by Month**

Mo./Yr.	Gallons Sprayed	Pilot (Occ. 1)	Navigator (Occ. 2)	Officer- Other (Occ. 3)	Enlisted Flyer (Occ. 4)	Enlisted- Other (Occ. 5)
04/65	659,841	14	3	1	6	2
05/65	1,767,431	15	4	1	6	2
06/65	0	16	4	1	7	4
07/65	942,630	19	4	1	7	3
08/65	26,500	19	4	1	7	3
09/65	44,650	22	4	1	6	3
10/65	78,850	23	4	1	6	6
11/65	106,900	24	6	1	10	12
12/65	148,525	23	5	1	11	12
01/66	152,450	21	6	1	10	16
02/66	129,150	22	6	1	10	26
03/66	135,600	21	4	2	10	32
04/66	141,050	22	5	2	10	37
05/66	183,900	21	6	2	9	38
06/66	191,830	20	6	2	10	41
07/66	112,300	21	8	2	9	45
08/66	192,050	26	8	2	11	46
09/66	213,970	28	9	2	12	62
10/66	122,040	34	8	3	16	85
11/66	164,800	41	8	4	18	104
12/66	212,100	45	9	5	28	123
01/67	202,360	49	9	5	28	123
02/67	363,830	59	13	5	28	116
03/67	285,400	51	13	4	28	114
04/67	208,300	50	14	4	33	108
05/67	251,320	53	15	4	34	101
06/67	335,860	55	13	3	36	105
07/67	253,884	51	15	3	37	163
08/67	162,895	63	13	4	32	160
09/67	298,615	60	18	5	33	161
10/67	265,335	55	19	5	36	149
11/67	372,425	55	17	6	33	145
12/67	383,605	58	18	6	34	129
01/68	333,595	54	19	6	33	127
02/68	27,450	65	19	6	35	141
03/68	48,200	69	20	5	34	160
04/68	307,740	72	20	6	36	161
05/68	336,300	75	18	6	32	160
06/68	226,325	77	18	6	37	164

TABLE F-1. (continued)

**Herbicide Orange Equivalent Gallons and
Ranch Hand Manning by Month**

Mo./Yr.	Gallons Sprayed	Pilot (Occ. 1)	Navigator (Occ. 2)	Officer- Other (Occ. 3)	Enlisted Flyer (Occ. 4)	Enlisted- Other (Occ. 5)
07/68	258,100	84	19	7	42	187
08/68	289,160	91	18	9	45	192
09/68	216,300	89	22	8	44	147
10/68	72,250	89	20	8	49	155
11/68	189,100	101	17	7	53	153
12/68	218,750	94	17	8	51	154
01/69	264,450	98	19	7	51	154
02/69	197,450	91	18	5	51	166
03/69	356,500	90	17	5	53	172
04/69	339,800	94	20	6	54	161
05/69	353,800	93	19	6	54	151
06/69	383,533	88	19	7	57	155
07/69	287,425	91	16	6	55	152
08/69	299,100	85	16	6	55	155
09/69	206,800	83	15	6	61	142
10/69	181,000	83	17	6	61	122
11/69	205,100	90	16	6	60	118
12/69	276,900	76	16	5	52	114
01/70	186,350	66	15	5	54	116
02/70	152,100	58	15	5	41	122
03/70	153,730	59	13	5	39	125
04/70	45,700	54	13	5	37	109
05/70	0	51	14	5	29	94
06/70	0	47	14	3	18	84
07/70	0	44	11	2	16	74
08/70	0	40	9	1	14	63
09/70	0	40	7	1	13	43
10/70	0	34	6	1	14	37
11/70	0	30	5	1	15	35
12/70	0	25	4	1	13	30
01/71	0	23	4	1	14	28
02/71	0	23	4	1	14	28
03/71	0	23	4	1	14	28
04/71	0	23	4	1	14	28
05/71	0	23	4	1	14	28
06/71	0	28	4	1	14	28
07/71	0	29	4	1	14	28
08/71	0	29	4	1	14	28
09/71	0	29	4	1	14	28
10/71	0	29	4	1	14	28

Source: Baseline Morbidity Report, 24 February 1984.

APPENDIX G
General Health

APPENDIX G: General Health

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TABLE G-1.

Summary Statistics for
General Health Covariates by Group

Covariate	Covariate Category	Group		p-Value
		<u>Ranch Hand</u> Percent	<u>Comparison</u> Percent	
Race	Black	5.9	6.4	0.673
	Nonblack	94.1	93.6	
Occupation	Officer	37.4	37.4	0.727
	Enlisted Flyer	17.4	16.2	
	Enlisted Groundcrew	45.2	46.3	
		<u>Mean±SE</u>	<u>Mean±SE</u>	
Age (at Baseline)	--	43.94±0.24	43.85±0.22	0.789
Personality Score	--	-1.18±0.29	-1.56±0.25	0.332

-- Covariate not categorized for these results.

TABLE G-2.

Unadjusted Analysis for Self-Perception of Health by Group
(Original Comparisons Only)

Group	Self-Perception of Health								Total
	Excellent		Good		Fair		Poor		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Ranch Hand	490	48.2	434	42.7	74	7.3	18	1.8	1,016
Original Comparison	490	51.3	403	42.2	55	5.8	7	0.7	955
p=0.075									

TABLE G-3.

Unadjusted Analysis for Appearance of Acute
Illness or Distress by Group
(Original Comparisons Only)

Group	Acute Illness or Distress				Total	p-Value*
	Yes		No			
	Number	Percent	Number	Percent		
Ranch Hand	4	0.4	1,010	99.6	1,014	0.340
Original Comparison	6	0.6	949	99.4	955	

*Fisher's exact test, 1-sided.

TABLE G-4.

Unadjusted Analysis for Appearance of Relative Age by Group
(Original Comparisons Only)

Group	Appearance of Relative Age						Total	p-Value
	Younger		Same		Older			
	Number	Percent	Number	Percent	Number	Percent		
Ranch Hand	16	1.6	957	94.3	42	4.1	1,015	0.454
Original Comparison	9	0.9	906	94.9	40	4.2	955	

TABLE G-5.

**Adjusted Relative Risks of Appearance of
Relative Age by Occupation
(Original Comparisons Only)**

Occupation	Adjusted Relative Risk	95% C.I.	p-Value
Officer	3.27	(0.67,15.8)	0.142
Enlisted Flyer	0.47	(0.20,1.12)	0.089
Enlisted Groundcrew	1.17	(0.65,2.08)	0.603

TABLE G-6.

**Unadjusted Analysis for Sedimentation Rate by Group
(Original Comparisons Only)**

Group	Sedimentation Rate				Total	p-Value
	Normal ≤20 mm/hr		Abnormal >20 mm/hr			
	Number	Percent	Number	Percent		
Ranch Hand	957	94.2	59	5.8	1,016	0.059
Original Comparison	918	96.1	37	3.9	955	

TABLE G-7.

Unadjusted Analysis for Percent Body Fat by Group
(Original Comparisons Only)

Group	Percent Body Fat				Total	p-Value
	Lean/Normal ≤25%		Obese >25%			
	Number	Percent	Number	Percent		
Ranch Hand	831	81.8	185	18.2	1,016	0.230
Original Comparison	759	79.6	195	20.4	954	

APPENDIX H

Malignancy

APPENDIX H: Malignancy

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TABLE H-1.

Unadjusted Analyses of Followup Participants with Verified and Suspected Neoplasms in the Baseline-Followup Interval by Group
(Nonblacks and Blacks, Original Comparisons Only)

Site	Neoplasm Behavior and Status	Group*				Total**	p-Value***
		Ranch Hand		Original Comparison			
		Number**	Percent	Number**	Percent		
Skin	Malignant						
	Verified	37	3.6	31	3.2	68	0.711
	Verified and Suspected	47	4.6	45	4.7	92	0.999
	Benign						
	Verified	76	7.5	65	6.8	141	0.600
	Verified and Suspected	78	7.7	68	7.1	146	0.667
	Uncertain Behavior and Unspecified Nature:						
	Verified	1	0.1	1	0.1	2	0.999
	Verified and Suspected	1	0.1	1	0.1	2	0.999
	Any Skin Neoplasm ^a						
	Verified	114	11.2	96	10.1	210	0.422
	Verified and Suspected	124	12.2	113	11.8	237	0.835
Systemic	Malignant						
	Verified	8	0.8	6	0.6	14	0.791
	Verified and Suspected	12	1.2	11	1.2	23	0.999
	Benign						
	Verified	42	4.1	41	4.3	83	0.911
	Verified and Suspected	48	4.7	49	5.1	97	0.679
	Uncertain Behavior and Unspecified Nature:						
	Verified	6	0.6	6	0.6	12	0.999
	Verified and Suspected	6	0.6	9	0.9	15	0.442
	Any Systemic Neoplasm ^b						
	Verified	55	5.4	51	5.3	106	0.999
	Verified and Suspected	65	6.4	66	6.9	131	0.652

TABLE H-1. (continued)

Unadjusted Analyses of Followup Participants with Verified and Suspected Neoplasms in the Baseline-Followup Interval by Group (Nonblacks and Blacks, Original Comparisons Only)

Site	Neoplasm Behavior and Status	Group*				Total**	p-Value***
		Ranch Hand		Original Comparison			
		Number**	Percent	Number**	Percent		
All Neoplasms	Malignant, Benign, Uncertain Behavior, Unspecified Nature ^c						
	Verified	161	15.9	140	14.7	301	0.491
	Verified and Suspected	177	17.4	169	17.7	346	0.906

*Sample sizes: 1,016 Ranch Hands, 955 Original Comparisons.

**Number of participants.

***Fisher's exact test.

^aParticipant has one or more malignant, benign, or unspecified skin neoplasms.

^bParticipant has one or more malignant, or benign skin or systemic neoplasms.

^cParticipant has one or more malignant, benign, or unspecified systemic neoplasms.

TABLE H-2.

Unadjusted Analyses of Nonblack Followup Participants with Verified and Suspected Malignant Skin Neoplasms in the Baseline-Followup Interval by Cell Type and Group
(Original Comparisons Only)

Cell Type	Status	Statistic*	Group**			Est. Relative Risk (95% C.I.)	p-Value
			Ranch Hand	Original Comparison			
Basal Cell Carcinoma	Verified	Number/% Total Neoplasms	29 42	22 31	2.5%	1.24 (0.71, 2.18)	0.480
	Verified & Suspected	Number/% Total Neoplasms	36 53	36 46	4.0%	0.94 (0.58, 1.50)	0.811
Squamous Cell Carcinoma	Verified	Number/% Total Neoplasms	4 6	3 3	0.3%	1.25 (0.28, 5.61)	0.999
	Verified & Suspected	Number/% Total Neoplasms	4 6	3 3	0.3%	1.25 (0.28, 5.61)	0.999
Melanoma	Verified	Number/% Total Neoplasms	1 2	3 3	0.3%	0.31 (0.03, 3.01)	0.359
	Verified & Suspected	Number/% Total Neoplasms	1 2	4 4	0.4%	0.23 (0.03, 2.10)	0.204
All Malignant Skin Neoplasms	Verified	Number/% Total Neoplasms	37 56	31 41	3.5%	1.13 (0.69, 1.83)	0.711
	Verified & Suspected	Number/% Total Neoplasms	47 70	45 58	5.0%	0.98 (0.64, 1.49)	0.999
Sun-Exposure Related Malignant Neoplasms*	Verified	Number/% Total Neoplasms	32 47	25 33	2.8%	1.21 (0.71, 2.06)	0.504
	Verified & Suspected	Number/% Total Neoplasms	39 58	39 50	4.4%	0.94 (0.59, 1.47)	0.817

*Number and percent of participants; total number of malignant neoplasms of specified cell type.

**Number of participants -- 956 Ranch Hands, 897 Original Comparisons.

*Basal cell carcinoma, melanoma, and malignant epithelial neoplasms NOS.

TABLE H-3.

Association Between Baseline-Followup Interval Basal Cell Carcinoma Incidence
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Age	Born ≥ 1942	11	1.3	0.001	14	1.6	<0.001
	Born 1923-41	43	3.6		61	5.1	
	Born ≤ 1922	5	5.8		9	10.3	
Occupation	Officer	31	3.7	0.047	47	5.5	0.003
	Enlisted Flyer	11	3.1		14	3.9	
	Enlisted Groundcrew	17	1.8		23	2.4	
Total Lifetime Smoking (Pack-Years)	0	16	2.6	0.023	21	3.4	0.005
	>0-20	21	2.1		28	2.8	
	>20-40	12	3.1		24	6.1	
	>40	10	6.4		11	7.0	
Total Lifetime Alcohol Consumption (Drink-Years)	0	4	2.8	0.980	5	3.6	0.800
	>0-5	20	2.8		27	3.8	
	>5-30	18	2.8		24	3.7	
	>30-100	13	2.7		24	5.0	
	>100	4	3.9		4	3.9	
Ethnic Background ^a	A	49	3.1	0.333	72	4.6	0.046
	B	8	1.9		9	2.1	
	C	1	1.6		1	1.6	
	D	0	0.0		0	0.0	
Skin Color	Dark	0	0.0	0.156	0	0.0	0.232
	Medium	1	1.4		2	2.7	
	Pale	3	1.0		5	1.6	
	Dark Peach	43	3.4		56	4.4	
	Pale Peach	12	2.3		21	4.0	

TABLE H-3. (continued)
 Association Between Baseline-Followup Interval Basal Cell Carcinoma Incidence
 and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Eye Color	Brown	18	2.8	0.590	24	3.7	0.998
	Hazel	17	3.7		18	4.0	
	Green	2	1.7		5	4.2	
	Grey	2	2.2		4	4.3	
	Blue	20	2.4		33	3.9	
Hair Color	Black	11	2.5	0.152	16	3.6	0.040
	Dark Brown	25	2.4		37	3.6	
	Light Brown	18	3.2		24	4.3	
	Red	2	12.5		3	18.8	
	Blond	3	2.8		4	3.7	
Residential History (Average Latitude)	≥37°	21	1.9	0.008	31	2.7	0.004
	<37°	38	3.7		53	5.2	
Skin Reaction to First 30 Min. of Sun Exposure	Burns	7	2.8	0.001	11	4.5	<0.001
	Usually Burns	24	5.6		32	7.5	
	Burns Mildly	17	2.1		22	2.7	
	Rarely Burns	11	1.6		19	2.8	
Skin Reaction to >2 Hrs. of Sun After First Exposure	Burns Painfully	2	1.7	<0.001	4	3.3	0.027
	Burns	21	6.2		23	6.8	
	Becomes Red	22	2.1		35	3.4	
	No Reaction	14	2.1		22	3.3	
Skin Reaction After Repeated Exposure to Sun	Freckles, No Tan	0	0	<0.001	1	2.2	0.001
	Tans Mildly	20	6.4		25	8.0	
	Tans Moderately	22	2.2		33	3.2	
	Tans Deep Brown	16	2.0		24	3.1	

TABLE H-3. (continued)
Association Between Baseline-Followup Interval Basal Cell Carcinoma Incidence
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Sun Reaction Index	Tends to Burn	2	1.4	<0.001	4	2.8	<0.001
	Mild Reaction	27	6.0		32	7.1	
	Tends to Tan	29	1.9		47	3.0	
Exposures to Carcinogens	Asbestos	Yes 10 No 49	2.2 2.9	0.519	17 67	3.7 3.9	0.999
	Nonmedical x rays	Yes 17 No 42	3.4 2.5	0.272	26 58	5.3 3.5	0.084
Industrial Chemicals		Yes 28 No 31	2.5 3.0	0.511	40 44	3.6 4.2	0.437
	Herbicides	Yes 40 No 19	3.2 2.1	0.142	57 27	4.5 3.0	0.072
Insecticides		Yes 40 No 19	3.1 2.2	0.281	55 29	4.2 3.4	0.365
	Degreasing Chemicals	Yes 35 No 24	2.8 2.7	0.894	47 37	3.7 4.1	0.735
Composite Carcinogen Exposure		Yes 15 No 42	3.1 2.5	0.523	18 64	3.7 3.9	0.999

TABLE H-3. (continued)
Association Between Baseline-Followup Interval Basal Cell Carcinoma Incidence
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Exposure to Individual Carcinogens	Anthracene	Yes 0	0.0	0.999	0	0.0	0.999
		No 59	2.7		84	3.9	
	Arsenic	Yes 2	4.9	0.301	3	7.3	0.206
		No 56	2.6		80	3.8	
	Benzene	Yes 4	5.4	0.140	5	6.8	0.207
		No 55	2.6		79	3.8	
	Benzidine	Yes 1	9.1	0.263	1	9.1	0.354
		No 58	2.7		83	3.9	
	Chromates	Yes 3	3.6	0.484	4	4.8	0.558
		No 54	2.6		78	3.8	
	Coal Tar	Yes 1	1.5	0.999	2	2.9	0.999
		No 58	2.8		82	3.9	
	Creosote	Yes 6	3.8	0.441	7	4.4	0.669
		No 53	2.6		77	3.8	
	Aminodiphenyl	Yes 0	0.0	0.999	0	0.0	0.999
		No 58	2.7		83	3.9	
	Chloromethyl Ether	Yes 1	4.8	0.442	1	4.8	0.566
		No 58	2.7		83	3.9	
	Mustard Gas	Yes 0	0.0	0.999	0	0.0	0.999
		No 59	2.7		84	3.9	

TABLE H-3. (continued)

Association Between Baseline-Followup Interval Basal Cell Carcinoma Incidence
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Exposure to Individual Carcinogens (continued)	Naphthylamine	Yes 3	5.8	0.161	4	7.7	0.136
		No 55	2.6		79	3.7	
	Cutting Oils	Yes 9	4.0	0.200	12	5.3	0.271
		No 50	2.6		72	3.7	
	Trichloroethylene	Yes 4	2.2	0.814	6	3.3	0.842
		No 55	2.8		78	3.9	
	Ultraviolet Light	Yes 2	4.6	0.339	2	4.6	0.688
		No 57	2.7		82	3.9	
	Vinyl Chloride	Yes 0	0.0	0.999	1	3.2	0.999
		No 59	2.8		83	3.9	

*Number of participants with basal cell carcinoma.

*Ethnic Background:

- A - English, Welsh, Scottish, Irish.
- B - Scandinavian, German, Polish, Russian, other Slavic, Jewish, French.
- C - Spanish, Italian, Greek.
- D - Mexican, American Indian, Asian.

TABLE H-4.

Association Between Baseline-Pollovup Interval Sun Exposure-Related Skin Malignancy Incidence
and the Covariates for Combined Polloovup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Age	Born ≥1942	14	1.6	0.004	19	2.2	<0.001
	Born 1923-41	46	3.8		64	5.4	
	Born ≤1922	5	5.8		9	10.3	
Occupation	Officer	33	3.9	0.077	50	5.9	0.006
	Enlisted Flyer	12	3.3		15	4.2	
	Enlisted Groundcrew	20	2.1		27	2.8	
Total Lifetime Smoking (Pack-Years)	0	19	3.1	0.012	24	3.9	0.007
	>0-20	22	2.2		31	3.1	
	>20-40	13	3.3		25	6.4	
	>40	11	7.0		12	7.6	
Total Lifetime Alcohol Consumption (Drink-Years)	0	4	2.8	0.858	5	3.6	0.736
	>0-5	22	3.1		29	4.0	
	>5-30	18	2.8		26	4.0	
	>30-100	15	3.1		26	5.4	
	>100	5	4.8		5	4.8	
Ethnic Background	A	54	3.4	0.213	78	4.9	0.036
	B	8	1.9		10	2.4	
	C	1	1.6		1	1.6	
	D	0	0.0		0	0.0	
Skin Color	Dark	0	0.0	0.116	0	0.0	0.213
	Medium	1	1.4		2	2.7	
	Pale	4	1.3		6	2.0	
	Dark Peach	48	3.8		62	4.9	
	Pale Peach	12	2.3		22	4.2	

TABLE H-4. (continued)

Association Between Baseline-Followup Interval Sun Exposure-Related Skin Malignancy Incidence
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Eye Color	Brown	20	3.1	0.461	27	4.2	0.999
	Hazel	19	4.2		20	4.4	
	Green	2	1.7		5	4.2	
	Grey	2	2.2		4	4.3	
	Blue	22	2.6		36	4.2	
Hair Color	Black	12	2.7	0.171	17	3.9	0.051
	Dark Brown	27	2.6		40	3.9	
	Light Brown	20	3.6		26	4.6	
	Red	2	12.5		3	18.8	
	Blond	4	3.7		6	5.6	
Residential History (Average Latitude)	>37°	24	2.1	0.011	34	3.0	0.003
	<37°	41	4.0		58	5.7	
Skin Reaction to First 30 Min. of Sun Exposure	Burns	8	3.2	<0.001	13	5.3	<0.001
	Usually Burns	26	6.1		34	7.9	
	Burns Mildly	20	2.5		26	3.2	
	Rarely Burns	11	1.6		19	2.8	
Skin Reaction to >2 Hrs. of Sun After First Exposure	Burns Painfully	4	3.3	0.001	6	5.0	0.016
	Burns	22	6.5		25	7.4	
	Becomes Red	24	2.3		38	3.6	
	No Reaction	15	2.3		23	3.5	
Skin Reaction After Repeated Exposure to Sun	Freckles, No Tan	0	0	<0.001	1	2.2	<0.001
	Tans Mildly	22	7.0		27	8.6	
	Tans Moderately	23	2.3		35	3.4	
	Tans Deep Brown	19	2.4		28	3.6	

TABLE H-4. (continued)

Association Between Baseline-Followup Interval Sun Exposure-Related Skin Malignancy Incidence
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Sun Reaction Index	Tends to Burn	4	2.8	<0.001	6	4.1	<0.001
	Mild Reaction	28	6.2		34	7.5	
	Tends to Tan	32	2.1		51	3.3	
Exposures to Carcinogens	Asbestos	Yes 10 No 55	2.2 3.2	0.283	17 75	3.7 4.4	0.602
	Nonmedical X Rays	Yes 18 No 47	3.6 2.8	0.367	27 65	5.5 3.9	0.129
Industrial Chemicals		Yes 33 No 32	2.9 3.1	0.900	45 47	4.0 4.5	0.594
	Herbicides	Yes 43 No 22	3.4 2.4	0.203	61 31	4.8 3.4	0.130
Insecticides		Yes 42 No 23	3.2 2.7	0.523	58 34	4.4 4.0	0.664
	Degreasing Chemicals	Yes 37 No 28	2.9 3.1	0.899	50 42	4.0 4.6	0.451
Composite Carcinogen Exposure		Yes 15 No 48	3.1 2.9	0.879	18 72	3.7 4.4	0.608

TABLE H-4. (continued)

Association Between Baseline-Pollup Interval Sun Exposure-Related Skin Malignancy Incidence
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Exposure to Individual Carcinogens	Anthracene	Yes 0 No 65	0.0 3.0	0.999	0 92	0.0 4.3	0.999
	Arsenic	Yes 2 No 62	4.9 2.9	0.343	3 88	7.3 4.1	0.246
	Benzene	Yes 4 No 61	5.4 2.9	0.280	5 87	6.8 4.2	0.241
	Benzidine	Yes 1 No 64	9.1 3.0	0.285	1 91	9.1 4.2	0.380
	Chromates	Yes 3 No 60	3.6 2.9	0.734	4 86	4.8 4.1	0.777
	Coal Tar	Yes 1 No 64	1.5 3.1	0.721	2 90	2.9 4.3	0.999
	Creosote	Yes 6 No 59	3.8 2.9	0.473	7 85	4.4 4.2	0.839
	Aminodiphenyl	Yes 0 No 64	0.0 3.0	0.999	0 91	0.0 4.2	0.999
	Chloromethyl Ether	Yes 1 No 64	4.8 3.0	0.475	1 91	4.8 4.3	0.600
	Mustard Gas	Yes 0 No 65	0.0 3.0	0.999	0 92	0.0 4.3	0.999

TABLE H-4. (continued)

Association Between Baseline-Pollup Interval Sun Exposure-Related Skin Malignancy Incidence
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified				Verified and Suspected			
		Number*	Percent	p-Value		Number*	Percent	p-Value	
Exposure to Individual Carcinogens (continued)	Naphthylamine	Yes	3	5.8	0.197	4	7.7	0.277	
		No	61	2.9		87	4.1		
	Cutting Oils	Yes	9	4.0	0.406	12	5.3	0.384	
		No	56	2.9		80	4.1		
	Trichloroethylene	Yes	4	2.2	0.653	6	3.3	0.701	
		No	61	3.1		86	4.4		
	Ultraviolet Light	Yes	2	4.6	0.384	2	4.6	0.711	
		No	63	3.0		90	4.3		
	Vinyl Chloride	Yes	0	0.0	0.999	1	3.2	0.999	
		No	65	3.1		91	4.3		

*Number of participants with sun exposure-related skin malignancies.

*Ethnic Background:

- A - English, Welsh, Scottish, Irish.
- B - Scandinavian, German, Polish, Russian, other Slavic, Jewish, French.
- C - Spanish, Italian, Greek.
- D - Mexican, American Indian, Asian.

TABLE H-5.

**Summary Results of Main Effects Models for Selection
of Covariates for Basal Cell Carcinomas in the Baseline-Followup Interval**

Covariate	Category	Basal Cell Carcinoma in Baseline-Followup Interval	
		p-Value	
		Model 1 ^a	Model 2 ^b
Group	Ranch Hand, Comparison	0.264	0.259
Age	Born ≥ 1942 , 1923-1941, ≤ 1922	0.001	0.002
Occupation	Officer, Enlisted Flyer, Enlisted Groundcrew	0.683	0.609
Lifetime Smoking	0-20, >20-40, >40 Pack-years	0.091	0.096
Lifetime Alcohol	0-30, >30	0.743	0.819
Ethnic Background ^c	A, Not A	0.391	0.425
Skin Color	Peach, Not Peach	0.084	0.055
Hair Color	Blond or Red, Other	0.880	0.761
Reaction of Skin to 30 Minutes Sun	Burns, Usually Burns, Other	0.195	--
Reaction of Skin to >2 Hours of Sun	Burns Painfully, Burns, Other	0.007	--
Reaction of Skin to Repeated Sun Exposure	Freckles With no Tan, Tans Easily, Other	<0.001	--
Sun-Reaction Index	Burns With Freckles, Intermediate Reaction, Tans Easily	--	<0.001
Residential History	<37° N latitude, $\geq 37^\circ$ N latitude	0.006	0.008

^aModel includes three reactions of skin to sun variables.

^bModel includes sun-reaction index.

^cEthnic background: A - English, Welsh, Scottish, Irish.

TABLE H-6.

Adjusted Analyses of Nonblack Followup Participants for Malignant
Skin Neoplasm Incidence During Baseline-Followup Interval
(Original Comparisons Only)

Variable	Status	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
Basal Cell Carcinoma	Verified	1.46 (0.82,2.61)	0.198	AGE (p<0.001) LAT (p=0.015) SUNREAC (p=0.001) GRP*SUNREAC (marginal: p=0.051)
	Verified & Suspected	****	****	GRP*SUNREAC (p=0.007) AGE (p<0.001) LAT (p=0.006)
Sun-Exposure Skin Neoplasms	Verified	****	****	GRP*SKIN (p=0.036) AGE (p<0.001) SUNREAC (p=0.003) LAT (p=0.015)
	Verified & Suspected	****	****	GRP*SUNREAC (p=0.030) SKIN*SUNREAC (p=0.042) AGE (p<0.001) LAT (p=0.008)

*Abbreviations:

LAT: average lifetime residential latitude
 SUNREAC: sun reaction index
 GRP: group
 OCC: occupation
 SKIN: skin color

****Group-by-covariate interactions--adjusted relative, confidence interval, and p-value are not presented.

TABLE H-7.

Summary of Group-by-Covariate Interactions for
Malignant Skin Neoplasms in the Baseline-Followup Interval
(Nonblacks Only)

Variable Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
			Ranch Hand		Comparison			
			Number	Percent	Number	Percent		
	Officer	n	372		475			
		Yes	14	3.8	16	3.4	1.14 (0.54, 2.40)	0.726
		No	358	96.2	459	96.6		
Basal Cell Group-by-Carcinoma Occupation (Verified Only)	Enlisted Flyer	n	166		193			
		Yes	9	5.4	2	1.0	6.50 (1.36, 31.01)	0.019
		No	157	94.6	191	99.0		
Enlisted Groundcrew	Enlisted Groundcrew	n	416		539			
		Yes	6	1.4	11	2.0	0.81 (0.29, 2.23)	0.680
		No	410	98.6	528	98.0		

TABLE H-7. (continued)

Summary of Group-by-Covariate Interactions for
Malignant Skin Neoplasms in the Baseline-Followup Interval
(Nonblacks Only)

Variable Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
			Ranch Hand		Comparison			
			Number	Percent	Number	Percent		
Burns Easily	n Yes No		68		77			
			0	0	4	5.2	-- ^a	0.121 ^b
			68	100	73	94.8		
Basal Cell Group-by-Carcinoma Sun Reaction (Verified Index Plus Suspected)	n Yes No	Intermediate Reaction	192		262			
			17	8.9	15	5.7	1.76 (0.84, 3.69)	0.134
			175	91.1	247	94.3		
Tans Easily	n Yes No		693		867			
			19	2.7	28	3.2	0.90 (0.50, 1.64)	0.731
			674	97.3	839	96.8		

^aAdjusted relative risk not calculated because of a zero cell count.

^bFisher's exact test.

TABLE H-8.

Summary of Group-by-Covariate Interactions for
Malignant Skin Neoplasms in the Baseline-Followup Interval
(Original Comparisons Only*)

Variable Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
			Ranch Hand		Original Comparison			
			Number	Percent	Number	Percent		
	Burns Easily	n	68		56			
		Yes	0	0	2	3.6	-- ^a	0.202 ^b
		No	68	100	54	96.4		
Basal Cell Group-by-Carcinoma Sun Reaction (Verified Index Only)	Intermediate	n	192		186			
		Yes	15	7.8	6	3.2	2.81 (1.05, 7.55)	0.040
		No	177	92.2	180	96.8		
	Tans Easily	n	694		653			
		Yes	14	2.0	13	2.0	1.13 (0.52, 2.43)	0.758
		No	680	98.0	640	98.0		

TABLE H-8. (continued)

Summary of Group-by-Covariate Interactions for
Malignant Skin Neoplasms in the Baseline-Followup Interval
(Original Comparisons Only*)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
Basal Cell Carcinoma (Verified Plus Suspected)	Burns Easily	n		68		55			
		Yes		0	0	4	7.3	-- ^a	0.038 ^b
		No		68	100	51	92.7		
	Intermediate	n		192		185			
		Yes		17	8.9	8	4.3	2.38 (0.98, 5.76)	0.055
		No		175	91.1	177	95.7		
	Tans Easily	n		694		646			
		Yes		19	2.7	23	3.6	0.86 (0.46, 1.60)	0.627
		No		675	97.3	623	96.4		

TABLE H-8. (continued)

Summary of Group-by-Covariate Interactions for
Malignant Skin Neoplasms in the Baseline-Followup Interval
(Original Comparisons Only*)

Variable	Interaction	Stratification	Statistic	Group						Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison					
				Number	Percent	Number	Percent	Number	Percent		
Sun Exposure Related Neoplasms (Verified Only)	Peach	n									
		Yes	768	4.0	744	2.7	0.20	(0.02, 1.80)	0.150		
		No	31	96.0	20	97.3					
	Not Peach	n									
		Yes	185	0.5	150	2.7	1.70	(0.95, 3.04)	0.073		
		No	1	99.5	4	97.3					

TABLE H-8. (continued)

Summary of Group-by-Covariate Interactions for
Malignant Skin Neoplasms in the Baseline-Followup Interval
(Original Comparisons Only*)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
Sun Exposure Related Neoplasms (Verified Plus Suspected)	Burns Easily	n							
		Yes	68	2.9	56	7.1	0.47 (0.08, 2.74)	0.401	
		No	2	97.1	4	92.9			
	Intermediate	n							
		Yes	192	9.4	186	4.3	2.74 (1.14, 6.63)	0.025	
		No	18	90.6	8	95.7			
	Tans Easily	n							
		Yes	693	2.7	652	4.0	0.75 (0.41, 1.37)	0.343	
		No	19	97.3	26	96.0			
			674		626				

*Blacks excluded.

^aAdjusted relative risk not calculated because of a zero cell count.^bFisher's exact test.

TABLE H-9.

Followup Participants With Verified Malignant Systemic
Neoplasms in Baseline-Followup Interval by Group
(Original Comparisons Only)

Site	Group		Total
	Ranch Hand	Original Comparison	
Oral Cavity and Pharynx	2 ^{a, b}	0	2
Thyroid Gland	0	1	1
Bronchus and Lung	1	0	1
Colon	0	3 ^{c, d}	3
Kidney and Bladder	2	1	3
Prostate	1	1	2
Testicles	1	0	1
Connective and Other Soft Tissue	<u>1</u>	<u>0</u>	<u>1</u>
Total	8	6	14

^aIncludes one Ranch Hand with separate malignancies of tongue and epiglottis and also malignant neoplasm of bone.

^bIncludes one Ranch Hand with separate malignant neoplasms of tongue and oropharynx and secondary malignant neoplasm of other site.

^cIncludes one comparison with secondary malignant neoplasms of liver and bone and bone marrow.

^dIncludes one comparison with secondary malignant neoplasm of liver.

TABLE H-10.

Unadjusted Analyses of Followup Participants with Verified and Suspected
Malignant Systemic Neoplasms in the Baseline-Followup Interval by Group
(Original Comparisons Only)

Status	Statistic	Group		Original		Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Comparison			
Verified	Number/%	8	0.8%	6	0.6%	1.26 (0.43,3.63)	0.791
	Total Neoplasms	12		9			
Verified & Suspected	Number/%	12	1.2%	11	1.2%	1.03 (0.45,2.34)	0.999
	Total Neoplasms	23		14			

TABLE H-11.

Association Between Baseline-Followup Interval Incidence of All Malignant Systemic
Neoplasms Combined and the Covariates for the Combined Followup Ranch Hand and Comparison Groups

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Age	Born ≥ 1942	1	0.1	<0.001	4	0.4	0.001
	Born 1923-41	10	0.8		16	1.3	
	Born ≤ 1922	4	4.6		4	4.6	
Race	Nonblack	15	0.7	0.999	23	1.1	0.999
	Black	0	0.0		1	0.7	
Occupation	Officer	10	1.2	0.056	13	1.5	0.193
	Enlisted Flyer	2	0.5		4	1.0	
	Enlisted Groundcrew	3	0.3		7	0.7	
Total Lifetime Smoking (Pack-Years)	0	2	0.3	0.220	4	0.6	0.374
	>0-20	6	0.6		11	1.0	
	>20-40	5	1.2		7	1.7	
	>40	2	1.3		2	1.3	
Total Lifetime Alcohol Consumption (Drink-Years)	0	0	0	0.082	1	0.7	0.233
	>0-5	2	0.3		5	0.7	
	>5-30	3	0.4		5	0.7	
	>30-100	7	1.4		9	1.8	
	>100	1	0.9		2	1.9	
Exposures to Carcinogens	Asbestos	Yes 3	0.6	0.999	5	1.0	0.999
		No 12	0.7		19	1.1	
Nonmedical X Rays		Yes 5	0.9	0.364	10	1.9	0.049
		No 10	0.6		14	0.8	

TABLE H-11. (continued)
 Association Between Baseline-Followup Interval Incidence of All Malignant Systemic
 Neoplasms Combined and the Covariates for the Combined Followup Ranch Hand and Comparison Groups

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Exposures to Carcinogens (continued)	Industrial Chemicals	Yes	5	0.4	11	0.9	0.682
		No	10	0.9	13	1.2	
	Herbicides	Yes	9	0.7	14	1.1	0.999
		No	6	0.6	10	1.0	
	Insecticides	Yes	4	0.3	10	0.7	0.091
		No	11	1.2	14	1.5	
Composite Carcinogen Exposure	Degreasing Chemicals	Yes	6	0.5	14	1.0	0.999
		No	9	0.9	10	1.0	
		Yes	4	0.8	5	1.0	0.999
		No	11	0.6	18	1.0	
	Anthracene	Yes	0	0.0	0	0.0	0.999
		No	15	0.7	24	1.0	
Exposure to Individual Carcinogens	Arsenic	Yes	0	0	2	4.8	0.069
		No	15	0.7	22	1.0	
	Benzene	Yes	1	1.2	1	1.2	0.587
		No	14	0.6	23	1.0	
	Benzidine	Yes	1	7.1	1	7.1	0.131
		No	14	0.6	22	1.0	

TABLE H-11. (continued)

Association Between Baseline-Followup Interval Incidence of All Malignant Systemic Neoplasms Combined and the Covariates for the Combined Followup Ranch Hand and Comparison Groups

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Exposure to Individual Carcinogens (continued)	Chromates	Yes 2	2.3	0.110	2	2.3	0.232
		No 13	0.6		22	1.0	
Coal Tar		Yes 2	2.7	0.079	2	2.7	0.175
		No 13	0.6		22	1.0	
Creosote		Yes 1	0.6	0.999	3	1.8	0.240
		No 14	0.7		21	1.0	
Aminodiphenyl		Yes 0	0	0.999	1	16.7	0.061
		No 15	0.7		23	1.0	
Chloromethyl Ether		Yes 1	4.4	0.140	2	8.7	0.023
		No 14	0.6		22	1.0	
Mustard Gas		Yes 0	0	0.999	1	11.1	0.090
		No 15	0.7		23	1.0	
Naphthylamine		Yes 2	3.6	0.050	3	5.4	0.019
		No 13	0.6		21	0.9	
Cutting Oils		Yes 3	1.2	0.204	5	2.1	0.100
		No 12	0.6		19	0.9	
Trichloroethylene		Yes 3	1.5	0.135	4	2.0	0.149
		No 12	0.6		20	1.0	

TABLE H-11. (continued)

Association Between Baseline-Followup Interval Incidence of All Malignant Systemic Neoplasms Combined and the Covariates for the Combined Followup Ranch Hand and Comparison Groups

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Exposure to Individual Carcinogens (continued)	Ultraviolet Light	Yes 1	2.0	0.286	1	2.0	0.417
		No 14	0.6		23	1.0	
	Vinyl Chloride	Yes 0	0.0	0.999	1	3.0	0.294
		No 15	0.7		23	1.0	

*Number of participants with malignant systemic neoplasms.

TABLE H-12.

Adjusted Analyses of Followup Participants for the Incidence of All
Malignant Systemic Neoplasms During the Baseline-Followup Interval
(Original Comparisons Only)

Variable	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Systemic Neoplasms (Verified)	1.47 (0.50,4.33)	0.481	AGE (p<0.001)
Systemic Neoplasms (Verified & Suspected)	****	****	GRP*OCC (p=0.028) AGE (p<0.001) RACE*PACKYR (p=0.032)

****Group-by-covariate interaction--adjusted relative risk, confidence interval, and p-value not presented.

TABLE H-13.

**Summary of Group-by-Occupation Interaction for All Malignant
Systemic Neoplasms (Verified Plus Suspected) During the Baseline-Followup Interval**

Variable	Interaction	Stratification	Statistic	Group						Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Comparison					
				Number	Percent	Number	Percent	Number	Percent		
Systemic Cancer (Verified Plus Suspected)	Officer	n		380		484					
		Yes		5	1.3	8	1.7	0.79 (0.25,2.44)	0.679		
		No		375	98.7	476	98.3				
	Enlisted Flyer	n		175		209					
		Yes		4	2.3	0	0	---	0.042 ^b		
		No		171	97.7	209	100				
	Enlisted Groundcrew	n		457		598					
		Yes		3	0.7	4	0.7	0.93 (0.20,4.26)	0.923		
		No		454	99.3	594	99.3				

^aAdjusted relative risk not calculated because of a zero cell.

^bFisher's exact test.

TABLE H-14.

Summary of Group by Occupation Interaction for All Malignant Systemic
Neoplasms (Verified Plus Suspected) During the Baseline-Followup Interval
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
All Systemic Cancer (Verified Plus Suspected)	Group-by- Occupation	Officers	n	380		350			
			Yes	5	1.3	7	2.0	0.72 (0.22, 2.30)	0.577
			No	375	98.7	343	98.0		
	Enlisted Flyers	Enlisted Flyers	n	175		174			
			Yes	4	2.9	0	0.0	-- ^a	0.123 ^b
			No	171	97.1	174	100.0		
	Enlisted Groundcrew	Enlisted Groundcrew	n	457		430			
			Yes	3	0.7	4	0.9	0.71 (0.16, 3.28)	0.666
			No	454	99.3	426	99.1		

^aAdjusted relative risk not calculated because of a zero cell count.

^bFisher's exact test.

TABLE H-15.

Unadjusted Analyses of Followup Participants with Lifetime Occurrence
of Verified and Suspected Lifetime Neoplasms by Group
(Nonblacks and Blacks, Original Comparisons Only)

Site	Neoplasm Behavior and Status	Group				Total**	p-Value***
		Ranch Hand		Comparison			
		Number**	Percent	Number**	Percent		
Skin	Malignant						
	Verified	66	6.5	48	5.0	114	0.177
	Verified and Suspected	75	7.4	62	6.5	137	0.479
	Benign						
	Verified	84	8.3	67	7.0	151	0.310
	Verified and Suspected	86	8.5	70	7.3	156	0.360
	Uncertain Behavior and Unspecified Nature:						
	Verified	1	0.1	1	0.1	2	0.999
	Verified and Suspected	1	0.1	1	0.1	2	0.999
	Any Skin Neoplasm ^a						
Verified	150	14.8	111	11.6	261	0.046	
Verified and Suspected	159	15.7	128	13.4	287	0.160	
Systemic	Malignant						
	Verified	17	1.7	14	1.5	31	0.722
	Verified and Suspected	21	2.1	19	2.0	40	0.999
	Benign						
	Verified	51	5.0	52	5.5	103	0.687
	Verified and Suspected	57	5.6	60	6.3	117	0.568
	Uncertain Behavior and Unspecified Nature:						
	Verified	15	1.5	11	1.2	26	0.560
	Verified and Suspected	15	1.5	14	1.5	29	0.999
	Any Systemic Neoplasm ^b						
Verified	81	8.0	71	7.4	152	0.673	
Verified and Suspected	91	9.0	86	9.0	177	0.999	

TABLE H-15. (continued)

Unadjusted Analyses of Followup Participants with Lifetime Occurrence
of Verified and Suspected Lifetime Neoplasms by Group
(Nonblacks and Blacks, Original Comparisons Only)

Site	Neoplasm Behavior and Status	Group					
		Ranch Hand		Comparison		Total**	p-Value***
		Number**	Percent	Number**	Percent		
All Neoplasms	Malignant, Benign,						
	Uncertain Behavior,						
	Unspecified Nature ^c						
	Verified	216	21.3	167	17.5	383	0.035
	Verified and Suspected	231	22.7	196	20.5	427	0.251

*Sample sizes: 1,016 Ranch Hands, 955 Original Comparisons.

**Number of participants.

***Fisher's exact test.

^aParticipant has one or more malignant, benign, or unspecified skin neoplasms.

^bParticipant has one or more malignant, benign, or unspecified systemic neoplasms.

^cParticipant has one or more malignant or benign skin or systemic neoplasms.

TABLE H-16.

Unadjusted Analyses of Nonblack Followup Participants with Lifetime Occurrence
of Verified and Suspected Lifetime Malignant Skin Neoplasms by Cell Type and Group
(Original Comparisons Only)

Cell Type	Status	Statistic	Group		Est. Relative Risk (95% C.I.)	p-Value
			Ranch Hand	Original Comparison		
Basal Cell Carcinoma	Verified	Number/% Total Neoplasms	53 77	34 52	1.49 (0.96, 2.32)	0.079
		Number/% Total Neoplasms	59 88	48 68	1.16 (0.79, 1.72)	0.486
Squamous Cell Carcinoma	Verified	Number/% Total Neoplasms	4 6	5 6	0.75 (0.20, 2.80)	0.747
		Number/% Total Neoplasms	4 6	5 6	0.75 (0.20, 2.80)	0.747
Melanoma	Verified	Number/% Total Neoplasms	5 6	5 6	0.94 (0.27, 3.25)	0.999
		Number/% Total Neoplasms	5 6	6 7	0.78 (0.24, 2.57)	0.768
All Malignant Skin Neoplasms	Verified	Number/% Total Neoplasms	66 103	48 73	1.31 (0.89, 1.93)	0.176
		Number/% Total Neoplasms	75 117	62 90	1.15 (0.81, 1.63)	0.478
Sun-Exposure Related Malignant Neoplasms*	Verified	Number/% Total Neoplasms	59 90	39 58	1.45 (0.96, 2.19)	0.096
		Number/% Total Neoplasms	65 101	53 75	1.16 (0.80, 1.69)	0.448

*Number and percent of participants; total number of malignant neoplasms of specified cell type.

**Number of participants -- 956 Ranch Hands and 897 Original Comparisons.

*Basal cell carcinoma, melanoma, and malignant epithelial neoplasms NOS.

TABLE B-17.

Association Between Lifetime Incidence of Sun-Exposure Related Skin Malignancies
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified		Verified and Suspected	
		Number*	Percent	Number*	p-Value
Age	Born ≥ 1942	8	9.2	28	3.2
	Born 1923-41	83	6.9	99	8.3
	Born ≤ 1922	23	2.6	12	13.8
Occupation	Officer	60	7.1	75	8.8
	Enlisted Flyer	17	4.7	20	5.6
	Enlisted Groundcrew	37	3.9	44	4.6
Total Lifetime Smoking (Pack-Years)	0	35	5.7	40	6.5
	>0-20	40	4.0	49	4.9
	>20-40	24	6.1	34	8.7
	>40	15	9.6	16	10.2
Total Lifetime Alcohol Consumption (Drink-Years)	0	8	5.7	9	6.4
	>0-5	39	5.4	45	6.3
	>5-30	29	4.4	36	5.5
	>30-100	24	5.0	35	7.3
	>100	11	10.6	11	10.6
Ethnic Background ^a	A	95	6.0	118	7.5
	B	16	3.8	17	4.0
	C	1	1.6	1	1.6
	D	0	0.0	0	0.0
Skin Color	Dark	0	0.0	0	0.0
	Medium	2	2.7	2	2.7
	Pale	10	3.3	12	3.9
	Dark Peach	76	6.0	90	7.1
	Pale Peach	26	5.0	35	6.7

TABLE H-17. (continued)
Association Between Lifetime Incidence of Sun-Exposure Related Skin Malignancies
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Eye Color	Brown	34	5.3	0.466	40	6.2	0.960
	Hazel	31	6.8		32	7.0	
	Green	4	3.4		7	5.9	
	Grey	5	5.4		7	7.5	
	Blue	40	4.7		53	6.2	
Hair Color	Black	22	5.0	0.230	26	5.9	0.096
	Dark Brown	46	4.4		58	5.6	
	Light Brown	36	6.4		42	7.5	
	Red	2	12.5		3	18.8	
	Blond	8	7.4		10	9.3	
Residential History (Average Latitude)	≥37°	48	4.2	0.026	56	4.9	0.003
	<37°	66	6.5		83	8.1	
Skin Reaction to First 30 Min. of Sun Exposure	Burns	23	9.3	<0.001	28	11.3	<0.001
	Usually Burns	39	9.1		47	11.0	
	Burns Mildly	34	4.2		38	4.7	
	Rarely Burns	17	2.5		25	3.7	
Skin Reaction to >2 Hrs of Sun After First Exposure	Burns Painfully	13	10.8	<0.001	15	12.5	<0.001
	Burns	32	9.5		35	10.4	
	Becomes Red	46	4.4		59	5.7	
	No Reaction	23	3.5		30	4.5	
Skin Reaction After Repeated Exposure to Sun	Freckles, No Tan	5	11.1	<0.001	6	13.3	<0.001
	Tans Mildly	33	10.5		38	12.1	
	Tans Moderately	40	3.9		51	5.0	
	Tans Deep Brown	35	4.5		43	5.5	

TABLE H-17. (continued)
 Association Between Lifetime Incidence of Sun-Exposure Related Skin Malignancies
 and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Sun Reaction Index	Tends to Burn	14	9.7	<0.001	16	11.0	<0.001
	Mild Reaction	42	9.3		48	10.6	
	Tends to Tan	57	3.7		74	4.7	
Exposures to Carcinogens	Asbestos	Yes 19	4.2	0.288	26	5.7	0.520
		No 95	5.6		113	6.6	
	Nonmedical X Rays	Yes 31	6.3	0.252	39	7.9	0.143
		No 83	5.0		100	6.0	
	Industrial Chemicals	Yes 54	4.8	0.336	65	5.8	0.220
		No 60	5.8		74	7.1	
	Herbicides	Yes 74	5.9	0.144	91	7.2	0.076
		No 40	4.4		48	5.3	
	Insecticides	Yes 76	5.8	0.200	40	6.9	0.324
		No 38	4.5		49	5.7	
	Degreasing Chemicals	Yes 64	5.1	0.697	77	6.1	0.534
		No 50	5.5		62	6.9	
Composite Carcinogen Exposure		Yes 21	4.3	0.355	24	4.9	0.141
		No 91	5.5		113	6.8	

TABLE B-17. (continued)

Covariate	Covariate Category	Verified			Verified and Suspected		
		Number*	Percent	p-Value	Number*	Percent	p-Value
Exposure to Individual Carcinogens	Anthracene	Yes 0 No 114	0.0 5.3	0.999	0 139	0.0 6.4	0.999
	Arsenic	Yes 4 No 109	9.8 5.1	0.163	5 133	12.2 6.3	0.181
	Benzene	Yes 6 No 108	8.1 5.2	0.281	7 132	9.5 6.3	0.327
	Benzidine	Yes 1 No 113	9.1 5.3	0.449	1 138	9.1 6.4	0.519
	Chromates	Yes 4 No 108	4.8 5.2	0.999	5 132	6.0 6.4	0.999
	Coal Tar	Yes 2 No 112	2.9 5.3	0.580	3 136	4.4 6.5	0.799
	Creosote	Yes 9 No 105	5.7 5.2	0.715	10 129	6.3 6.4	0.999
	Aminodiphenyl	Yes 0 No 113	0.0 5.2	0.999	0 138	0.0 6.4	0.999
	Chloromethyl Ether	Yes 2 No 112	9.5 5.2	0.305	2 137	9.5 6.4	0.641
	Mustard Gas	Yes 0 No 114	0.0 5.3	0.999	0 139	0.0 6.4	0.999

TABLE H-17. (continued)

Association Between Lifetime Incidence of Sun-Exposure Related Skin Malignancies
and the Covariates for Combined Followup Ranch Hand and Comparison Nonblack Participants

Covariate	Covariate Category	Verified		Verified and Suspected	
		Number*	Percent	Number*	p-Value
Exposure to Individual Carcinogens (continued)	Naphthylamine	Yes 3 No 110	5.8 5.2	4 134	0.751 7.7 6.3
	Cutting Oils	Yes 12 No 102	5.3 5.3	15 124	0.999 6.6 6.4
	Trichloroethylene	Yes 5 No 109	2.7 5.5	7 132	0.120 3.8 6.7
	Ultraviolet Light	Yes 5 No 109	11.4 5.1	5 134	0.078 11.4 6.3
	Vinyl Chloride	Yes 0 No 114	0.0 5.3	1 138	0.406 3.2 6.5

*Number of participants with sun-exposure related skin malignancies.

*Ethnic Background:

A—English, Welsh, Scottish, Irish.

B—Scandinavian, German, Polish, Russian, other Slavic, Jewish, French.

C—Spanish, Italian, Greek.

D—Mexican, American Indian, Asian.

TABLE H-18.

Summary of Group-by-Covariate Interactions for
Lifetime Malignant Skin Neoplasm Incidence
(Nonblacks Only)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value		
				Ranch Hand		Original Comparison					
				Number	Percent	Number	Percent				
	Burns Easily	n				77					
		Yes		68		3	4.4	9	11.7	0.29 (0.07, 1.28)	0.102
		No		65	95.6	68		68	88.3		
Basal Cell Group-by-Carcinoma (Verified Index Plus Suspected)	Intermediate Sun Reaction	n				262					
		Yes		192		25	13.0	21	8.0	1.97 (1.04, 3.73)	0.038
		No		167	87.0	167		241	92.0		
	Tans Easily	n				867					
		Yes		693		31	4.5	36	4.2	1.15 (0.70, 1.88)	0.591
		No		662	95.5	662		831	95.8		

TABLE H-19.

Adjusted Analyses of Nonblack Followup Participants
for Lifetime Malignant Skin Neoplasm Incidence
(Original Comparisons Only)

Variable	Status	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Basal Cell Carcinoma	Verified	****	****	GRP*SUNREAC (p=0.010) SKIN*SUNREAC (p<0.001) OCC*AGE (p=0.010) OCC*SUNREAC (p=0.007) LAT (p=0.006)
	Verified & Suspected	****	****	GRP*SUNREAC (p=0.003) AGE (p<0.001) LAT (p=0.002) SUNREAC*OCC (p=0.043) SKIN*SUNREAC (p<0.001)
Sun-Exposure Skin Neoplasms	Verified	****	****	GRP*SUNREAC (p=0.045) SKIN*LAT (p=0.028) SKIN*SUNREAC (p<0.001) OCC*AGE (p=0.023)
	Verified & Suspected	****	****	GRP*SUNREAC (p=0.016) AGE (p<0.001) SUNREAC*LAT (p=0.017) SKIN*SUNREAC (p<0.001)

****Group-by-covariate interactions--adjusted relative risk, confidence interval, and p-value not presented.

TABLE H-20.

Summary of Group-by-Covariate Interactions
for Lifetime Malignant Skin Neoplasms Incidence
(Original Comparisons Only*)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
Basal Cell Carcinoma (Verified Only)	Burns Easily	n							
		Yes	68			56		0.17 (0.02,1.67)	0.128
		No	3	4.4	6	10.7			
	Intermediate		65	95.6	50	89.3			
		n	192		186				
		Yes	23	12.0	8	4.3	3.76 (1.60,8.86)	0.002	
		No	169	88.0	178	95.7			
		Tans Easily	n	693		652		1.45 (0.79,2.67)	0.226
			Yes	27	3.9	19	2.9		
	No		666	96.1	633	97.1			

TABLE H-20. (continued)

Summary of Group-by-Covariate Interactions for
Lifetime Malignant Skin Neoplasms Incidence
(Original Comparisons Only*)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
Basal Cell Carcinoma (Verified Plus Suspected)	Burns Easily	n	68		56				
		Yes	3	4.4	8	14.3	0.19	0.070	
		No	65	95.6	48	85.7			
	Intermediate	n	192		186				
		Yes	25	13.0	10	5.4	3.25	0.003	
		No	167	87.0	176	94.6			
Tans Easily	n	693		652					
	Yes	31	4.5	29	4.4	1.10	0.719		
	No	662	95.5	623	95.6				

TABLE H-20. (continued)

Summary of Group-by-Covariate Interactions for
Lifetime Malignant Skin Neoplasms Incidence
(Original Comparisons Only*)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
Sun Exposure Related Cancers (Verified Plus Suspected)	Group-by-Sun Reaction Index	Burns Easily	n	68		56			
			Yes	7	10.3	8	14.3	1.20 (0.34, 4.22)	0.777
		No	61	89.7	48	85.7			
		Intermediate	n	192		186			
			Yes	26	13.5	10	5.4	3.98 (1.70, 9.33)	0.002
		No	166	86.5	176	94.6			
	Tans Easily	n	693		652				
		Yes	32	4.6	34	5.2	1.17 (0.31, 4.41)	0.819	
		No	661	95.4	618	94.8			

TABLE H 20. (continued)

Summary of Group-by Covariate Interactions for
Lifetime Malignant Skin Neoplasia Incidence
(Original Comparisons Only*)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
Sun Exposure Related Cancers (Verified Only)	Burns Easily	n	68		56				
		Yes	7	10.3	6	10.7	0.80 (0.25, 2.53)	0.700	
		No	61	89.7	50	89.3			
	Intermediate	n	192		186				
		Yes	24	12.5	8	4.3	3.42 (1.56, 7.51)	0.002	
		No	168	87.5	178	95.7			
	Tans Easily	n	693		652				
		Yes	28	4.0	24	3.7	0.97 (0.59, 1.61)	0.911	
		No	665	96.0	628	96.3			

*Blacks excluded.

TABLE B-21.

Summary of Followup Participants With Lifetime Incidence of
Verified Malignant Systemic Neoplasms by Group
(Original Comparisons Only)

Site	Group		Total
	Ranch Hand	Original Comparison	
Eye	1	0	1
Oral Cavity and Pharynx	3 ^{a, b}	0	3
Larynx	0	1	1
Thyroid Gland	0	2	2
Bronchus and Lung	2	0	2
Colon	0	4 ^{c, d}	4
Kidney and Bladder	4	3	7
Prostate	2	2	4
Testicles	3	0	3
Connective and Other Soft Tissue	1	1	2
Ill-Defined Sites	<u>1</u> ^e	<u>1</u> ^f	<u>2</u>
Total	17	14	31

^aIncludes one Ranch Hand with separate malignancies of tongue and epiglottis and also malignant neoplasm of bone.

^bIncludes one Ranch Hand with separate malignant neoplasms of tongue and oropharynx and secondary malignant neoplasm of other site.

^cIncludes one Comparison with secondary malignant neoplasms of liver and bone and bone marrow.

^dIncludes one Comparison with secondary malignant neoplasm of liver.

^eMalignant neoplasm of thorax.

^fMalignant neoplasm of face, head, or neck.

TABLE H-22.

Unadjusted Analyses of the Lifetime Incidence Rates
of All Malignant Systemic Neoplasms Combined, by Group
(Original Comparisons Only)

Status	Statistic	Group		Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand	Original Comparison		
Verified	Number/%	17 1.7%	14 1.5%	1.14 (0.56,2.33)	0.722
	Total Neoplasms	25	19		
Verified & Suspected	Number/%	21 2.1%	19 2.0%	1.04 (0.56,1.95)	0.999
	Total Neoplasms	36	24		

TABLE H-23.

Summary of Group-by-Occupation Interactions
for Lifetime Incidence of All Malignant
Systemic Neoplasms Combined

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Comparison			
				Number	Percent	Number	Percent		
Malignant Systemic Neoplasm (Verified Only)	Officer	n		380		484			
		Yes		8	2.1	12	2.5	0.84 (0.34, 2.08)	0.698
	Enlisted Flyer	No		372	97.9	472	97.5		
		n		177		210			
	Enlisted Groundcrew	Yes		5	2.8	0	0		0.019 ^b
		No		172	97.2	210	100		
		n		459		599			
		Yes		4	0.9	5	0.8	1.07 (0.28, 4.03)	0.922
		No		455	99.1	594	99.2		

^aAdjusted relative risk not calculated because of a zero cell.

^bFisher's exact test.

TABLE H-23. (continued)

Summary of Group-by-Occupation Interactions
for Lifetime Incidence of All Malignant
Systemic Neoplasms Combined

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Comparison			
				Number	Percent	Number	Percent		
Malignant Systemic Neoplasm (Verified plus Suspected)	Officer	n	380		484				
		Yes	9	2.4	14	2.9	0.80 (0.34, 1.89)	0.616	
		No	371	97.6	470	97.1			
	Group-by-Occupation	n	175		209				
		Yes	7	4.0	0	0	---	0.004 ^b	
		No	168	96.0	209	100			
	Enlisted Groundcrew	n	457		598				
		Yes	5	1.1	8	1.3	0.79 (0.26, 2.47)	0.690	
		No	452	98.9	590	98.7			

^aAdjusted relative risk not calculated because of a zero cell.

^bFisher's exact test.

TABLE H-24.

Adjusted Analyses for Lifetime Incidence of All
Malignant Systemic Neoplasms Combined
(Original Comparisons Only)

Variable	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Malignant Systemic Neoplasms (Verified)	****	****	GRP*OCC (p=0.034) AGE (p<0.001)
Malignant Systemic Neoplasms (Verified & Suspected)	****	****	GRP*OCC (p=0.003) AGE (p<0.001) RACE*PACKYR (p=0.033)

****Group-by-covariate interaction--adjusted relative risk, confidence interval, and p-value not presented.

TABLE H-25.

Summary of Group-by-Occupation Interactions
for Lifetime Incidence of All Malignant
Systemic Neoplasms Combined
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Statistic	Original Comparison		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch	Hand		Number	Percent		
Malignant Systemic Neoplasms (Verified Only)	Officer	n		380			350			
		Yes		8	2.1		9			
	Enlisted Flyer	No		372	97.9		341	2.6	0.90 (0.34, 2.38)	0.834
		n		177			174			
	Group-by-Occupation	Yes		5	2.8		0	0	-- ^a	0.061 ^b
		No		172	97.2		174	100		
Enlisted Groundcrew	Enlisted Groundcrew	n		459			431			
		Yes		4	0.9		5	1.2	0.81 (0.21, 3.07)	0.757
		No		455	99.1		426	98.8		

TABLE H-25. (continued)

Summary of Group-by-Occupation Interactions
for Lifetime Incidence of All Malignant
Systemic Neoplasms Combined
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
Malignant Systemic Neoplasms (Verified Plus Suspected)	Officer	n		380		350			
		Yes		9	2.4	11	3.1	0.81 (0.33, 1.98)	0.638
	Enlisted Flyer	No		371	97.6	339	96.9		
		n		175		174			
	Group-by-Occupation	Yes		7	4.0	0	0	-- ^a	0.015 ^a
		No		168	96.0	174	100		
Enlisted Groundcrew	Enlisted Groundcrew	n		457		430			
		Yes		5	1.1	8	1.9	0.59 (0.19, 1.85)	0.369
		No		452	98.9	422	98.1		

^aAdjusted relative risk not calculated because of zero cell.

^bFisher's exact test.

TABLE B-26.

Unadjusted Exposure Index Analyses for Followup Participants
for Occurrence of Malignant Neoplasms
in the Baseline-Followup Interval

Variable	Occupation	Statistic	Exposure Index ^a						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Basal Cell Carcinoma (Verified Only) ^b	Officer	n	125		127		121		Overall		0.178
		Abnormal	3	2.4	8	6.3	3	2.5	M vs. L	2.73 (0.71, 10.55)	0.216
		Normal	122	97.6	119	93.7	118	97.5	H vs. L	1.03 (0.21, 5.23)	0.999
	Enlisted Flyer	n	54		61		52		Overall		0.073
		Abnormal	6	11.1	2	3.3	1	1.9	M vs. L	0.27 (0.05, 1.41)	0.145
		Normal	48	88.9	59	96.7	51	98.1	H vs. L	0.16 (0.02, 1.35)	0.113
	Enlisted Groundcrew	n	138		149		129		Overall		0.627
		Abnormal	3	2.2	2	1.3	1	0.8	M vs. L	0.61 (0.10, 3.72)	0.674
		Normal	135	97.8	147	98.7	128	99.2	H vs. L	0.35 (0.04, 3.42)	0.623
Basal Cell Carcinoma (Verified and Suspected) ^b	Officer	n	125		127		121		Overall		0.042
		Abnormal	4	3.3	12	9.4	4	3.3	M vs. L	3.16 (0.99, 10.07)	0.068
		Normal	121	96.8	115	90.6	121	96.7	H vs. L	1.03 (0.25, 4.23)	0.999
	Enlisted Flyer	n	54		61		52		Overall		0.073
		Abnormal	6	11.1	2	3.3	1	1.9	M vs. L	0.27 (0.05, 1.41)	0.145
		Normal	48	88.9	59	96.7	51	98.1	H vs. L	0.16 (0.02, 1.35)	0.113
	Enlisted Groundcrew	n	138		149		129		Overall		0.372
		Abnormal	4	2.9	2	1.3	1	0.8	M vs. L	0.46 (0.08, 2.53)	0.432
		Normal	134	97.1	147	98.7	128	99.2	H vs. L	0.26 (0.03, 2.37)	0.372

TABLE H-26. (continued)

Unadjusted Exposure Index Analyses for Followup Participants
for Occurrence of Malignant Neoplasms
in the Baseline-Followup Interval

Variable	Occupation	Statistic	Exposure Index ^a						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Sun-Exposure Related Malignancies (Verified Only) ^b	Officer	n	125		127		121		Overall		0.096
		Abnormal	3	2.4	9	7.1	3	2.5	M vs. L	3.10 (0.82,11.74)	0.136
		Normal	122	97.6	118	92.9	118	97.5	H vs. L	1.03 (0.21,5.23)	0.999
	Enlisted Flyer	n	54		61		52		Overall		0.073
		Abnormal	6	11.1	2	3.3	1	1.9	M vs. L	0.27 (0.05,1.41)	0.145
		Normal	48	88.9	59	96.7	51	98.1	H vs. L	0.16 (0.02,1.35)	0.113
	Enlisted Groundcrew	n	138		149		129		Overall		0.929
		Abnormal	3	2.2	3	2.0	2	1.6	M vs. L	0.93 (0.18,4.66)	0.999
		Normal	135	97.8	146	98.0	127	98.4	H vs. L	0.71 (0.12,4.31)	0.999
	Sun-Exposure Related Malignancies (Verified and Suspected) ^b	Officer	n	125		127		121		Overall	
Abnormal			4	3.2	13	10.2	4	3.3	M vs. L	3.45 (1.09,10.89)	0.042
Normal			121	96.8	114	89.8	117	96.7	H vs. L	1.03 (0.25,4.23)	0.999
Enlisted Flyer		n	54		61		52		Overall		0.073
		Abnormal	6	11.1	2	3.3	1	1.9	M vs. L	0.27 (0.05,1.41)	0.145
		Normal	48	88.9	59	96.7	51	98.1	H vs. L	0.16 (0.02,1.35)	0.113
Enlisted Groundcrew		n	138		149		129		Overall		0.742
		Abnormal	4	2.9	3	2.0	2	1.6	M vs. L	0.69 (0.15,3.13)	0.714
		Normal	134	97.1	146	98.0	127	98.4	M vs. L	0.53 (0.10,2.93)	0.685

TABLE H-26. (continued)

Unadjusted Exposure Index Analyses for Followup Participants
for Occurrence of Malignant Neoplasms
in the Baseline-Followup Interval

Variable	Occupation	Statistic	Exposure Index ^a						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Systemic Malignancies (Verified Only) ^c	Officer	n	127		130		123		Overall		0.186
		Abnormal	1	0.8	3	2.3	0	0.0	M vs. L	2.98 (0.31, 29.00)	0.622
		Normal	126	99.2	127	97.7	123	100.0	H vs. L	0.34 (0.01, 8.46)*	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.612
		Abnormal	1	1.8	1	1.5	0	0.0	M vs. L	0.84 (0.05, 13.81)	0.999
		Normal	54	98.2	64	98.5	57	100.0	H vs. L	0.32 (0.01, 7.92)*	0.491
Enlisted Groundcrew	n	154		163		142		Overall		0.598	
	Abnormal	0	0.0	1	0.6	1	0.7	M vs. L	2.85 (0.12, 70.55)*	0.999	
	Normal	154	100.0	162	99.4	141	99.3	H vs. L	3.28 (0.13, 81.06)*	0.480	
Systemic Malignancies (Verified and Suspected) ^c	Officer	n	127		130		123		Overall		0.081
		Abnormal	1	0.8	4	3.1	0	0.0	M vs. L	4.00 (0.44, 36.29)	0.370
		Normal	126	99.2	126	96.9	123	100.0	H vs. L	0.34 (0.01, 8.46)*	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.708
		Abnormal	2	3.6	1	1.5	1	1.8	M vs. L	0.41 (0.04, 4.69)	0.593
		Normal	53	96.4	64	98.5	56	98.2	H vs. L	0.47 (0.04, 5.37)	0.615
Enlisted Groundcrew	n	154		163		142		Overall		0.323	
	Abnormal	0	0.0	1	0.6	2	1.4	M vs. L	2.85 (0.12, 70.55)*	0.999	
	Normal	154	100.0	162	99.4	140	98.6	H vs. L	5.50 (0.26, 115.51)*	0.229	

^aNumber and percent of total participants.

^bNonblacks only.

^cBlacks and nonblacks.

*0.5 added to each cell to calculate relative risk and confidence interval, due to zero cell frequency.

TABLE H-27.
Unadjusted Exposure Index Analysis for Followup Participants
for Lifetime Occurrence of Malignant Neoplasms

Variable	Occupation	Statistic	Exposure Index ^a						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Basal Cell Carcinoma (Verified only) ^b	Officer	n	125		127		121		Overall		0.641
		Abnormal	7	5.6	11	8.7	9	7.4	M vs. L	1.60 (0.60,4.27)	0.464
	Enlisted Flyer	Normal	118	94.4	116	91.3	112	92.6	H vs. L	1.36 (0.49,3.76)	0.613
		n	54		61		52		Overall		0.030
	Enlisted Groundcrew	Abnormal	7	13.0	2	3.3	1	1.9	M vs. L	0.23 (0.05,1.15)	0.081
		Normal	47	87.0	59	96.7	51	98.1	H vs. L	0.13 (0.02,1.11)	0.060
Basal Cell Carcinoma (Verified and Suspected) ^b	Officer	n	138		149		129		Overall		0.984
		Abnormal	5	3.6	6	4.0	5	3.9	M vs. L	1.12 (0.33,3.74)	0.999
	Enlisted Flyer	Normal	133	96.4	143	96.0	124	96.1	H vs. L	1.07 (0.30,3.80)	0.999
		n	125		127		121		Overall		0.419
	Enlisted Groundcrew	Abnormal	8	6.4	14	11.0	10	8.3	M vs. L	1.81 (0.73,4.49)	0.265
		Normal	117	93.6	113	89.0	111	91.7	H vs. L	1.32 (0.50,3.46)	0.630
Basal Cell Carcinoma (Verified and Suspected) ^b	Officer	n	54		61		52		Overall		0.030
		Abnormal	7	13.0	2	3.3	1	1.9	M vs. L	0.23 (0.05,1.15)	0.081
	Enlisted Flyer	Normal	47	87.0	59	96.7	51	98.1	H vs. L	0.13 (0.02,1.11)	0.060
		n	138		149		129		Overall		0.980
	Enlisted Groundcrew	Abnormal	6	4.3	6	4.0	5	3.9	M vs. L	0.92 (0.29,2.93)	0.999
		Normal	132	95.7	143	96.0	124	96.1	H vs. L	0.89 (0.26,2.98)	0.999

TABLE B-27. (continued)

Unadjusted Exposure Index Analysis for Followup Participants
for Lifetime Occurrence of Malignant Neoplasms

Variable	Occupation	Statistic	Exposure Index ^a						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Sun-Exposure Related Malignancies (Verified Only) ^b	Officer	n	125		127		121		Overall		0.625
		Abnormal	9	7.2	13	10.2	9	7.4	M vs. L	1.47 (0.61, 3.57)	0.504
		Normal	116	92.8	114	89.8	112	92.6	H vs. L	1.04 (0.40, 2.70)	0.999
	Enlisted Flyer	n	54		61		52		Overall		0.058
		Abnormal	7	13.0	3	4.9	1	1.9	M vs. L	0.35 (0.09, 1.42)	0.186
		Normal	47	87.0	58	95.1	51	98.1	H vs. L	0.13 (0.02, 1.11)	0.060
	Enlisted Groundcrew	n	138		149		129		Overall		0.910
		Abnormal	5	3.6	7	4.7	5	3.9	M vs. L	1.31 (0.41, 4.23)	0.772
		Normal	133	96.4	142	95.3	124	96.1	H vs. L	1.07 (0.30, 3.80)	0.999
Sun-Exposure Related Malignancies (Verified and Suspected) ^b	Officer	n	125		127		121		Overall		0.382
		Abnormal	10	8.0	16	12.6	10	8.3	M vs. L	1.66 (0.72, 3.81)	0.301
		Normal	115	92.0	111	87.4	111	91.7	H vs. L	1.04 (0.42, 2.59)	0.999
	Enlisted Flyer	n	54		61		52		Overall		0.058
		Abnormal	7	13.0	3	4.9	1	1.9	M vs. L	0.35 (0.09, 1.42)	0.186
		Normal	47	87.0	58	95.1	51	98.1	H vs. L	0.13 (0.02, 1.11)	0.060
	Enlisted Groundcrew	n	138		149		129		Overall		0.945
		Abnormal	6	4.3	7	4.7	5	3.9	M vs. L	1.09 (0.36, 3.31)	0.999
		Normal	132	95.7	142	95.3	124	96.1	H vs. L	0.89 (0.26, 2.98)	0.999

TABLE H-27. (continued)

Unadjusted Exposure Index Analysis for Followup Participants
for Lifetime Occurrence of Malignant Neoplasms

Variable	Occupation	Statistic	Exposure Index ^a						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Systemic Malignancies (Verified Only) ^c	Officer	n	127		130		123		Overall		0.876
		Abnormal	2	1.6	3	2.3	3	2.4	M vs. L	1.48 (0.24, 8.99)	0.999
		Normal	125	98.4	127	97.7	120	97.6	H vs. L	1.56 (0.26, 9.52)	0.680
	Enlisted Flyer	n	55		65		57		Overall		0.825
		Abnormal	2	3.6	2	3.1	1	1.8	M vs. L	0.84 (0.12, 6.18)	0.999
		Normal	53	96.4	63	96.9	56	98.2	H vs. L	0.47 (0.04, 5.37)	0.615
Enlisted Groundcrew	n	154		163		142		Overall		0.205	
	Abnormal	0	0.0	3	1.8	1	0.7	M vs. L	6.74 (0.35, 131.53)*	0.248	
	Normal	154	100.0	160	98.2	141	99.3	H vs. L	3.28 (0.13, 81.06)*	0.480	
Systemic Malignancies (Verified and Suspected) ^c	Officer	n	127		130		123		Overall		0.730
		Abnormal	2	1.6	4	3.1	3	2.4	M vs. L	1.98 (0.36, 11.03)	0.684
		Normal	125	98.4	126	96.9	120	97.6	H vs. L	1.56 (0.26, 9.52)	0.680
	Enlisted Flyer	n	55		65		57		Overall		0.784
		Abnormal	3	5.5	2	3.1	2	3.5	M vs. L	0.55 (0.09, 3.42)	0.660
		Normal	52	94.5	63	96.9	55	96.5	H vs. L	0.63 (0.10, 3.93)	0.676
Enlisted Groundcrew	n	154		163		142		Overall		0.261	
	Abnormal	0	0.0	3	1.8	2	1.4	M vs. L	6.74 (0.35, 131.53)*	0.248	
	Normal	154	100.0	160	98.2	140	98.6	H vs. L	5.50 (0.26, 115.51)*	0.229	

^aNumber and percent of total participants.^bNonblacks only.^cBlacks and nonblacks.

*0.5 added to each cell to calculate relative risk and confidence interval due to zero cell.

APPENDIX I

Neurological Assessment

APPENDIX I: Neurological Assessment

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TABLE I-1.

Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Smell	Officer	n	127		130		123		Overall		0.361
		Abnormal	2	1.6	0	0.0	1	0.8	M vs. L	0.19 (0.01,4.05)*	0.243
		Normal	125	98.4	130	100.0	122	99.2	H vs. L	0.51 (0.05,5.72)	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.739
		Abnormal	1	1.8	1	1.5	2	3.5	M vs. L	0.84 (0.05,13.81)	0.999
		Normal	54	98.2	64	98.5	55	96.5	H vs. L	1.96 (0.17,22.30)	0.999
	Enlisted Groundcrew	n	154		163		142		Overall		0.995
		Abnormal	1	0.7	1	0.6	1	0.7	M vs. L	0.94 (0.06,15.23)	0.999
		Normal	153	99.3	162	99.4	141	99.3	H vs. L	1.09 (0.07,17.51)	0.999
Visual Fields	Officer	n	127		130		123		Overall		0.593
		Abnormal	1	0.8	0	0.0	1	0.8	M vs. L	0.32 (0.01,8.01)*	0.494
		Normal	126	99.2	130	100.0	122	99.2	H vs. L	1.03 (0.06,16.70)	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.328
		Abnormal	1	1.8	0	0.0	0	0.0	M vs. L	0.28 (0.01,6.95)*	0.458
		Normal	54	98.2	65	100.0	57	100.0	H vs. L	0.32 (0.01,7.92)*	0.491
	Enlisted Groundcrew	n	154		163		142		Overall		0.356
		Abnormal	2	1.3	0	0.0	1	0.7	M vs. L	0.19 (0.01,3.92)*	0.235
		Normal	152	98.7	163	100.0	141	99.3	H vs. L	0.54 (0.05,6.01)	0.999

TABLE I-1. (continued)

Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Light Reaction	Officer	n	126		130		123		Overall		0.133
		Abnormal	2	1.6	0	0.0	0	0.0	M vs. L	0.19 (0.01,4.01)*	0.241
		Normal	124	98.4	130	100.0	123	100.0	H vs. L	0.20 (0.01,4.24)*	0.498
	Enlisted Flyer	n	55		65		57		Overall		0.328
		Abnormal	1	1.8	0	0.0	0	0.0	M vs. L	0.28 (0.01,6.95)*	0.458
		Normal	54	98.2	65	100.0	57	100.0	H vs. L	0.32 (0.01,7.92)*	0.491
Enlisted Groundcrew	Enlisted Groundcrew	n	154		163		142		Overall		0.866
		Abnormal	2	1.3	2	1.2	1	0.7	M vs. L	0.94 (0.13,6.79)	0.999
		Normal	152	98.7	161	98.8	141	99.3	H vs. L	0.54 (0.05,6.01)	0.999
	Officer	n	127		130		123		Overall		0.368
		Abnormal	1	0.8	0	0.0	0	0.0	M vs. L	0.32 (0.01,8.01)*	0.494
		Normal	126	99.2	130	100.0	123	100.0	H vs. L	0.34 (0.01,8.46)*	0.999
Enlisted Flyer	Enlisted Flyer	n	55		65		57		Overall		0.612
		Abnormal	1	1.8	1	1.5	0	0.0	M vs. L	0.84 (0.05,13.81)	0.999
		Normal	54	98.2	64	98.5	57	100.0	H vs. L	0.32 (0.01,7.92)*	0.491
	Enlisted Groundcrew	n	154		163		142		Overall		0.995
		Abnormal	1	0.7	1	0.6	1	0.7	M vs. L	0.94 (0.06,15.23)	0.999
		Normal	153	99.3	162	99.4	141	99.3	H vs. L	1.09 (0.07,17.51)	0.999

TABLE I-1. (continued)
Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Facial Sensation	Officer	n	126		130		123		Overall		0.617
		Abnormal	1	0.8	1	0.8	0	0.0	M vs. L	0.97 (0.06,15.66)	0.999
		Normal	125	99.2	129	99.2	123	100.0	H vs. L	0.34 (0.01,8.40)*	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.328
		Abnormal	1	1.8	0	0.0	0	0.0	M vs. L	0.28 (0.01,6.95)*	0.458
		Normal	54	98.2	65	100.0	57	100.0	H vs. L	0.32 (0.01,7.92)*	0.491
Corneal Reflex	Enlisted Groundcrew	n	154		163		141		Overall		0.372
		Abnormal	1	0.7	0	0.0	0	0.0	M vs. L	0.31 (0.01,7.74)*	0.486
		Normal	153	99.3	163	100.0	141	100.0	H vs. L	0.36 (0.02,8.95)*	0.999
	Officer	n	125		130		123		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	125	100.0	130	100.0	123	100.0	H vs. L	—	—
Enlisted Flyer	n	55		65		57		Overall		—	
	Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—	
	Normal	55	100.0	65	100.0	57	100.0	H vs. L	—	—	
Enlisted Groundcrew	n	152		161		142		Overall		—	
	Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—	
	Normal	152	100.0	161	100.0	142	100.0	H vs. L	—	—	

TABLE I-1. (continued)

Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Jaw Clench	Officer	n	127		130		123		Overall		0.368
		Abnormal	1	0.8	0	0.0	0	0.0	M vs. L	0.32 (0.01,8.01)*	0.494
		Normal	126	99.2	130	100.0	123	100.0	H vs. L	0.34 (0.01,8.46)*	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.328
		Abnormal	1	1.8	0	0.0	0	0.0	M vs. L	0.28 (0.01,6.95)*	0.458
		Normal	54	98.2	65	100.0	57	100.0	H vs. L	0.32 (0.01,7.92)*	0.491
Smile	Officer	n	154		163		142		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	154	100.0	163	100.0	142	100.0	H vs. L	—	—
	Enlisted Flyer	n	127		130		123		Overall		0.618
		Abnormal	1	0.8	1	0.8	0	0.0	M vs. L	0.98 (0.06,15.79)	0.999
		Normal	126	99.2	129	99.2	123	100.0	H vs. L	0.34 (0.01,8.46)*	0.999
Enlisted Groundcrew	n	55		65		57		Overall		0.612	
	Abnormal	1	1.8	1	1.5	0	0.0	M vs. L	0.84 (0.05,13.81)	0.999	
	Normal	54	98.2	64	98.5	57	100.0	H vs. L	0.32 (0.01,7.92)*	0.491	
Enlisted Groundcrew	n	154		163		142		Overall		0.323	
	Abnormal	0	0.0	1	0.6	2	1.4	M vs. L	2.85 (0.12,70.55)*	0.999	
	Normal	154	100.0	162	99.4	140	98.6	H vs. L	5.50 (0.26,115.5)*	0.229	

TABLE I-1. (continued)
Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Palpebral Fissures	Officer	n	127		130		122		Overall		0.801
		Abnormal	1	0.8	2	1.5	1	0.8	M vs. L	1.97 (0.18,21.99)	0.999
		Normal	126	99.2	128	98.5	121	99.2	H vs. L	1.04 (0.06,16.84)	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.420
		Abnormal	0	0.0	1	1.5	0	0.0	M vs. L	2.58 (0.10,64.65)*	0.999
		Normal	55	100.0	64	98.5	57	100.0	H vs. L	—	—
Balance	Officer	n	154		163		142		Overall		0.598
		Abnormal	0	0.0	1	0.6	1	0.7	M vs. L	2.85 (0.12,70.55)*	0.999
		Normal	154	100.0	162	99.4	141	99.3	H vs. L	3.28 (0.13,81.06)*	0.480
	Enlisted Flyer	n	127		130		123		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	127	100.0	130	100.0	123	100.0	H vs. L	—	—
Groundcrew	Enlisted Flyer	n	55		64		57		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	55	100.0	64	100.0	57	100.0	H vs. L	—	—
	Enlisted Groundcrew	n	154		163		142		Overall		0.574
		Abnormal	1	0.7	0	0.0	1	0.7	M vs. L	0.31 (0.01,7.74)*	0.486
		Normal	153	99.3	163	100.0	141	99.3	H vs. L	1.09 (0.07,17.51)*	0.999

TABLE I-1. (continued)

Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Gag Reflex	Officer	n	126		130		123		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	126	100.0	130	100.0	123	100.0	H vs. L	—	—
	Enlisted Flyer	n	55		65		57		Overall		0.328
		Abnormal	1	1.8	0	0.0	0	0.0	M vs. L	0.28 (0.01,6.95)*	0.458
		Normal	54	98.2	65	100.0	57	100.0	H vs. L	0.32 (0.01,7.92)*	0.491
Enlisted Groundcrew	n	153		163		142		Overall		—	
	Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—	
	Normal	153	100.0	163	100.0	142	100.0	H vs. L	—	—	
Speech	Officer	n	127		130		123		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	127	100.0	130	100.0	123	100.0	H vs. L	—	—
	Enlisted Flyer	n	55		65		57		Overall		0.328
		Abnormal	1	1.8	0	0.0	0	0.0	M vs. L	0.28 (0.01,6.95)*	0.458
		Normal	54	98.2	65	100.0	57	100.0	H vs. L	0.32 (0.01,7.92)*	0.491
Enlisted Groundcrew	n	154		163		142		Overall		0.574	
	Abnormal	1	0.7	0	0.0	1	0.7	M vs. L	0.31 (0.01,7.74)*	0.486	
	Normal	153	99.3	163	100.0	141	99.3	H vs. L	1.09 (0.07,17.51)	0.999	

TABLE I-1. (continued)
Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Tongue Position Relative to Midline	Officer	n	127		130		123		Overall		0.368
		Abnormal	1	0.8	0	0.0	0	0.0	M vs. L	0.32 (0.01, 8.01)*	0.494
	Enlisted Flyer	Normal	126	99.2	130	100.0	123	100.0	H vs. L	0.34 (0.01, 8.46)*	0.999
		n	55		65		57		Overall		0.378
	Enlisted Groundcrew	Abnormal	1	1.8	0	0.0	0	0.0	M vs. L	0.28 (0.01, 6.95)*	0.458
		Normal	54	98.2	65	100.0	57	100.0	H vs. L	0.32 (0.01, 7.92)*	0.491
	Enlisted Groundcrew	n	153		163		142		Overall		0.404
		Abnormal	0	0.0	1	0.6	0	0.0	M vs. L	2.83 (0.12, 70.09)*	0.999
	Enlisted Groundcrew	Normal	153	100.0	162	99.4	142	100.0	H vs. L	---	---
		n	126		130		123		Overall		0.365
Palate and Uvula Movement	Officer	Abnormal	1	0.8	0	0.0	0	0.0	M vs. L	0.32 (0.01, 7.94)*	0.492
		Normal	125	99.2	130	100.0	123	100.0	H vs. L	0.34 (0.01, 8.40)*	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.328
		Abnormal	1	1.8	0	0.0	0	0.0	M vs. L	0.28 (0.01, 6.95)*	0.458
	Enlisted Groundcrew	Normal	54	98.2	65	100.0	57	100.0	H vs. L	0.32 (0.01, 7.92)*	0.491
		n	153		163		142		Overall		---
	Enlisted Groundcrew	Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	---	---
		Normal	153	100.0	163	100.0	142	100.0	H vs. L	---	---

TABLE I-1. (continued)

Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Neck Range of Motion	Officer	n	127		130		123		Overall		0.924
		Abnormal	9	7.1	9	6.9	10	8.1	M vs. L	0.98 (0.37, 2.54)	0.999
		Normal	118	92.9	121	93.1	113	91.9	H vs. L	1.16 (0.46, 2.96)	0.814
	Enlisted Flyer	n	55		65		57		Overall		0.891
		Abnormal	5	9.1	6	9.2	4	7.0	M vs. L	1.02 (0.29, 3.53)	0.999
		Normal	50	90.9	59	90.8	53	93.0	H vs. L	0.76 (0.19, 2.97)	0.740
Cranial Nerve Function Index	Enlisted Groundcrew	n	154		163		142		Overall		0.250
		Abnormal	9	5.8	6	3.7	3	2.1	M vs. L	0.62 (0.21, 1.77)	0.433
		Normal	145	94.2	157	96.3	139	97.9	H vs. L	0.35 (0.09, 1.31)	0.142
	Officer	n	122		130		123		Overall		0.734
		Abnormal	15	12.3	12	9.2	13	10.7	M vs. L	0.73 (0.33, 1.62)	0.542
		Normal	107	87.7	118	90.8	109	89.3	H vs. L	0.85 (0.39, 1.87)	0.841
Cranial Nerve Function Index	Enlisted Flyer	n	55		64		57		Overall		0.754
		Abnormal	7	12.7	8	12.5	5	8.8	M vs. L	0.98 (0.33, 2.90)	0.999
		Normal	48	87.3	56	87.5	52	91.2	H vs. L	0.66 (0.20, 2.22)	0.554
	Enlisted Groundcrew	n	151		161		141		Overall		0.512
		Abnormal	15	9.9	12	7.5	9	6.4	M vs. L	0.73 (0.33, 1.62)	0.546
		Normal	136	90.1	149	92.5	132	93.6	H vs. L	0.62 (0.26, 1.46)	0.290

TABLE I-1. (continued)

Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Cranial Nerve Function Index (Neck Range of Motion Excluded)	Officer	n	122		130		122		Overall		0.136
		Abnormal	8	6.6	3	2.3	3	2.5	M vs. L	0.34 (0.09,1.30)	0.127
		Normal	114	93.4	127	97.7	119	97.5	H vs. L	0.36 (0.09,1.39)	0.216
	Enlisted Flyer	n	55		64		57		Overall		0.791
		Abnormal	3	5.5	2	3.1	2	3.5	M vs. L	0.56 (0.09,3.47)	0.661
		Normal	52	94.5	62	96.9	55	96.5	H vs. L	0.63 (0.10,3.93)	0.676
	Enlisted Groundcrew	n	151		161		141		Overall		0.785
		Abnormal	8	5.3	6	3.7	7	5.0	M vs. L	0.69 (0.23,2.04)	0.590
		Normal	143	94.7	155	96.3	134	95.0	H vs. L	0.93 (0.33,2.65)	0.999
Pin Prick	Officer	n	126		127		122		Overall		0.713
		Abnormal	9	7.1	6	4.7	7	5.7	M vs. L	0.65 (0.22,1.87)	0.440
		Normal	117	92.9	121	95.3	115	94.3	H vs. L	0.79 (0.29,2.20)	0.797
	Enlisted Flyer	n	55		64		57		Overall		0.584
		Abnormal	5	9.1	3	4.7	5	8.8	M vs. L	0.49 (0.11,2.16)	0.469
		Normal	50	90.9	61	95.3	52	91.2	H vs. L	0.96 (0.26,3.52)	0.999
	Enlisted Groundcrew	n	152		162		138		Overall		0.052
		Abnormal	13	8.6	8	4.9	3	2.2	M vs. L	0.56 (0.22,1.38)	0.259
		Normal	139	91.4	154	95.1	135	97.8	H vs. L	0.24 (0.07,0.85)	0.020

TABLE 11. (continued)

Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Light Touch	Officer	n	126		127		122		Overall		0.141
		Abnormal	9	7.1	4	3.2	3	2.5	M vs. L	0.42 (0.13,1.41)	0.167
		Normal	117	92.9	123	96.8	119	97.5	H vs. L	0.33 (0.09,1.24)	0.137
	Enlisted Flyer	n	55		64		57		Overall		0.619
		Abnormal	3	5.5	2	3.1	4	7.0	M vs. L	0.56 (0.09,3.47)	0.661
		Normal	52	94.5	62	96.9	53	93.0	H vs. L	1.31 (0.28,6.13)	0.999
Muscle Status	Enlisted Groundcrew	n	152		162		138		Overall		0.834
		Abnormal	5	3.3	5	3.1	3	2.2	M vs. L	0.94 (0.27,3.30)	0.999
		Normal	147	96.7	157	96.9	135	97.8	H vs. L	0.65 (0.15,2.79)	0.725
	Officer	n	127		130		123		Overall		0.428
		Abnormal	5	3.9	2	1.5	5	4.1	M vs. L	0.38 (0.07,2.00)	0.278
		Normal	122	96.1	128	98.5	118	95.9	H vs. L	1.03 (0.29,3.66)	0.999
Muscle Status	Enlisted Flyer	n	55		65		57		Overall		0.992
		Abnormal	1	1.8	1	1.5	1	1.8	M vs. L	0.84 (0.05,13.81)	0.999
		Normal	54	98.2	64	98.5	56	98.2	H vs. L	0.96 (0.06,15.81)	0.999
	Enlisted Groundcrew	n	154		163		142		Overall		0.781
		Abnormal	3	2.0	5	3.1	3	2.1	M vs. L	1.59 (0.37,6.78)	0.724
		Normal	151	98.0	158	96.9	139	97.9	H vs. L	1.09 (0.22,5.47)	0.999

TABLE I-1. (continued)
Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Vibratory Sensation	Officer	n	126		127		122		Overall		0.542
		Abnormal	3	2.4	1	0.8	3	2.5	M vs. L	0.33 (0.03, 3.17)	0.370
		Normal	123	97.6	126	99.2	119	97.5	H vs. L	1.03 (0.21, 5.22)	0.999
	Enlisted Flyer	n	55		64		57		Overall		0.628
		Abnormal	0	0.0	1	1.6	1	1.8	M vs. L	2.62 (0.11, 65.68)*	0.999
		Normal	55	100.0	63	98.4	56	98.2	H vs. L	2.95 (0.12, 73.90)*	0.999
Enlisted Groundcrew	n	152		162		138		Overall		0.166	
	Abnormal	0	0.0	2	1.2	0	0.0	M vs. L	4.75 (0.23, 99.76)*	0.499	
	Normal	152	100.0	160	98.8	138	100.0	H vs. L			
Patellar Reflex	Officer	n	127		130		123		Overall		0.156
		Abnormal	0	0.0	1	0.8	3	2.4	M vs. L	2.95 (0.12, 73.18)*	0.999
		Normal	127	100.0	129	99.2	120	97.6	H vs. L	7.41 (0.38, 144.90)*	0.118
	Enlisted Flyer	n	55		65		57		Overall		0.992
		Abnormal	1	1.8	1	1.5	1	1.8	M vs. L	0.84 (0.05, 13.81)	0.999
		Normal	54	98.2	64	98.5	56	98.2	H vs. L	0.96 (0.06, 15.81)	0.999
Enlisted Groundcrew	n	154		163		142		Overall		0.170	
	Abnormal	3	2.0	0	0.0	1	0.7	M vs. L	0.13 (0.01, 2.58)*	0.114	
	Normal	151	98.0	163	100.0	141	99.3	H vs. L	0.36 (0.04, 3.47)	0.624	

TABLE I-1. (continued)

Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Achilles Reflex	Officer	n	124		129		123		Overall		0.774
		Abnormal	8	6.5	6	4.7	8	6.5	M vs. L	0.71 (0.24, 2.10)	0.591
		Normal	116	93.5	123	95.3	115	93.5	H vs. L	1.01 (0.37, 2.78)	0.999
	Enlisted Flyer	n	55		64		57		Overall		0.059
		Abnormal	5	9.1	0	0.0	4	7.0	M vs. L	0.07 (0.004, 1.32)*	0.019
		Normal	50	90.9	64	100.0	53	93.0	H vs. L	0.76 (0.19, 2.97)	0.740
Enlisted Groundcrew	Enlisted Groundcrew	n	153		163		141		Overall		0.920
		Abnormal	10	6.5	9	5.5	8	5.7	M vs. L	0.84 (0.33, 2.12)	0.814
		Normal	143	93.5	154	94.5	133	94.3	H vs. L	0.86 (0.33, 2.25)	0.812
	Officer	n	127		130		123		Overall		0.344
		Abnormal	1	0.8	0	0.0	2	1.6	M vs. L	0.32 (0.01, 8.01)*	0.494
		Normal	126	99.2	130	100.0	121	98.4	H vs. L	2.08 (0.19, 23.27)	0.618
Biceps Reflex	Enlisted Flyer	n	55		65		57		Overall		0.420
		Abnormal	0	0.0	1	1.5	0	0.0	M vs. L	2.58 (0.10, 64.65)	0.999
		Normal	55	100.0	64	98.5	57	100.0	H vs. L	—	—
	Enlisted Groundcrew	n	154		163		142		Overall		0.515
		Abnormal	1	0.7	3	1.8	1	0.7	M vs. L	2.87 (0.30, 27.88)	0.623
		Normal	153	99.3	160	98.2	141	99.3	H vs. L	1.09 (0.07, 17.51)	0.999

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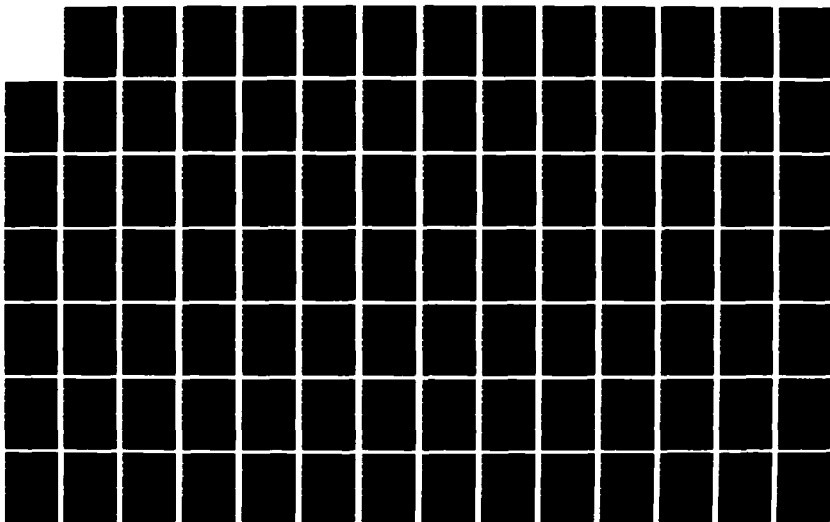
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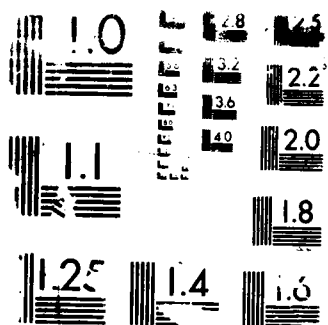
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TABLE I-1. (continued)
Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Babinski Reflex	Officer	n	127		128		122		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	127	100.0	128	100.0	122	100.0	H vs. L	—	—
	Enlisted Flyer	n	55		65		57		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	55	100.0	65	100.0	57	100.0	H vs. L	—	—
Enlisted Groundcrew	n	153		162		142		Overall		0.329	
	Abnormal	2	1.3	0	0.0	2	1.4	M vs. L	0.19 (0.01,3.92)*	0.235	
	Normal	151	98.7	162	100.0	140	98.6	H vs. L	1.08 (0.15,7.76)	0.999	
Tremor	Officer	n	127		130		123		Overall		0.248
		Abnormal	5	3.9	1	0.8	3	2.4	M vs. L	0.19 (0.02,1.64)	0.117
		Normal	122	96.1	129	99.2	120	97.6	H vs. L	0.61 (0.14,2.61)	0.722
	Enlisted Flyer	n	55		65		57		Overall		0.609
		Abnormal	1	1.8	3	4.6	3	5.3	M vs. L	2.61 (0.26,25.86)	0.624
		Normal	54	98.2	62	95.4	54	94.7	H vs. L	3.00 (0.30,29.76)	0.618
Enlisted Groundcrew	n	154		163		142		Overall		0.312	
	Abnormal	5	3.3	4	2.5	1	0.7	M vs. L	0.75 (0.20,2.85)	0.744	
	Normal	149	96.7	159	97.5	141	99.3	H vs. L	0.21 (0.02,1.83)	0.216	

TABLE I-1. (continued)

Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Coordination	Officer	n	127		130		123		Overall		0.603
		Abnormal	0	0.0	1	0.8	1	0.8	M vs. L	2.95 (0.12, 73.18)*	0.999
		Normal	127	100.0	129	99.2	122	99.2	H vs. L	3.12 (0.13, 77.39)*	0.492
	Enlisted Flyer	n	55		64		57		Overall		0.415
		Abnormal	0	0.0	1	1.6	0	0.0	M vs. L	2.62 (0.11, 65.68)*	0.999
		Normal	55	100.0	63	98.4	57	100.0	H vs. L	—	—
Romberg Sign	Enlisted Groundcrew	n	154		163		142		Overall		0.516
		Abnormal	2	1.3	1	0.6	3	2.1	M vs. L	0.47 (0.04, 5.23)	0.613
		Normal	152	98.7	162	99.4	139	97.9	H vs. L	1.64 (0.27, 9.96)	0.674
	Officer	n	127		130		123		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	127	100.0	130	100.0	123	100.0	H vs. L	—	—
Romberg Sign	Enlisted Flyer	n	55		64		57		Overall		—
		Abnormal	0	0.0	0	0.0	0	0.0	M vs. L	—	—
		Normal	55	100.0	64	100.0	57	100.0	H vs. L	—	—
	Enlisted Groundcrew	n	154		163		142		Overall		0.574
		Abnormal	1	0.7	0	0.0	1	0.7	M vs. L	0.31 (0.01, 7.74)	0.486
		Normal	153	99.3	163	100.0	141	99.3	H vs. L	1.09 (0.07, 17.51)	0.999

TABLE I-1. (continued)
Unadjusted Exposure Index Analyses for Neurological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Gait	Officer	n	127		130		123		Overall		0.591
		Abnormal	3	2.4	1	0.8	2	1.6	M vs. L	0.32 (0.03, 3.12)	0.366
		Normal	124	97.6	129	99.2	121	98.4	H vs. L	0.68 (0.11, 4.16)	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.370
		Abnormal	2	3.6	2	3.1	0	0.0	M vs. L	0.84 (0.12, 6.18)	0.999
		Normal	53	96.4	63	96.9	57	100.0	H vs. L	0.19 (0.01, 3.97)*	0.239
Enlisted Groundcrew	n	154		163		142		Overall		0.580	
	Abnormal	4	2.6	2	1.2	4	2.8	M vs. L	0.47 (0.08, 2.58)	0.437	
	Normal	150	97.4	161	98.8	138	97.2	H vs. L	1.09 (0.27, 4.43)	0.999	
ONS Summary Index	Officer	n	127		130		123		Overall		0.123
		Abnormal	8	6.3	2	1.5	4	3.3	M vs. L	0.23 (0.05, 1.12)	0.058
		Normal	119	93.7	128	98.5	119	96.7	H vs. L	0.50 (0.15, 1.71)	0.377
	Enlisted Flyer	n	55		64		57		Overall		0.810
		Abnormal	3	5.5	5	7.8	3	5.3	M vs. L	1.47 (0.34, 6.45)	0.724
		Normal	52	94.5	59	92.2	54	94.7	H vs. L	0.96 (0.19, 4.99)	0.999
	Enlisted Groundcrew	n	154		163		142		Overall		0.585
		Abnormal	10	6.5	7	4.3	6	4.2	M vs. L	0.65 (0.24, 1.74)	0.459
		Normal	144	93.5	156	95.7	136	95.8	H vs. L	0.64 (0.23, 1.80)	0.448

*Estimated relative risk and confidence interval calculated after adding 0.5 to each cell.

—No abnormalities present in contrast; estimated relative risk, confidence interval, and p-value not calculated.

TABLE I-2.
Interaction Summaries of Adjusted Exposure
Index Analyses for Selected Neurological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index						Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low		Medium		High				
				Number	Percent	Number	Percent	Number	Percent			
Cranial Nerve Function Index	Diabetic	n	7		12		14		Overall		0.339*	
		Abnormal	0	0.0	3	25.0	2	14.3	H vs. L	5.53 (0.25,124.40)**	0.263*	
		Normal	7	100.0	9	75.0	12	85.7	H vs. L	3.00 (0.13,71.31)**	0.533*	
	Impaired	n	11		14		18		Overall		0.114*	
		Abnormal	0	0.0	2	14.3	0	0.0	H vs. L	4.60 (0.20,106.30)**	0.487*	
		Normal	11	100.0	12	85.7	18	100.0	H vs. L	—	—	
Light Touch	Normal ^a	n	133		135		109		Overall		0.336	
		Abnormal	15	11.3	7	5.2	7	6.4	H vs. L	0.55 (0.21,1.44)	0.225	
		Normal	118	88.7	128	94.8	102	93.6	H vs. L	0.56 (0.22,1.44)	0.228	
	Yes ^b	n	38		45		40		Overall		0.086	
		Abnormal	1	2.6	2	4.4	4	10.0	H vs. L	0.42 (0.02,8.81)	0.573	
		Normal	37	97.4	43	95.6	36	90.0	H vs. L	5.48 (0.41,71.54)	0.194	
No	n	17		19		17		Overall		0.111*		
	Abnormal	2	11.8	0	0.0	0	0.0	H vs. L	0.16 (0.01,3.56)**	0.216*		
	Normal	15	88.2	19	100.0	17	100.0	H vs. L	0.18 (0.01,3.98)**	0.485*		

TABLE I-2. (continued)
Interaction Summaries of Adjusted Exposure
Index Analyses for Selected Neurological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index						Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low		Medium		High				
				Number	Percent	Number	Percent	Number	Percent			
Muscle Status	Born ≥1942	n	87		129		82		Overall		0.539*	
		Abnormal	1	1.1	2	1.6	0	0.0	M vs. L	1.35 (0.12, 15.17)*	0.999*	
		Normal	86	98.9	127	98.4	82	100.0	H vs. L	0.35 (0.01, 8.70)**	0.999*	
		n	63		33		54		Overall		0.436*	
		Abnormal	1	1.6	2	6.1	3	5.6	M vs. L	4.00 (0.35, 45.84)*	0.271*	
		Normal	62	98.4	31	93.9	51	94.4	H vs. L	3.65 (0.37, 36.13)*	0.334*	
	Born 1923-1941	n	4		1		6		Overall		0.051*	
		Abnormal	1	25.0	1	100.0	0	0.0	M vs. L	7.00 (0.17, 291.34)**	0.400*	
		Normal	3	75.0	0	0.0	6	100.0	H vs. L	0.18 (0.01, 5.68)**	0.400*	
		Born ≤1922	n	86		129		81		Overall		0.309
			Abnormal	2	2.3	6	4.7	1	1.2	M vs. L	2.18 (0.43, 11.12)	0.346
			Normal	84	97.7	123	95.3	80	98.8	H vs. L	0.57 (0.05, 6.37)	0.644
Born 1923-1941 ^b	n		63		33		54		Overall		0.649	
	Abnormal		5	7.9	2	6.1	6	11.1	M vs. L	0.64 (0.11, 3.75)	0.624	
	Normal		58	92.1	31	93.9	48	88.9	H vs. L	1.40 (0.38, 5.19)	0.616	
	Born ≤1922	n	4		1		6		Overall		0.100*	
		Abnormal	3	75.0	1	100.0	1	16.7	M vs. L	1.29 (0.03, 53.51)**	0.999*	
		Normal	1	25.0	0	0.0	5	83.3	H vs. L	0.07 (0.003, 1.51)*	0.190*	

TABLE I-2. (continued)
Interaction Summaries of Adjusted Exposure
Index Analyses for Selected Neurological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index						Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low		Medium		High				
				Number	Percent	Number	Percent	Number	Percent			
Central Nervous System Index	Exposure Index-by- Insecticide	Yes ^b	n	102		113		95		Overall		0.560
			Abnormal	4	3.9	7	6.2	3	3.2	M vs. L	1.68 (0.48,5.95)	0.419
			Normal	98	96.1	106	93.8	92	96.8	H vs. L	0.87 (0.19,3.99)	0.853
	Exposure (Enlisted Groundcrew)	No	n	52		50		47		Overall		0.050*
			Abnormal	6	11.5	0	0.0	3	6.4	M vs. L	0.07 (0.004,1.29)**	0.027*
			Normal	46	88.5	50	100.0	44	93.6	H vs. L	0.38 (0.10,1.54)*	0.209*

*Estimated relative risk or p-value, based on stratified tables.

**Estimated relative risk and confidence interval calculated after adding 0.5 to each cell.

—No abnormal participants present in contrast; adjusted relative risk, p-value, and confidence interval not presented.

^aResults adjusted for age.

^bResults adjusted for diabetic class.

Note: Small sample sizes may affect validity of overall p-value.

TABLE I-3.

**Exclusions and Missing Data
for Neurological Assessment by Group
(Original Comparisons Only)**

Data Category	Group		Total
	Ranch Hand	Original Comparison	
Lifetime Alcohol History (Drink-years); Missing Data	39	27	66
Peripheral Edema (Exclusion Category for Pin Prick, Light Touch, and Ankle Vibration)	13	12	25
Diabetic Class (Missing Data)	0	3	3
Positive Syphilis Serology (RPR and FTA); Exclusion Category	0	0	0

TABLE I-4.

Unadjusted Analyses for Verified Neurological
Diseases by Group*--1982-1985
(Original Comparisons Only)

Disease Category	Group Abnormalities				Total	p-Value**
	Ranch Hand		Original Comparison			
	Number	Percent	Number	Percent		
Inflammatory Diseases	0	0.0	0	0.0	0	—
Hereditary and Degenerative Diseases	2	0.2	0	0.0	2	0.500
Peripheral Disorders	18	1.8	20	2.1	38	0.626
Disorders of the Eye	5	0.5	5	0.5	10	0.999
Disorders of the Ear	6	0.6	6	0.6	12	0.999
Other Disorders	8	0.8	3	0.3	11	0.288

*Based on 1,016 Ranch Hands and 955 Original Comparisons; some participants may be classified in more than one category.

**Fisher's exact test.

TABLE I-5.

Unadjusted Analyses for Verified Neurological
Diseases by Group*--Baseline and First Followup Studies Combined
(Original Comparisons Only)

Disease Category	Group Abnormalities				Total	p-Value ^{*,a}
	Ranch Hand		Original Comparison			
	Number	Percent	Number	Percent		
Inflammatory Diseases	3	0.3	2	0.2	5	0.999
Hereditary and Degenerative Diseases	2	0.2	3	0.3	5	0.678
Peripheral Disorders	23	2.3	27	2.8	50	0.475
Disorders of the Eye	16	1.6	16	1.7	32	0.861
Disorders of the Ear	24	2.4	26	2.7	50	0.668
Other Disorders	15	1.5	12	1.3	27	0.703

*Based on 1,016 Ranch Hands and 955 Original Comparisons; some participants may be classified in more than one category.

**Fisher's exact test.

^aGroup significance for patterns of disease: $p=0.702$.

TABLE I-6.

Unadjusted Analyses for Cranial Nerve
Function by Group (Original Comparisons Only)

Variable	Cranial Nerve	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
			Ranch Hand		Original Comparison			
			Number	Percent	Number	Percent		
Smell	I Olfactory	n	1,016		955		1.05 (0.42,2.58)	0.999
		Abnormal	10	1.0	9	0.9		
		Normal	1,006	99.0	946	99.1		
Visual Fields	II Optic	n	1,016		955		1.41 (0.40,5.02)	0.754
		Abnormal	6	0.6	4	0.4		
		Normal	1,010	99.4	951	99.6		
Light Reaction	III Oculomotor	n	1,015		954		1.08 (0.39,2.98)	0.999
		Abnormal	8	0.8	7	0.7		
		Normal	1,007	99.2	947	99.3		
Ocular Movements	III Oculomotor IV Trochlear VI Abducens	n	1,016		955		1.13 (0.34,3.71)	0.999
		Abnormal	6	0.6	5	0.5		
		Normal	1,010	99.4	950	99.5		
Facial Sensation	V Trigeminal	n	1,014		953		1.88 (0.34,10.31)	0.688
		Abnormal	4	0.4	2	0.2		
		Normal	1,010	99.6	951	99.8		
Jaw Clench	V Trigeminal	n	1,016		955		1.88 (0.17,20.79)	0.999
		Abnormal	2	0.2	1	0.1		
		Normal	1,014	99.8	954	99.9		
Smile	VII Facial	n	1,016		955		3.31 (0.69,15.95)	0.181
		Abnormal	7	0.7	2	0.2		
		Normal	1,009	99.3	953	99.8		
Palpebral Fissures	VII Facial	n	1,015		955		1.32 (0.42,4.17)	0.775
		Abnormal	7	0.7	5	0.5		
		Normal	1,008	99.3	950	99.5		

TABLE I-6. (continued)

Unadjusted Analyses for Cranial Nerve
Function by Group (Original Comparisons Only)

Variable	Cranial Nerve	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
			Ranch Hand		Original Comparison			
			Number	Percent	Number	Percent		
Balance	VIII Acoustic	n	1,015		955		1.88 (0.17,20.81)	0.999
		Abnormal	2	0.2	1	0.1		
		Normal	1,013	99.8	954	99.9		
Gag Reflex	IX Glosso-pharyngeal	n	1,014		955		0.94 (0.06,15.08)	0.999
		Abnormal	1	0.1	1	0.1		
		Normal	1,013	99.9	954	99.9		
Speech	X Vagus	n	1,016		954		6.59 (0.34,127.80)*	0.250
		Abnormal	3	0.3	0	0.0		
		Normal	1,013	99.7	954	100.0		
Tongue Position Relative to Midline	X Vagus	n	1,015		955		6.61 (0.34,128.06)*	0.250
		Abnormal	3	0.3	0	0.0		
		Normal	1,012	99.7	955	100.0		
Palate and Uvula Movement	XI Spinal Accessory	n	1,014		955		1.89 (0.17,20.83)	0.999
		Abnormal	2	0.2	1	0.1		
		Normal	1,012	99.8	954	99.9		
Neck Range of Motion	XII Hypoglossal	n	1,016		955		0.89 (0.62,1.28)	0.579
		Abnormal	61	6.0	64	6.7		
		Normal	955	94.0	891	93.3		
Cranial Nerve Function Index		n	1,003		941		1.01 (0.75,1.37)	0.939
		Abnormal	96	9.6	89	9.5		
		Normal	907	90.4	852	90.5		

TABLE I-6. (continued)

Unadjusted Analyses for Cranial Nerve
Function by Group (Original Comparisons Only)

Variable	Cranial Nerve	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
			Ranch Hand		Original Comparison			
			Number	Percent	Number	Percent		
Cranial Nerve Function Index (Neck Range of Motion Excluded)	n		1,003		941			
	Abnormal		42	4.2	29	3.1	1.34 (0.85,2.23)	0.226
	Normal		961	95.8	912	96.9		

*Estimated relative risk and confidence interval calculated after adding 0.5 to each cell.

TABLE I-7.

Adjusted Analyses for Selected Variables of Cranial
Nerve Function by Group (Original Comparisons Only)

		Group				Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
Variable	Statistic	Ranch Hand		Original Comparison				
		Number	Percent	Number	Percent			
Neck Range of Motion	n	1,016		955		0.92 (0.64,1.57)	0.647	AGE(p<0.001)
	Abnormal	61	6.0	64	6.7			
	Normal	955	94.0	891	93.3			
Cranial Nerve Function Index	n	1,003		941		1.04 (0.76,1.41)	0.812	AGE(p<0.001)
	Abnormal	96	9.6	89	9.5			
	Normal	907	90.4	852	90.5			
Cranial Nerve Function Index (Neck Range of Motion Excluded)	n	964		911		1.27 (0.77,2.12)	0.350	DIAB*INS(p=0.032) OCC*DRKYR(p=0.016) OCC*DIAB(p=0.032)
	Abnormal	38	3.9	28	3.1			
	Normal	926	96.1	883	96.9			
Alternative Model—Includes Missing Drink-Year Participants ^{a, b}								
Range of Motion Excluded)	n	1,003		938		1.41 (0.86,2.32)	0.170	DIAB*INS(p=0.022) OCC*DIAB(p=0.027)
	Abnormal	42	4.2	28	3.0			
	Normal	961	95.8	910	97.0			

*Abbreviations:

DIAB: diabetic class
 INS: insecticide exposure
 OCC: occupation
 DRKYR: drink-years

^aLifetime alcohol consumption (drink-years) not used as a covariate.

^b66 missing drink-year participants: 4/39 Ranch Hands abnormal; 0/27 Original Comparisons abnormal.

TABLE I-8.

Unadjusted Analyses for Peripheral Nerve Function by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Pin Prick	n	1,003		943		0.89 (0.62,1.28)	0.573
	Abnormal	59	5.9	62	6.6		
	Normal	944	94.1	881	93.4		
Light Touch	n	1,003		943		1.09 (0.68,1.75)	0.809
	Abnormal	38	3.8	33	3.5		
	Normal	965	96.2	910	96.5		
Muscle Status	n	1,016		955		0.94 (0.54,1.63)	0.888
	Abnormal	26	2.6	26	2.7		
	Normal	990	97.4	929	97.3		
Vibratory Sensation	n	1,003		943		1.48 (0.57,3.84)	0.482
	Abnormal	11	1.1	7	0.7		
	Normal	992	98.9	936	99.3		
Patellar Reflex	n	1,016		954		0.74 (0.33,1.63)	0.547
	Abnormal	11	1.1	14	1.5		
	Normal	1,005	98.9	940	98.5		
Achilles Reflex	n	1,009		950		0.87 (0.60,1.26)	0.510
	Abnormal	58	5.7	62	6.5		
	Normal	951	94.3	888	93.5		
Biceps Reflex	n	1,016		955		0.85 (0.34,2.09)	0.819
	Abnormal	9	0.9	10	1.0		
	Normal	1,007	99.1	945	99.0		
Babinski Reflex	n	1,011		951		0.94 (0.24,3.77)	0.999
	Abnormal	4	0.4	4	0.4		
	Normal	1,007	99.6	947	99.6		

TABLE I-9.

Adjusted Analyses for Selected Variables of
Peripheral Nerve Function by Group
(Original Comparisons Only)

Variable	Statistic	Group		Original Comparison		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
		Ranch Bend		Number	Percent			
Pin Prick	n	1,003		941				
	Abnormal	59	5.9	61	6.5	****	****	GRP*DIAB(p=0.001)
	Normal	944	94.1	880	93.5			AGE(p<0.001)
Light Touch	n	964		914				
	Abnormal	37	3.8	31	3.4	1.12 (0.69,1.82)	0.652	AGE(p=0.049)
	Normal	927	96.2	883	96.6			DIAB(p=0.014)
Muscle Status	n	977		925				
	Abnormal	25	2.6	24	2.6	1.04 (0.57,1.89)	0.893	DIAB*AGE(p=0.037)
	Normal	952	97.4	901	97.4			DIAB*INS(p=0.028)
Achilles Reflex	n	1,009		947				
	Abnormal	58	5.7	61	6.4	0.92 (0.63,1.35)	0.677	AGE(p<0.001)
	Normal	951	94.3	886	93.6			DIAB(p<0.001)

*Additional Abbreviation:

GRP: group

****Group-by-covariate interaction—adjusted relative risk, confidence interval, and p-value are not presented.

TABLE I-10.

Summary of Group-by-Diabetic Class
Interaction for Pin Prick
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
Pin Prick Diabetic Class	Abnormal	n	Abnormal	76		74			
				13	17.1	7	9.5	2.03 (0.76, 5.43)	0.161
				63	82.9	67	90.5		
	Impaired	n	Abnormal	105		135			
				1	1.0	14	10.4	0.08 (0.01, 0.61)	0.015
				104	99.0	121	89.6		
	Normal	n	Abnormal	822		732			
				45	5.5	40	5.5	1.01 (0.65, 1.57)	0.951
				777	94.5	692	94.5		

TABLE I-11.

Unadjusted Analyses for CNS Coordination Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Tremor	n	1,016		955			
	Abnormal	26	2.6	14	1.5	1.77 (0.92,3.40)	0.110
	Normal	990	97.4	941	98.5		
Coordination	n	1,015		955			
	Abnormal	9	0.9	7	0.7	1.21 (0.45,3.27)	0.804
	Normal	1,006	99.1	948	99.3		
Romberg Sign	n	1,015		955			
	Abnormal	2	0.2	1	0.1	1.88 (0.17,20.81)	0.999
	Normal	1,013	99.8	954	99.9		
Gait	n	1,016		954			
	Abnormal	20	2.0	11	1.2	1.72 (0.82,3.61)	0.153
	Normal	996	98.0	943	98.8		
CNS Summary Index	n	1,015		954			
	Abnormal	48	4.7	29	3.0	1.58 (0.99,2.53)	0.062
	Normal	967	95.3	925	97.0		

TABLE I-12.

Adjusted Analyses for Selected Variables of
CNS Coordination by Group (Original Comparisons Only)

Variable	Statistic	Group		Original Comparison	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
		Ranch Hand	Number Percent	Number Percent			
Tremor	n	1,016		952			
	Abnormal Normal	26 990	2.6 97.4	14 938	1.5 98.5	0.112	DIAB(p=0.002)
Gait	n	1,016		951			
	Abnormal Normal	20 996	2.0 98.0	10 941	1.1 98.9	0.105	DIAB(p=0.035)
CNS Summary Index	n	1,015		951			
	Abnormal Normal	48 967	4.7 95.3	28 923	2.9 97.1	0.055	DIAB(p=0.009)

TABLE I-13.

Longitudinal Analysis of Romberg Sign and Babinski Reflex:
A Contrast of Baseline and Followup Examination Abnormalities
(Original Comparisons Only)

Variable	Group	1982 Baseline Exam	1985 Followup Exam		Odds Ratio (OR)*	p-Value (OR _{RH} vs OR _{OC})
			Abnormal	Normal		
Romberg Sign	Ranch	Abnormal	2	188	0	0.31
	Hand	Normal	0	777		
	Original Comparison	Abnormal Normal	0 1	180 690	0.006	
Babinski Reflex	Ranch	Abnormal	1	7	0.43	0.07
	Hand	Normal	3	953		
	Original Comparison	Abnormal Normal	0 4	1 863	4.00	

*Odds Ratio:
$$\frac{\text{Number Normal Baseline, Abnormal Followup}}{\text{Number Abnormal Baseline, Normal Followup}}$$

· APPENDIX J

Psychological Assessment

APPENDIX J: Psychological Assessment

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TABLE J-1.

Summary of Kolmogorov-Smirnov Tests on MMPI for Officers

Parameter*	Group	Mean Score	Standard Deviation	Kolmogorov- Smirnov p-Value
Anxiety	Ranch Hand Comparison	52.82 53.64	7.38 7.77	0.281
Consistency	Ranch Hand Comparison	49.23 49.23	6.92 6.62	0.995
Defensiveness	Ranch Hand Comparison	49.64 49.61	6.64 6.97	0.990
Denial	Ranch Hand Comparison	59.47 59.81	7.31 7.46	0.877
Depression	Ranch Hand Comparison	55.11 55.27	10.17 10.28	0.999
Hypochondria	Ranch Hand Comparison	55.60 55.02	8.85 8.76	0.970
Hysteria	Ranch Hand Comparison	60.45 59.97	7.00 7.47	0.627
Mania/Hypomania	Ranch Hand Comparison	54.36 53.39	8.94 9.12	0.092
Masculinity/ Femininity	Ranch Hand Comparison	58.83 58.10	8.64 9.07	0.366
Paranoia	Ranch Hand Comparison	53.71 53.91	7.34 7.34	0.975
Psychopathic/ Deviate	Ranch Hand Comparison	56.82 57.08	8.87 10.02	0.837
Schizophrenia	Ranch Hand Comparison	54.80 55.14	8.48 9.02	0.942
Social Introversion	Ranch Hand Comparison	46.56 47.19	7.43 7.77	0.594
Validity	Ranch Hand Comparison	0.93 0.89	3.11 3.20	0.776

*n=380 Ranch Hands; n=480 Comparisons (except for validity, where n=483 Comparisons).

TABLE J-2.

Summary of Kolmogorov-Smirnov Tests on MMPI for Enlisted Flyers

Parameter*	Group	Mean Score	Standard Deviation	Kolmogorov- Smirnov p-Value
Anxiety	Ranch Hand Comparison	54.78 55.09	9.73 10.09	0.678
Consistency	Ranch Hand Comparison	52.24 51.83	10.30 8.22	0.995
Defensiveness	Ranch Hand Comparison	53.05 52.00	7.96 8.31	0.270
Denial	Ranch Hand Comparison	55.95 56.95	8.73 8.50	0.807
Depression	Ranch Hand Comparison	58.21 58.32	11.79 11.86	0.744
Hypochondria	Ranch Hand Comparison	58.48 59.25	12.16 12.85	0.496
Hysteria	Ranch Hand Comparison	60.00 61.32	8.94 9.47	0.366
Mania/Hypomania	Ranch Hand Comparison	55.05 54.99	10.00 9.87	0.496
Masculinity/ Femininity	Ranch Hand Comparison	55.79 56.57	7.85 8.46	0.776
Paranoia	Ranch Hand Comparison	52.77 51.92	8.43 7.83	0.695
Psychopathic/ Deviate	Ranch Hand Comparison	57.48 58.95	11.40 10.79	0.088
Schizophrenia	Ranch Hand Comparison	56.56 57.06	13.03 11.49	0.178
Social Introversion	Ranch Hand Comparison	50.35 49.48	8.89 8.14	0.678
Validity	Ranch Hand Comparison	3.93 6.31	42.48 54.96	0.864

*n=176 Ranch Hands; n=208 Comparisons (except for validity, where n=177 Ranch Hands and n=210 Comparisons).

TABLE J-3.

Summary of Kolmogorov-Smirnov Tests on MMPI
for Enlisted Groundcrew

Parameter*	Group	Mean Score	Standard Deviation	Kolmogorov- Smirnov p-Value
Anxiety	Ranch Hand Comparison	55.86 55.61	10.96 9.58	0.993
Consistency	Ranch Hand Comparison	53.05 52.03	10.64 8.43	0.877
Defensiveness	Ranch Hand Comparison	52.42 52.60	8.27 8.35	0.970
Denial	Ranch Hand Comparison	55.53 56.52	8.57 8.88	0.118
Depression	Ranch Hand Comparison	58.79 57.66	12.98 10.78	0.594
Hypochondria	Ranch Hand Comparison	58.44 57.13	13.22 11.12	0.142
Hysteria	Ranch Hand Comparison	60.36 59.78	9.80 8.99	0.577
Mania/Hypomania	Ranch Hand Comparison	55.26 56.33	9.78 10.17	0.450
Masculinity/ Femininity	Ranch Hand Comparison	56.18 57.18	8.24 8.82	0.292
Paranoia	Ranch Hand Comparison	53.12 53.73	9.05 8.47	0.393
Psychopathic/ Deviate	Ranch Hand Comparison	59.01 59.26	11.29 10.66	0.728
Schizophrenia	Ranch Hand Comparison	58.20 57.36	14.22 11.12	0.837
Social Introversion	Ranch Hand Comparison	51.86 50.43	9.82 8.71	0.107
Validity	Ranch Hand Comparison	1.97 0.89	26.48 4.80	0.999

*n=458 Ranch Hands; n=598 Comparisons (except for validity,
where n=459 Ranch Hands and n=599 Comparisons).

TABLE J-4.

Summary of Group-by-Covariate Interactions
for Psychological Variables

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Comparison		
Anxiety	Group by- Education	High School	n	564	685		
			Number/% Abnormal Normal	57 507	49 636	7.2% 92.8%	0.114
		College	n	448	600		
			Number/% Abnormal Normal	16 432	30 570	5.0% 95.0%	0.233
Consistency	Group-by- Education	High School	n	537	661		
			Number/% Abnormal Normal	30 507	19 642	2.9% 97.5%	0.051
		College	n	437	585		
			Number/% Abnormal Normal	6 431	15 570	2.6% 97.4%	0.110
Depression	Group-by- Combat Index	Low	n	192	490		
			Number/% Abnormal Normal	28 164	40 450	8.2% 91.8%	0.039
		Medium	n	368	417		
			Number/% Abnormal Normal	37 331	38 379	9.1% 90.9%	0.657
		High	n	414	339		
			Number/% Abnormal Normal	43 371	47 292	13.9% 86.1%	0.159

TABLE J-4. (continued)
Summary of Group-by-Covariate Interactions
for Psychological Variables

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Comparison		
Paranoia	Group-by Age	Born ≥1942	n	410	545		
			Number/% Abnormal	15	19		
		Born <1942	Normal	395	526	0.88 (0.43, 1.77)	0.712
						3.5% 96.5%	
Schizophrenia	Group-by Education	High School	n	602	740		
			Number/% Abnormal	16	9		
		College	Normal	586	731	2.63 (1.11, 6.20)	0.027
						1.2% 98.8%	
		College	n	537	665		
			Number/% Abnormal	72	63	1.51 (1.05, 2.16)	0.033
Social Introversion	Group-by Combat Index	Low	Normal	465	602	9.5% 90.5%	
			n	439	585		
			Number/% Abnormal	18	37	0.63 (0.35, 1.12)	0.119
			Normal	421	548	6.3% 93.7%	
		Medium	n	198	509		
			Number/% Abnormal	11	6	4.86 (1.77, 13.36)	0.002
			Normal	187	503	1.2% 98.8%	
			n	384	427		
		High	Number/% Abnormal	6	4	1.59 (0.44, 5.68)	0.478
			Normal	378	423	0.9% 99.1%	
			n	430	349		
			Number/% Abnormal	9	9	0.82 (0.32, 2.09)	0.677
			Normal	421	340	2.6% 97.4%	

TABLE J-4. (continued)
Summary of Group-by-Covariate Interactions
for Psychological Variables

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Comparison		
Validity	Group-by-Race	Nonblack	n	954	1,206		
			Number/%				
			>0	208	21.8%	19.5%	0.095
			0	746	78.2%	80.5%	
		Black	n	60	83		
			Number/%				
			>0	15	25.0%	42.2%	0.038
			0	45	75.0%	57.8%	
Total CMI	Group-by-Education	High School	n	529	655		
			Number/%				
			Adj. Mean*	37.18	31.43	--	<0.001
			95% C.I.*	(30.25, 45.65)	(25.46, 38.76)		
		College	n	433	574		
			Number/%				
			Adj. Mean*	23.72	24.22	--	0.657
			95% C.I.*	(19.10, 29.41)	(19.57, 29.91)		
M-R Subscore	Group-by-Education	High School	n	555	675	Overall:	0.030
			Number/%			Medium vs. Low	
			0 (Low)	246	44.3%	1.37 (1.07, 1.75)	0.014
			1-10 (Medium)	267	48.1%	High vs. Low	
		College	n	443	590	Overall:	0.254
			Number/%			Medium vs. Low	
			0 (Low)	292	65.9%	0.91 (0.70, 1.18)	0.699
			1-10 (Medium)	141	31.8%	High vs. Low	0.465
			>10 (High)	10	2.3%	0.80 (0.35, 1.84)	0.597

*Transformed from log(X+1) scale, where X was the number of questions answered "yes."
--No relative risk given for Total CMI, which was analyzed as a continuous variable.

TABLE J-5.

Summary of Kolmogorov-Smirnov Tests on CMI

Stratification	Group	Sample Size	Mean Score	Standard Deviation	Kolmogorov-Smirnov p-Value
<u>Age</u>					
Born ≥ 1942	Ranch Hand	402	15.88	15.21	<0.001
	Comparison	543	13.07	12.40	
Born 1923-1941	Ranch Hand	562	15.49	12.99	0.281
	Comparison	674	14.64	12.52	
Born ≤ 1922	Ranch Hand	36	18.56	15.94	0.970
	Comparison	51	16.57	9.27	
<u>Race</u>					
Nonblack	Ranch Hand	941	15.63	13.83	0.003
	Comparison	1,187	13.94	12.00	
Black	Ranch Hand	59	17.81	16.91	0.481
	Comparison	81	15.68	17.01	
<u>Education</u>					
High School	Ranch Hand	556	18.88	15.80	<0.001
	Comparison	677	15.77	13.50	
College	Ranch Hand	444	11.85	10.18	0.999
	Comparison	591	12.08	10.63	
<u>Current Alcohol Use</u>					
Drinker	Ranch Hand	851	15.16	13.12	0.024
	Comparison	1,092	13.72	12.00	
Nondrinker	Ranch Hand	148	18.84	17.71	0.149
	Comparison	176	16.06	14.38	
<u>Occupation</u>					
Officer	Ranch Hand	377	11.23	9.01	0.807
	Comparison	476	10.88	9.09	
Enlisted Flyer	Ranch Hand	174	17.72	14.84	0.220
	Comparison	204	15.63	13.53	
Enlisted Groundcrew	Ranch Hand	449	18.80	16.06	0.007
	Comparison	588	16.06	13.69	

TABLE J-6.

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Anxiety	Officer	n	127	130	123	Overall		0.876
		Number/% Abnormal	2 1.6%	3 2.3%	3 2.4%	M vs. L	1.48 (0.24, 8.99)	0.999
	Enlisted Flyer	n	125	127	120	H vs. L	1.56 (0.26, 9.52)	0.680
		Number/% Abnormal	54	65	57	Overall		0.211
	Enlisted Groundcrew	n	8	4	4	M vs. L	0.38 (0.11, 1.33)	0.137
		Number/% Abnormal	46 85.2%	61 93.8%	53 93.0%	H vs. L	0.43 (0.12, 1.54)	0.230
Consistency	Officer	n	154	163	141	Overall		0.560
		Number/% Abnormal	19 12.3%	18 11.0%	12 8.5%	M vs. L	0.88 (0.44, 1.75)	0.730
	Enlisted Flyer	n	135	145	129	H vs. L	0.66 (0.31, 1.42)	0.343
		Number/% Abnormal	54	65	57	Overall		0.476
	Enlisted Groundcrew	n	4	2	2	M vs. L	0.40 (0.07, 2.26)	0.409
		Number/% Abnormal	50 92.6%	63 96.9%	55 96.5%	H vs. L	0.46 (0.08, 2.59)	0.430
Consistency	Officer	n	154	163	141	Overall		0.813
		Number/% Abnormal	9 5.8%	9 5.5%	6 4.3%	M vs. L	0.94 (0.36, 2.44)	0.999
	Enlisted Flyer	n	145	154	135	H vs. L	0.72 (0.25, 2.01)	0.603
		Number/% Abnormal	54	65	57	Overall		0.476
	Enlisted Groundcrew	n	4	2	2	M vs. L	0.40 (0.07, 2.26)	0.409
		Number/% Abnormal	50 92.6%	63 96.9%	55 96.5%	H vs. L	0.46 (0.08, 2.59)	0.430

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Officer	Officer	n	127	130	123	Overall		0.603
		Number/%						
		Abnormal	0	0.0%	1	0.8%	M vs. L	2.95 (0.12, 73.18)*
Defensiveness	Enlisted Flyer	Normal	127	100.0%	129	99.2%	H vs. L	3.12 (0.13, 77.39)*
		n	54	65	57	Overall		0.991
		Number/%						
Enlisted Groundcrew	Enlisted Groundcrew	Abnormal	1	1.9%	1	1.5%	M vs. L	0.83 (0.05, 13.56)
		Normal	53	98.1%	64	98.5%	H vs. L	0.95 (0.06, 15.52)
		n	154	163	141	Overall		0.697
Denial	Officer	Abnormal	6	3.9%	5	3.1%	M vs. L	0.78 (0.23, 2.61)
		Normal	148	96.1%	158	96.9%	H vs. L	1.29 (0.42, 3.93)
		n	154	163	141	Overall		0.779
Enlisted Flyer	Enlisted Flyer	n	127	130	123	Overall		0.094
		Number/%						
		Abnormal	6	4.7%	2	1.5%	M vs. L	0.32 (0.06, 1.59)
Enlisted Groundcrew	Enlisted Groundcrew	Normal	121	95.3%	128	98.5%	H vs. L	0.17 (0.02, 1.39)
		n	54	65	57	Overall		0.366
		Number/%						
Denial	Enlisted Flyer	Abnormal	2	3.7%	2	3.1%	M vs. L	0.83 (0.11, 6.06)
		Normal	52	96.3%	63	96.9%	H vs. L	0.18 (0.01, 3.89)*
		n	154	163	141	Overall		0.234
Enlisted Groundcrew	Enlisted Groundcrew	Abnormal	2	1.3%	0	0.0%	M vs. L	0.326
		Normal	152	98.7%	163	100.0%	H vs. L	0.19 (0.01, 3.92)*
		n	154	163	141	Overall		1.09 (0.15, 7.87)

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Depression	Officer	n	127	130	123	Overall		0.517
		Number/% Abnormal	8 6.3%	6 4.6%	10 8.1%	M vs. L	0.72 (0.24, 2.14)	0.593
		Normal	119 93.7%	124 95.4%	113 91.9%	H vs. L	1.32 (0.50, 3.45)	0.631
Depression	Enlisted Flyer	n	54	65	57	Overall		0.223
		Number/% Abnormal	11 20.4%	7 10.8%	6 10.5%	M vs. L	0.47 (0.17, 1.32)	0.199
		Normal	43 79.6%	58 89.2%	51 89.5%	H vs. L	0.46 (0.16, 1.35)	0.191
Depression	Enlisted Groundcrew	n	154	163	141	Overall		0.695
		Number/% Abnormal	25 16.2%	21 12.9%	20 14.2%	M vs. L	0.76 (0.41, 1.43)	0.428
		Normal	129 83.8%	142 87.1%	121 85.8%	H vs. L	0.85 (0.45, 1.62)	0.746
Hypochondria	Officer	n	127	130	123	Overall		0.530
		Number/% Abnormal	10 7.9%	6 4.6%	9 7.3%	M vs. L	0.57 (0.20, 1.61)	0.312
		Normal	117 92.1%	124 95.4%	114 92.7%	H vs. L	0.92 (0.36, 2.36)	0.999
Hypochondria	Enlisted Flyer	n	54	65	57	Overall		0.059
		Number/% Abnormal	11 20.4%	4 6.2%	10 17.5%	M vs. L	0.26 (0.08, 0.86)	0.026
		Normal	43 79.6%	61 93.8%	47 82.5%	H vs. L	0.83 (0.32, 2.15)	0.810
Hypochondria	Enlisted Groundcrew	n	154	163	141	Overall		0.176
		Number/% Abnormal	25 16.2%	18 11.0%	26 18.4%	M vs. L	0.64 (0.33, 1.23)	0.192
		Normal	129 83.8%	145 89.0%	115 81.6%	H vs. L	1.17 (0.64, 2.13)	0.646

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Hysteria	Officer	n	127	130	123	Overall		0.200
		Number/%						
		Abnormal	7 5.5%	9 6.9%	14 11.4%	M vs. L	1.28 (0.46, 3.53)	0.797
	Enlisted Flyer	Normal	120 94.5%	121 93.1%	109 88.6%	H vs. L	2.20 (0.86, 5.66)	0.113
		n	54	65	57	Overall		0.198
	Enlisted Groundcrew	Number/%						
		Abnormal	11 20.4%	6 9.2%	7 12.3%	M vs. L	0.40 (0.14, 1.16)	0.115
		Normal	43 79.6%	59 90.8%	50 87.7%	H vs. L	0.55 (0.20, 1.54)	0.307
	Enlisted Groundcrew	n	154	163	141	Overall		0.065
		Number/%						
	Officer	Abnormal	28 18.2%	16 9.8%	25 17.7%	M vs. L	0.49 (0.25, 0.95)	0.035
		Normal	126 81.8%	147 90.2%	116 82.3%	H vs. L	0.97 (0.54, 1.76)	0.999
		n	127	130	123	Overall		0.585
	Enlisted Flyer	Number/%						
		Abnormal	8 6.3%	5 3.9%	8 6.5%	M vs. L	0.60 (0.19, 1.87)	0.407
Mania/Hypomania	Enlisted Flyer	Normal	119 93.7%	125 96.1%	115 93.5%	H vs. L	1.04 (0.38, 2.85)	0.999
		n	54	65	57	Overall		0.623
		Number/%						
	Enlisted Groundcrew	Abnormal	3 5.6%	6 9.2%	6 10.5%	M vs. L	1.73 (0.41, 7.27)	0.509
		Normal	51 94.4%	59 90.8%	51 89.5%	H vs. L	2.00 (0.47, 8.44)	0.491
	Enlisted Groundcrew	n	154	163	141	Overall		0.568
		Number/%						
		Abnormal	11 7.1%	10 6.1%	6 4.3%	M vs. L	0.85 (0.35, 2.06)	0.823
	Enlisted Groundcrew	Normal	143 92.9%	153 93.9%	135 95.7%	H vs. L	0.58 (0.21, 1.61)	0.326
		n	154	163	141	Overall		0.326

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Officer	n	Number/%	127	130	123	Overall		0.142
		Abnormal	7 5.5%	15 11.5%	15 12.2%	M vs. L	2.24 (0.88, 5.68)	0.118
		Normal	120 94.5%	115 88.5%	108 87.8%	H vs. L	2.38 (0.94, 6.06)	0.075
Masculinity/ Femininity	n	Number/%	54	65	57	Overall		0.478
		Abnormal	1 1.9%	4 6.2%	2 3.5%	M vs. L	3.48 (0.38, 32.06)	0.375
		Normal	53 98.1%	61 93.8%	55 96.5%	H vs. L	1.93 (0.17, 21.89)	0.999
Enlisted Groundcrew	n	Number/%	154	163	141	Overall		0.360
		Abnormal	10 6.5%	5 3.1%	7 5.0%	M vs. L	0.46 (0.15, 1.37)	0.189
		Normal	144 93.5%	158 96.9%	134 95.0%	H vs. L	0.75 (0.28, 2.03)	0.625
Officer	n	Number/%	127	130	123	Overall		0.194
		Abnormal	1 0.8%	1 0.8%	4 3.3%	M vs. L	0.98 (0.06, 15.79)	0.999
		Normal	126 99.2%	129 99.2%	119 96.7%	H vs. L	4.24 (0.47, 38.44)	0.208
Paranoia	n	Number/%	54	65	57	Overall		0.447
		Abnormal	3 5.6%	1 1.5%	3 5.3%	M vs. L	0.27 (0.03, 2.63)	0.328
		Normal	51 94.4%	64 98.5%	54 94.7%	H vs. L	0.94 (0.18, 4.90)	0.999
Enlisted Groundcrew	n	Number/%	154	163	141	Overall		0.735
		Abnormal	5 3.3%	6 3.7%	7 5.0%	M vs. L	1.14 (0.34, 3.81)	0.999
		Normal	149 96.7%	157 96.3%	134 95.0%	H vs. L	1.56 (0.48, 5.02)	0.560

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p Value
			Low	Medium	High			
Officer	Officer	n	127	130	123	Overall		0.545
		Number/% Abnormal	9 7.1%	7 5.4%	11 8.9%	M vs. L	0.75 (0.27, 2.07)	0.614
		Normal	118 92.9%	123 94.6%	112 91.1%	H vs. L	1.29 (0.51, 3.23)	0.646
Psychopathic/ Deviate	Enlisted Flyer	n	54	65	57	Overall		0.593
		Number/% Abnormal	8 14.8%	11 16.9%	6 10.5%	M vs. L	1.17 (0.43, 3.16)	0.806
		Normal	46 85.2%	54 83.1%	51 89.5%	H vs. L	0.68 (0.22, 2.10)	0.574
Enlisted Groundcrew	Enlisted Groundcrew	n	154	163	141	Overall		0.220
		Number/% Abnormal	25 16.2%	18 11.0%	25 17.7%	M vs. L	0.64 (0.33, 1.23)	0.192
		Normal	129 83.8%	145 89.0%	116 82.3%	H vs. L	1.11 (0.61, 2.04)	0.758
Officer	Officer	n	127	130	123	Overall		0.546
		Number/% Abnormal	5 3.9%	4 3.1%	2 1.6%	M vs. L	0.78 (0.20, 2.95)	0.747
		Normal	122 96.1%	126 96.9%	121 98.4%	H vs. L	0.40 (0.08, 2.12)	0.447
Schizophrenia	Enlisted Flyer	n	54	65	57	Overall		0.519
		Number/% Abnormal	8 14.8%	6 9.2%	5 8.8%	M vs. L	0.59 (0.19, 1.80)	0.400
		Normal	46 85.2%	59 90.8%	52 91.2%	H vs. L	0.55 (0.17, 1.81)	0.385
Enlisted Groundcrew	Enlisted Groundcrew	n	154	163	141	Overall		0.600
		Number/% Abnormal	18 11.7%	25 15.3%	21 14.9%	M vs. L	1.37 (0.71, 2.62)	0.413
		Normal	136 88.3%	138 84.7%	120 85.1%	H vs. L	1.32 (0.67, 2.60)	0.492

TABLE J-6. (continued)
Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Social Introversion	Officer	n	127	130	123	Overall		0.385
		Number/% Abnormal	1 0.8%	2 1.5%	0 0.0%	M vs. L	1.97 (0.18, 21.99)	0.999
	Enlisted Flyer	Normal	126 99.2%	128 98.5%	123 100.0%	H vs. L	0.34 (0.01, 8.46)*	0.999
		n	54	65	57	Overall		0.696
	Enlisted Groundcrew	Number/% Abnormal	2 3.7%	1 1.5%	1 1.8%	M vs. L	0.41 (0.04, 4.61)	0.590
		Normal	52 96.3%	64 98.5%	56 98.2%	H vs. L	0.46 (0.04, 5.27)	0.611
Validity	Officer	n	154	163	141	Overall		0.635
		Number/% Abnormal	8 5.2%	5 3.1%	6 4.3%	M vs. L	0.58 (0.19, 1.81)	0.403
	Enlisted Flyer	Normal	146 94.8%	158 96.9%	135 95.7%	H vs. L	0.81 (0.27, 2.40)	0.788
		n	55	65	57	Overall		0.310
	Enlisted Groundcrew	Number/% Abnormal	10 18.2%	8 12.3%	13 22.8%	M vs. L	0.63 (0.23, 1.73)	0.445
		Normal	45 81.8%	57 87.7%	44 77.2%	H vs. L	1.33 (0.53, 3.35)	0.642
Validity	Officer	n	127	130	123	Overall		0.052
		Number/% >0	32 25.2%	34 26.2%	18 14.6%	M vs. L	1.05 (0.60, 1.84)	0.887
	Enlisted Flyer	0	95 74.8%	96 73.8%	105 85.4%	H vs. L	0.51 (0.27, 0.97)	0.041
		n	55	65	57	Overall		0.310
	Enlisted Groundcrew	Number/% Abnormal	10 18.2%	8 12.3%	13 22.8%	M vs. L	0.63 (0.23, 1.73)	0.445
		Normal	45 81.8%	57 87.7%	44 77.2%	H vs. L	1.33 (0.53, 3.35)	0.642
Validity	Officer	n	154	163	142	Overall		0.802
		Number/% >0	34 22.1%	39 23.9%	36 25.4%	M vs. L	1.11 (0.66, 1.87)	0.790
	Enlisted Flyer	0	120 77.9%	124 76.1%	106 74.6%	H vs. L	1.20 (0.70, 2.05)	0.584
		n	55	65	57	Overall		0.310
	Enlisted Groundcrew	Number/% Abnormal	10 18.2%	8 12.3%	13 22.8%	M vs. L	0.63 (0.23, 1.73)	0.445
		Normal	45 81.8%	57 87.7%	44 77.2%	H vs. L	1.33 (0.53, 3.35)	0.642

TABLE J-6. (continued)
Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
Total Cornell Medical Index	Officer	n	126	128	123	Overall		0.049
		Mean**	7.99	8.55	10.04	M vs. L	--	0.506
		95% C.I.**	(6.84, 9.31)	(7.52, 9.69)	(8.99, 11.20)	H vs. L	--	0.018
Enlisted Groundcrew	Enlisted Flyer	n	53	65	56	Overall		0.906
		Mean**	13.69	13.13	13.96	M vs. L	--	0.784
		95% C.I.**	(10.63, 17.56)	(11.16, 15.42)	(11.51, 16.88)	H vs. L	--	0.906
Enlisted Groundcrew	Enlisted Groundcrew	n	153	159	137	Overall		0.304
		Mean**	14.46	13.03	14.92	M vs. L	--	0.252
		95% C.I.**	(12.64, 16.52)	(11.57, 14.65)	(13.05, 17.05)	H vs. L	--	0.745
Officer	Officer	n	125	128	121	Overall		0.247
		Number/% >0	41 32.8%	37 28.9%	47 38.8%	M vs. L	0.83 (0.49, 1.42)	0.586
		0	84 67.2%	91 71.1%	74 61.2%	H vs. L	1.30 (0.77, 2.19)	0.353
Enlisted Flyer	Enlisted Flyer	n	53	65	56	Overall		0.400
		Number/% Abnormal	22 41.5%	35 53.8%	26 46.4%	M vs. L	1.64 (0.79, 3.42)	0.200
		Normal	31 58.5%	30 46.2%	30 53.6%	H vs. L	1.22 (0.57, 2.61)	0.700
Enlisted Groundcrew	Enlisted Groundcrew	n	154	157	139	Overall		0.592
		Number/% >0	91 59.1%	87 55.4%	74 53.2%	M vs. L	0.86 (0.55, 1.35)	0.567
		0	63 40.9%	70 44.6%	65 46.8%	H vs. L	0.79 (0.50, 1.25)	0.346

TABLE J-6. (continued)

Unadjusted Exposure Index Analyses for Psychological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low	Medium	High			
A-H Area Subscore	Officer	n	113	112	114	Overall		0.980
		Number/%						
		>0	57 50.4%	56 50.0%	56 49.1%	H vs. L	0.98 (0.58,1.66)	0.999
A-H Area Subscore	Enlisted Flyer	n	50	60	50	Overall		0.946
		Number/%						
		>0	33 66.0%	39 65.0%	34 68.0%	H vs. L	0.96 (0.43,2.11)	0.999
A-H Area Subscore	Enlisted Groundcrew	n	136	150	129	Overall		0.557
		Number/%						
		>0	93 68.4%	96 64.0%	90 69.8%	H vs. L	0.82 (0.50,1.34)	0.455
HRB Impairment Index	Officer	n	126	130	121	Overall		0.401
		Number/%						
		Abnormal	29 23.0%	31 23.9%	21 17.4%	H vs. L	1.05 (0.59,1.87)	0.884
HRB Impairment Index	Enlisted Flyer	n	52	65	57	Overall		0.253
		Number/%						
		Abnormal	20 38.5%	35 53.9%	27 47.4%	H vs. L	1.87 (0.89,3.92)	0.136
HRB Impairment Index	Enlisted Groundcrew	n	153	163	139	Overall		0.272
		Number/%						
		Abnormal	64 41.8%	72 44.2%	49 35.3%	H vs. L	1.10 (0.71,1.72)	0.733
HRB Impairment Index	Enlisted Groundcrew	n	89	91	90	Overall		0.280
		Number/%						
		Abnormal	58 65.2%	55 60.5%	64 71.1%	H vs. L	0.76 (0.47,1.22)	0.280

*Estimated relative risk and confidence interval calculated after adding 0.5 to each cell.

**Converted from log (X+1) scale, where X was the number of questions answered "yes."

--No relative risk given for Total Cornell Medical Index, which was analyzed as a continuous variable.

TABLE J-7.

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Anxiety	Nonblack	n	Number/%	138	149	128	Overall		0.932*
			Abnormal	14	10.1%	12	M vs. L	1.07 (0.50, 2.27)*	0.999*
			Normal	124	89.9%	116	H vs. L	0.92 (0.41, 2.06)*	0.999*
	Black	n	Number/%	16	14	13	Overall		0.074*
			Abnormal	5	31.3%	2	M vs. L	0.37 (0.06, 2.29)*	0.399*
			Normal	11	68.7%	12	H vs. L	0.08 (0.004, 1.56)**	0.048*
Denial	Born >=1942	n	Number/%	43	22	11	Overall		0.455*
			Abnormal	2	4.7%	0	M vs. L	0.37 (0.02, 8.02)**	0.545*
			Normal	41	95.3%	11	H vs. L	0.72 (0.03, 16.12)**	0.999*
	Born 1923-1941(a)	n	Number/%	79	93	109	Overall		0.337
			Abnormal	3	3.8%	1	M vs. L	0.27 (0.03, 2.61)	0.255
			Normal	76	96.2%	108	H vs. L	0.25 (0.03, 2.49)	0.238
	Born <=1922	n	Number/%	5	15	3	Overall		0.558*
			Abnormal	1	20.0%	1	M vs. L	0.29 (0.01, 5.66)*	0.447*
			Normal	4	80.0%	3	H vs. L	0.43 (0.01, 14.08)**	0.999*

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Depression	Exposure Index-by- Race	Nonblack	n	138	149	128	Overall		0.856*
			Number/%						
			Abnormal	21	15.2%	20	15.6%	M vs. L	0.86 (0.45, 1.67)*
	Exposure Index-by- Race (Enlisted Groundcrew)	Black	Normal	117	84.8%	129	86.6%	H vs. L	1.03 (0.53, 2.01)*
			n	16	14	13	Overall		0.092*
			Number/%						
Hypochondria	Exposure Index-by- Education (Officer)	High School	Abnormal	4	25.0%	1	7.1%	M vs. L	0.23 (0.02, 2.37)*
			Normal	12	75.0%	13	92.9%	H vs. L	0.10 (0.01, 2.11)**
			n	11	17	24	Overall		0.011*
	Exposure Index-by- Education (Officer)	College	Number/%						
			Abnormal	4	36.4%	3	17.7%	M vs. L	0.38 (0.07, 2.16)*
			Normal	7	63.6%	14	82.3%	H vs. L	0.03 (0.002, 0.71)**
Hypochondria	Exposure Index-by- Race	Nonblack	n	116	113	99	Overall		0.120*
			Number/%						
			Abnormal	6	5.2%	3	2.7%	M vs. L	0.50 (0.12, 2.05)*
	Exposure Index-by- Race (Enlisted Groundcrew)	Black	Normal	110	94.8%	110	97.3%	H vs. L	1.83 (0.63, 5.34)*
			n	134	146	119			
			Number/%						
Hypochondria	Exposure Index-by- Race	Nonblack	Abnormal	17	12.7%	15	10.3%	M vs. L	0.82 (0.39, 1.74)
			Normal	117	87.3%	131	89.7%	H vs. L	1.67 (0.83, 3.33)
	Exposure Index-by- Race (Enlisted Groundcrew)	Black	n	14	14	12			
			Number/%						
			Abnormal	6	42.9%	3	21.4%	M vs. L	0.31 (0.06, 1.70)
			Normal	8	57.1%	11	78.6%	H vs. L	0.10 (0.01, 1.02)

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value	
				Low	Medium	High				
Hysteria	Exposure Index-by- Education (Officer)	High School	n	11	17	24	Overall		0.129*	
			Number/%							
			Abnormal	2	18.2%	2	11.8%	0	0.0%	0.60 (0.07,5.03)*
		College(b)	Normal	9	81.8%	15	88.2%	24	100.0%	0.08 (0.003,1.77)**
								H vs. L		
								H vs. L		
Hysteria	Exposure Index-by- Race (Enlisted Groundcrew)	Nonblack	n	138	149	128	Overall		0.029*	
			Number/%							
			Abnormal	23	16.7%	13	8.7%	25	19.5%	0.48 (0.23,0.99)*
		Black	Normal	115	83.3%	136	91.3%	103	80.5%	1.21 (0.65,2.27)*
								H vs. L		
								H vs. L		
Mania/ Hypomania	Exposure Index-by- Drink-years (Officer)	0	n	5	0	6	Overall		0.094*	
			Number/%							
			Abnormal	0	0.0%	—	0	0.0%	H vs. L	0.60 (0.11,3.15)*
		0-50	Normal	5	100.0%	—	6	100.0%	H vs. L	0.08 (0.004,1.56)**
Mania/ Hypomania	Exposure Index-by- Drink-years (Officer)	0-50	n	105	109	92	Overall		0.207*	
			Number/%							
			Abnormal	8	7.6%	5	4.6%	2	2.2%	0.58 (0.18,1.84)*
		>50	Normal	97	92.4%	104	95.4%	90	97.8%	0.27 (0.06,1.30)*
								H vs. L		
								H vs. L		
Mania/ Hypomania	Exposure Index-by- Drink-years (Officer)	>50	n	15	18	22	Overall		0.016*	
			Number/%							
			Abnormal	0	0.0%	0	0.0%	5	22.7%	—
		>50	Normal	15	100.0%	18	100.0%	17	77.3%	9.74 (0.50,190.8)**
								H vs. L		
								H vs. L		

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Masculinity/ Femininity	Exposure Index-by- Education (Officer)	High School	n	11	16	24			
			Number/% Abnormal	1	4	1	4.2% M vs. L	5.96 (0.53,67.59)	0.150
		College	Normal	10	12	23	95.8% H vs. L	0.33 (0.02,6.55)	0.467
			n	114	110	96			
Paranoia	Exposure Index-by- Age (Officer)	Born >=1942	Number/% Abnormal	0	1	0	0.0% M vs. L	6.07 (0.24,155.30)**	0.338*
			Normal	43	21	11	100.0% H vs. L	—	—
		Born <1942	n	84	108	112	Overall		0.106*
			Number/% Abnormal	1	0	4	3.6% M vs. L	0.26 (0.01,6.38)**	0.437*
Paranoia	Exposure Index-by- Age (Enlisted Flyer)	Born >=1942	Normal	83	108	108	96.4% H vs. L	3.07 (0.34,28.02)*	0.394*
			n	11	18	9	Overall		0.565*
		Born <1942	Number/% Abnormal	0	1	0	0.0% M vs. L	1.97 (0.07,52.71)**	0.999*
			Normal	11	17	9	100.0% H vs. L	—	—
Paranoia	Exposure Index-by- Age (Enlisted Flyer)	Born >=1942	n	43	47	48	Overall		0.195*
			Number/% Abnormal	3	0	3	6.3% M vs. L	0.12 (0.01,2.43)**	0.105*
		Born <1942	Normal	40	47	45	93.7% H vs. L	0.89 (0.17,4.66)*	0.999*
			n	43	47	48	Overall		0.195*

TABLE J-7. (continued)
Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Paranoia	Exposure Index-by- Race	Nonblack	n	138	149	128	Overall		0.348*
			Number/% Abnormal	3	2.2%	5	3.4%	7	5.5%
		Black	Normal	135	97.8%	144	96.6%	121	94.5%
	(Enlisted Groundcrew)	Black	n	16	14	13	Overall		0.422*
			Number/% Abnormal	2	12.5%	1	7.1%	0	0.0%
Psychopathic/ Deviate	Exposure Index-by- Education	High School	Normal	14	87.5%	13	92.9%	13	100.0%
		College	Abnormal	2	12.5%	1	7.1%	0	0.0%
			Normal	14	87.5%	13	92.9%	13	100.0%
	(Enlisted Groundcrew)	College	n	110	131	108	Overall		0.999*
			Number/% Abnormal	16	14.5%	15	11.5%	24	22.2%
	Exposure Index-by- Education	High School	Normal	94	85.5%	116	88.5%	84	77.8%
		College	Abnormal	16	14.5%	15	11.5%	24	22.2%
			Normal	94	85.5%	116	88.5%	84	77.8%
	(Enlisted Groundcrew)	College	n	38	29	23	Overall		1.50 (0.72, 3.09)
			Number/% Abnormal	8	21.1%	3	10.3%	1	4.3%
	(Enlisted Groundcrew)	College	Normal	30	78.9%	26	89.7%	22	95.7%
	(Enlisted Groundcrew)	College	n	38	29	23	Overall		0.52 (0.12, 2.23)
			Number/% Abnormal	8	21.1%	3	10.3%	1	4.3%
	(Enlisted Groundcrew)	College	Normal	30	78.9%	26	89.7%	22	95.7%

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Total OMI	0	n	Adj. Mean 95% C.I.	5	0	6	M vs. L	(c)	—
				4.01 (1.77, 8.06)	—	6.87 (3.57, 12.53)	M vs. L	(c)	0.228
	0-50	n	Adj. Mean 95% C.I.	104	107	92	M vs. L	(c)	0.964
				6.95 (5.10, 9.37)	6.98 (5.13, 9.39)	8.40 (6.19, 11.29)	H vs. L	(c)	0.058
	>50	n	Adj. Mean 95% C.I.	15	17	22	M vs. L	(c)	0.007
				13.74 (8.91, 20.92)	7.17 (4.68, 10.75)	9.27 (6.34, 13.36)	H vs. L	(c)	0.080
		Exposure Index-by- Drink-years (Officer Enlisted)							

TABLE J-7. (continued)
Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Total OMI	Exposure Index-by- Education	High School 0	n	2	4	4	M vs. L	(c)	0.018
			Adj. Mean 95% C.I.	4.00 (1.01, 11.48)	17.79 (8.68, 35.49)	11.32 (5.31, 23.09)	M vs. L	(c)	0.106
		High School 0-50	n	25	36	27	M vs. L	(c)	0.191
			Adj. Mean 95% C.I.	16.06 (11.23, 22.81)	12.68 (9.27, 17.23)	10.87 (7.82, 14.97)	M vs. L	(c)	0.045
		High School >50	n	14	10	11	M vs. L	(c)	0.509
			Adj. Mean 95% C.I.	16.32 (10.59, 24.87)	19.64 (12.38, 30.85)	18.27 (11.68, 28.27)	M vs. L	(c)	0.680
	Exposure Index-by- Drink-Years (Enlisted Flyer)	College 0	n	1	1	0	M vs. L	(c)	0.049
			Adj. Mean 95% C.I.	0.84 (0, 5.66)	10.17 (2.13, 38.86)	— —	M vs. L	(c)	—
		College 0-50	n	6	10	8	M vs. L	(c)	0.100
			Adj. Mean 95% C.I.	6.43 (3.25, 11.97)	11.84 (7.33, 18.81)	11.92 (7.06, 19.72)	M vs. L	(c)	0.112
		College >50	n	0	0	1	M vs. L	(c)	—
			Adj. Mean 95% C.I.	— —	— —	20.55 (5.04, 75.84)	M vs. L	(c)	—

TABLE J-7. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
M-R Subscore	0	n Number/%		3	5	4	Overall		0.060*
			>0	0	0.0%	3	75.0% M vs. L	21.00 (0.64, 690.0)**	0.143*
			0	3	100.0%	1	25.0% H vs. L	16.33 (0.48, 555.6)**	0.143*
	Exposure Index-by- Drink-years (Enlisted Flyer	n Number/%		31	46	35	Overall		0.054
			>0	12	38.7%	10	28.6% M vs. L	1.98 (0.77, 5.09)	0.158
			0	19	61.3%	25	71.4% H vs. L	0.65 (0.23, 1.83)	0.410
	0-50(a)	n Number/%		14	10	12	Overall		0.440
			>0	7	50.0%	5	50.0% M vs. L	1.00 (0.20, 5.07)	1.000
			0	7	50.0%	3	25.0% H vs. L	2.67 (0.49, 14.46)	0.255
	>50(a)	n Number/%		14	10	12	Overall		0.440
			>0	7	50.0%	5	50.0% M vs. L	1.00 (0.20, 5.07)	1.000
			0	7	50.0%	3	25.0% H vs. L	2.67 (0.49, 14.46)	0.255

TABLE J-7. (continued)
Interaction Summaries of Adjusted Exposure Index Analyses for Psychological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
A-H Area Subscore	High School 0 Drink-years	n		2	4	4	Overall		0.007*
		Number/%							
		Abnormal		0	0.0	4	M vs. L	45.00 (0.67, 304.3)**	0.067*
		Normal		2	100.0	0	H vs. L	45.00 (0.67, 304.3)**	0.067*
		n		22	33	22	Overall		0.035*
		Number/%							
	High School 0-50 Drink- years	Abnormal		18	81.8	10	M vs. L	0.27 (0.07, 0.96)*	0.047*
		Normal		4	18.2	12	Y vs. L	0.19 (0.05, 0.73)*	0.027*
		n		14	9	11	Overall		0.583*
		Number/%							
		Abnormal		10	71.4	9	M vs. L	3.20 (0.30, 34.59)*	0.611*
		Normal		4	28.6	2	H vs. L	1.80 (0.26, 12.30)*	0.661*
Index-by- Drink-years (Enlisted Flyer)	Exposure 0 Drink-years	College		n	0	1	Overall		—
		Abnormal		0	—	0	M vs. L	—	—
		Normal		0	—	1	H vs. L	—	—
		n		6	10	7	Overall		0.115*
		Number/%							
		Abnormal		1	16.7	5	M vs. L	7.50 (0.62, 90.65)*	0.145*
	College 0-50 Drink- years	Normal		5	83.3	2	H vs. L	12.50 (0.84, 186.30)*	0.103*
		n		0	0	1	Overall		—
		Number/%							
		Abnormal		0	—	1	M vs. L	—	—
		Normal		0	—	0	H vs. L	—	—
		n		0	0	1	Overall		—

TABLE J-7. (continued)

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
HRB Impairment Index	Exposure Index-by- Race	Nonblack	n	132	144	115			
			Number/% Abnormal	48	59	40	34.8%	M vs. L	1.88 (1.09,3.25)
		Normal	84	85	75	59.0%	H vs. L	0.77 (0.43,1.40)	0.400
	Enlisted (Groundcrew)	Black	n	13	14	12			
			Number/% Abnormal	11	10	3	71.4%	M vs. L	0.39 (0.05,2.72)
		Normal	2	4	9	28.6%	H vs. L	0.06 (0.01,0.44)	0.006

*Unadjusted estimate of relative risk and confidence interval, or p-value, based on stratified tables.

##Unadjusted estimate of relative risk and confidence interval calculated after adding 0.5 to each cell.

(a) Results have been adjusted for education.

(b) Results have been adjusted for age.

—Zero counts in cells do not allow for calculation of percent, relative risk, confidence interval, or p-value.

(c) No relative risk given for total OMI, which was analyzed continuously.

Note: Small sample sizes may affect validity of overall p-value.

Note: Results without (*) or (**) are adjusted for all other main effects in model (age, race, education, drink-years, and combat index [for MPTI variables]), unless otherwise noted.

Note: Participants judged to have PTSD are eliminated from analysis of Total QMI, Section M-R Subscore, Section A-H Area Subscore, and HRB Impairment Index.

TABLE J-8.

Unadjusted Analyses for Reported Psychological Illnesses by Group:
Baseline and First Followup Studies Combined*
(Original Comparisons Only)

Type of Illness	Group Abnormalities				Total	p-Value**
	Ranch Hand		Original Comparison			
	Number	Percent	Number	Percent		
Psychoses	14	1.4	8	0.8	22	0.289
Alcohol Dependence	9	0.9	4	0.4	13	0.268
Anxiety	7	0.7	8	0.8	15	0.798
Other Neuroses	72	7.1	46	4.8	118	0.037

*Analyses based on 1,016 Ranch Hands and 955 Original Comparisons; some participants had more than one illness.

**Fisher's exact test.

TABLE J-9.

**Summary of Kolmogorov-Smirnov Tests on MMPI for Officers
(Original Comparisons Only)**

Parameter*	Group	Mean Score	Standard Deviation	Kolmogorov- Smirnov p-Value
Anxiety	Ranch Hand	52.82	7.38	0.328
	Original Comparison	53.22	7.06	
Consistency	Ranch Hand	49.23	6.92	0.995
	Original Comparison	49.02	5.50	
Defensiveness	Ranch Hand	49.64	6.64	0.822
	Original Comparison	49.69	7.14	
Denial	Ranch Hand	59.47	7.31	0.901
	Original Comparison	59.46	7.40	
Depression	Ranch Hand	55.11	10.17	0.975
	Original Comparison	54.86	9.38	
Hypochondria	Ranch Hand	55.60	8.85	0.990
	Original Comparison	54.96	8.09	
Hysteria	Ranch Hand	60.45	7.00	0.711
	Original Comparison	59.79	6.81	
Mania/Hypomania	Ranch Hand	54.36	8.94	0.436
	Original Comparison	53.68	9.10	
Masculinity/ Femininity	Ranch Hand	58.83	8.64	0.577
	Original Comparison	58.14	8.94	
Paranoia	Ranch Hand	53.71	7.34	0.995
	Original Comparison	53.57	6.86	
Psychopathic/ Deviate	Ranch Hand	56.82	8.87	0.644
	Original Comparison	56.61	9.65	
Schizophrenia	Ranch Hand	54.80	8.48	0.661
	Original Comparison	54.66	7.89	
Social Introversion	Ranch Hand	46.56	7.43	0.627
	Original Comparison	47.13	7.60	
Validity	Ranch Hand	0.93	3.11	0.594
	Original Comparison	0.80	2.86	

*n=380 Ranch Hands; n=350 Original Comparisons.

TABLE J-10.

**Summary of Kolmogorov-Smirnov Tests on MMPI for Enlisted Flyers
(Original Comparisons Only)**

Parameter*	Group	Mean Score	Standard Deviation	Kolmogorov- Smirnov p-Value
Anxiety	Ranch Hand	54.78	9.73	0.993
	Original Comparison	54.16	8.78	
Consistency	Ranch Hand	52.24	10.30	0.923
	Original Comparison	51.41	8.15	
Defensiveness	Ranch Hand	53.05	7.96	0.353
	Original Comparison	52.09	8.34	
Denial	Ranch Hand	55.95	8.73	0.760
	Original Comparison	56.81	8.44	
Depression	Ranch Hand	58.21	11.79	0.760
	Original Comparison	57.27	10.35	
Hypochondria	Ranch Hand	58.48	12.16	0.577
	Original Comparison	58.44	11.71	
Hysteria	Ranch Hand	60.00	8.94	0.465
	Original Comparison	60.70	8.77	
Mania/Hypomania	Ranch Hand	55.05	10.00	0.155
	Original Comparison	55.50	9.42	
Masculinity/ Femininity	Ranch Hand	55.79	7.85	0.877
	Original Comparison	56.22	8.39	
Paranoia	Ranch Hand	52.77	8.43	0.877
	Original Comparison	51.72	7.68	
Psychopathic/ Deviate	Ranch Hand	57.48	11.40	0.163
	Original Comparison	57.85	9.72	
Schizophrenia	Ranch Hand	56.56	13.03	0.496
	Original Comparison	56.27	10.59	
Social Introversion	Ranch Hand	50.35	8.89	0.194
	Original Comparison	49.00	7.94	
Validity	Ranch Hand	3.93	42.48	0.864
	Original Comparison	7.18	60.31	

*n=176 Ranch Hands; n=172 Original Comparisons (except for validity, where n=177 Ranch Hands and n=174 Original Comparisons).

TABLE J-11.

Summary of Kolmogorov-Smirnov Tests on MMPI
for Enlisted Groundcrew
(Original Comparisons Only)

Parameter*	Group	Mean Score	Standard Deviation	Kolmogorov- Smirnov p-Value
Anxiety	Ranch Hand	55.86	10.96	0.877
	Original Comparison	55.72	9.34	
Consistency	Ranch Hand	53.05	10.64	0.728
	Original Comparison	51.78	8.19	
Defensiveness	Ranch Hand	52.42	8.27	0.923
	Original Comparison	52.69	8.51	
Denial	Ranch Hand	55.53	8.57	0.112
	Original Comparison	56.80	8.72	
Depression	Ranch Hand	58.79	12.98	0.661
	Original Comparison	57.85	10.63	
Hypochondria	Ranch Hand	58.44	13.22	0.577
	Original Comparison	57.50	11.30	
Hysteria	Ranch Hand	60.36	9.80	0.644
	Original Comparison	59.75	8.84	
Mania/Hypomania	Ranch Hand	55.26	9.78	0.822
	Original Comparison	55.69	9.72	
Masculinity/ Femininity	Ranch Hand	56.18	8.24	0.304
	Original Comparison	57.24	8.49	
Paranoia	Ranch Hand	53.12	9.05	0.340
	Original Comparison	53.73	8.48	
Psychopathic/ Deviate	Ranch Hand	59.01	11.29	0.644
	Original Comparison	59.34	10.70	
Schizophrenia	Ranch Hand	58.20	14.22	0.328
	Original Comparison	57.58	10.64	
Social Introversion	Ranch Hand	51.86	9.82	0.353
	Original Comparison	50.99	8.63	
Validity	Ranch Hand	1.97	26.48	0.999
	Original Comparison	0.97	5.41	

*n=458 Ranch Hands; n=430 Original Comparisons (except for validity, where n=459 Ranch Hands and n=431 Original Comparisons).

TABLE J-12.

Summary of Kolmogorov-Smirnov Tests on CMI
(Original Comparisons Only)

Stratification	Group	Sample Size	Mean Score	Standard Deviation	Kolmogorov-Smirnov p-Value
<u>Age</u>					
Born ≥ 1942	Ranch Hand	402	15.88	15.21	<0.001
	Original Comparison	366	12.95	11.57	
Born 1923-1941	Ranch Hand	562	15.49	12.99	0.776
	Original Comparison	528	14.55	11.88	
Born ≤ 1922	Ranch Hand	36	18.56	15.94	0.980
	Original Comparison	45	16.47	9.28	
<u>Race</u>					
Nonblack	Ranch Hand	941	15.63	13.83	0.038
	Original Comparison	882	13.96	11.47	
Black	Ranch Hand	59	17.81	16.91	0.561
	Original Comparison	57	14.82	14.62	
<u>Education</u>					
High School	Ranch Hand	556	18.88	15.80	<0.001
	Original Comparison	524	15.62	13.12	
College	Ranch Hand	444	11.85	10.18	0.577
	Original Comparison	415	11.99	9.16	
<u>Current Alcohol Use</u>					
Drinker	Ranch Hand	851	15.16	13.12	0.170
	Original Comparison	812	13.77	11.32	
Nondrinker	Ranch Hand	148	18.84	17.71	0.162
	Original Comparison	127	15.61	13.69	
<u>Occupation</u>					
Officer	Ranch Hand	377	11.23	9.01	0.970
	Original Comparison	345	10.99	7.53	
Enlisted Flyer	Ranch Hand	174	17.72	14.84	0.270
	Original Comparison	170	15.31	12.51	
Enlisted Groundcrew	Ranch Hand	449	18.80	16.06	0.003
	Original Comparison	424	15.96	13.48	

TABLE J-13.

Unadjusted Analyses for MMPI by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Anxiety	n	1,014		952			
	Abnormal	73	7.2	49	5.1	1.43 (0.98, 2.08)	0.062
	Normal	941	92.8	903	94.9		
Consistency	n	1,014		952			
	Abnormal	36	3.6	22	2.3	1.56 (0.91, 2.67)	0.111
	Normal	978	96.4	930	97.7		
Defensiveness	n	1,014		952			
	Abnormal	23	2.3	30	3.2	0.71 (0.41, 1.24)	0.265
	Normal	991	97.7	922	96.8		
Denial	n	1,014		952			
	Abnormal	17	1.7	37	3.9	0.42 (0.24, 0.75)	0.003
	Normal	997	98.3	915	96.1		
Depression	n	1,014		952			
	Abnormal	114	11.2	87	9.1	1.26 (0.94, 1.69)	0.136
	Normal	900	88.8	865	90.9		
Hypochondria	n	1,014		952			
	Abnormal	119	11.7	91	9.6	1.26 (0.94, 1.68)	0.125
	Normal	895	88.3	861	90.4		
Hysteria	n	1,014		952			
	Abnormal	123	12.1	89	9.4	1.34 (1.00, 1.79)	0.050
	Normal	891	87.9	863	90.6		

TABLE J-13. (continued)
Unadjusted Analyses for MMPI by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Mania/Hypomania	n	1,014		952			
	Abnormal	63	6.2	56	5.9	1.06 (0.73,1.54)	0.777
	Normal	951	93.8	896	94.1		
Masculinity/ Femininity	n	1,014		952			
	Abnormal	66	6.5	83	8.7	0.73 (0.52,1.02)	0.073
	Normal	948	93.5	869	91.3		
Paranoia	n	1,014		952			
	Abnormal	31	3.1	17	1.8	1.73 (0.95,3.16)	0.079
	Normal	983	96.9	935	98.2		
Psychopathic/ Deviate	n	1,014		952			
	Abnormal	120	11.8	104	10.9	1.09 (0.83,1.45)	0.570
	Normal	894	88.2	848	89.1		
Schizophrenia	n	1,014		952			
	Abnormal	94	9.3	71	7.5	1.27 (0.92,1.75)	0.166
	Normal	920	90.7	881	92.5		
Social Introversion	n	1,014		952			
	Abnormal	26	2.6	14	1.5	1.76 (0.92,3.40)	0.109
	Normal	988	97.4	938	98.5		
Validity	n	1,016		955			
	>0	224	22.0	198	20.7	1.08 (0.87,1.34)	0.510
	0	792	78.0	757	79.3		

TABLE J-14.

Adjusted Analyses for MMPI by Group
(Original Comparisons Only)

Variable	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
	Ranch Hand Total	Original Comparison Total			
Anxiety	1,012	950	1.39 (0.95, 2.05)	0.092	EDUC ($p < 0.001$) AGE*CI ($p = 0.010$)
Consistency	976	926	****	****	AGE ($p = 0.025$) RACE*DRKYR ($p = 0.024$) GRP*EDUC ($p = 0.034$)
Defensiveness	976	926	0.68 (0.38, 1.19)	0.175	EDUC ($p < 0.001$) AGE*DRKYR ($p = 0.043$)
Denial	974	924	0.43 (0.23, 0.80)	0.006	AGE*DRKYR ($p = 0.026$) EDUC*CI ($p = 0.040$)
Depression	1,014	952	1.26 (0.94, 1.70)	0.120	EDUC ($p < 0.001$)
Hypochondria	1,014	952	1.29 (0.96, 1.72)	0.091	AGE ($p = 0.005$) EDUC ($p < 0.001$)
Hysteria	1,014	952	1.37 (1.02, 1.83)	0.033	AGE ($p = 0.001$) EDUC ($p < 0.001$)
Mania/Hypomania	974	924	0.97 (0.66, 1.43)	0.882	AGE ($p = 0.048$) CI ($p = 0.010$) DRKYR ($p = 0.016$)

TABLE J-14. (continued)
Adjusted Analyses for MMPI by Group
(Original Comparisons Only)

Variable	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
	Ranch Hand Total	Original Comparison Total			
Masculinity/ Femininity	1,014	952	0.71 (0.51, 1.00)	0.047	EDUC (p<0.001) RACE*AGE (p=0.006)
Paranoia	1,012	950	****	****	AGE*CI (p=0.004) GRP*AGE (p=0.040)
Psychopathic/ Deviate	974	924	1.13 (0.84, 1.52)	0.433	EDUC (p=0.010) AGE*CI (p≥0.001) RACE*DRKYR (p=0.001)
Schizophrenia	976	926	1.27 (0.91, 1.77)	0.153	EDUC (p<0.001) RACE*DRKYR (p=0.003)
Social Introversion	1,014	952	1.72 (0.89, 3.31)	0.099	AGE (p=0.005)
Validity	1,014	953	****	****	AGE*CI (p=0.034) GRP*RACE (p=0.016) GRP*CI (p=0.030)

*Abbreviations:

EDUC: education
CI: combat index
DRKYR: drink-years
GRP: group

***Group-by-covariate interaction: adjusted relative risk, confidence interval, and p-value are not presented.

TABLE J-15.

Unadjusted Analyses for the Cornell
Medical Index (CMI) by Group
(Original Comparisons Only)

Variable	Statistic	Group		Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand	Original Comparison		
Total CMI	n	1,000	939		
	Mean*	11.74	10.55	--	0.004
	95% C.I.*	(11.17, 12.35)	(10.02, 11.11)		
M-R Subscore	n	998	936	Overall	0.198
	Number/%				
	0 (Low)	538	531	Medium vs. Low	
	1-10 (Medium)	408	370	1.09 (0.91, 1.31)	0.371
	>10 (High)	52	35	High vs. Low	
				1.47 (0.99, 2.29)	0.095
A-H Area Subscore	n	914	1,148	Overall	0.106
	Number/%				
	0 (Low)	360	375	Medium vs. Low	
	1-3 (Medium)	449	394	1.19 (0.97, 1.45)	0.090
	4-8 (High)	105	82	High vs. Low	
				1.33 (0.97, 1.84)	0.086

*Transformed from log (X+1) scale, where X was the number of questions answered "yes."

--No relative risk given for Total CMI, which was analyzed as a continuous variable.

TABLE J-16.

Adjusted Analyses for CMI Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
		Rank Hand	Original Comparison			
Total CMI	n	962	913			PTSD (p<0.001)
	Adj. Mean	****	****	--	****	RACE*DRKYR (p=0.027)
	95% C.I.	****	****			AGE*EDUC (p=0.010) GRP*EDUC (p=0.002)
M-R Subscore	n	998	935			AGE (p<0.001)
				****	****	PTSD (p<0.001)
						GRP*EDUC (p=0.006)
A-H Area Subscore	n	914	850			AGE (p<0.001)
				Overall	0.108	EDUC (p<0.001)
				Medium vs. Low:	0.063	PTSD (p<0.001)
				1.20 (0.99,1.47)	0.132	
				High vs. Low:		
				1.32 (0.92,1.89)		

***Group-by-covariate interaction -- adjusted mean/relative risk, confidence interval, and p-value are not presented.

--No relative risk given for total CMI, which was analyzed as a continuous variable.

*Additional Abbreviations:

PTSD: post-traumatic stress disorder

TABLE J-17.

Summary Results for the Halstead-Reitan
Battery Impairment Index Unadjusted and Adjusted Analyses
(Original Comparisons Only)

Analysis	Statistic	Group		Ranch Hand	Original Comparison		Est. Relative Risk (95% C.I).	p-Value	Covariate Remarks
		Number	Percent	Number	Percent	Percent			
Unadjusted Analysis	n	1,006		947					
	Abnormal	348	34.6	319	33.7		1.04 (0.86,1.26)	0.703	
	Normal	658	65.4	628	66.3				
Adjusted Analysis	n	1,006		947			1.10 (0.90,1.34)	0.359	AGE (p<0.001) RACE (p<0.001) EDUC (p<0.001)

TABLE J-18.

Summary of Group-by-Covariate Interactions
for Psychological Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Original Comparison		
Consistency	Group-by-Education	High School	n	537	516		
			Number/% Abnormal	30	13	2.5%	0.014
		College	Normal	507	503	2.31 (1.18, 4.50)	
			n	437	585		
Paranoia	Group-by-Age	Born $\geq$ 1942	Number/% Abnormal	6	15	2.6%	0.359
			Normal	431	570	0.61 (0.22, 1.74)	
		Born <1942	n	410	545		
			Number/% Abnormal	15	19	3.5%	0.927
		Born <1942	Normal	395	526	0.96 (0.44, 2.13)	
			n	602	740		
			Number/% Abnormal	16	9	1.2%	
			Normal	586	731	3.85 (1.36, 10.94)	0.011

TABLE J-18. (continued)

Summary of Group-by-Covariate Interactions
for Psychological Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Original Comparison		
Validity	Group-by- Race	Nonblack CI=Low	n	178	353		
			Number/%				
			>0	47	73	20.7%	0.059
			0	131	280	79.3%	
		Nonblack CI=Medium	n	367	295		
			Number/%				
		Nonblack CI=High	>0	78	43	14.6%	0.021
			0	289	252	85.4%	
		Nonblack CI=High	n	409	247		
			Number/%				
			>0	83	57	23.1%	0.319
			0	326	190	76.9%	
	Group-by Combat Index	Black CI=Low	n	20	24		
			Number/%				
			>0	6	9	37.5%	0.170
			0	14	15	62.5%	
		Black CI=Medium	n	18	12		
			Number/%				
		Black CI=High	>0	6	5	41.7%	0.239
			0	12	7	58.3%	
		Black CI=High	n	22	22		
			Number/%				
			>0	3	11	50.0%	0.006
			0	19	11	50.0%	

TABLE J-18. (continued)

Summary of Group-by-Covariate Interactions
for Psychological Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Original Comparison		
Total OMI	Group-by-Education	High School	n	529	511	—	<0.001
			Adj. Mean*	35.50	29.65		
			95% C.I.*	(28.09, 44.79)	(23.27, 37.70)		
		College	n	433	402	—	0.498
			Adj. Mean*	22.70	23.49		
			95% C.I.*	(17.76, 28.95)	(18.37, 29.97)		
M-R Subscore	Group-by-Education	High School	n	555	521	Overall Med vs. Low	0.015
			Number/%				
			0 (Low)	246	281		
				44.3%	53.9%		
			1-10 (Med)	267	213		
				48.1%	40.9%		
			>10 (High)	42	27		
				7.6%	5.2%		
		College	n	443	414	Overall Med vs. Low	0.196
			Number/%				
			0 (Low)	292	250		
				65.9%	60.4%		
			1-10 (Med)	141	156		
				31.8%	37.7%		
			>10 (High)	10	8		
				2.3%	1.9%		

*Converted from log (X+1) scale, where X was the number of questions answered "yes".

—No relative risk given for Total OMI, which was analyzed as a continuous variable.

APPENDIX K
Gastrointestinal Assessment

APPENDIX K: Gastrointestinal Assessment

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TABLE K-1.

Summary of Group-by-Covariate Interactions for Hepatic Function Variables and Porphyrin Determinations Analyzed Continuously

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch	Hand	
SGOT	Group-by-Current Alcohol Use (Drinks/day)	<1	n	652	843	0.889
			Mean	32.2	32.3	
			Adj. Mean 95% C.I.	33.4 (32.4, 34.4)	33.4 (32.5, 34.4)	
		1-4	n	275	335	0.010
			Mean	35.3	33.4	
			Adj. Mean 95% C.I.	36.5 (35.1, 38.0)	34.4 (33.2, 35.7)	
		>4	n	76	108	0.477
			Mean	37.5	38.1	
			Adj. Mean 95% C.I.	38.2 (35.7, 40.9)	39.4 (37.2, 41.8)	
SGPT	Group-by-Current Alcohol Use (Drinks/day)	<1	n	652	843	0.011
			Mean	20.5	21.9	
			Adj. Mean 95% C.I.	19.8 (18.6, 21.2)	21.1 (19.8, 22.5)	
		1-4	n	275	335	0.428
			Mean	23.4	22.6	
			Adj. Mean 95% C.I.	22.2 (20.2, 24.3)	21.5 (19.7, 23.5)	
		>4	n	76	108	0.058
			Mean	23.9	27.0	
			Adj. Mean 95% C.I.	23.3 (19.7, 27.5)	26.7 (22.8, 31.3)	

TABLE K-1. (continued)

Summary of Group-by-Covariate Interactions for Hepatic Function Variables and Porphyrin Determinations Analyzed Continuously

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch	Hand	
Alkaline Phosphatase	Group-by-Industrial Chemicals	Exposed to Industrial Chemicals	n	504	681	<0.001
			Mean	94.8	89.9	
			Adj. Mean	102.4	97.2	
			95% C.I.	(97.9, 107.2)	(93.1, 101.5)	
		Not Exposed to Industrial Chemicals	n	499	604	0.973
			Mean	88.9	88.7	
			Adj. Mean	88.5	88.5	
			95% C.I.	(84.9, 92.1)	(85.0, 92.1)	
LDH	Group-by-Age	Born $\geq$ 1942	n	408	547	0.425
			Mean	122.2	121.2	
			Adj. Mean	124.8	123.6	
			95% C.I.	(121.9, 127.7)	(121.0, 126.3)	
		Born 1923-1941	n	565	691	0.217
			Mean	123.8	125.3	
			Adj. Mean	127.0	128.6	
			95% C.I.	(124.5, 129.7)	(126.1, 131.1)	
		Born $\leq$ 1922	n	36	51	0.966
			Mean	135.1	135.5	
			Adj. Mean	138.9	139.1	
			95% C.I.	(130.8, 147.5)	(132.2, 146.5)	

TABLE K-1. (continued)

Summary of Group-by-Covariate Interactions for Hepatic Function Variables and Porphyrin Determinations Analyzed Continuously

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch Hand	Comparison	
Triglycerides	Group-by-Age	Born ≥ 1942	n	406	546	0.321
			Mean	107.1	110.2	
			Adj. Mean 95% C.I.	95.6 (88.0, 103.9)	99.7 (92.5, 107.4)	
	Group-by-Age	Born 1923-1941	n	561	689	0.784
			Mean	126.0	124.5	
			Adj. Mean 95% C.I.	116.8 (108.6, 125.5)	115.6 (108.0, 123.8)	
	Group-by-Age	Born ≤ 1922	n	36	51	0.039
			Mean	139.0	105.6	
			Adj. Mean 95% C.I.	130.7 (105.4, 161.9)	98.3 (81.9, 118.0)	
Uroporphyrins	Group-by-Blood Urea Nitrogen (BUN)	BUN ≤ 14	n	547	701	<0.001
			Mean	16.2	18.4	
			Adj. Mean 95% C.I.	16.3 (15.4, 17.4)	18.6 (17.6, 19.7)	
	Group-by-Blood Urea Nitrogen (BUN)	BUN > 14	n	453	582	0.686
			Mean	17.8	17.4	
			Adj. Mean 95% C.I.	17.9 (16.8, 19.2)	17.6 (16.6, 18.7)	

TABLE K-2.

Summary of Group-by-Covariate Interactions for Hepatic Function Variables
and Porphyrin Determinations Analyzed Categorically

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Comparison			
				Number	Percent	Number	Percent		
Direct Bilirubin	Group-by-Industrial Chemicals	Exposed to Industrial Chemicals	n	507		683			
			High	27	5.3	20	2.9		
			Normal	480	94.7	663	97.1	1.89 (1.05,3.42)	0.035
		Not Exposed to Industrial Chemicals	n	496		603			
			High	11	2.2	23	3.8		
			Normal	485	97.8	580	96.2	0.58 (0.28,1.20)	0.143
Triglycerides	Group-by-Occupation	Officer	n	376		484			
			High	34	9.0	26	5.4		
			Normal	342	91.0	458	94.6	1.77 (1.04,3.01)	0.035
		Enlisted Flyer	n	177		209			
			High	15	8.5	14	6.7		
			Normal	162	91.5	195	93.3	1.27 (0.59,2.71)	0.539
Enlisted Groundcrew	n	456		596					
	High	19	4.2	39	6.5				
	Normal	437	95.8	557	93.5	0.63 (0.36,1.10)	0.104		

TABLE K-3.

Unadjusted Categorical Exposure Index Analyses for Hepatic Function Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
SGT	Officer	n	126		130		120		Overall		0.519
		Abnormal	9	7.1	14	10.8	9	7.5	M vs. L	1.57 (0.65,3.77)	0.384
		Normal	117	92.9	116	89.2	111	92.5	H vs. L	1.05 (0.40,2.75)	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.234
		Abnormal	1	1.8	6	9.2	4	7.0	M vs. L	5.49 (0.64,47.09)	0.123
		Normal	54	98.2	59	90.8	53	93.0	H vs. L	4.08 (0.44,37.67)	0.364
Enlisted Groundcrew	n	154		160		142		Overall		0.065	
	Abnormal	7	4.5	13	8.1	17	12.0	M vs. L	1.86 (0.72,4.79)	0.249	
	Normal	147	95.5	147	91.9	125	88.0	H vs. L	2.86 (1.15,7.11)	0.031	
SGT	Officer	n	126		130		120		Overall		0.669
		Abnormal	22	17.5	20	15.4	16	13.3	M vs. L	0.86 (0.44,1.67)	0.736
		Normal	104	82.5	110	84.6	104	86.7	H vs. L	0.73 (0.36,1.46)	0.384
	Enlisted Flyer	n	55		65		57		Overall		0.105
		Abnormal	2	3.6	10	15.4	6	10.5	M vs. L	4.82 (1.01,23.03)	0.037
		Normal	53	96.4	55	84.6	51	89.5	H vs. L	3.12 (0.60,16.17)	0.272
	Enlisted Groundcrew	n	154		160		142		Overall		0.265
		Abnormal	17	11.0	27	16.9	17	12.0	M vs. L	1.64 (0.85,3.14)	0.147
		Normal	137	89.0	133	83.1	125	88.0	H vs. L	1.10 (0.54,2.24)	0.856

TABLE K-3. (continued)

Unadjusted Categorical Exposure Index Analyses for Hepatic Function Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
GGTP	Officer	n	126		130		120		Overall		0.859
		Abnormal	11	8.7	9	6.9	9	7.5	M vs. L	0.78 (0.31,1.95)	0.646
		Normal	115	91.3	121	93.1	111	92.5	H vs. L	0.73 (0.36,1.46)	0.384
	Enlisted Flyer	n	55		65		57		Overall		0.950
		Abnormal	5	9.1	7	10.8	6	10.5	M vs. L	1.21 (0.36,4.04)	0.999
		Normal	50	90.9	58	89.2	51	89.5	H vs. L	1.18 (0.34,4.10)	0.999
	Enlisted Groundcrew	n	154		160		142		Overall		0.773
		Abnormal	16	10.4	13	8.1	14	9.9	M vs. L	0.76 (0.35,1.64)	0.561
		Normal	138	89.6	147	91.9	128	90.1	H vs. L	0.94 (0.44,2.01)	0.999
Alkaline Phosphatase	Officer	n	126		130		120		Overall		0.448
		Abnormal	4	3.2	7	5.4	3	2.5	M vs. L	1.74 (0.50,6.08)	0.540
		Normal	122	96.8	123	94.6	117	97.5	H vs. L	0.78 (0.17,3.57)	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.258
		Abnormal	1	1.8	5	7.7	5	8.8	M vs. L	4.50 (0.51,39.74)	0.217
		Normal	54	98.2	60	92.3	52	91.2	H vs. L	5.19 (0.59,45.96)	0.206
	Enlisted Groundcrew	n	154		160		142		Overall		0.378
		Abnormal	8	5.2	10	6.3	13	9.2	M vs. L	1.22 (0.47,3.17)	0.810
		Normal	146	94.8	150	93.8	129	90.8	H vs. L	1.84 (0.74,4.58)	0.257

TABLE K-3. (continued)

Unadjusted Categorical Exposure Index Analyses for Hepatic Function Variables by Occupation

Exposure Index											
Variable	Occupation	Statistic	Low		Medium		High		Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Number	Percent	Number	Percent	Number	Percent			
Total Bilirubin	Officer	n	126		130		120		Overall		0.846
		Abnormal	3	2.4	2	1.5	3	2.5	M vs. L	0.64 (0.11, 3.90)	0.680
		Normal	123	97.6	128	98.5	117	97.5	H vs. L	1.05 (0.21, 5.31)	0.999
	Enlisted Flyer	n	55		65		57		Overall		0.353
		Abnormal	0	0.0	1	1.5	2	3.5	M vs. L	21.58 (0.10, 64.65)	0.999
		Normal	55	100.0	64	98.5	55	96.5	H vs. L	5.00 (0.24, 106.54)	0.496
Direct Bilirubin	Enlisted Groundcrew	n	154		160		142		Overall		0.374
		Abnormal	7	4.5	3	1.9	6	4.2	M vs. L	0.40 (0.10, 1.58)	0.211
		Normal	147	95.5	157	98.1	136	95.8	H vs. L	0.93 (0.30, 2.83)	0.999
	Officer	n	126		130		120		Overall		0.327
		Abnormal	2	1.6	5	3.8	6	5.0	M vs. L	2.48 (0.47, 13.02)	0.447
		Normal	124	98.4	125	96.2	114	95.0	H vs. L	3.26 (0.65, 16.50)	0.164
Direct Bilirubin	Enlisted Flyer	n	55		65		57		Overall		0.624
		Abnormal	2	3.6	5	7.7	3	5.3	M vs. L	2.21 (0.41, 11.86)	0.451
		Normal	53	96.4	60	92.3	54	94.7	H vs. L	1.47 (0.24, 9.17)	0.999
	Enlisted Groundcrew	n	154		160		142		Overall		0.834
		Abnormal	4	2.6	6	3.8	5	3.5	M vs. L	1.46 (0.40, 5.28)	0.750
		Normal	150	97.4	154	96.3	137	96.5	H vs. L	1.37 (0.36, 5.20)	0.742

TABLE K-4.

Unadjusted Continuous Exposure Index Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
SGOT	Officer	n	126	130	120	Overall	0.695
		Mean	33.3	34.5	33.8	M vs. L	0.400
		95% C.I.	(31.5, 35.3)	(32.6, 36.5)	(31.9, 35.8)	H vs. L	0.757
	Enlisted Flyer	n	55	65	57	Overall	0.289
		Mean	30.9	33.3	33.2	M vs. L	0.151
		95% C.I.	(28.5, 33.4)	(31.0, 35.8)	(30.7, 35.8)	H vs. L	0.192
	Enlisted Groundcrew	n	154	160	142	Overall	0.418
		Mean	32.9	33.2	34.4	M vs. L	0.801
		95% C.I.	(31.4, 34.5)	(31.7, 34.8)	(32.8, 36.1)	H vs. L	0.211
SGPT	Officer	n	126	130	120	Overall	0.712
		Mean	22.5	22.1	21.3	M vs. L	0.804
		95% C.I.	(20.5, 24.6)	(20.2, 24.2)	(19.4, 23.39)	H vs. L	0.421
	Enlisted Flyer	n	55	65	57	Overall	0.061
		Mean	18.5	21.9	22.0	M vs. L	0.037
		95% C.I.	(16.4, 20.8)	(19.7, 24.5)	(19.6, 24.7)	H vs. L	0.041
	Enlisted Groundcrew	n	154	160	142	Overall	0.495
		Mean	20.9	22.3	21.5	M vs. L	0.237
		95% C.I.	(19.3, 22.6)	(20.7, 24.1)	(19.9, 23.4)	H vs. L	0.595

TABLE K-4. (continued)
Unadjusted Continuous Exposure Index Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
GGTP	Officer	n	126	130	120	Overall	0.885
		Mean	31.4	32.7	32.6	M vs. L	0.653
		95% C.I.	(27.8, 35.5)	(29.0, 36.9)	(28.7, 36.9)	H vs. L	0.688
	Enlisted Flyer	n	55	65	57	Overall	0.243
		Mean	29.7	34.9	37.1	M vs. L	0.225
		95% C.I.	(24.6, 35.9)	(29.3, 41.5)	(30.8, 44.7)	H vs. L	0.104
Enlisted Groundcrew		n	154	160	142	Overall	0.412
		Mean	34.7	33.0	31.1	M vs. L	0.527
		95% C.I.	(31.1, 38.7)	(29.6, 36.7)	(27.8, 34.9)	H vs. L	0.183
Alkaline Phosphatase	Officer	n	126	130	120	Overall	0.735
		Mean	87.2	86.8	88.9	M vs. L	0.893
		95% C.I.	(83.5, 91.1)	(83.2, 90.6)	(85.0, 92.9)	H vs. L	0.546
	Enlisted Flyer	n	55	65	57	Overall	0.189
		Mean	88.9	96.3	95.2	M vs. L	0.086
		95% C.I.	(83.1, 95.0)	(90.5, 102.4)	(89.1, 101.6)	H vs. L	0.153
Enlisted Groundcrew		n	154	160	142	Overall	0.535
		Mean	93.2	95.1	96.2	M vs. L	0.484
		95% C.I.	(89.7, 96.9)	(91.5, 98.8)	(92.4, 100.2)	H vs. L	0.270

TABLE K-4. (continued)

Unadjusted Continuous Exposure Index Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
Total Bilirubin	Officer	n	126	130	120	Overall	0.382
		Mean	0.76	0.73	0.77	M vs. L	0.324
		95% C.I.	(0.72,0.80)	(0.69,0.77)	(0.73,0.81)	H vs. L	0.722
	Enlisted Flyer	n	55	65	57	Overall	0.045
		Mean	0.66	0.73	0.76	M vs. L	0.092
		95% C.I.	(0.61,0.72)	(0.67,0.78)	(0.70,0.83)	H vs. L	0.014
	Enlisted Groundcrew	n	126	130	120	Overall	0.373
		Mean	0.74	0.75	0.78	M vs. L	0.783
		95% C.I.	(0.70,0.78)	(0.71,0.78)	(0.74,0.82)	H vs. L	0.182
Direct Bilirubin	Officer	n	126	130	120	Overall	0.606
		Mean	0.18	0.17	0.19	M vs. L	0.484
		95% C.I.	(0.17,0.21)	(0.16,0.19)	(0.17,0.21)	H vs. L	0.784
	Enlisted Flyer	n	55	65	57	Overall	0.684
		Mean	0.16	0.18	0.18	M vs. L	0.455
		95% C.I.	(0.14,0.20)	(0.15,0.21)	(0.15,0.21)	H vs. L	0.440
	Enlisted Groundcrew	n	126	130	120	Overall	0.541
		Mean	0.17	0.15	0.19	M vs. L	0.277
		95% C.I.	(0.15,0.19)	(0.17,0.20)	(0.16,0.19)	H vs. L	0.728

TABLE K-4. (continued)

Unadjusted Continuous Exposure Index Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
LDH	Officer	n	126	130	120	Overall	0.489
		Mean	125.1	124.2	121.8	M vs. L	0.742
		95% C.I.	(121.2, 129.1)	(120.4, 128.1)	(117.9, 125.8)	H vs. L	0.246
	Enlisted Flyer	n	55	65	57	Overall	0.118
		Mean	120.2	117.6	126.2	M vs. L	0.533
		95% C.I.	(114.4, 126.4)	(112.4, 123.3)	(120.2, 132.5)	H vs. L	0.175
	Enlisted Groundcrew	n	154	160	142	Overall	0.031
		Mean	123.1	122.3	127.9	M vs. L	0.710
		95% C.I.	(120.1, 126.2)	(119.4, 125.3)	(124.6, 131.2)	H vs. L	0.037
	Officer	n	126	130	120	Overall	0.122
		Mean	220.7	211.8	210.7	M vs. L	0.093
		95% C.I.	(213.3, 228.3)	(204.8, 219.0)	(203.5, 218.2)	H vs. L	0.063
Cholesterol	Enlisted Flyer	n	55	65	57	Overall	0.203
		Mean	221.1	213.9	227.7	M vs. L	0.351
		95% C.I.	(210.2, 232.6)	(204.2, 224.2)	(216.6, 239.3)	H vs. L	0.418
	Enlisted Groundcrew	n	154	160	142	Overall	0.873
		Mean	211.4	211.1	213.3	M vs. L	0.984
		95% C.I.	(205.4, 217.6)	(205.2, 217.2)	(207.0, 219.8)	H vs. L	0.677

TABLE K-4. (continued)

Unadjusted Continuous Exposure Index Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
Triglycerides	Officer	n	126	130	120	Overall	0.624
		Mean	114.2	117.9	125.1	M vs. L	0.728
		95% C.I.	(100.2, 130.1)	(103.8, 134.1)	(109.5, 142.9)	H vs. L	0.338
	Enlisted Flyer	n	55	65	57	Overall	0.953
		Mean	123.8	119.9	123.1	M vs. L	0.775
		95% C.I.	(105.2, 145.7)	(103.2, 139.3)	(104.9, 144.5)	H vs. L	0.811
	Enlisted Groundcrew	n	154	160	142	Overall	0.796
		Mean	118.7	113.8	117.9	M vs. L	0.528
		95% C.I.	(108.1, 130.3)	(103.9, 124.7)	(107.0, 129.9)	H vs. L	0.919

TABLE K-5.

Summary of Adjusted Exposure Index, Analyses Involving Interactions with a Continuous Covariate for Hepatic Function Variables

Variable	Occupation	Interaction Covariate	p-Value Interaction	Exposure Index Level	Slope	p-Value on Test of Slope Against Null Hypothesis of Zero Slope
SGOT	Enlisted Flyer	Current Alcohol Use	<0.001	Low	-0.012	0.266
				Medium	0.068	0.004
				High	0.029	0.138
SGOT	Enlisted Groundcrew	Current Alcohol Use	<0.001	Low	0.004	0.628
				Medium	0.047	<0.001
				High	0.062	<0.001
SGPT	Enlisted Groundcrew	Current Alcohol Use	0.006	Low	-0.026	0.097
				Medium	0.027	0.189
				High	0.071	0.013
GGTP	Enlisted Flyer	Current Alcohol Use	0.003	Low	0.022	0.455
				Medium	0.183	<0.001
				High	0.154	0.006
GGTP	Enlisted Groundcrew	Current Alcohol Use	0.009	Low	0.035	0.129
				Medium	0.091	<0.001
				High	0.170	<0.001
Direct Bilirubin	Enlisted Flyer	Current Alcohol Use	0.017	Low	0.013	0.445
				Medium	0.097	<0.001
				High	0.065	0.090
Cholesterol	Enlisted Groundcrew	Current Alcohol Use	0.006	Low	0.003	0.591
				Medium	-0.008	0.285
				High	0.033	0.002

TABLE K-5. (continued)

Summary of Adjusted Exposure Index, Analyses Involving Interactions with a Continuous Covariate for Hepatic Function Variables

Variable	Occupation	Interaction Covariate	p-Value Interaction	Exposure Index Level	Slope	p-Value on Test of Slope Against Null Hypothesis of Zero Slope
LDH	Enlisted Groundcrew	Current Alcohol Use	0.025	Low	-0.005	0.322
				Medium	0.016	0.020
				High	0.003	0.728
Triglycerides	Enlisted Flyer	Age	0.012	Low	0.014	0.286
				Medium	0.015	0.247
				High	0.038	0.032

TABLE K-6.

Summary of Adjusted Exposure Index, Analyses Involving Interactions with a Categorical Covariate for Hepatic Function Variables

Variable	Occupation	Interaction Covariate	Stratification	Exposure Index Level	Adjusted Mean (n)	Interaction p-Value
Total Bilirubin	Enlisted Groundcrew	Race	Black	Low	0.63 (14)	0.007
				Medium	0.90 (13)	
				High	0.70 (13)	
			Nonblack	Low	0.75 (138)	
				Medium	0.73 (147)	
				High	0.80 (127)	

TABLE K-7.

Unadjusted Analyses for Baseline and
Interval History of Liver Disease by Group
(Verified by Medical Record Review)
(Original Comparisons Only)

Disease	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Comparison			
		Number	Percent	Number	Percent		
Hepatitis (Viral and Alcoholic)	n	1,016		955			
	Yes	37	3.6	34	3.6	1.02 (0.64,1.65)	0.999
	No	979	96.4	921	96.4		
Jaundice	n	1,016		955			
	Yes	20	2.0	21	2.2	0.89 (0.48,1.66)	0.754
	No	996	98.0	934	97.8		
Cirrhosis	n	1,016		955			
	Yes	3	0.5	1	0.1	2.83 (0.29,27.21)	0.625
	No	1,013	99.5	954	99.9		
Enlarged Liver	n	1,016		955			
	Yes	17	1.7	15	1.6	1.07 (0.53,2.15)	0.999
	No	999	98.3	940	98.4		
Miscel- laneous	n	1,016		955			
Liver	Yes	17	1.7	7	0.7	2.31 (0.95,5.58)	0.065
Disorders	No	999	98.3	948	99.3		

TABLE K-8.

Unadjusted Analyses of Enlarged Livers
 Diagnosed at Physical Examination by Group*
 (Original Comparisons Only)

Group	Enlarged Liver				Total	p-Value
	Yes		No			
	Number	Percent	Number	Percent		
Ranch Hand	8	0.8	1,002	99.2	1,010	0.227
Original Comparison	3	0.3	950	99.7	953	

*Excludes participants with positive HB_sAg.

TABLE K-9.

Unadjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group
(Original Comparisons Only)

Variable	Statistic	Group		Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand	Original Comparison		
SGOT	n	1,009	952	—	0.903
	Mean	33.5	33.4		
	95% C.I.	(32.9, 34.1)	(32.8, 34.0)	0.94 (0.68, 1.30)	0.701
	Number/% Normal High	929 92.1% 80 7.9%	872 91.6% 80 8.4%		
SGPT	n	1,009	952	—	0.060
	Mean	21.6	22.5		
	95% C.I.	(21.0, 22.3)	(21.8, 23.2)	0.94 (0.73, 1.22)	0.651
	Number/% Normal High	872 86.4% 137 13.6%	816 85.7% 136 14.3%		
GGT	n	1,009	952	—	0.921
	Mean	32.8	32.7		
	95% C.I.	(31.4, 34.3)	(31.3, 34.2)	0.94 (0.69, 1.28)	0.682
	Number/% Normal High	919 91.1% 90 8.9%	862 90.6% 90 9.4%		
Alkaline Phosphatase	n	1,009	952	—	0.044
	Mean	91.8	89.7		
	95% C.I.	(90.4, 93.3)	(88.3, 91.2)	1.31 (0.87, 1.97)	0.205
	Number/% Normal High	953 94.5% 56 5.5%	911 95.7% 41 4.3%		

TABLE K-9. (continued)
Unadjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group
(Original Comparisons Only)

Variable	Statistic	Group		Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand	Original Comparison		
Total Bilirubin	n	1,009	952		
	Mean	0.74 (0.73,0.76)	0.75 (0.73,0.76)	—	0.772
	95% C.I.				
	Number/% Normal	982 97.3%	919 96.5%		
	High	27 2.7%	33 3.5%	0.77 (0.46, 1.28)	0.310
Direct Bilirubin	n	1,009	952		
	Mean	0.28 (0.27,0.28)	0.28 (0.27,0.28)	—	0.795
	95% C.I.				
	Number/% Normal	971 96.2%	920 96.6%		
	High	38 3.8%	32 3.4%	1.13 (0.70, 1.82)	0.629
LDH	n	1,009	952		
	Mean	123.5 (122.2,124.8)	124.3 (122.8,125.7)	—	0.449
	95% C.I.				
	Number/% Normal	999 99.0%	941 98.8%		
	High	10 1.0%	11 1.2%	0.86 (0.36,2.02)	0.724
Cholesterol	n	1,009	952		
	Mean	214.3 (211.8,216.8)	216.7 (214.0,219.3)	—	0.205
	95% C.I.				
	Number/% Normal	863 85.5%	778 81.7%		
	High	146 14.5%	174 18.3%	0.76 (0.60,0.96)	0.023

TABLE K-9. (continued)

Unadjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group
(Original Comparisons Only)

Variable	Statistic	Group		Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand	Original Comparison		
Triglycerides	n	1,009	952	—	0.908
	Mean	118.5	118.1		
	95% C.I.	(113.8, 123.3)	(113.4, 122.9)		
	Number/% Normal High	941 93.3% 68 6.7%	891 93.6% 61 6.4%		
Uroporphyrin	n	1,006	949	—	0.176
	Mean	16.9	17.7		
	95% C.I.	(16.2, 17.7)	(16.9, 18.4)		
Coproporphyrin	n	1,008	950	—	0.053
	Mean	119.1	115.0		
	95% C.I.	(116.2, 122.0)	(112.0, 118.0)		

— No relative risk or confidence interval given for continuous analyses.

TABLE K-10.

Adjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group (Original Comparisons Only)

Variable	Analysis	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
			Ranch Hand	Original Comparison			
SCOT	CC	n	1,003	949			ALC*DC (p<0.001)
		Adj. Mean	34.69	34.64		0.908	AGE*ALC (p=0.033)
		95% C.I.	(33.66, 35.75)	(33.61, 35.70)			RACE (p=0.003)
SCOT	CD	n	1,003	949			RACE (p=0.004)
		Adj. Mean	35.97	35.99		0.974	ALC (p<0.001)
		95% C.I.	(34.82, 37.17)	(34.83, 37.18)			IC (p=0.032)
DD	DD	n	1,003	949	0.93 (0.66, 1.29)	0.655	DC (p=0.044)
							AGE*ALC (p<0.001)
							OC*ALC (p<0.001)
SEPT	CC	n	1,003	949			RACE (p=0.026)
		Adj. Mean	21.52	22.53		0.035	ALC*DC (p=0.002)
		95% C.I.	(20.89, 22.17)	(21.86, 23.23)			AGE*ALC (p=0.006)
SEPT	CD	n	1,003	949			ALC*DC (p=0.043)
		Adj. Mean	21.49	22.52		0.032	AGE*ALC (p=0.008)
		95% C.I.	(20.21, 22.86)	(21.18, 23.96)			
DD	DD	n	1,003	949	0.91 (0.70, 1.18)	0.467	AGE (p=0.008)
							ALC (p=0.003)

TABLE K-10. (continued)

Adjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group (Original Comparisons Only)

Variable	Analysis	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
			Ranch Hand	Original Comparison			
GGTP	OC	n	1,003	949	—	0.941	ALC*DC (p<0.001)
		Adj. Mean	37.47	37.39			AGE*DC (p=0.029)
		95% C.I.	(34.93, 40.20)	(34.84, 40.12)			RACE*IC (p=0.005)
GGTP	CD	n	1,003	949	—	0.932	AGE*ALC (p=0.006)
		Adj. Mean	42.35	42.24			RACE (p<0.001)
		95% C.I.	(38.17, 46.98)	(38.08, 46.86)			
DD	DD	n	1,003	949	0.94 (0.68, 1.28)	0.680	AGE*ALC (p=0.005)
							RACE (p=0.049)
Alkaline Phosphatase	OC	n	1,003	950	—	0.020	RACE*IC (p=0.002)
		Adj. Mean	91.5	89.1			WINE (p<0.001)
		95% C.I.	(89.1, 93.9)	(86.8, 91.5)			AGE (p<0.001)
Alkaline Phosphatase	CD	n	1,003	950	—	****	OC (p<0.001)
		Adj. Mean	****	****			GRP*IC (p=0.006)
		95% C.I.	****	****			AGE*IC (p=0.040)
DD	DD	n	1,003	950	1.39 (0.91, 2.12)	0.121	RACE*IC (p=0.002)
							WINE (p<0.001)
							OC (p<0.001)
Alkaline Phosphatase	DD	n	1,003	950	1.39 (0.91, 2.12)	0.121	WINE*DC (p=0.010)
							AGE*IC (p=0.006)
							RACE*IC (p=0.004)
Alkaline Phosphatase	DD	n	1,003	950	1.39 (0.91, 2.12)	0.121	OC*IC (p=0.011)
							GRP*IC (marginal)
							(p=0.052)

TABLE K-10. (continued)

Adjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group (Original Comparisons Only)

Variable	Analysis	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
			Ranch Hand	Original Comparison			
Total Bilirubin	OC	n	1,003	949	0.714	0.714	OCC*RACE (p=0.002) ALC*RACE (p=0.008) AGE*DC (p=0.043)
		Adj. Mean 95% C.I.	0.78 (0.75,0.81)	0.78 (0.75,0.82)			
	CD	n	1,003	949	0.774	0.774	OCC*RACE (p=0.003) OCC*ALC (p=0.047) RACE*ALC (p=0.002)
		Adj. Mean 95% C.I.	0.84 (0.80,0.88)	0.84 (0.80,0.88)			
	DD	n	1,009	952	0.314	0.314	RACE (p<0.001)
Direct Bilirubin	OC	n	1,003	949	0.746	0.746	ALC (p<0.001)
		Adj. Mean 95% C.I.	(0.278) (0.271,0.285)	0.276 (0.269,0.283)			
	CD	n	1,003	949	0.673	0.673	IC*DC (p=0.014) ALC*DC (p=0.012) ALC*RACE (p=0.030) ALC*OCC (p=0.007)
		Adj. Mean 95% C.I.	0.308 (0.291,0.325)	0.305 (0.288,0.323)			
	DD	n	1,003	949	****	****	CRP*IC (p=0.010) RACE (p=0.014) ALC (p=0.016)

TABLE K-10. (continued)

Adjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group (Original Comparisons Only)

Variable	Analysis	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
			Ranch Hand	Original Comparison			
LDH	OC	n	1,009	952	—	****	GRP*AGE (p=0.038)
		Adj. Mean	****	****			IC*AGE (p=0.029)
		95% C.I.	****	****			IC*OC (p=0.049)
LDH	OD	n	1,009	952	—	0.555	AGE (p<0.001)
		Adj. Mean	129.4	130.0			RACE (p=0.006)
		95% C.I.	(126.5, 132.2)	(127.2, 132.9)			
LDH	DD	n	1,003	949	0.85 (0.36, 2.01)	0.706	ALC (p=0.046)
OC	OC	n	1,003	949	—	0.301	OC*AGE (p=0.003)
		Adj. Mean	219.3	221.3			DC*AGE (p=0.006)
		95% C.I.	(214.1, 224.6)	(216.0, 226.6)			AGE (p<0.001)
Cholesterol	OD	n	1,003	949	—	0.243	ALC (p<0.001)
		Adj. Mean	223.7	226.0			IC (p=0.016)
		95% C.I.	(217.3, 230.3)	(219.6, 232.5)			
Cholesterol	DD	n	1,003	949	0.74 (0.58, 0.94)	0.015	OC*AGE (p=0.029)
							ALC (p<0.001)
							AGE (p<0.001)
Cholesterol	DD	n	1,003	949	0.74 (0.58, 0.94)	0.015	RACE*ALC (p=0.009)
							AGE (p=0.020)
							OC (p=0.037)

TABLE K-10. (continued)

Adjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group (Original Comparisons Only)

Variable	Analysis	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
			Ranch Hand	Original Comparison			
OC		n	1,003	949	—	***	GRP*AGE (p=0.012) ALC (p<0.001) RACE (p<0.001) OCC (p<0.001)
		Adj. Mean	****	****			
		95% C.I.	****	****			
Triglycerides	OD	n	1,003	949	—	0.904	OCC (p<0.001) RACE (p<0.001) AGE (p<0.001) ALC (p=0.007)
		Adj. Mean	112.7	112.3			
		95% C.I.	(103.4, 122.9)	(103.1, 122.4)			
DD		n	1,003	949	1.06 (0.74, 1.51)	0.770	AGE*ALC (p=0.023) RACE (p=0.044)
Uroporphyrin	OC	n	1,000	946	—	***	GRP*BUN (p=0.014) OCC*DC (p=0.006) ALC (p=0.048)
		Adj. Mean	****	****			
		95% C.I.	****	****			

TABLE K-10. (continued)

Adjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group (Original Comparisons Only)

Variable	Analysis	Statistic	Group			Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
			Ranch Hand	Original Comparison				
Coprotophyrin	OC	n	1,002	947		—	0.066	ALC (p<0.001) BUN (p<0.001)
		Adj. Mean	119.1	115.2				
		95% C.I.	(116.2, 121.9)	(112.4, 118.2)				

*Abbreviations:

GRP: group
 OC: occupation
 ALC: current alcohol use
 WINE: wine consumption
 DC: exposure to degreasing chemicals
 IC: exposure to industrial chemicals
 BUN: blood urea nitrogen

— No relative risk or confidence interval given for continuous analyses.

***Group-by-covariate interaction—adjusted mean/relative risk, confidence interval, and p-value not presented.

TABLE K-11.
Summary of Group-by-Covariate Interactions for Hepatic Function Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		p Value
				Ranch Hand	Original Comparison	
Alkaline Phosphatase	Group-by-Industrial Chemicals	Exposed to Industrial Chemicals	n	504	506	
			Mean	94.8	90.0	
			Adj. Mean	96.9	92.1	0.001
			95% C.I.	(93.5, 100.6)	(88.8, 95.5)	
		Not Exposed to Industrial Chemicals	n	499	444	
			Mean	88.9	89.5	
			Adj. Mean	92.5	93.3	0.608
			95% C.I.	(89.3, 95.8)	(90.0, 96.7)	
LDH	Group-by-Age	Born $\geq$ 1942	n	408	369	
			Mean	122.2	121.7	
			Adj. Mean	124.1	123.6	0.746
			95% C.I.	(121.1, 127.1)	(120.6, 126.7)	
		Born 1923-1941	n	6	7	
			Mean	126.6	127.6	
			Adj. Mean	126.6	127.6	0.999
			95% C.I.	(123.7, 129.1)	(125.1, 130.7)	
		Born $\leq$ 1922	n	36	45	
			Mean	135.1	134.6	
			Adj. Mean	138.0	137.4	0.913
			95% C.I.	(129.9, 146.5)	(130.1, 145.1)	

TABLE K-11.

Summary of Group-by-Covariate Interactions for Hepatic Function Variables (continued)
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		p Value
				Ranch Hand	Original Comparison	
Triglycerides	Group-by-Age	Born ≥ 1942	n	406	368	
			Mean	107.14	110.24	
			Adj. Mean	95.55	98.49	0.055
			95% C.I.	(87.62, 104.20)	(90.12, 107.63)	
		Born 1923-1941	n	561	536	
			Mean	125.98	124.23	
			Adj. Mean	116.13	115.14	0.815
			95% C.I.	(107.39, 131.47)	(106.66, 134.31)	
		Born ≤ 1922	n	36	45	
			Mean	139.00	106.00	
			Adj. Mean	139.40	83.40	0.015
			95% C.I.	(106.06, 161.94)	(81.89, 119.89)	
Uroporphyrin	Group by BUN	BUN ≤ 30	n	547	509	
			Mean	16.22	16.18	
			Adj. Mean	16.39	16.45	0.125
			95% C.I.	(15.41, 17.44)	(15.33, 19.65)	
		BUN > 30	n	453	507	
			Mean	17.39	17.15	
			Adj. Mean	18.02	17.94	0.409
			95% C.I.	(16.85, 19.19)	(16.80, 18.67)	

TABLE K 12.

Summary of Group by-Covariate Interactions for Variables and
and Porphyrin Determinations Analyzed Categorically
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p Value
				Ranch Hand		Comparison			
				Number	Percent	Number	Percent		
Direct Bilirubin	Group-by-Industrial Chemicals	Exposed to Industrial Chemicals	n	507		506			
			High	27	5.3	14	2.8		
			Normal	480	94.7	492	97.2	1.96 (1.02, 3.80)	0.045
		Not Exposed to Industrial Chemicals	n	496		443			
			High	11	2.2	18	4.1		
			Normal	485	97.8	425	95.9	0.53 (0.25,1.15)	0.107

TABLE K-13.

Unadjusted Analysis for Interval History of Skin Bruises,
Skin Patches, or Skin Sensitivity by Group
(Original Comparisons Only)

Group	Bruises, Patches, or Sensitivity				Total	p-Value
	Yes		No			
	Number	Percent	Number	Percent		
Ranch Hand	265	26.2	746	73.8	1,011	0.003
Original Comparison	195	20.5	758	79.5	953	

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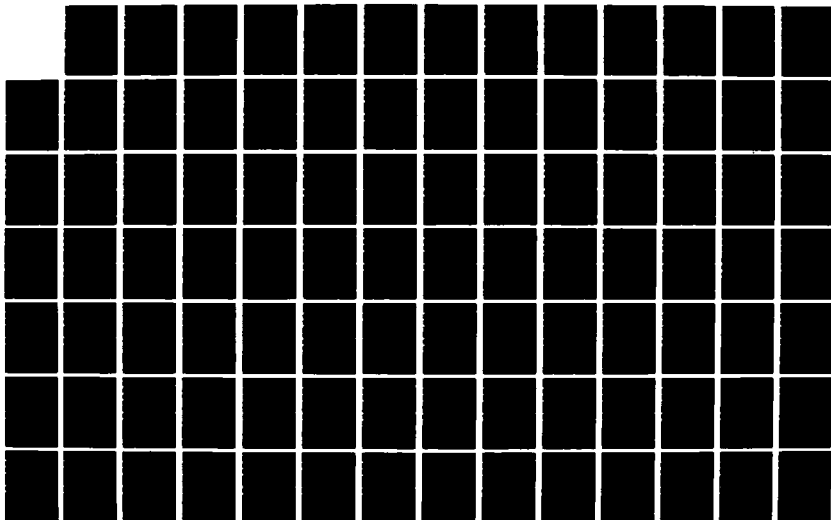
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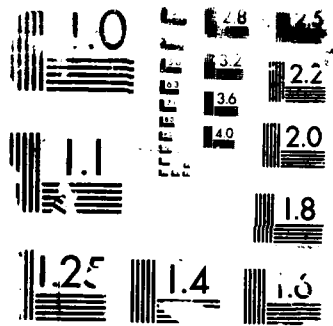
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TABLE K-14.

Unadjusted Analyses for Porphyrin Abnormalities by Group and Skin Patch, Bruise, or Sensitivity Reported at Followup Questionnaire
(Original Comparisons Only)

Group	Skin Patch, Bruise, or Reported Sensitivity	Abnormal Porphyrin Findings for a Participant						Total	p-Value*
		0		1		2			
		Number	Percent	Number	Percent	Number	Percent		
Both Groups	Yes	412	89.8	45	9.8	2	0.4	459	0.754
	No	1,361	91.0	129	8.6	6	0.4	1496	
Ranch Hand	Yes	239	90.5	24	9.1	1	0.4	264	0.950
	No	670	90.3	70	9.4	2	0.3	742	
Original Comparison	Yes	173	88.7	21	10.8	1	0.5	195	0.419
	No	691	91.6	59	7.8	4	0.5	754	

*Chi-square test, 2 d.f.

TABLE K-15.

Unadjusted Analyses for Uroporphyrin Abnormalities by Skin Patch, Bruise,
or Sensitivity Reported at Followup Questionnaire and by Group
(Original Comparisons Only)

Variable	Stratification	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
			Ranch Hand		Original Comparison			
			Number	Percent	Number	Percent		
Uroporphyrins	Skin Patch, Bruise, or Sensitivity Reported	n	264		195			
		Abnormal	12	4.5	9	4.6		
		Normal	252	95.5	186	95.4	0.98 (0.41,2.38)	0.999
	Skin Patch, Bruise, or Sensitivity Not Reported	n	742		754			
		Abnormal	42	5.7	40	5.3		
		Normal	700	94.3	714	94.7	1.07 (0.69,1.67)	0.821

TABLE K-16.

Longitudinal Results for SGOT, SGPT, and GGTP:
 A Contrast of Baseline and First Followup
 Examination Test Means
 (Original Comparisons Only)

Variable	Group	Total	Means		p-Value* (Equality of Difference)
			1982 Baseline	1985 Followup	
SGOT	Ranch Hand	971	32.91	33.73	0.90
	Original Comparison	872	32.93	33.69	
SGPT	Ranch Hand	971	20.08	21.82	0.86
	Original Comparison	872	20.51	22.36	
GGTP	Ranch Hand	971	39.26	33.16	0.78
	Original Comparison	872	38.76	32.56	

*Analyzed in log units.

APPENDIX L
Dermatological Evaluation

APPENDIX L: Dermatological Evaluation

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TABLE L-1.

Unadjusted Exposure Index Analyses for Dermatological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Comedones	Officer	n	127		130		123		Overall		0.198
		Abnormal	19	15.0	31	23.8	25	20.3	M vs. L	1.78 (0.95, 3.35)	0.084
		Normal	108	85.0	99	76.2	98	79.7	H vs. L	1.45 (0.75, 2.80)	0.320
	Enlisted Flyer	n	55		65		57		Overall		0.225
		Abnormal	23	41.8	19	29.2	16	28.1	M vs. L	0.58 (0.27, 1.23)	0.180
		Normal	32	58.2	46	70.8	41	71.9	H vs. L	0.54 (0.25, 1.19)	0.165
Enlisted Groundcrew	n	154		163		142		Overall		0.393	
	Abnormal	40	26.0	36	22.1	41	28.9	M vs. L	0.81 (0.48, 1.35)	0.433	
	Normal	114	74.0	127	77.9	101	71.1	H vs. L	1.16 (0.69, 1.93)	0.603	
Acneiform Lesions	Officer	n	127		130		123		Overall		0.720
		Abnormal	19	15.0	21	16.2	23	18.7	M vs. L	1.10 (0.56, 2.15)	0.864
		Normal	108	85.0	109	83.8	100	81.3	H vs. L	1.31 (0.67, 2.54)	0.500
	Enlisted Flyer	n	55		65		57		Overall		0.994
		Abnormal	8	14.5	9	13.8	8	14.0	M vs. L	0.94 (0.34, 2.64)	0.999
		Normal	47	85.5	56	86.2	49	86.0	H vs. L	0.96 (0.33, 2.77)	0.999
Enlisted Groundcrew	n	154		163		142		Overall		0.806	
	Abnormal	31	20.1	36	22.1	33	23.2	M vs. L	1.13 (0.66, 1.93)	0.682	
	Normal	123	79.9	127	77.9	109	76.8	H vs. L	1.20 (0.69, 2.09)	0.573	

TABLE L-1. (continued)

Unadjusted Exposure Index Analyses for Dermatological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Acneiform Scars	Officer	n	127		130		123		Overall		0.175
		Abnormal	7	5.5	13	10.0	15	12.2	M vs. L	1.91 (0.73,4.94)	0.245
	Enlisted Flyer	Normal	120	94.5	117	90.0	108	87.8	H vs. L	2.38 (0.94,6.06)	0.075
		n	55		65		57		Overall		0.401
	Enlisted Flyer	Abnormal	12	21.8	12	18.5	7	12.3	M vs. L	0.81 (0.33,1.99)	0.655
		Normal	43	78.2	53	81.5	50	87.7	H vs. L	0.50 (0.18,1.39)	0.214
Depigmentation	Enlisted Groundcrew	n	154		163		142		Overall		0.135
		Abnormal	22	14.3	29	17.8	33	23.2	M vs. L	1.30 (0.71,2.38)	0.446
	Officer	Normal	132	85.7	134	82.2	109	76.8	H vs. L	1.82 (1.00,3.30)	0.053
		n	127		130		123		Overall		0.008
	Enlisted Flyer	Abnormal	14	11.0	5	3.8	19	15.4	M vs. L	0.32 (0.11,0.93)	0.033
		Normal	113	89.0	125	96.2	104	84.6	H vs. L	1.48 (0.70,3.09)	0.352
Depigmentation	Enlisted Flyer	n	55		65		57		Overall		0.509
		Abnormal	10	18.2	7	10.8	8	14.0	M vs. L	0.54 (0.19,1.54)	0.298
	Enlisted Groundcrew	Normal	45	81.8	58	89.2	49	86.0	H vs. L	0.74 (0.27,2.03)	0.613
		n	154		163		142		Overall		0.045
	Enlisted Groundcrew	Abnormal	15	9.7	7	4.3	17	12.0	M vs. L	0.42 (0.17,1.05)	0.076
		Normal	139	90.3	156	95.7	125	88.0	H vs. L	1.26 (0.60,2.63)	0.578

TABLE L-1. (continued)
Unadjusted Exposure Index Analyses for Dermatological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Inclusion Cysts	Officer	n	127		130		123		Overall		0.221
		Abnormal	11	8.7	20	15.4	13	10.6	M vs. L	1.92 (0.88,4.19)	0.125
		Normal	116	91.3	110	84.6	110	89.4	H vs. L	1.25 (0.54,2.90)	0.671
	Enlisted Flyer	n	55		65		57		Overall		0.857
		Abnormal	6	10.9	9	13.8	8	14.0	M vs. L	1.31 (0.44,3.95)	0.783
		Normal	49	89.1	56	86.2	49	86.0	H vs. L	1.33 (0.43,4.13)	0.777
	Enlisted Groundcrew	n	154		163		142		Overall		0.836
		Abnormal	16	10.4	15	9.2	16	11.3	M vs. L	0.87 (0.42,1.84)	0.850
		Normal	138	89.6	148	90.8	126	88.7	H vs. L	1.10 (0.53,2.28)	0.853
Hyperpigmentation	Officer	n	127		130		123		Overall		0.922
		Abnormal	23	18.1	23	17.7	20	16.3	M vs. L	0.97 (0.51,1.84)	0.999
		Normal	104	81.9	107	82.3	103	83.7	H vs. L	0.88 (0.46,1.70)	0.739
	Enlisted Flyer	n	55		65		57		Overall		0.579
		Abnormal	13	23.6	13	20.0	16	28.1	M vs. L	0.81 (0.34,1.93)	0.662
		Normal	42	76.4	52	80.0	41	71.9	H vs. L	1.26 (0.54,2.95)	0.669
	Enlisted Groundcrew	n	154		163		142		Overall		0.452
		Abnormal	41	26.6	47	28.8	32	22.5	M vs. L	1.12 (0.68,1.83)	0.707
		Normal	113	73.4	116	71.2	110	77.5	H vs. L	0.80 (0.47,1.36)	0.422

TABLE L-1. (continued)

Unadjusted Exposure Index Analyses for Dermatological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Other Abnormalities	Officer	n	127		130		123		Overall		0.122
		Abnormal	73	57.5	87	67.0	85	69.1	M vs. L	1.50 (0.90,2.49)	0.125
		Normal	54	42.5	43	33.0	38	30.9	H vs. L	1.66 (0.98,2.78)	0.067
	Enlisted Groundcrew	n	55		65		57		Overall		0.071
		Abnormal	43	78.2	43	66.2	33	57.9	M vs. L	0.55 (0.24,1.24)	0.160
		Normal	12	21.8	22	33.8	24	42.1	H vs. L	0.38 (0.17,0.88)	0.027
Dermatology Index	Officer	n	154		163		142		Overall		0.237
		Abnormal	87	56.5	78	47.9	79	55.6	M vs. L	0.71 (0.45,1.10)	0.144
		Normal	67	43.5	85	52.1	63	44.4	H vs. L	0.97 (0.61,1.53)	0.907
	Enlisted Flyer	n	127		130		123		Overall		0.300
		>0 (Abnormal)	46	36.2	56	43.1	56	45.5	M vs. L	1.33 (0.81,2.20)	0.308
		0 (Normal)	81	63.8	74	56.9	67	54.5	H vs. L	1.47 (0.89,2.44)	0.157
Enlisted Groundcrew	Enlisted Flyer	n	55		65		57		Overall		0.579
		>0 (Abnormal)	33	60.0	34	52.3	29	50.9	M vs. L	0.73 (0.35,1.51)	0.462
		0 (Normal)	22	40.0	31	47.7	28	49.1	H vs. L	0.69 (0.33,1.46)	0.349
	Enlisted Groundcrew	n	154		163		142		Overall		0.348
		>0 (Abnormal)	74	48.1	77	47.2	78	54.9	M vs. L	0.97 (0.62,1.50)	0.911
		0 (Normal)	80	51.9	86	52.8	64	45.1	H vs. L	1.32 (0.83,2.08)	0.247

TABLE L-2.

Interaction Summaries of Adjusted Exposure
Index Analyses of Dermatological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
				Low		Medium		High				
				Number	Percent	Number	Percent	Number	Percent			
Acneiform Scars ^a	Exposure Index-by- Race	Nonblack, No pre-SEA Acne	n	99		77		76		Overall		0.006*
		Abnormal	0	0.0	6	7.8	8	10.5	M vs. L	18.09 (1.00, 326.31)**	0.006*	
		Normal	99	100.0	71	92.2	68	89.5	H vs. L	24.69 (1.40, 434.96)**	0.001*	
	Exposure Index-by- Presence of pre-SEA Acne (Officer)	Nonblack, No pre-SEA Acne	n	25		49		44		Overall		0.833
		Abnormal	5	20.0	7	14.3	6	13.6	M vs. L	0.73 (0.20, 2.68)	0.630	
		Normal	20	80.0	42	85.7	38	86.4	H vs. L	0.67 (0.17, 2.56)	0.555	
	Black, No pre-SEA Acne	n	1		2		1		Overall		0.135*	
		Abnormal	1	100.0	0	0.0	0	0.0	M vs. L	0.07 (0.001, 5.49)**	0.333*	
		Normal	0	0.0	2	100.0	1	100.0	H vs. L	0.11 (0.001, 10.27)**	0.999*	
	Black, No pre-SEA Acne	n	1		1		1		Overall		0.135*	
Abnormal		1	100.0	0	0.0	1	100.0	M vs. L	0.11 (0.001, 10.27)**	0.999*		
Normal		0	0.0	1	100.0	0	0.0	H vs. L	—	—		
Acneiform Scars	Exposure Index-by- Presence of pre-SEA Acne	No pre-SEA Acne	n	101		105		99				
		Abnormal	16	15.8	15	14.3	16	16.2	M vs. L	0.86 (0.39, 1.86)	0.695	
		Normal	85	84.2	90	85.7	83	83.8	H vs. L	1.11 (0.51, 2.39)	0.799	
	Enlisted Groundcrew)	Pre-SEA Acne	n	51		57		41				
		Abnormal	6	11.8	14	24.6	17	41.5	M vs. L	2.24 (0.79, 6.39)	0.131	
		Normal	45	88.2	43	75.4	24	58.5	H vs. L	5.38 (1.45, 19.96)	0.012	

TABLE L-2. (continued)

Interaction Summaries of Adjusted Exposure
Index Analyses of Dermatological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
				Low		Medium		High				
				Number	Percent	Number	Percent	Number	Percent			
Depigmen- tation	Exposure Index-by- Presence of pre-SEA Acne	No pre-SEA Acne	n	101		105		99		Overall		0.314*
			Abnormal	13	12.9	7	6.7	11	11.1	H vs. L	0.48 (0.19, 1.27)*	0.161*
			Normal	88	87.1	98	93.3	88	88.9	H vs. L	0.85 (0.36, 1.99)*	0.828*
	(Enlisted Groundcrew)	Pre-SEA Acne	n	51		57		41		Overall		0.006*
			Abnormal	2	3.9	0	0.0	6	14.6	H vs. L	0.17 (0.01, 3.67)**	0.221*
			Normal	49	96.1	57	100.0	35	85.4	H vs. L	4.20 (0.80, 22.05)*	0.133*
Dermatology Index	Exposure Index-by- Race	Nonblack, No pre-SEA Acne	n	99		77		76		Overall		0.025*
			Abnormal	32	32.3	40	51.9	35	46.1	H vs. L	2.26 (1.23, 4.18)*	0.013*
			Normal	67	67.7	37	48.1	41	53.9	H vs. L	1.78 (0.96, 3.31)*	0.084*
	Nonblack, pre-SEA Acne	n	25		49		44		Overall		0.222*	
			Abnormal	12	48.0	15	30.6	20	45.5	H vs. L	0.48 (0.18, 1.29)*	0.202*
			Normal	13	52.0	34	69.4	24	54.5	H vs. L	0.90 (0.34, 2.41)*	0.999*
	Exposure Index-by- Presence of pre-SEA Acne (Officer)	Black, No pre-SEA Acne	n	1		2		1		Overall		0.135*
			Abnormal	1	100.0	0	0.0	0	0.0	H vs. L	0.07 (0.001, 5.49)**	0.333*
			Normal	0	0.0	2	100.0	1	100.0	H vs. L	0.11 (0.001, 10.27)**	0.999*
	Black, pre-SEA Acne	n	1		1		1		Overall		0.223*	
			Abnormal	1	100.0	0	0.0	1	100.0	H vs. L	0.11 (0.001, 10.27)**	0.999*
			Normal	0	0.0	1	100.0	0	0.0	H vs. L	—	—

TABLE L-2. (continued)

Interaction Summaries of Adjusted Exposure
Index Analyses of Dermatological Variables

FOOTNOTES, Table L-2

^aResults presented for acneiform scars (officers) are based on stratification into the four categories shown. Unadjusted results are presented for all strata except nonblack Ranch Hands with pre-SEA acne. These results are adjusted for age.

*Unadjusted estimate of relative risk and confidence interval, or p-value, based on stratified tables.

**Unadjusted estimate of relative risk and confidence interval calculated after adding 0.5 to each cell.

—No normal participants present in contrast; estimated relative risk, confidence interval and p-value not presented.

Note: Small sample sizes may affect validity of overall p-value.

Note: Results without (*) or (**) are adjusted for all other main effects in model (age, race, presence of pre-SEA acne), unless otherwise noted.

TABLE L-3.

Unadjusted Analysis for Reported Historical
Occurrence of Acne by Group
(Original Comparisons Only)

Group	Acne				Total	Summary Statistics
	Yes		No			
	Number	Percent	Number	Percent		
Ranch Hand	412	40.6	604	59.4	1,016	Est. RR: 1.18 95% C.I.: (0.99,1.42) p-Value: 0.071
Original Comparison	349	36.5	606	63.5	955	
Total	761		1,210		1,971	

TABLE L-4.

Unadjusted Analysis for Reported Historical Occurrence
Relative to 1961 by Group*
(Original Comparisons Only)

Group	Occurrence of Acne				Total	Summary Statistics
	Post-1961		Pre-1961			
	Number	Percent	Number	Percent		
Ranch Hand	239	58.3	171	41.7	410	Est. RR (for post- 1961 cases): 1.14 95% C.I.: (0.85, 1.52) p-Value: 0.418
Original Comparison	192	55.2	156	44.8	348	
Total	431		327		758	

*Three participants deleted due to missing data on time of occurrence.

TABLE L-5.

**Unadjusted Analysis for Reported Historical Occurrence of Acne
Relative to SEA Tour of Duty for Post-1961 Acne by Group*
(Original Comparisons Only)**

Group	Post-1961 Acne						Total	p-Value
	Pre-SEA		Post-SEA		Pre- and Post-SEA			
	Number	Percent	Number	Percent	Number	Percent		
Ranch Hand	58	25.4	80	35.1	90	39.5	228	0.155
Original								
Comparison	48	26.2	81	44.2	54	29.5	183	
Total	106		161		144		411	

*Twenty post-1961 participants with acne deleted due to missing data on time of occurrence.

TABLE L-6.

**Adjusted Analysis for Duration of Acne (in Years)
for Post-1961 Acne by Group***

Group	Total	Adjusted Mean**	95% C.I.**	p-Value	Covariate Remarks
Ranch Hand	219	8.18	(7.43,8.96)	0.070	Time Reference to SEA (p<0.001)
Original					
Comparison	175	7.15	(6.38,7.97)		
Total	394				

*Seventeen participants deleted due to missing data on time of occurrence.

**Converted from square root scale.

TABLE L-7.

Results Discussed Narratively
in Questionnaire Data Section of Chapter
(Original Comparisons Only)

Description	p-Value
• Effect due to SEA category in continuous analysis of duration of acne	<0.001
• Interaction between group and SEA category in continuous analysis of duration of acne	0.286
• Categorical analysis of duration of acne -- p-value for group difference	
<u>SEA Category</u>	
pre-SEA	0.718
post-SEA	0.592
pre- and post-SEA	0.753
• Intersection of Venn diagram circles (temples, ears, and eyes) -- p-value for group difference	
<u>SEA Category</u>	
post-SEA and pre- and post-SEA	0.133
post-SEA	0.627

TABLE L-8.

Unadjusted Analyses for
Dermatological Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Comedones	n	1,016		954			
	Abnormal	250	24.6	253	26.5		
	Normal	766	75.4	701	73.5	0.90 (0.74, 1.11)	0.352
Acneiform Lesions	n	1,016		954			
	Abnormal	188	18.5	159	16.7		
	Normal	828	81.5	795	83.3	1.14 (0.90, 1.43)	0.288
Acneiform Scars	n	1,016		954			
	Abnormal	150	14.8	128	13.4		
	Normal	866	85.2	826	86.6	1.12 (0.87, 1.44)	0.401
Depigmentation	n	1,016		954			
	Abnormal	102	10.0	113	11.8		
	Normal	914	90.0	841	88.2	0.83 (0.63, 1.10)	0.219
Inclusion Cysts	n	1,016		954			
	Abnormal	114	11.2	118	12.4		
	Normal	902	88.8	836	87.6	0.90 (0.68, 1.18)	0.442
Hyperpigmentation	n	1,016		954			
	Abnormal	228	22.4	222	23.3		
	Normal	788	77.6	732	76.7	0.95 (0.77, 1.18)	0.668

TABLE L-8. (continued)

Unadjusted Analyses for
Dermatological Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Other Abnormalities	n	1,016		954		1.03 (0.86, 1.23)	0.783
	Abnormal	608	59.8	565	59.2		
	Normal	408	40.2	389	40.8		
Dermatology Index	n	1,016		954		Overall 1 vs. 0 0.99 (0.81, 1.20) 2 vs. 0 0.97 (0.73, 1.29) 3 vs. 0 0.91 (0.56, 1.48) 4 vs. 0 1.87 (0.63, 5.49)	0.816 0.919 0.885 0.711 0.304
	0	533	52.5	497	52.1		
	1	318	31.3	301	31.6		
	2	121	11.9	116	12.2		
	3	34	3.3	35	3.7		
	4	10	1.0	5	0.5		

TABLE L-9.

Adjusted Analyses for
Dermatological Variables by Group
(Original Comparisons Only)

Variable	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
	Ranch Hand Total	Original Comparison Total			
Comedones	1,007	946	0.93 (0.75, 1.14)	0.469	RACE (p<0.001) AGE (p<0.001) OCC*SEA ACNE (p=0.047)
Acneiform Lesions	1,007	946	1.13 (0.89, 1.43)	0.315	AGE (p<0.001) RACE (p=0.034) SEA ACNE (p=0.007)
Acneiform Scars	1,007	946	1.12 (0.86, 1.45)	0.417	AGE (p<0.001) RACE (p<0.001) SEA ACNE (p<0.001)
Depigmentation	1,016	954	0.83 (0.63, 1.10)	0.202	RACE (p=0.010)
Inclusion Cysts	1,016	954	0.90 (0.68, 1.18)*	0.442*	--
Hyperpigmentation	1,007	946	0.95 (0.76, 1.17)	0.608	RACE (p<0.001) SEA ACNE (p=0.008)

TABLE L-9. (continued)

Adjusted Analyses for
Dermatological Variables by Group
(Original Comparisons Only)

Variable	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
	Ranch Hand Total	Original Comparison Total			
Other Abnormalities	1,016	954	1.07 (0.89, 1.30)	0.459	AGE (p<0.001) RACE (p<0.001)
Dermatology Index	1,007	946	****	****	OCC (p=0.013) GROUP*SEA ACNE (p=0.030)

*No significant covariates in adjusted analysis; consequently, estimated relative risk, confidence interval, and p-value are from unadjusted analysis.

***Group-by-covariate interaction; adjusted relative risk, confidence interval, and p-value are not presented.

Abbreviations:

OCC: Occupation

SEA ACNE: Presence of pre-SEA acne

TABLE L-10.

Summary of Group-by-Presence of Pre-SEA Acne
Interaction for Dermatology Index
(Original Comparisons Only)

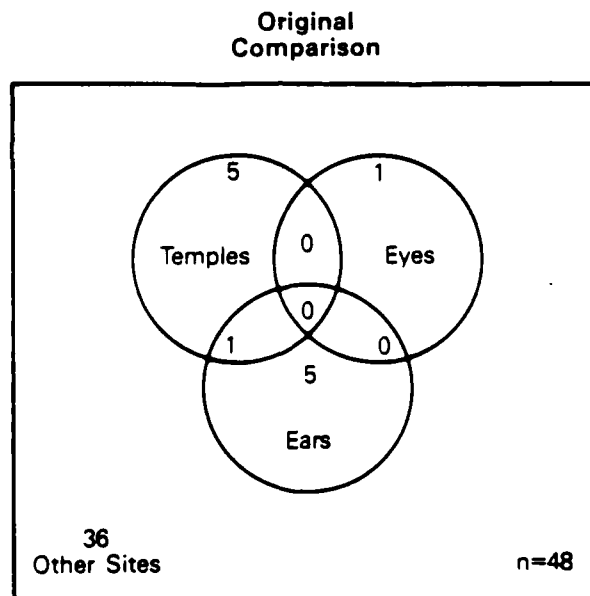
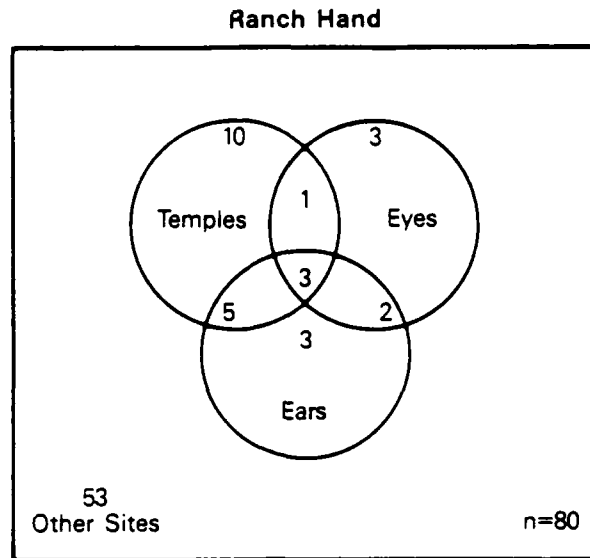
Variable	Interaction	Stratification	Statistic	Group				Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Number	Hand Percent	Original Comparison Number	Percent			
Dermatology Index	No		n	684		653				
			0	360	52.6	370	56.7			
			1	234	34.2	202	30.9	1 vs. 0	1.19 (0.94, 1.52)	0.153
			2	69	10.1	61	9.3	2 vs. 0	1.17 (0.80, 1.70)	0.422
			3	16	2.3	19	2.9	3 vs. 0	0.87 (0.44, 1.71)	0.689
			4	5	0.7	1	0.2	4 vs. 0	4.16 (0.61, 28.48)	0.146
	Yes		n	323		293				
			0	167	51.7	122	41.6			
			1	82	25.4	98	33.4	1 vs. 0	0.62 (0.42, 0.90)	0.012
			2	51	15.8	55	18.8	2 vs. 0	0.68 (0.44, 1.07)	0.097
			3	18	5.6	15	5.1	3 vs. 0	0.89 (0.43, 1.83)	0.745
			4	5	1.5	3	1.0	4 vs. 0	1.20 (0.30, 4.88)	0.797

TABLE L-11.

Longitudinal Analysis of the Dermatology Index:
A Contrast of Baseline and First Followup Examination Abnormalities
(Original Comparisons Only)

Group	1982	1985 Followup Exam		Odds Ratio (OR)*	p-Value (OR _{RH} vs. OR _{OC})
	Baseline Exam	Abnormal	Normal		
Ranch Hand	Abnormal	241	136	1.68	0.53
	Normal	228	366		
Original Comparison	Abnormal	222	109	1.85	
	Normal	202	339		

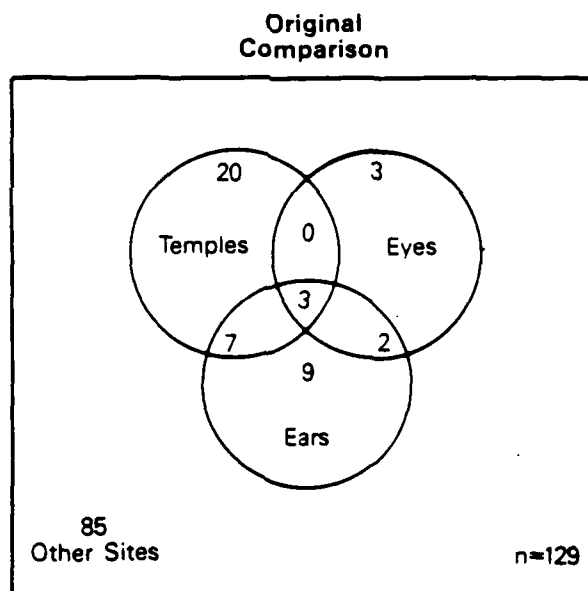
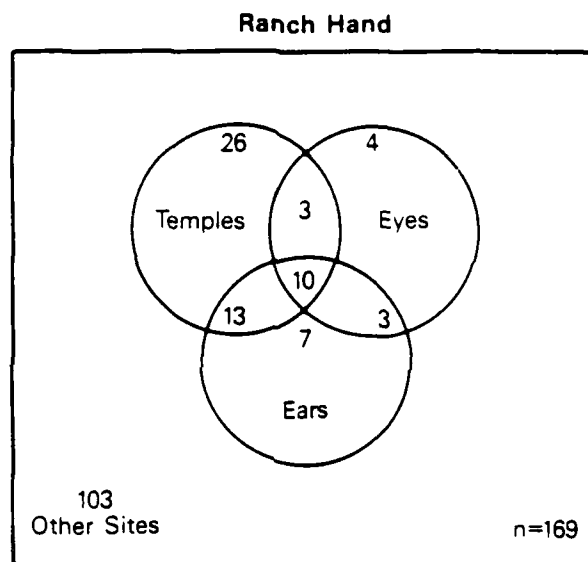
*Odds Ratio:
$$\frac{\text{Number Normal Baseline, Abnormal Followup}}{\text{Number Abnormal Baseline, Normal Followup}}$$



$p = 0.374$
(8 Categories)

$p = 0.310$
(7 Categories;
Other Sites
Deleted)

Figure L-1.
Location of Post-SEA and Pre- and
Post-SEA Acne by Group
(Original Comparisons Only)



p = 0.492
(8 Categories)

p = 0.449
(7 Categories;
Other Sites
Deleted)

Figure L-2.
Location of Post-SEA Acne by Group
(Original Comparisons Only)

APPENDIX M

Cardiovascular Assessment

APPENDIX M: CARDIOVASCULAR ASSESSMENT

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TABLE M-1.

**Association Between Reported Essential Hypertension and the Covariates
in the Combined Ranch Hand and Comparison Groups**

Covariate	Covariate Category	Total	Percent Abnormal	p-Value
Age	Born ≥ 1942	934	20.4	<0.001
	Born <1942	1,214	29.6	
Race	Black	126	27.8	0.647
	Nonblack	2,022	25.5	
Occupation	Officer	807	27.6	0.108
	Enlisted Flyer	354	27.1	
	Enlisted Groundcrew	987	23.5	
Current Smoking	0	1,262	28.8	<0.001
	>0 - 20	463	22.0	
	>20	422	20.4	
Pack-Years Smoking	0	512	28.7	0.120
	>0 - 10	760	23.6	
	>10	869	25.7	
Cholesterol	≤ 200	766	19.7	<0.001
	>200 - 230	650	26.6	
	>230	732	31.0	
HDL	≤ 40	719	27.5	0.309
	>40 - 50	754	25.3	
	>50	675	24.0	
Cholesterol-HDL Ratio	≤ 4.2	717	20.6	<0.001
	>4.2 - ≤ 5.5	743	26.0	
	≥ 5.5	688	30.5	
Percent Body Fat	<10	10	0.0	<0.001
	10 - 25	1,758	21.0	
	>25	379	47.8	
Personality Score	<-5	829	26.8	0.202
	-5 - 5	731	26.7	
	>5	580	22.9	
Differential Cortisol	≤ 0.6	704	29.1	0.030
	>0.6 - 4.0	745	24.4	
	>4.0	683	23.3	
Current Alcohol Use (Drinks/Day)	0	592	25.2	0.011
	>0 - 1	809	22.5	
	>1	738	29.1	
Drink-Years Alcohol	≤ 1.25	691	25.9	0.005
	>1.25 - 25	719	21.8	
	>25	666	29.4	

TABLE M-2.

Association Between Reported Heart Disease and the Covariates
in the Combined Ranch Hand and Comparison Groups

Covariate	Covariate Category	Total	Percent Abnormal	p-Value
Age	Born ≥ 1942	934	22.7	<0.001
	Born <1942	1,214	30.3	
Race	Black	126	31.0	0.354
	Nonblack	2,022	26.8	
Occupation	Officer	807	30.6	0.014
	Enlisted Flyer	354	24.9	
	Enlisted Groundcrew	987	24.8	
Current Smoking	0	1,262	27.5	0.342
	>0 - 20	463	28.1	
	>20	422	24.2	
Pack-Years Smoking	0	512	28.1	0.667
	>0 - 10	760	25.9	
	>10	869	27.3	
Cholesterol	≤ 200	766	26.5	0.361
	>200 - 230	650	25.5	
	>230	732	28.8	
HDL	≤ 40	719	26.6	0.326
	>40 - 50	754	25.6	
	>50	675	29.0	
Cholesterol-HDL Ratio	≤ 4.2	717	29.6	0.009
	>4.2 - ≤ 5.5	743	23.0	
	≥ 5.5	688	28.6	
Percent Body Fat	<10	10	30.0	0.849
	10 - 25	1,758	27.2	
	>25	379	25.9	
Personality Score	<-5	829	27.5	0.214
	-5 - 5	731	24.9	
	>5	580	29.1	
Differential Cortisol	≤ 0.6	704	24.6	0.212
	>0.6 - 4.0	745	27.9	
	>4.0	683	28.4	
Current Alcohol Use (Drinks/Day)	0	592	27.4	0.297
	>0 - 1	809	28.6	
	>1	738	25.1	
Drink-Years Alcohol	≤ 1.25	691	26.8	0.537
	>1.25 - 25	719	25.7	
	>25	666	28.4	

TABLE M-3.

**Association Between Reported Myocardial Infarction and the Covariates
in the Combined Ranch Hand and Comparison Groups**

Covariate	Covariate Category	Total	Percent Abnormal	p-Value
Age	Born ≥ 1942	934	0.4	<0.001
	Born <1942	1,214	3.1	
Race	Black	126	0.8	0.523
	Nonblack	2,022	2.0	
Occupation	Officer	807	1.5	0.477
	Enlisted Flyer	354	2.3	
	Enlisted Groundcrew	987	2.2	
Current Smoking	0	1,262	1.4	0.083
	$>0 - 20$	463	3.0	
	>20	422	2.4	
Pack-Years Smoking	0	512	0.2	0.001
	$>0 - 10$	760	1.8	
	>10	869	3.1	
Cholesterol	≤ 200	766	1.2	0.093
	$>200 - 230$	650	2.0	
	>230	732	2.7	
HDL	≤ 40	719	2.8	0.096
	$>40 - <50$	754	1.9	
	>50	675	1.2	
Cholesterol-HDL Ratio	≤ 4.2	717	1.0	0.002
	$>4.2 - <5.5$	743	1.5	
	≥ 5.5	688	3.5	
Percent Body Fat	<10	10	0.0	0.867
	$10 - 25$	1,758	1.9	
	>25	379	2.1	
Personality Score	<-5	829	1.9	0.195
	$-5 - 5$	731	2.6	
	>5	580	1.2	
Differential Cortisol	≤ 0.6	704	2.0	0.973
	$>0.6 - 4.0$	745	1.9	
	>4.0	683	2.0	
Current Alcohol Use (Drinks/Day)	0	592	2.4	0.365
	$>0 - 1$	809	2.1	
	>1	738	1.4	
Drink-Years Alcohol	≤ 1.25	691	2.6	0.034
	$>1.25 - 25$	719	0.8	
	>25	666	2.2	

TABLE M-4.

**Cardiovascular Morbidity-Mortality Analysis
(Ranch Hands and Comparisons*)**

<u>Endpoint</u>	<u>Status</u>	<u>Ranch Hands n=1,257</u>			<u>Comparisons* n=1,253</u>		
		<u>Event</u>			<u>Event</u>		
		<u>Yes</u>	<u>No</u>	<u>Total</u>	<u>Yes</u>	<u>No</u>	<u>Total</u>
Death (Any Cause) or Verified Heart Disease	Dead	66	0	66	77	0	77
	Living, Fully Compliant ^a	251	823	1,074	187	768	955
	Living, not Fully Compliant ^b	27.4 ^c	89.6 ^c	117	43.3 ^c	177.7 ^c	221
	Estimated Percent Events	27.4%			24.5%		
Death (Any Cause) or Verified Myocardial Infarction	Dead	66	0	66	77	0	77
	Living, Fully Compliant ^a	13	1,061	1,074	9	946	955
	Living, not Fully Compliant ^b	1.4 ^c	115.6 ^c	117	2.1 ^c	218.9 ^c	221
	Estimated Percent Events	6.4%			7.0%		
Fatal or Nonfatal Verified Heart Disease	Dead	5	61	66	3	74	77
	Living, Fully Compliant ^a	251	823	1,074	187	768	955
	Living, not Fully Compliant ^b	27.4 ^c	89.6 ^c	117	43.3 ^c	177.7 ^c	221
	Estimated Percent Events	22.5%			18.6%		
Fatal or Nonfatal Verified Myocardial Infarction or Fatal Heart Disease	Dead	1	65	66	2	75	77
	Living, Fully Compliant ^a	13	1,061	1,074	9	946	955
	Living, not Fully Compliant ^b	1.4 ^c	115.6 ^c	117	2.1 ^c	218.9 ^c	221
	Estimated Percent Events	1.2%			1.0%		

*Comparison: first Comparison of the randomly ordered set matched to the Ranch Hands.

^aFully compliant at Baseline or third-year followup examination.

^bNot fully compliant at Baseline and not fully compliant at third-year followup examination.

^cEstimated using event rate in living, fully compliants.

TABLE M-5.

Summary of Group-by-Covariate Interactions
for Central Cardiac Function Variables (Diabetics Excluded)

Variable	Interaction	Stratification	Adj. Relative Risk (95% C.I.)	p-Value
Systolic Blood Pressure (Continuous Analysis)	Group-by-Age (Blacks)	Age (Baseline): 35	4.56 (-1.91, 11.03)*	0.170
		Age (Baseline): 53	-16.01 (-27.52, -4.50)*	0.008
ECG (Overall)	Group-by-Pack-years Smoking	Pack-years: 0	0.70 (0.50, 0.98)	0.038
		Pack-years: 30	1.25 (0.89, 1.76)	0.197
ECG: Arrhythmia	Group-by-Pack-years Smoking (21% Body Fat)	Pack-years: 0	0.58 (0.30, 1.10)	0.093
		Pack-years: 30	1.59 (0.83, 3.04)	0.162
	Group-by-Percent Body Fat (7 Pack-years Smoking)	10% Body Fat	0.23 (0.07, 0.78)	0.018
		30% Body Fat	1.88 (0.66, 5.34)	0.234

*Difference in group means (Ranch Hand-Comparison) and associated p-value given, rather than relative risk, for continuous analysis of dependent variables.

TABLE M-6.

Summary of Group-by-Covariate Interactions
for Peripheral Vascular Function Variables (Diabetics Excluded)

Variable	Interaction	Stratification	Adj. Relative Risk (95% C.I.)	p-Value
Popliteal Pulses (Manual)	Group-by-Race	Black Nonblack	6.74 (0.72, 63.40) 0.55 (0.28, 1.12)	0.095 0.099
Dorsalis Pedis Pulses (Manual)	Group-by-Occupation	Officer Enlisted Flyer Enlisted Groundcrew	0.70 (0.45, 1.09) 1.70 (0.86, 3.34) 1.32 (0.84, 2.06)	0.116 0.124 0.222
Posterior Tibial Pulses (Manual)	Group-by-Occupation	Officer Enlisted Flyer Enlisted Groundcrew	0.33 (0.09, 1.18) 4.33 (1.14, 16.50) 1.22 (0.58, 2.57)	0.087 0.032 0.603
Leg Pulses (Manual)	Group-by-Occupation (21% Body Fat)	Officer Enlisted Flyer Enlisted Groundcrew	0.62 (0.41, 0.94) 1.55 (0.87, 2.76) 1.24 (0.85, 1.81)	0.026 0.136 0.271
	Group-by-Percent Body Fat (Officer)	Nonobese (<25%) Obese (>25%)	0.66 (0.42, 1.04) 0.44 (0.17, 1.12)	0.084 0.072
	Group-by-Percent Body Fat (Enlisted Flyer)	Nonobese (<25%) Obese (>25%)	1.36 (0.73, 2.55) 1.83 (0.76, 4.38)	0.177 0.332
	Group-by-Percent Body Fat (Enlisted Groundcrew)	Nonobese (<25%) Obese (>25%)	1.20 (0.79, 1.83) 0.91 (0.39, 2.10)	0.818 0.390
Peripheral Pulses (Manual)	Group-by-Occupation	Officer Enlisted Flyer Enlisted Groundcrew	0.64 (0.42, 0.96) 1.45 (0.82, 2.56) 1.16 (0.80, 1.69)	0.030 0.204 0.441
All Pulses (Manual)	Group-by-Occupation	Officer Enlisted Flyer Enlisted Groundcrew	0.64 (0.42, 0.96) 1.45 (0.82, 2.57) 1.14 (0.78, 1.66)	0.030 0.204 0.490

TABLE M-7.

Unadjusted Exposure Index Analyses
for Reported and Verified Heart Disease by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Reported Essential Hypertension	Officer	n	119		122		109		Overall		0.850
		Abnormal	31	26.0	33	27.0	32	29.4	M vs. L	1.05 (0.59,1.86)	0.857
		Normal	88	74.0	89	73.0	77	70.6	H vs. L	1.18 (0.66,2.11)	0.575
	Enlisted Flyer	n	54		56		53		Overall		0.525
		Abnormal	14	25.9	14	25.0	18	34.0	M vs. L	0.95 (0.40,2.48)	0.912
		Normal	40	74.1	42	75.0	35	66.0	H vs. L	1.47 (0.64,3.38)	0.363
	Enlisted Groundcrew	n	148		151		130		Overall		0.490
		Abnormal	33	22.3	42	27.8	30	23.1	M vs. L	1.34 (0.79,2.27)	0.271
		Normal	115	77.7	109	72.2	100	76.9	H vs. L	1.05 (0.60,1.83)	0.881
Verified Essential Hypertension	Officer	n	119		122		109		Overall		0.413
		Abnormal	23	19.3	22	18.0	27	24.8	M vs. L	0.92 (0.48,1.76)	0.795
		Normal	96	80.7	100	82.0	82	75.2	H vs. L	1.37 (0.73,2.58)	0.322
	Enlisted Flyer	n	54		56		53		Overall		0.514
		Abnormal	11	20.4	8	14.3	12	22.6	M vs. L	0.65 (0.24,1.77)	0.401
		Normal	43	79.6	48	85.7	41	77.4	H vs. L	1.14 (0.45,2.88)	0.772
	Enlisted Groundcrew	n	148		151		130		Overall		0.375
		Abnormal	28	18.9	38	25.2	26	20.0	M vs. L	1.44 (0.83,2.50)	0.194
		Normal	120	81.1	113	74.8	104	80.0	H vs. L	1.07 (0.59,1.94)	0.818

TABLE M-7. (continued)

Unadjusted Exposure Index Analyses
for Reported and Verified Heart Disease by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Reported Heart Disease	Officer	n	119		122		109		Overall		0.607
		Abnormal	41	34.4	40	32.8	31	28.4	M vs. L	0.93 (0.54,1.58)	0.787
		Normal	78	65.6	82	67.2	78	71.6	H vs. L	0.76 (0.43,1.33)	0.332
	Enlisted Flyer	n	54		56		53		Overall		0.306
		Abnormal	15	27.8	19	33.9	11	20.8	M vs. L	1.34 (0.59,3.01)	0.484
		Normal	39	72.2	37	66.1	42	79.2	H vs. L	0.68 (0.28,1.66)	0.401
	Enlisted Groundcrew	n	148		151		130		Overall		0.008
		Abnormal	42	28.4	25	16.6	41	31.5	M vs. L	0.50 (0.29,0.87)	0.015
		Normal	106	71.6	126	83.4	89	68.5	H vs. L	1.16 (0.70,1.95)	0.569
Verified Heart Disease	Officer	n	119		122		109		Overall		0.665
		Abnormal	37	31.1	35	28.7	28	25.7	M vs. L	0.89 (0.51,1.55)	0.682
		Normal	82	68.9	87	71.3	81	74.3	H vs. L	0.77 (0.43,1.37)	0.368
	Enlisted Flyer	n	54		56		53		Overall		0.335
		Abnormal	14	25.9	16	28.6	9	17.0	M vs. L	1.14 (0.49,2.65)	0.757
		Normal	40	74.1	40	71.4	44	83.0	H vs. L	0.58 (0.23,1.50)	0.263
	Enlisted Groundcrew	n	148		151		130		Overall		0.002
		Abnormal	37	25.0	16	10.6	32	24.6	M vs. L	0.36 (0.19,0.67)	0.001
		Normal	111	75.0	135	89.4	98	75.4	H vs. L	0.98 (0.57,1.76)	0.994

TABLE M-7. (continued)
Unadjusted Exposure Index Analyses
for Reported and Verified Heart Disease by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Reported Myocardial Infarction.	Officer	n	119		122		109		Overall		0.256
		Abnormal	1	0.8	4	3.3	1	0.9	M vs. L	4.00 (0.44, 36.3)	0.219
	Enlisted Flyer	n	118	99.2	118	96.7	108	99.1	H vs. L	1.09 (0.07, 17.7)	0.952
		Abnormal	54		56		53		Overall		0.061
	Enlisted Groundcrew	n	0	0.0	1	0.8	4	7.6	M vs. L	—	—
		Normal	54	100.0	55	98.2	49	92.4	H vs. L	—	—
Verified Myocardial Infarction	Officer	n	148		151		130		Overall		0.592
		Abnormal	3	2.0	2	1.3	4	3.1	M vs. L	0.65 (0.11, 3.94)	0.638
	Enlisted Flyer	n	145	98.0	149	98.7	126	96.9	H vs. L	1.53 (0.34, 6.98)	0.582
		Abnormal	54		56		53		Overall		—
	Enlisted Groundcrew	n	0	0.0	1	1.8	1	1.9	M vs. L	—	—
		Normal	54	100.0	55	98.2	52	98.1	H vs. L	—	—
Verified Myocardial Infarction	Officer	n	148		151		130		Overall		—
		Abnormal	2	1.4	0	0.0	1	0.8	M vs. L	—	—
	Enlisted Flyer	n	146	98.6	151	100.0	129	99.2	H vs. L	—	—
		Abnormal	54		56		53		Overall		—
	Enlisted Groundcrew	n	0	0.0	1	1.8	1	1.9	M vs. L	—	—
		Normal	54	100.0	55	98.2	52	98.1	H vs. L	—	—

— Analysis not performed due to sparse cells.

TABLE M-8.

Unadjusted Exposure Index Analyses
for Central Cardiac Function Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Systolic Blood Pressure	Officer	n	119		122		109		Overall		0.996
		Abnormal	8	6.7	8	6.6	7	6.4	M vs. L	0.97 (0.35, 2.69)	0.960
		Normal	111	93.3	114	93.4	102	93.6	H vs. L	0.95 (0.34, 2.63)	0.928
	Enlisted Flyer	n	54		56		53		Overall		0.927
		Abnormal	4	7.4	4	7.1	3	5.7	M vs. L	0.96 (0.23, 4.05)	0.960
		Normal	50	92.6	52	92.9	50	94.3	H vs. L	0.75 (0.16, 3.53)	0.719
Enlisted Groundcrew	n	148		151		130		Overall		0.166	
	Abnormal	5	3.4	13	8.6	8	6.2	M vs. L	2.69 (0.94, 7.76)	0.066	
	Normal	143	96.6	138	91.4	122	93.8	H vs. L	1.88 (0.60, 5.88)	0.280	
Heart Sounds	Officer	n	119		122		109		Overall		0.844 ^a
		Abnormal	4	3.4	4	3.3	5	4.6	M vs. L	0.97 (0.24, 3.99)	0.968
		Normal	115	96.6	118	96.7	104	95.4	H vs. L	1.38 (0.36, 5.29)	0.638
	Enlisted Flyer	n	54		56		53				—
		Abnormal	1	1.8	2	3.6	0	0.0		—	—
		Normal	53	98.2	54	96.4	53	100.0		—	—
	Enlisted Groundcrew	n	148		150		130		Overall		0.167
		Abnormal	6	4.0	2	1.3	7	5.4	M vs. L	0.32 (0.06, 1.61)	0.168
		Normal	142	96.0	148	98.7	123	94.6	H vs. L	1.35 (0.44, 4.12)	0.603

TABLE M-8. (continued)
Unadjusted Exposure Index Analyses
for Central Cardiac Function Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
ECG (Overall)	Officer	n	119		122		109		Overall		0.347
		Abnormal	13	10.9	21	17.2	14	12.8	M vs. L	1.70 (0.81, 3.57)	0.165
		Normal	106	89.1	101	82.8	95	87.2	H vs. L	1.20 (0.54, 2.69)	0.653
	Enlisted Flyer	n	54		56		53		Overall		0.614
		Abnormal	9	16.7	13	23.2	9	17.0	M vs. L	1.51 (0.59, 3.90)	0.395
		Normal	45	83.3	43	76.8	44	83.0	H vs. L	1.02 (0.37, 2.82)	0.968
	Enlisted Groundcrew	n	148		151		130		Overall		0.266
		Abnormal	17	11.5	10	6.6	15	11.5	M vs. L	0.55 (0.24, 1.24)	0.147
		Normal	131	88.5	141	93.4	115	88.5	H vs. L	1.01 (0.48, 2.10)	0.992
Right Bundle Branch Block	Officer	n	119		122		109				—
		Abnormal	0	0.0	1	0.8	0	0.0		—	—
		Normal	119	100.0	121	99.2	109	100.0		—	—
	Enlisted Flyer	n	54		56		53				—
		Abnormal	1	1.8	0	0.0	0	0.0		—	—
		Normal	53	98.2	56	100.0	53	100.0		—	—
	Enlisted Groundcrew	n	148		151		130				—
		Abnormal	1	0.7	0	0.0	2	1.5		—	—
		Normal	147	99.3	151	100.0	128	98.5		—	—

TABLE M-8. (continued)

Unadjusted Exposure Index Analyses
for Central Cardiac Function Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value	
			Low		Medium		High					
			Number	Percent	Number	Percent	Number	Percent				
Left Bundle Branch Block	Officer	n	119		122		109				—	
		Abnormal	0	0.0	0	0.0	0	0.0			—	
		Normal	119	100.0	122	100.0	109	100.0			—	
	Enlisted Flyer	n	54		56		53				—	
		Abnormal	0	0.0	0	0.0	0	0.0			—	
		Normal	54	100.0	56	100.0	53	100.0			—	
	Enlisted Groundcrew	n	148		151		130				—	
		Abnormal	0	0.0	0	0.0	0	0.0			—	
		Normal	148	100.0	151	100.0	130	100.0			—	
	Nonspecific ST-T Wave Changes	Officer	n	119		122		109		Overall		0.340
			Abnormal	8	6.7	15	12.3	11	10.1	M vs. L	1.94 (0.79,4.77)	0.147
			Normal	111	93.3	107	87.7	98	89.9	H vs. L	1.56 (0.60,4.03)	0.363
Enlisted Flyer		n	54		56		53		Overall		0.171	
		Abnormal	4	7.4	11	19.6	7	13.2	M vs. L	3.06 (0.91,10.28)	0.072	
		Normal	50	92.6	45	80.4	46	86.8	H vs. L	1.90 (0.52,6.92)	0.327	
Enlisted Groundcrew		n	148		151		130		Overall		0.126	
		Abnormal	15	10.1	7	4.6	7	5.4	M vs. L	0.43 (0.17,1.09)	0.075	
		Normal	133	89.9	144	95.4	123	94.6	H vs. L	0.50 (0.20,1.28)	0.150	

TABLE M-8. (continued)
Unadjusted Exposure Index Analyses
for Central Cardiac Function Variables by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Bradycardia	Officer	n	119		122		109		Overall		0.975
		Abnormal	7	5.9	8	6.6	7	6.4	M vs. L	1.12 (0.39, 3.20)	0.826
		Normal	112	94.1	114	93.4	102	93.6	H vs. L	1.10 (0.37, 3.24)	0.865
	Enlisted Flyer	n	54		56		53		Overall		0.205
		Abnormal	1	1.8	5	8.9	2	3.8	M vs. L	5.20 (0.59, 46.04)	0.139
		Normal	53	98.2	51	91.1	51	96.2	H vs. L	2.08 (0.18, 23.63)	0.555
Enlisted Groundcrew	n	148		151		130		Overall		0.078	
	Abnormal	9	6.1	2	1.3	4	3.1	M vs. L	0.21 (0.04, 0.98)	0.047	
	Normal	139	93.9	149	98.7	126	96.9	H vs. L	0.49 (0.15, 1.63)	0.246	
Tachycardia	Officer	n	119		122		109				—
		Abnormal	0	0.0	0	0.0	0	0.0		—	—
		Normal	119	100.0	122	100.0	109	100.0		—	—
	Enlisted Flyer	n	54		56		53				—
		Abnormal	0	0.0	0	0.0	0	0.0		—	—
		Normal	54	100.0	56	100.0	53	100.0		—	—
	Enlisted Groundcrew	n	148		151		130				—
		Abnormal	0	0.0	0	0.0	0	0.0		—	—
		Normal	148	100.0	151	100.0	130	100.0		—	—

TABLE M-8. (continued)

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Other ECG Diagnoses	Officer	n	119		122		109		Overall		0.311
		Abnormal	14	11.8	21	17.2	12	11.0	M vs. L	1.56 (0.75, 3.23)	0.234
		Normal	105	88.2	101	82.8	97	89.0	H vs. L	0.93 (0.41, 2.10)	0.857
	Enlisted Flyer	n	54		56		53				0.265
		Abnormal	9	16.7	5	8.9	4	7.6	M vs. L	0.49 (0.15, 1.57)	0.230
		Normal	45	83.3	51	91.1	49	92.4	H vs. L	0.42 (0.12, 1.42)	0.159
	Enlisted Groundcrew	n	148		151		130				0.645
		Abnormal	13	8.8	9	6.0	10	7.7	M vs. L	0.66 (0.27, 1.59)	0.352
		Normal	135	91.2	142	94.0	120	92.3	H vs. L	0.87 (0.37, 2.04)	0.741
Arrhythmia	Officer	n	119		122		109		Overall		0.166 ^a
		Abnormal	6	5.0	3	2.5	1	0.9	M vs. L	0.47 (0.12, 1.94)	0.298
		Normal	113	95.0	119	97.5	108	99.1	H vs. L	0.17 (0.02, 1.47)	0.110
	Enlisted Flyer	n	54		56		53				—
		Abnormal	2	3.7	0	0.0	1	1.9		—	—
		Normal	52	96.3	56	100.0	52	98.1		—	—
	Enlisted Groundcrew	n	148		151		130		Overall		0.482
		Abnormal	7	4.7	4	2.6	7	5.4	M vs. L	0.55 (0.16, 1.91)	0.347
		Normal	141	95.3	147	97.4	123	94.6	H vs. L	1.15 (0.39, 3.36)	0.582

^aOverall analysis; sparse cells, chi-square test may not be valid.

— Analysis not performed due to sparse cells.

TABLE H-9.

Unadjusted Exposure Index Analyses
for Diastolic Blood Pressure, Fundoscopic Abnormalities,
Carotid Bruits, and Manual Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Diastolic Blood Pressure	Officer	n	119		122		109		Overall		0.585
		Abnormal	8	6.7	7	5.7	10	9.2	M vs. L	0.84 (0.30,2.41)	0.749
		Normal	111	93.3	115	94.3	99	90.8	H vs. L	1.40 (0.53,3.69)	0.497
	Enlisted Flyer	n	54		56		53		Overall		0.903
		Abnormal	5	9.3	5	8.9	6	11.3	M vs. L	0.96 (0.26,3.53)	0.952
		Normal	49	90.7	51	91.1	47	88.7	H vs. L	1.25 (0.36,4.38)	0.726
Enlisted Groundcrew	n	148		151		130		Overall		0.434	
	Abnormal	11	7.4	17	11.3	10	7.7	M vs. L	1.58 (0.71,3.50)	0.258	
	Normal	137	92.6	134	88.7	120	92.3	H vs. L	1.04 (0.43,2.53)	0.936	
Fundoscopic Examination	Officer	n	119		122		109		Overall		0.337 ^a
		Abnormal	2	1.7	0	0.0	2	1.8		—	—
		Normal	117	98.3	122	100.0	107	98.2		—	—
	Enlisted Flyer	n	54		56		53			—	—
		Abnormal	1	1.8	0	0.0	0	0.0		—	—
		Normal	53	98.2	56	100.0	53	100.0			
	Enlisted Groundcrew	n	148		150		130			—	—
		Abnormal	1	0.7	0	0.0	1	0.8		—	—
		Normal	147	99.3	150	100.0	129	99.2		—	—

TABLE M-9. (continued)

Unadjusted Exposure Index Analyses
for Diastolic Blood Pressure, Fundoscopic Abnormalities,
Carotid Bruits, and Manual Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Carotid Bruits	Officer	n	120		122		109		Overall	—	0.388 ^a
		Abnormal	3	1.7	1	0.8	0	0.0			
		Normal	117	98.3	121	99.2	109	100.0			
	Enlisted Flyer	n	54		56		53		—	—	—
		Abnormal	0	0.0	0	0.0	2	3.8			
		Normal	54	100.0	56	100.0	51	96.2			
	Enlisted Groundcrew	n	148		150		130		—	—	—
		Abnormal	0	0.0	0	0.0	2	1.5			
		Normal	148	100.0	150	100.0	128	98.5			
Radial Pulses	Officer	n	118		119		108		Overall	—	0.342 ^a
		Abnormal	2	1.7	0	0.0	2	1.8			
		Normal	116	98.3	119	100.0	106	98.2			
	Enlisted Flyer	n	54		55		53		—	—	—
		Abnormal	0	0.0	0	0.0	0	0.0			
		Normal	54	100.0	55	100.0	53	100.0			
	Enlisted Groundcrew	n	146		149		127		—	—	—
		Abnormal	0	0.0	0	0.0	0	0.0			
		Normal	146	100.0	149	100.0	127	100.0			

TABLE M-9. (continued)

Unadjusted Exposure Index Analyses
for Diastolic Blood Pressure, Fundoscopic Abnormalities,
Carotid Bruits, and Manual Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Femoral Pulses (Manual)	Officer	n	118		119		108		Overall		0.379 ^a
		Abnormal	1	0.8	1	0.8	3	2.8		—	—
	Enlisted Flyer	n	54		55		53		Overall		0.334
		Abnormal	1	1.8	2	3.6	4	7.6	H vs. L	2.00 (0.18, 22.7)	0.575
	Enlisted Groundcrew	n	146		149		127		Overall		0.088
		Abnormal	5	3.4	0	0.0	3	2.4	H vs. L	0.68 (0.16, 2.91)	0.603
Popliteal Pulses (Manual)	Officer	n	118		119		108				—
		Abnormal	0	0.0	1	0.8	1	0.9		—	—
	Enlisted Flyer	n	54		55		53		Overall		0.224 ^a
		Abnormal	2	3.7	0	0.0	3	5.7		—	—
	Enlisted Groundcrew	n	146		149		127		Overall		0.692 ^a
		Abnormal	4	2.7	2	1.3	3	2.4	H vs. L	0.48 (0.09, 2.68)	0.407
		Normal	142	97.3	147	98.7	124	97.6	H vs. L	0.86 (0.19, 3.92)	0.841

TABLE H-9. (continued)

Unadjusted Exposure Index Analyses
for Diastolic Blood Pressure, Auscultoscopic Abnormalities,
Carotid Bruits, and Manual Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Dorsalis Pedis Pulses (Manual)	Officer	n	118		119		108		Overall		0.418
		Abnormal	15	12.7	13	10.9	8	7.4	M vs. L	0.84 (0.38,1.86)	0.667
		Normal	103	87.3	106	89.1	100	92.6	H vs. L	0.55 (0.22,3.35)	0.194
	Enlisted Flyer	n	54		55		53		Overall		0.716
		Abnormal	6	11.1	9	16.4	8	15.1	M vs. L	1.57 (0.52,4.75)	0.430
		Normal	48	88.9	46	83.6	45	84.9	H vs. L	1.42 (0.46,4.42)	0.542
Enlisted Groundcrew	n	146		149		127		Overall		0.555	
	Abnormal	17	11.6	12	8.0	14	11.0	M vs. L	0.66 (0.31,1.45)	0.303	
	Normal	129	88.4	137	92.0	113	89.0	H vs. L	0.94 (0.44,1.99)	0.841	
Posterior Tibial Pulses (Manual)	Officer	n	118		119		108				—
		Abnormal	1	0.8	2	1.7	0	0.0			—
		Normal	117	99.2	117	98.3	108	100.0			—
	Enlisted Flyer	n	54		55		53		Overall		0.879 ^a
		Abnormal	3	5.6	3	5.4	4	7.6	M vs. L	0.98 (0.19,5.09)	0.984
		Normal	51	94.4	52	94.6	49	92.4	H vs. L	1.39 (0.30,6.52)	0.674
Enlisted Groundcrew	n	146		149		127		Overall		0.859	
	Abnormal	4	2.7	5	3.4	5	3.9	M vs. L	1.23 (0.32,4.68)	0.757	
	Normal	142	97.3	144	96.6	122	96.1	H vs. L	1.45 (0.38,5.54)	0.582	

TABLE M-9. (continued)

Unadjusted Exposure Index Analyses
for Diastolic Blood Pressure, Fundoscopic Abnormalities,
Carotid Bruits, and Manual Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
All Leg Pulses (Manual)	Officer	n	118		119		108		Overall		0.932
		Abnormal	15	12.7	14	11.8	12	11.1	M vs. L	0.92 (0.42, 1.99)	0.826
		Normal	103	87.3	105	88.2	96	89.0	H vs. L	0.86 (0.38, 1.93)	0.711
	Enlisted Flyer	n	54		55		53		Overall		0.848
		Abnormal	9	16.7	11	20.0	11	20.8	M vs. L	1.25 (0.47, 3.31)	0.653
		Normal	45	83.3	44	80.0	42	79.2	H vs. L	1.31 (0.49, 3.48)	0.589
	Enlisted Groundcrew	n	146		149		127		Overall		0.659
		Abnormal	23	15.8	18	12.1	18	14.2	M vs. L	0.73 (0.38, 1.43)	0.363
		Normal	123	84.2	131	87.9	109	85.8	H vs. L	0.88 (0.45, 1.72)	0.719
Peripheral Pulses (Manual)	Officer	n	118		119		108		Overall		0.904
		Abnormal	16	13.6	14	11.8	13	12.0	M vs. L	0.85 (0.39, 1.83)	0.697
		Normal	102	86.4	105	88.2	95	88.0	H vs. L	0.87 (0.40, 1.91)	0.734
	Enlisted Flyer	n	54		55		53		Overall		0.848
		Abnormal	9	16.7	11	20.0	11	20.8	M vs. L	1.25 (0.47, 3.31)	0.653
		Normal	45	83.3	44	80.0	42	79.2	H vs. L	1.31 (0.49, 3.48)	0.589
	Enlisted Groundcrew	n	146		149		127		Overall		0.659
		Abnormal	23	15.8	18	12.1	18	14.2	M vs. L	0.73 (0.38, 1.43)	0.363
		Normal	123	84.2	131	87.9	109	85.8	H vs. L	0.88 (0.45, 1.72)	0.719

TABLE M-9. (continued)

Unadjusted Exposure Index Analyses
for Diastolic Blood Pressure, Auscultoscopic Abnormalities,
Carotid Bruits, and Manual Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
All Pulses (Manual)	Officer	n	118		119		108				0.904
		Abnormal	16	13.6	14	11.8	13	12.0	M vs. L	0.85 (0.39,1.83)	0.697
		Normal	102	86.4	105	88.2	95	88.0	H vs. L	0.87 (0.40,1.91)	0.734
	Enlisted Flyer	n	54		55		53				0.848
		Abnormal	9	16.7	11	20.0	11	20.8	M vs. L	1.25 (0.47,3.31)	0.653
		Normal	45	83.3	44	80.0	42	79.2	H vs. L	1.31 (0.49,3.48)	0.589
Enlisted Groundcrew	n	146		149		127				0.659	
	Abnormal	23	15.8	18	12.1	18	14.2	M vs. L	0.73 (0.38,1.43)	0.363	
	Normal	123	84.2	131	87.9	109	85.8	H vs. L	0.88 (0.45,1.72)	0.719	

*Overall analysis; sparse cells, chi-square test may not be valid.

-- Analysis not performed due to sparse cells.

TABLE M-10.
Unadjusted Exposure Index Analyses for
Peripheral Vascular System Doppler Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast Risk (95% C.I.)	p-Value
			Low		Medium		High			
			Number	Percent	Number	Percent	Number	Percent		
Radial Pulses	Officer	n	119		122		109			
		Abnormal	1	0.8	0	0.0	0	0.0		
		Normal	118	99.2	122	100.0	109	100.0		
	Enlisted Flyer	n	54		56		53			
		Abnormal	0	0.0	0	0.0	0	0.0		
Femoral Pulses	Enlisted Groundcrew	Normal	54	100.0	56	100.0	53	100.0		
		n	148		151		130			
		Abnormal	1	0.7	0	0.0	1	0.8		
		Normal	147	99.3	151	100.0	129	99.2		
Femoral Pulses	Officer	n	119		122		109			
		Abnormal	1	0.8	0	0.0	0	0.0		
		Normal	118	99.2	122	100.0	109	100.0		
	Enlisted Flyer	n	54		56		53			
		Abnormal	0	0.0	1	1.8	1	1.9		
Femoral Pulses	Enlisted Groundcrew	Normal	54	100.0	55	98.2	52	98.1		
		n	148		151		130		Overall	0.304 ^a
		Abnormal	1	0.7	0	0.0	2	1.5		
		Normal	147	99.3	151	100.0	128	98.5		

TABLE M-10. (continued)

Unadjusted Exposure Index Analyses for
Peripheral Vascular System Doppler Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Popliteal Pulses	Officer	n	119		122		109				
		Abnormal	1	0.8	2	1.6	0	0.0			
		Normal	118	99.2	120	98.4	109	100.0			
	Enlisted Flyer	n	54		56		53				
		Abnormal	0	0.0	2	3.6	1	1.9			
Dorsalis Pedis Pulses		Normal	54	100.0	54	96.4	52	98.1			
	Enlisted Groundcrew	n	148		151		130		Overall		0.123 ^a
		Abnormal	1	0.7	0	0.0	3	2.3			
		Normal	147	99.3	151	100.0	127	97.7			
Officer	n	Abnormal	119		121		109		Overall		0.967
		Normal	33	27.7	35	28.9	30	27.5	M vs. L	1.06 (0.60,1.86)	0.841
		Abnormal	86	72.3	86	71.1	79	72.5	H vs. L	0.99 (0.55,1.77)	0.968
		Normal									
	Enlisted Flyer	n	54		56		52		Overall		0.848
		Abnormal	11	20.4	13	23.2	13	25.0	M vs. L	1.18 (0.48,2.93)	0.719
		Normal	43	79.6	43	76.8	39	75.0	H vs. L	1.30 (0.52,3.25)	0.569
	Enlisted Groundcrew	n	147		151		129		Overall		0.967
		Abnormal	32	21.8	32	21.2	29	22.5	M vs. L	0.97 (0.56,1.68)	0.904
		Normal	115	78.2	119	78.8	100	77.5	H vs. L	1.04 (0.59,1.84)	0.889

TABLE M-10. (continued)

Unadjusted Exposure Index Analyses for
Peripheral Vascular System Doppler Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Posterior Tibial Pulses	Officer	n	119		121		109		Overall		0.410
		Abnormal	2	1.7	5	4.1	2	1.8	M vs. L	2.52 (0.48,13.3)	0.276
		Normal	117	98.3	116	95.9	107	98.2	H vs. L	1.09 (0.15,7.90)	0.928
		n	54		56		52		Overall		0.248 ^a
	Enlisted Flyer	Abnormal	0	0.0	3	5.4	2	3.8		—	—
		Normal	54	100.0	53	94.6	50	96.2		—	—
Leg Pulses	Enlisted Groundcrew	n	147		151		130		Overall		0.193 ^a
		Abnormal	2	1.4	0	0.0	3	2.3		—	—
		Normal	145	98.6	151	100.0	127	97.7		—	—
		n	119		121		109		Overall		0.822
	Officer	Abnormal	33	27.7	38	31.4	32	29.4	M vs. L	1.19 (0.68,2.08)	0.535
		Normal	86	72.3	83	68.6	77	70.6	H vs. L	1.08 (0.61,1.93)	0.787
Leg Pulses	Enlisted Flyer	n	54		56		52		Overall		0.666
		Abnormal	11	20.4	15	26.8	14	26.9	M vs. L	1.43 (0.58,3.48)	0.430
		Normal	43	79.6	41	73.2	38	73.1	H vs. L	1.44 (0.58,3.55)	0.430
		n	147		151		129		Overall		0.955
	Enlisted Groundcrew	Abnormal	33	22.4	32	21.2	29	22.5	M vs. L	0.93 (0.54,1.61)	0.795
		Normal	114	77.8	119	78.8	100	77.5	H vs. L	1.00 (0.57,1.77)	1.000

TABLE M-10. (continued)
Unadjusted Exposure Index Analyses for
Peripheral Vascular System Doppler Pulse Readings by Occupation

Variable	Occupation	Statistic	Exposure Index						Contrast	Est. Relative Risk (95% C.I.)	p-Value
			Low		Medium		High				
			Number	Percent	Number	Percent	Number	Percent			
Peripheral Pulses	Officer	n	119		121		109		Overall		0.822
		Abnormal	33	27.7	38	31.4	32	29.4	M vs. L	1.19 (0.68,2.08)	0.535
		Normal	86	72.3	83	68.6	77	70.6	H vs. L	1.08 (0.61,1.93)	0.787
	Enlisted Flyer	n	54		56		52		Overall		0.666
		Abnormal	11	20.4	15	26.8	14	26.9	M vs. L	1.43 (0.58,3.48)	0.430
		Normal	43	79.6	41	73.2	38	73.1	H vs. L	1.44 (0.58,3.55)	0.430
Enlisted Groundcrew	n	147		151		129		Overall		0.894	
	Abnormal	34	23.1	32	21.2	30	23.3	M vs. L	0.89 (0.52,1.54)	0.689	
	Normal	113	76.9	119	78.8	99	76.7	H vs. L	1.01 (0.58,1.76)	0.984	
All Pulses	Officer	n	119		121		109		Overall		0.822
		Abnormal	33	27.7	38	31.4	32	29.4	M vs. L	1.19 (0.68,2.08)	0.535
		Normal	86	72.3	83	68.6	77	70.6	H vs. L	1.08 (0.61,1.93)	0.787
	Enlisted Flyer	n	54		56		52		Overall		0.666
		Abnormal	11	20.4	15	26.8	14	26.9	M vs. L	1.43 (0.58,3.48)	0.430
		Normal	43	79.6	41	73.2	38	73.1	H vs. L	1.44 (0.58,3.55)	0.430
Enlisted Groundcrew	n	147		151		129		Overall		0.894	
	Abnormal	34	23.1	32	21.2	30	23.3	M vs. L	0.89 (0.52,1.54)	0.689	
	Normal	113	76.9	119	78.8	99	76.7	H vs. L	1.01 (0.58,1.76)	0.984	

*Overall analysis; sparse cells, chi-square test may not be valid.

— Analysis not performed due to sparse cells.

TABLE M-11.

Association Between Central and Peripheral Abnormalities and
Verified Heart Disease in the Combined
Ranch Hand and Comparison Groups

Variable	Stratification	Total	Essential Hypertension		Heart Disease*		Myocardial Infarction
			Percent Abnormal	p-Value	Percent Abnormal	p-Value	
Systolic Pressure	≤140	2,002	17.5	<0.001	21.7	0.556	0.386
	>140	145	61.4		24.1	2.1	
Diastolic Pressure	≤90	1,966	14.8	<0.001	22.4	0.043	0.790
	>90	180	81.7		15.6	0.6	
ECG	Normal	1,858	18.8	<0.001	17.4	<0.001	<0.001
	Abnormal	290	30.7		50.3	5.9	
Heart Sounds	Normal	2,084	20.1	0.036	21.4	0.017	<0.001
	Abnormal	63	31.8		34.9	6.4	
Funduscopy Examination	Normal	2,134	20.2	0.008	21.6	0.014	0.999
	Abnormal	13	53.8		53.8	0.0	
Carotid Bruit	Normal	2,132	20.3	0.080	21.8	0.775	0.999
	Abnormal	14	42.9		28.6	0.0	
Peripheral Pulses (Manual)	Normal	1,806	20.0	0.547	21.5	0.725	0.391
	Abnormal	314	21.7		22.6	1.6	
Peripheral Pulses (Doppler)	Normal	1,611	20.6	0.754	20.4	0.007	0.306
	Abnormal	529	19.8		26.1	1.5	

*Excluding hypertension.

TABLE M-12.

Unadjusted Analyses for Reported and Verified Heart Disease by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Reported Essential Hypertension	n	942		888			
	Yes	247	26.2	231	26.0	1.01 (0.82, 1.24)	0.920
	No	695	73.8	657	74.0		
Verified Essential Hypertension	n	942		888			
	Yes	195	20.7	184	20.7	1.00 (0.80, 1.25)	0.992
	No	747	79.3	704	79.3		
Reported Heart Disease (Excluding Hypertension)	n	942		888			
	Yes	265	28.1	234	26.4	1.09 (0.89, 1.34)	0.390
	No	677	71.9	654	73.6		
Verified Heart Disease (Excluding Hypertension)	n	942		888			
	Yes	224	23.8	180	20.3	1.23 (0.98, 1.53)	0.070
	No	718	76.2	708	79.7		
Reported Myocardial Infarction	n	942		888			
	Yes	20	2.1	18	2.0	1.05 (0.55, 1.99)	0.889
	No	922	97.9	870	98.0		
Verified Myocardial Infarction	n	942		888			
	Yes	9	1.0	11	1.2	0.77 (0.32, 1.87)	0.562
	No	933	99.0	877	98.8		

TABLE M-13.

Adjusted Analyses for Reported and Verified Heart Disease
(Original Comparisons Only)

Variable	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
Reported Essential Hypertension	1.12 (0.90,1.40)	0.312	AGE (p<0.001), CSMOK (p<0.001), CHOL (p<0.001), %BFAT (p<0.001), ALC (p=0.003)
Verified Essential Hypertension	1.10 (0.86,1.39)	0.447	CSMOK (p=0.015), CHOL (p<0.001), %BFAT (p<0.001), PS (p=0.024), ALC (p=0.028)
Reported Heart Disease	1.14 (0.92,1.40)	0.230	AGE (p<0.001), RACE (p=0.046)
Verified Heart Disease	1.28 (1.02,1.60)	0.032	AGE (p<0.001)
Reported Myocardial Infarction	1.16 (0.58,2.32)	0.682	AGE (p<0.001), OCC (p=0.005), CHOL (p=0.040)
Verified Myocardial Infarction	0.90 (0.36,2.24)	0.810	AGE (p<0.001), CHOL (p=0.021)

*Abbreviations:

CSMOK: Current smoking
 CHOL: Cholesterol
 %BFAT: Percent body fat
 ALC: Current alcohol use (drinks/day)
 PS: Personality score
 OCC: Occupation

TABLE M-14.

Unadjusted Analyses for Central Cardiac Function by Group (Diabetics Excluded)
(Original Comparisons Only)

Variable	Statistic	Group		Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand	Original Comparison		
		Number	Percent	Number	Percent
Systolic Blood Pressure	n	942		888	
	Abnormal	60	6.4	67	7.6
	Normal	882	93.6	821	92.4
Heart Sounds	n	941		888	
	Abnormal	31	3.3	27	3.0
	Normal	910	96.7	861	97.0
ECG	n	942		888	
	Abnormal	121	12.8	125	14.1
(Overall)	Normal	821	87.2	763	85.9
ECG: RBBB	n	942		888	
	Abnormal	5	0.5	6	0.7
	Normal	937	99.5	882	99.3
ECG: LBBB	n	942		888	
	Abnormal	0	0.0	0	0.0
	Normal	942	100.0	888	100.0
ECG: Nonspecific T-Wave Changes	n	942		888	
	Abnormal	85	9.0	78	8.8
	Normal	857	91.0	810	91.2
				1.03 (0.75, 1.42)	0.857

TABLE M-14. (continued)

Unadjusted Analyses for Central Cardiac Function by Group (Diabetics Excluded)
(Original Comparisons Only)

Variable	Statistic	Group				Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
ECG: Bradycardia	n	942		888			
	Abnormal	45	4.8	38	4.3		
	Normal	897	95.2	850	95.7	1.12 (0.72, 1.75)	0.610
ECG: Tachycardia	n	942		888			
	Abnormal	0	0.0	0	0.0		
	Normal	942	100.0	888	100.0	--	--
ECG: Arrhythmia	n	942		888			
	Abnormal	31	3.3	32	3.6		
	Normal	911	96.7	856	96.4	0.91 (0.55, 1.50)	0.711
ECG: Other Diagnoses	n	942		888			
	Abnormal	97	10.3	92	10.4		
	Normal	845	89.7	796	89.6	0.99 (0.74, 1.34)	0.968

--No relative risk given, since no abnormalities are present.

TABLE M-15.

Adjusted Analyses for Central Cardiac Function (Diabetics Excluded)*
(Original Comparisons Only)

Variable	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks**
Systolic Blood Pressure (Discrete)	0.95 (0.65,1.38)	0.772	AGE (p<0.001) CHOL (p=0.001) %BFAT (p<0.001) PS (p=0.001)
Systolic Blood Pressure (Continuous)	-0.152 (-1.401,1.097)*	0.811*	AGE*OCC (p=0.018) CSMOK (p<0.001) CHOL (p<0.001) %BFAT (p<0.001) PS (p=0.001) ALC (p<0.001)
Heart Sounds	1.26 (0.73,2.17)	0.407	AGE (p<0.001) RACE (p=0.002) OCC (p=0.048) CHOL/HDL (p<0.001)
ECG (Overall)	****	****	AGE (p<0.001) RACE (p=0.023) %BFAT (p<0.001) GRP*PACKYR (p=0.034)
ECG: RBBB	0.85 (0.26,2.81)	0.787	AGE (p=0.015)
ECG: Nonspecific ST-T-Wave Changes	1.20 (0.85,1.69)	0.294	AGE (p<0.001) RACE (p=0.033) CHOL (p=0.009) %BFAT (p<0.001)
ECG: Bradycardia	1.16 (0.74,1.82)	0.509	OCC (p=0.019) CHOL/HDL (p<0.001)

TABLE M-15. (continued)

Adjusted Analyses for Central Cardiac Function (Diabetics Excluded)*
(Original Comparisons Only)

Variable	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks**
ECG: Arrhythmia	****	****	AGE (p<0.001) OCC (p<0.001) GRP*PACKYR (p=0.034) GRP*%BFAT (p=0.016)
ECG: Other Diagnoses	****	****	AGE (p<0.001) GRP*OCC (p=0.036)

*Some adjusted analyses did not explore effects of all covariates due to sparse number of abnormalities (see text).

**Additional Abbreviations:

CHOL/HDL: cholesterol to HDL ratio

GRP: group

PACKYR: pack-years of smoking

****Group-by-covariate interaction--relative risk/difference in group means, 95% confidence interval, and p-value not presented.

^aDifference in group means (Ranch Hand-Original Comparison) and associated p-value given, rather than relative risk, for continuous analysis of dependent variables.

TABLE M-16.

Summary of Group-by-Covariate Interactions
for Central Cardiac Function Variables (Diabetics Excluded)
(Original Comparisons Only)

Variable	Interaction	Stratification	Adj. Relative Risk (95% C.I.)	p-Value
ECG (Overall)	Group-by-Pack-Years Smoking	Pack-Years: 0	0.76 (0.53, 1.10)	0.142
		Pack-Years: 30	1.24 (0.87, 1.78)	0.234
ECG: Arrhythmia	Group-by-Pack-Years Smoking (21% Body Fat)	Pack-Years: 0	0.59 (0.30, 1.18)	0.134
		Pack-Years: 30	1.55 (0.72, 3.33)	0.263
	Group-by-Percent Body Fat (7 Pack-Years Smoking)	10% Body Fat	0.17 (0.05, 0.62)	0.007
		30% Body Fat	2.46 (0.76, 7.99)	0.136
ECG: Other Diagnoses	Group-by-Occupation	Officer	1.73 (1.06, 2.85)	0.030
		Enlisted Flyer	0.75 (0.38, 1.47)	0.401
		Enlisted Groundcrew	0.73 (0.44, 1.22)	0.234

TABLE M-17.

Unadjusted Analyses for Peripheral Vascular Function by Group
(Diabetics Excluded)
(Original Comparisons Only)

Variable	Statistic	Group		Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand	Original Comparison		
		Number	Percent	Number	Percent
Diastolic Blood Pressure	n	942		887	
	Abnormal	79	8.4	76	8.6
	Normal	863	91.6	811	91.4
Funduscopy Examination	n	941		888	
	Abnormal	7	0.7	6	0.7
	Normal	934	99.3	882	99.3
Carotid Bruits	n	941		887	
	Abnormal	7	0.7	6	0.7
	Normal	934	99.3	881	99.3
Radial Pulses (Manual)	n	929		876	
	Abnormal	4	0.4	7	0.8
	Normal	925	99.6	869	99.2
Radial Pulses (Doppler)	n	942		886	
	Abnormal	3	0.3	4	0.4
	Normal	939	99.7	882	99.6
Femoral Pulses (Manual)	n	929		876	
	Abnormal	20	2.2	21	2.4
	Normal	909	97.8	855	97.6

TABLE M-17. (continued)

Unadjusted Analyses for Peripheral Vascular Function by Group
(Diabetics Excluded)
(Original Comparisons Only)

Variable	Statistic	Group			Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison		
		Number	Percent	Number	Percent	
Femoral Pulses (Doppler)	n Abnormal Normal	942 6 936	0.6 99.4	887 3 884	0.3 99.7	1.89 (0.47, 7.57) 0.368
Popliteal Pulses (Manual)	n Abnormal Normal	929 16 913	1.7 98.3	876 21 855	2.4 97.6	0.71 (0.37, 1.38) 0.312
Popliteal Pulses (Doppler)	n Abnormal Normal	942 10 932	1.1 98.9	887 6 881	0.7 99.3	1.58 (0.57, 4.35) 0.379
Dorsalis Pedis Pulses (Manual)	n Abnormal Normal	929 102 827	11.0 89.0	876 95 781	10.8 89.2	1.01 (0.71, 1.45) 0.928
Dorsalis Pedis Pulses (Doppler)	n Abnormal Normal	938 228 710	24.3 75.7	885 203 682	22.9 77.1	1.08 (0.87, 1.34) 0.490
Posterior Tibial Pulses (Manual)	n Abnormal Normal	929 27 902	2.9 97.1	876 24 852	2.7 97.3	1.06 (0.61, 1.85) 0.834
Posterior Tibial Pulses (Doppler)	n Abnormal Normal	939 19 920	2.0 98.0	885 18 867	2.0 98.0	0.99 (0.52, 1.91) 0.984

TABLE M-17. (continued)

Unadjusted Analyses for Peripheral Vascular Function by Group
(Diabetics Excluded)
(Original Comparisons Only)

Variable	Statistic	Group		Est. Relative Risk (95% C I.)	p-Value
		Ranch Hand	Original Comparison		
		Number	Percent	Number	Percent
Leg Pulses (Manual)	n	929		876	
	Abnormal	131	14.1	134	15.3
	Normal	798	85.9	742	84.7
Leg Pulses (Doppler)	n	938		885	
	Abnormal	237	25.3	212	23.9
	Normal	701	74.7	673	76.1
Peripheral Pulses (Manual)	n	929		876	
	Abnormal	133	14.3	138	15.8
	Normal	796	85.7	738	84.2
Peripheral Pulses (Doppler)	n	938		885	
	Abnormal	239	25.5	214	24.2
	Normal	699	74.5	671	75.8
All Pulses (Manual)	n	929		876	
	Abnormal	133	14.3	138	15.8
	Normal	796	85.7	738	84.2
All Pulses (Doppler)	n	938		884	
	Abnormal	239	25.5	214	24.2
	Normal	699	74.5	670	75.8

TABLE M-18.

Adjusted Analyses for Peripheral Vascular Function
(Diabetics Excluded)*
(Original Comparisons Only)

Variable	Statistical/Clinical Analysis	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks**
Diastolic Blood Pressure	Discrete	1.04 (0.74,1.46)	0.818	CHOL (p<0.001) %BFAT (p<0.001)
	Continuous	0.250 (-0.530,1.030) ^a	0.537 ^a	AGE (p=0.016) CSMOK (p<0.001) CHOL (p<0.001) %BFAT (p<0.001) ALC (p=0.004)
Funduscopy Examination		1.31 (0.42,4.09)	0.646	AGE (p<0.001) RACE (p<0.001) CHOL/HDL (p=0.010) ALC (p=0.032)
Carotid Bruits		0.95 (0.30,2.97)	0.928	AGE (p=0.018) DRKCR (p<0.001)
Radial Pulses	Manual	0.57 (0.17,1.96)	0.373	AGE (p=0.047)
	Doppler	0.70 (0.16,3.16) ^b	0.646 ^b	—
Femoral Pulses	Manual	1.20 (0.60,2.36)	0.710	AGE (p<0.001) OCC (p=0.050) CHOL/HDL (p=0.043) %BFAT (p<0.001) DIFCORT (p=0.005)
	Doppler	1.87 (0.45,7.74)	0.384	AGE (p=0.001) CSMOK (p=0.001) CHOL/HDL (p=0.032)
Popliteal Pulses	Manual	****	****	AGE (p=0.002) RACE (p=0.002) PACKYR (p=0.006) CHOL/HDL (p=0.021) GRP*OCC (p=0.048)
	Doppler	1.66 (0.59,4.72)	0.337	AGE (p<0.001) RACE (p=0.015) CSMOK (p<0.001)
Dorsalis Pedis Pulses	Manual	1.06 (0.78,1.44)	0.704	AGE (p=0.004)
	Doppler	1.07 (0.86,1.33)	0.569	AGE (p=0.036) RACE (p=0.007) %BFAT (p=0.010)

TABLE M-18. (continued)

Adjusted Analyses for Peripheral Vascular Function
(Diabetics Excluded)*
(Original Comparisons Only)

Variable	Statistical/Clinical Analysis	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks**
Posterior Tibial Pulses	Manual	****	****	AGE (p=0.003) RACE (p<0.001) PACKYR (p=0.011) GRP*OOC (p=0.026)
	Doppler	1.07 (0.54,2.13)	0.849	AGE (p<0.001) RACE (p<0.001) CSMOK (p=0.010) CHOL/HDL (p=0.002)
Leg Pulses	Manual	****	****	AGE (p=0.001) GRP*OOC (p=0.038) GRP*%BFAT (p=0.010)
	Doppler	1.07 (0.86,1.33)	0.516	AGE (p=0.016) RACE (p=0.024) %BFAT (p=0.034)
Peripheral Pulses	Manual	****	****	AGE (p<0.001) GRP*%BFAT (p=0.036)
	Doppler	1.06 (0.86,1.32)	0.575	AGE (p=0.028) RACE (p=0.042) %BFAT (p=0.033)
All Pulses	Manual	****	****	AGE (p<0.001) GRP*%BFAT (p=0.036)
	Doppler	1.06 (0.86,1.32)	0.582	AGE (p=0.027) RACE (p=0.042) %BFAT (p=0.038)

*Some adjusted analyses did not explore effects of all covariates due to sparse number of abnormalities (see text).

**Additional Abbreviations:

DRKYR: Drink-years of alcohol
DIFCORT: Differential cortisol

^aDifference in group means (Ranch Hand - Original Comparison) and associated p-value given, rather than relative risk, continuous analysis of dependent variables.

^bUnadjusted for any covariates—same as for unadjusted results.

—No covariates significant.

****Group-by-covariate interaction—relative risk, 95% confidence interval, and p-value not presented.

TABLE M-19.

Summary of Group-by-Covariate Interactions
for Peripheral Vascular Function Variables (Diabetics Excluded)
(Original Comparisons Only)

Variable	Interaction	Stratification	Adj. Relative Risk (95% C.I.)	p Value
Popliteal Pulses (Manual)	Group-by-Occupation	Officer	0.21 (0.02, 2.54)	0.219
		Enlisted Flyer	4.68 (0.53, 41.1)	0.165
		Enlisted Groundcrew	0.99 (0.38, 2.55)	0.976
Posterior Tibial Pulses (Manual)	Group-by-Occupation	Officer	0.31 (0.05, 1.82)	0.197
		Enlisted Flyer	3.68 (0.96, 14.1)	0.057
		Enlisted Groundcrew	1.27 (0.56, 2.87)	0.575
Leg Pulses (Manual)	Group-by-Occupation (21% Body Fat)	Officer	0.65 (0.41, 1.01)	0.054
		Enlisted Flyer	1.52 (0.83, 2.77)	0.174
		Enlisted Groundcrew	1.23 (0.81, 1.87)	0.327
Peripheral Pulses (Manual)	Group-by-Percent Body Fat	10% Body Fat	1.87 (0.94, 3.72)	0.073
		30% Body Fat	0.58 (0.34, 0.98)	0.042
All Pulses (Manual)	Group-by-Percent Body Fat	10% Body Fat	1.87 (0.94, 3.72)	0.073
		30% Body Fat	0.58 (0.34, 0.98)	0.042

TABLE M-20.

Longitudinal Analysis of Pulse Index and Overall ECG:
A Contrast of Baseline and First Followup Examination Abnormalities
(Original Comparisons Only)

Variable	Group	1982	1985		Odds* Ratio (OR)	p-Value (OR _{RH} vs OR _{OC})
		Baseline Exam	Followup Exam			
			<u>Abnormal</u>	<u>Normal</u>		
All Pulses (Manual)	Ranch Hand	Abnormal	50	72	1.44	0.05
		Normal	104	743		
	Original Comparison	Abnormal	35	51	2.25	
		Normal	115	668		
ECG (Overall)	Ranch Hand	Abnormal	86	192	0.22	0.23
		Normal	43	650		
	Original Comparison	Abnormal	83	147	0.30	
		Normal	44	598		

*Odds Ratio:
$$\frac{\text{Number Normal Baseline, Abnormal Followup}}{\text{Number Abnormal Baseline, Normal Followup}}$$

APPENDIX N
Hematological Evaluation

APPENDIX N: Hematological Evaluation

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TABLE N-1.

Summary Statistics for Hematological Covariates by Group

Covariate	Covariate Category	Group		p-Value
		Ranch Hand Percent	Comparison Percent	
Race	Black	5.9	6.4	0.679
	Nonblack	94.1	93.6	
Occupation	Officer	37.4	37.5	0.724
	Enlisted Flyer	17.5	16.2	
	Enlisted Groundcrew	45.2	46.3	
		<u>Mean±SE</u>	<u>Mean±SE</u>	
Age (At Baseline)	--	43.94±0.24	43.86±0.22	0.804
Current Smoking ^a	--	10.75±0.48	9.13±0.40	0.010
Smoking History (Pack-Years)	--	13.24±0.52	12.98±0.47	0.708

^aEquivalent cigarettes per day.

--Covariate not categorized for these results.

TABLE N 2.

Summary of Group by Covariate
Interactions for Hematological Variables

Variable	Interaction Covariates	Stratification	Ranch Hand-Comparison Group Difference $\pm$ SE	p Value	Direction of Result*
RBC	Occupation	Officer			
		Non-smoker	-0.009 $\pm$ 0.030	0.775	
	Smoking History	30 Pack-Years	-0.014 $\pm$ 0.035	0.686	
		Enlisted Flyer			
		Non-smoker	-0.066 $\pm$ 0.053	0.212	
		30 Pack-Years	-0.001 $\pm$ 0.046	0.975	
		Enlisted Groundcrew			
		Non-smoker	-0.010 $\pm$ 0.029	0.736	
		30 Pack-Years	-0.093 $\pm$ 0.036	0.010	C>RH
WBC*	Race	Nonblack			
		Non-smoker			
	Smoking History	35	-0.010 $\pm$ 0.020	0.609	
		53	0.002 $\pm$ 0.021	0.942	
	Occupation	30 Pack-Years			
		35	0.115 $\pm$ 0.031	<0.001	RH>C
	Age (At Baseline)	53	-0.017 $\pm$ 0.019	0.369	
		Black			
	Officer	35	-0.550 $\pm$ 0.184	0.003	C>RH
		53	-0.143 $\pm$ 0.186	0.446	
	Enlisted Flyer	35	-0.341 $\pm$ 0.172	0.050	C>RH
		53	0.067 $\pm$ 0.134	0.618	
	Enlisted Groundcrew	35	-0.121 $\pm$ 0.074	0.104	
		53	0.286 $\pm$ 0.149	0.057	RH>C

TABLE N-2. (continued)
Summary of Group-by-Covariate
Interactions for Hematological Variables

Variable	Interaction Covariates	Stratification	Ranch Hand-Comparison Group Difference $\pm$ SE	p-Value	Direction of Result*
PLT ^a	Race	Nonblack			
		Nonsmoker			
	Smoking	30 Pack-Years,	0.003 $\pm$ 0.012	0.789	
	(Smoking History	Currently 1 Pack/Day	0.103 $\pm$ 0.042	0.014	RH>C
	and Current Smoking)				
		Black			
		Nonsmoker	-0.050 $\pm$ 0.050	0.317	
		30 Pack-Years,			
		Currently 1 Pack/Day	0.258 $\pm$ 0.096	0.007	RH>C

*RH>C: Variable mean in Ranch Hand group greater than variable mean in Comparison group.
C>RH: Variable mean in Comparison group greater than variable mean in Ranch Hand group.

^aUnits are on log scale.

TABLE N-3.

Interaction Summaries for Adjusted Continuous Exposure
Index Analyses for Hematological Variables

Variable	Interaction (Occupation)	Stratification	Contrast	Exposure Index Level Difference $\pm$ SE	p-Value	Direction of Result*
RBC	Exposure Index- by-Race (Officer)	Nonblack	M vs. L	0.014 $\pm$ 0.295	0.962	
			H vs. L	-0.180 $\pm$ 0.372	0.630	
		Black	M vs. L	-0.047 $\pm$ 0.402	0.908	
			H vs. L	0.516 $\pm$ 0.502	0.304	
RBC	Exposure Index- by-Age (At Baseline) (Enlisted Flyer)	35	M vs. L	-0.119 $\pm$ 0.128	0.356	
			H vs. L	0.261 $\pm$ 0.151	0.086	H > L
		53	M vs. L	0.033 $\pm$ 0.102	0.748	
			H vs. L	-0.172 $\pm$ 0.102	0.093	L > H
HGB	Exposure Index- by-Race (Officer)	Nonblack	M vs. L	-0.007 $\pm$ 0.122	0.955	
			H vs. L	0.060 $\pm$ 0.123	0.626	
		Black	M vs. L	0.089 $\pm$ 0.874	0.919	
			H vs. L	2.227 $\pm$ 0.960	0.021	H > L
HGB	Exposure Index- by-Age (At Baseline) (Enlisted Flyer)	35	M vs. L	-0.854 $\pm$ 0.389	0.029	
			H vs. L	0.626 $\pm$ 0.457	0.172	L > M
		53	M vs. L	0.425 $\pm$ 0.308	0.169	
			H vs. L	-0.339 $\pm$ 0.308	0.272	
HCT	Exposure Index- by-Race (Officer)	Nonblack	M vs. L	-0.093 $\pm$ 0.359	0.795	
			H vs. L	0.206 $\pm$ 0.362	0.569	
		Black	M vs. L	-0.849 $\pm$ 2.569	0.741	
			H vs. L	5.611 $\pm$ 2.823	0.048	H > L

TABLE N-3. (continued)
Interaction Summaries for Adjusted Continuous Exposure
Index Analyses for Hematological Variables

Variable	Interaction (Occupation)	Stratification	Contrast	Exposure Index Level Difference $\pm$ SE	p-Value	Direction of Result*
HCT	Exposure Index by-Age (At Baseline) (Enlisted Flyer)	35	M vs. L	-2.332 $\pm$ 1.141	0.042	L > M
			H vs. L	1.921 $\pm$ 1.341	0.154	
		53	M vs. L	1.074 $\pm$ 0.904	0.236	L > M
			H vs. L	-0.887 $\pm$ 0.904	0.328	
PLT*	Exposure Index - by-Current Smoking (Packs per Day) (Enlisted Flyer)	0	M vs. L	0.097 $\pm$ 0.054	0.075	M > L
			H vs. L	-0.005 $\pm$ 0.053	0.932	
		1	M vs. L	-0.015 $\pm$ 0.042	0.710	L > M
			H vs. L	-0.062 $\pm$ 0.045	0.169	
		2	M vs. L	-0.128 $\pm$ 0.068	0.064	L > M
			H vs. L	-0.118 $\pm$ 0.078	0.132	
PLT*	Exposure Index - by-Race (Enlisted Groundcrew)	Nonblack	M vs. L	-0.015 $\pm$ 0.025	0.557	M > L
			H vs. L	-0.004 $\pm$ 0.026	0.885	
		Black	M vs. L	0.156 $\pm$ 0.079	0.049	M > L
			H vs. L	-0.036 $\pm$ 0.081	0.659	

*H > L: Variable mean in high exposure index category greater than variable mean in low exposure index category.
L > H: Variable mean in low exposure index category greater than variable mean in high exposure index category.
L > M: Variable mean in low exposure index category greater than variable mean in medium exposure index category.
M > L: Variable mean in medium exposure index category greater than variable mean in low exposure index category.
*Units are in log scale.

TABLE N-4.

Unadjusted Categorical Analyses for
Hematological Variables by Group
(Original Comparisons Only)

Variable	Group	<u>Abnormally Low</u>		<u>Normal</u>		<u>Abnormally High</u>		Total	p-Value ^a
		Number	Percent	Number	Percent	Number	Percent		
RBC	Ranch Hand	30	3.0	976	96.2	8	0.8	1,014	0.598
	Original Comparison	36	3.8	910	95.4	8	0.8	954	
WBC	Ranch Hand	45	4.4	906	89.4	62	6.1	1,013	0.631
	Original Comparison	47	4.9	857	89.8	50	5.2	954	
HGB	Ranch Hand	39	3.8	752	74.2	223	22.0	1,014	0.867
	Original Comparison	34	3.6	717	75.2	203	21.3	954	
HCT	Ranch Hand	11	1.1	1,001	98.7	2	0.2	1,014	0.722
	Original Comparison	13	1.4	938	98.3	3	0.3	954	
MCV	Ranch Hand	10	1.0	857	84.5	147	14.5	1,014	0.904
	Original Comparison	11	1.2	809	84.8	134	14.0	954	
MCH	Ranch Hand	7	0.7	943	93.0	64	6.3	1,014	0.947
	Original Comparison	7	0.7	890	93.3	57	6.0	954	
MCHC	Ranch Hand	1	0.1	1,013	99.9	0	0.0	1,014	—
	Original Comparison	0	0.0	954	100.0	0	0.0	954	
PLT	Ranch Hand	5	0.5	987	97.4	21	2.1	1,013	0.760
	Original Comparison	2	0.2	935	98.0	17	1.8	954	

^aChi-square test, 2 d.f., except for HCT and PLT, which were obtained from continuity adjusted chi-square tests on 1 d.f. (Abnormally high category pooled with normal, and abnormally low category pooled with normal for HCT and PLT, respectively.)

—Only one abnormal MCHC value; p-value not given.

TABLE N-5.

Unadjusted Continuous Analyses for
Hematological Variables (Contrast of Group Means)
(Original Comparisons Only)

Variable	Group Mean $\pm$ SE		Difference $\pm$ SE	t-Statistic	p-Value
	Ranch Hand	Original Comparison			
RBC	4.964 $\pm$ 0.012	4.974 $\pm$ 0.012	-0.010 $\pm$ 0.017	-0.61	0.540
WBC ¹	7.003	6.844	--	1.78	0.076
HGB	15.624 $\pm$ 0.033	15.600 $\pm$ 0.034	0.024 $\pm$ 0.047	0.50	0.619
HCT	45.904 $\pm$ 0.097	45.874 $\pm$ 0.097	0.030 $\pm$ 0.137	0.22	0.827
MCV	92.596 $\pm$ 0.150	92.355 $\pm$ 0.157	0.241 $\pm$ 0.217	1.11	0.268
MCH	31.544 $\pm$ 0.055	31.435 $\pm$ 0.058	0.108 $\pm$ 0.080	1.35	0.177
MCHC	34.040 $\pm$ 0.021	34.009 $\pm$ 0.613	0.030 $\pm$ 0.029	1.06	0.291
PLT ¹	265.2	261.7	--	1.39	0.165

¹Means transformed from log scale.

--Difference and standard errors (SE) not presented, since variables were analyzed on logarithmic scale.

TABLE N-6.

Adjusted Categorical Analyses for Hematological Variables
(Abnormal Versus Normal, Adjusted for Age, Race, Occupation, and Smoking)
(Original Comparisons Only)

Variable	<u>Abnormally Low vs. Normal</u>		<u>Abnormally High vs. Normal</u>	
	Adj. Relative Risk (95% C.I.)	p-Value	Adj. Relative Risk (95% C.I.)	p-Value
RBC	0.81 (0.51,1.30)	0.380	0.95 (0.41,2.17)	0.898
WBC	0.95 (0.63,1.43)	0.730	1.16 (0.80,1.70)	0.431
HGB	1.10 (0.70,1.72)	0.692	1.05 (0.85,1.30)	0.662
HCT	0.84 (0.41,1.71) ^a	0.628 ^a	Sparse Data	
MCV				
Nonblack	1.92 (0.64,5.76)	0.242	1.09 (0.84,1.42)	0.503
Black	0.32 (0.09,1.11)	0.072	0.41 (0.12,1.34)	0.139
MCH	0.96 (0.40,2.30)	0.920	1.06 (0.74,1.52)	0.734
PLT	Sparse Data		1.13 (0.63,2.05) ^b	0.682 ^b

^aAbnormally low versus normal/abnormally high.

^bAbnormally high versus normal/abnormally low.

TABLE N-7.

Adjusted Continuous Analyses for Hematological Variables
(Ranch Hand-Original Comparison Group Differences)
(Original Comparisons Only)

Variable	Ranch Hand-Original Comparison Group Difference ±SE	p-Value	Covariate Remarks*
RBC	-0.018 ± 0.017	0.278	AGE (p<0.001) CSMOK (p=0.001) OCC*PACKYR (p=0.043)
WBC	****	****	GRP*RACE*OCC (p<0.001) GRP*AGE*RACE (p=0.013) GRP*AGE*PACKYR (p=0.013) GRP*RACE*PACKYR (p=0.022) PACKYR*CSMOK (p<0.001)
HGB	****	****	GRP*RACE*AGE (p=0.030) GRP*RACE*OCC (p=0.020) OCC*PACKYR (p=0.023) CSMOK (p<0.001)
HCT	****	****	GRP*RACE*AGE (p=0.026) GRP*RACE*OCC (p=0.011) AGE*OCC (p=0.009) CSMOK (p<0.001)
MCV	****	****	GRP*AGE*PACKYR (p=0.041) GRP*AGE*CSMOK (p=0.012) RACE*OCC (p=0.021) AGE*RACE (p<0.001)
MCH	****	****	GRP*AGE*CSMOK (p=0.026) AGE*RACE (p=0.001) OCC (p=0.001)
MCHC	0.030 ± 0.028	0.296	RACE (p<0.001)
PLT	****	****	GRP*RACE*PACKYR (p=0.011) GRP*AGE (p=0.040) OCC (p=0.005)

*CSMOK: current level of smoking (cigarettes per day)

PACKYR: smoking history (pack years)

OCC: occupation

GRP: group

****Group-by-covariate interaction--group difference, standard error (SE), and p-value not presented.

TABLE N-8.

Summary of Group-by-Covariate
Interactions for Hematological Variables
(Original Comparisons Only)

Variable	Interaction Covariates	Stratification	Ranch Hand-Original Comparison Group Difference $\pm$ SE	p-Value	Direction of Result*
WBC ^a	Race	Nonblack Nonsmoker			
		35			
	Smoking History	53	-0.014 $\pm$ 0.021	0.511	
			0.014 $\pm$ 0.022	0.508	
	Age (At Baseline)				
		30 Pack-Years			
		35	0.107 $\pm$ 0.033	0.001	RH>OC
		53	-0.011 $\pm$ 0.019	0.551	
		Black (No significant interactions)	-0.053 $\pm$ 0.058	0.364	

TABLE N-8. (continued)

Summary of Group-by-Covariate
Interactions for Hematological Variables
(Original Comparisons Only)

Variable	Interaction Covariates	Stratification	Ranch Hand-Original Comparison Group Difference $\pm$ SE	p-Value	Direction of Result*
HGB	Race	Nonblack <u>Officer</u>			
	Occupation	35	0.151 $\pm$ 0.113	0.181	
		53	-0.035 $\pm$ 0.082	0.667	
	Age (At Baseline)	Enlisted Flyer			
		35	0.087 $\pm$ 0.132	0.509	
		53	-0.100 $\pm$ 0.121	0.410	
		Enlisted Groundcrew			
		35	0.026 $\pm$ 0.080	0.744	
		53	-0.161 $\pm$ 0.107	0.134	
		Black			
		<u>Officer</u>			
		35	-1.034 $\pm$ 0.627	0.099	OC>RH
		53	0.209 $\pm$ 0.629	0.740	
		Enlisted Flyer			
		35	-1.398 $\pm$ 0.613	0.023	OC>RH
		53	-0.155 $\pm$ 0.481	0.747	
		Enlisted Groundcrew			
		35	-0.014 $\pm$ 0.283	0.962	
		53	1.230 $\pm$ 0.526	0.020	RH>OC

TABLE N-8. (continued)

Summary of Group-by-Covariate
Interactions for Hematological Variables
(Original Comparisons Only)

Variable	Interaction Covariates	Stratification	Ranch Hand-Original Comparison Group Difference $\pm$ SE	p-Value	Direction of Result*
HCT	Race	Nonblack <u>Officer</u>			
		35	0.506 $\pm$ 0.325	0.120	
	Occupation	53	-0.174 $\pm$ 0.237	0.462	
	Age (At Baseline)				
		<u>Enlisted Flyer</u>			
		35	0.390 $\pm$ 0.377	0.301	
		53	-0.291 $\pm$ 0.347	0.403	
		<u>Enlisted Groundcrew</u>			
		35	0.063 $\pm$ 0.230	0.783	
		53	-0.617 $\pm$ 0.307	0.045	OC>RH
		<u>Black</u>			
		<u>Officer</u>			
		35	-2.662 $\pm$ 1.801	0.140	
		53	0.825 $\pm$ 1.805	0.648	
		<u>Enlisted Flyer</u>			
		35	-4.365 $\pm$ 1.753	0.013	
		53	-0.878 $\pm$ 1.378	0.524	OC>RH
		<u>Enlisted Groundcrew</u>			
		35	-0.050 $\pm$ 0.806	0.950	
		53	3.436 $\pm$ 1.497	0.022	RH>OC

TABLE N-8. (continued)

Summary of Group-by-Covariate
Interactions for Hematological Variables
(Original Comparisons Only)

Variable	Interaction Covariates	Stratification	Ranch Hand-Original Comparison Group Difference $\pm$ SE	p-Value	Direction of Result*
MCV	Smoking (Smoking History and Current Smoking)	Nonsmoker			
		35	0.692 $\pm$ 0.418	0.098	RH>OC
		53	-0.136 $\pm$ 0.417	0.743	
	Age (At Baseline)	30 Pack-Years, Currently 1 Pack/Day			
		35	0.057 $\pm$ 0.635	0.928	
		53	-0.582 $\pm$ 0.412	0.158	
MCH	Current Smoking	Nonsmoker			
		35	0.126 $\pm$ 0.141	0.373	
		53	0.158 $\pm$ 0.132	0.232	
	Age (At Baseline)	1 Pack/Day			
		35	0.254 $\pm$ 0.144	0.079	RH>OC OC>RH
		53	-0.275 $\pm$ 0.149	0.066	
		2 Pack/Day			
		35	0.381 $\pm$ 0.273	0.162	OC>RH
		53	-0.707 $\pm$ 0.281	0.012	

TABLE N-8. (continued)

Summary of Group-by-Covariate
Interactions for Hematological Variables
(Original Comparisons Only)

Variable	Interaction Covariates	Stratification	Ranch Hand-Original Comparison Group Difference $\pm$ SE	p-Value	Direction of Result*
PLT ^a	Race	Nonblack <u>Nonsmoker</u>			
	Smoking History	35	0.030 $\pm$ 0.016	0.061	RH>OC
		53	-0.017 $\pm$ 0.018	0.354	
	Age (At Baseline)	30 Pack-Years <u>35</u>	0.050 $\pm$ 0.020	0.012	RH>OC
		53	0.003 $\pm$ 0.016	0.858	
	Race	Black <u>Nonsmoker</u>			
		35	-0.082 $\pm$ 0.051	0.111	
		53	-0.129 $\pm$ 0.054	0.016	OC>RH
	30 Pack-Years	35 <u>53</u>	0.261 $\pm$ 0.103	0.011	RH>OC
			0.214 $\pm$ 0.102	0.036	RH>OC

*RH>OC: Variable mean in Ranch Hand group greater than variable mean in Original Comparison group.

OC>RH: Variable mean in Original Comparison group greater than variable mean in Ranch Hand group.

^aUnits are on log scale.

TABLE N-9.

Longitudinal Analyses for
MCV, MCH, and PLT: A Contrast of
Baseline and First Followup Examination Test Means
(Original Comparisons Only)

Variable	Group	Total	Means		Difference (Followup-Baseline)	Error*	p-Value (Equality of Difference)
			Baseline	Followup			
MCV	Ranch Hand	971	88.89	92.60	+3.71	2.808	0.65
	Original Comparison	872	88.56	92.35	+3.79		
MCH	Ranch Hand	971	30.81	31.55	+0.74	0.873	0.21
	Original Comparison	872	30.63	31.44	+0.81		
PLT	Ranch Hand	971	276.90	271.50	-5.4	35.50	0.80
	Original Comparison	872	272.10	267.30	-4.8		

*Error = $\sqrt{\text{Subj} * \text{Time/Group mean squares.}}$

APPENDIX 0

Renal Assessment

TABLE 0-1.

Unadjusted Exposure Index Analyses for Renal Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p Value
			Low	Medium	High			
Kidney Disease	Officer	n	127	130	123	Overall		0.226
		Number/% Abnormal	10 7.9%	11 8.5%	17 13.8%	H vs. L	1.08 (0.44, 2.64)	0.999
		Normal	117 92.1%	119 91.5%	106 86.2%	H vs. L	1.88 (0.82, 4.28)	0.155
	Enlisted Flyer	n	55	65	57	Overall		0.165
		Number/% Abnormal	7 12.7%	8 12.3%	2 3.5%	H vs. L	0.96 (0.33, 2.85)	0.999
		Normal	48 87.3%	57 87.7%	55 96.5%	H vs. L	0.25 (0.05, 1.26)	0.091
Urinary Protein	Enlisted Groundcrew	n	153	163	141	Overall		0.214
		Number/% Abnormal	18 11.8%	11 6.7%	10 7.1%	H vs. L	0.54 (0.25, 1.19)	0.172
		Normal	135 88.2%	152 93.3%	131 92.9%	H vs. L	0.57 (0.26, 1.29)	0.233
	Officer	n	127	130	123	Overall		0.696
		Number/% Abnormal	4 3.1%	2 1.5%	3 2.4%	H vs. L	0.48 (0.09, 2.67)	0.443
		Normal	123 96.9%	128 98.5%	120 97.6%	H vs. L	0.77 (0.17, 3.51)	0.999
Urinary Protein	Enlisted Flyer	n	55	65	57	Overall		0.708
		Number/% Abnormal	2 3.6%	1 1.5%	1 1.8%	H vs. L	0.41 (0.04, 4.69)	0.593
		Normal	53 96.4%	64 98.5%	56 98.2%	H vs. L	0.47 (0.04, 5.37)	0.615
	Enlisted Groundcrew	n	154	163	142	Overall		0.726
		Number/% Abnormal	8 5.2%	7 4.3%	9 6.3%	H vs. L	0.82 (0.29, 2.32)	0.794
		Normal	146 94.8%	156 95.7%	133 93.7%	H vs. L	1.24 (0.46, 3.29)	0.804

TABLE 0-1. (continued)

Unadjusted Exposure Index Analyses for Renal Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p Value
			Low	Medium	High			
Urinary Occult Blood	Officer	n	127	130	123	Overall		0.334
		Number/% Abnormal	17 13.4%	15 11.5%	22 17.9%	M vs. L	0.84 (0.40, 1.77)	0.708
	Enlisted Flyer	n	110	115	101	H vs. L	1.41 (0.71, 2.81)	0.385
		Number/% Abnormal	86.6%	88.5%	82.1%			
	Enlisted Groundcrew	n	55	65	57	Overall		0.325
		Number/% Abnormal	12 21.8%	14 21.5%	7 12.3%	M vs. L	0.98 (0.41, 2.35)	0.999
Urinary White Blood Cell Count	Officer	n	43	51	50	H vs. L	0.50 (0.18, 1.39)	0.214
		Number/% Abnormal	78.2%	78.5%	87.7%			
	Enlisted Flyer	n	154	163	141	Overall		0.144
		Number/% Abnormal	25 16.2%	34 20.9%	36 25.5%	M vs. L	1.36 (0.77, 2.41)	0.315
	Enlisted Groundcrew	n	129	129	105	H vs. L	1.77 (1.00, 3.13)	0.061
		Number/% Abnormal	83.8%	79.1%	74.5%			
Urinary White Blood Cell Count	Officer	n	127	130	123	Overall		0.558
		Number/% Abnormal	11 8.7%	7 5.4%	10 8.1%	M vs. L	0.60 (0.23, 1.60)	0.337
	Enlisted Flyer	n	116	123	113	H vs. L	0.93 (0.38, 2.28)	0.999
		Number/% Abnormal	91.3%	94.6%	91.9%			
	Enlisted Groundcrew	n	55	65	57	Overall		0.763
		Number/% Abnormal	7 12.7%	8 12.3%	5 8.8%	M vs. L	0.96 (0.33, 2.85)	0.999
Urinary White Blood Cell Count	Officer	n	48	57	52	H vs. L	0.66 (0.20, 2.22)	0.554
		Number/% Abnormal	87.3%	87.7%	91.2%			
	Enlisted Flyer	n	154	163	142	Overall		0.447
		Number/% Abnormal	20 13.0%	15 9.2%	19 13.4%	M vs. L	0.68 (0.33, 1.38)	0.290
	Enlisted Groundcrew	n	134	148	123	H vs. L	1.04 (0.53, 2.03)	0.999
		Number/% Abnormal	87.0%	90.8%	86.6%			

TABLE 0-1. (continued)
Unadjusted Exposure Index Analyses for Renal Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	Est. Relative Risk (95% C.I.)	p Value
			Low	Medium	High			
Blood Urea Nitrogen	Officer	n	127	130	123	Overall		0.891
		Mean*	14.62	14.82	14.74	H vs. L		0.633
		95% C.I.*	(14.05, 15.19)	(14.20, 15.46)	(14.14, 15.35)	H vs. L		0.775
Blood Urea Nitrogen	Enlisted Flyer	n	55	65	57	Overall		0.983
		Mean*	13.84	13.80	13.93	H vs. L		0.963
		95% C.I.*	(12.79, 14.93)	(12.87, 14.77)	(13.15, 14.72)	H vs. L		0.895
Blood Urea Nitrogen	Enlisted Groundcrew	n	154	163	142	Overall		0.639
		Mean*	14.08	13.72	14.00	H vs. L		0.389
		95% C.I.*	(13.50, 14.67)	(13.15, 14.30)	(13.48, 14.52)	H vs. L		0.841
Urine Specific Gravity	Officer	n	127	130	123	Overall		0.786
		Mean	1.0144	1.0149	1.0150	H vs. L		0.554
		95% C.I.	(1.0132, 1.0156)	(1.0137, 1.0161)	(1.0137, 1.0162)	H vs. L		0.541
Urine Specific Gravity	Enlisted Flyer	n	55	65	57	Overall		0.358
		Mean	1.0159	1.0155	1.0141	H vs. L		0.803
		95% C.I.	(1.0139, 1.0178)	(1.0138, 1.0173)	(1.0123, 1.0158)	H vs. L		0.178
Urine Specific Gravity	Enlisted Groundcrew	n	154	163	142	Overall		0.967
		Mean	1.0167	1.0168	1.0166	H vs. L		0.885
		95% C.I.	(1.0156, 1.0178)	(1.0158, 1.0179)	(1.0154, 1.0179)	H vs. L		0.907

*Transformed from square root scale.

--No relative risk given for variables analyzed continuously.

TABLE 0-2.

Interaction Summaries of Adjusted Exposure Index Analyses for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p Value
				Low	Medium	High			
Urinary Protein	Diabetic	n	8	8	8	14	Overall		0.010*
		Number/%							
		Abnormal	3	37.5%	0	0.0%	H vs. L	0.09 (0.004, 2.16)**	0.200*
	Impaired	n	11	14	14	16	Overall		0.247*
		Number/%							
		Abnormal	1	9.1%	0	0.0%	H vs. L	0.24 (0.01, 6.53)**	0.440*
	Normal	n	108	108	108	93	Overall		0.190*
		Number/%							
		Abnormal	0	0.0%	2	1.9%	H vs. L	5.09 (0.24, 107.36)**	0.490*
	Black	n	138	149	129	129	Overall		0.259*
Urinary Occult Blood	Born ≥1942	n	87	129	81				
		Number/%							
		Abnormal	11	12.6%	23	17.8%	H vs. L	1.56 (0.71, 3.41)	0.252
	Born <1942	n	67	34	60				
		Number/%							
		Abnormal	14	20.9%	11	32.4%	H vs. L	1.73 (0.68, 4.42)	0.265
Urinary Protein	Normal	n	108	108	108	93	Overall		0.190*
		Number/%							
		Abnormal	0	0.0%	2	1.9%	H vs. L	5.09 (0.24, 107.36)**	0.490*
	Impaired	n	11	14	14	16	Overall		0.247*
		Number/%							
		Abnormal	1	9.1%	0	0.0%	H vs. L	0.24 (0.01, 6.53)**	0.440*
	Diabetic	n	8	8	8	14	Overall		0.010*
		Number/%							
		Abnormal	3	37.5%	0	0.0%	H vs. L	0.09 (0.004, 2.16)**	0.200*
	Black	n	138	149	129	129	Overall		0.259*
Urinary Occult Blood	Born ≥1942	n	87	129	81				
		Number/%							
		Abnormal	11	12.6%	23	17.8%	H vs. L	1.56 (0.71, 3.41)	0.252
	Born <1942	n	67	34	60				
		Number/%							
		Abnormal	14	20.9%	11	32.4%	H vs. L	1.73 (0.68, 4.42)	0.265
Urinary Protein	Nonblack	n	138	149	129	129	Overall		0.259*
		Number/%							
		Abnormal	4	2.9%	6	4.0%	H vs. L	1.41 (0.39, 5.09)*	0.751*
	Black	n	16	14	13	13	Overall		0.092*
		Number/%							
		Abnormal	4	25.0%	1	7.1%	H vs. L	0.23 (0.02, 2.37)*	0.336*
Urinary Occult Blood	Born ≥1942	n	87	129	81				
		Number/%							
		Abnormal	11	12.6%	23	17.8%	H vs. L	1.56 (0.71, 3.41)	0.252
	Born <1942	n	67	34	60				
		Number/%							
		Abnormal	14	20.9%	11	32.4%	H vs. L	1.73 (0.68, 4.42)	0.265
Urinary Protein	Normal	n	108	108	108	93	Overall		0.190*
		Number/%							
		Abnormal	0	0.0%	2	1.9%	H vs. L	5.09 (0.24, 107.36)**	0.490*
	Impaired	n	11	14	14	16	Overall		0.247*
		Number/%							
		Abnormal	1	9.1%	0	0.0%	H vs. L	0.24 (0.01, 6.53)**	0.440*
	Diabetic	n	8	8	8	14	Overall		0.010*
		Number/%							
		Abnormal	3	37.5%	0	0.0%	H vs. L	0.09 (0.004, 2.16)**	0.200*
	Black	n	138	149	129	129	Overall		0.259*
Urinary Occult Blood	Born ≥1942	n	87	129	81				
		Number/%							
		Abnormal	11	12.6%	23	17.8%	H vs. L	1.56 (0.71, 3.41)	0.252
	Born <1942	n	67	34	60				
		Number/%							
		Abnormal	14	20.9%	11	32.4%	H vs. L	1.73 (0.68, 4.42)	0.265

TABLE 0-2. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p Value	
				Low	Medium	High				
Urinary White Blood Cell Count(a)	Born ≥1942 Diabetic	n		0	1	0	Overall			
		Number/% Abnormal		0	1	100.0%	0	H vs. L		
		Normal		0	0	0.0%	0	H vs. L		
	Born ≥1942 Impaired	n		1	1	0	Overall		0.157*	
		Number/% Abnormal		0	1	100.0%	0	H vs. L	9.00 (0.10, 831.78)**	0.999*
		Normal		1	0	0.0%	0	H vs. L	--	
	Born ≥1942 Normal	n		10	16	9	Overall		0.065*	
		Number/% Abnormal		3	0	0.0%	1	11.1% H vs. L	0.07 (0.003, 1.42)**	0.046*
		Normal		7	16	100.0%	8	88.9% H vs. L	0.29 (0.02, 3.48)**	0.382*
	Born <1942 Diabetic	n		1	8	5	Overall		0.668*	
Number/% Abnormal			0	1	12.5%	0	0.0% H vs. L	0.60 (0.02, 23.07)**	0.999*	
Normal			1	7	87.5%	5	100.0% H vs. L	--		
Born <1942 Impaired	n		8	6	6	Overall		0.222*		
	Number/% Abnormal		0	2	33.3%	1	16.7% H vs. L	9.44 (0.37, 242.18)**	0.165*	
	Normal		8	4	66.7%	5	83.3% H vs. L	4.64 (0.16, 135.57)**	0.429*	
Born <1942 Normal	n		35	33	37	Overall		0.805		
	Number/% Abnormal		4	4	12.1%	3	8.1% H vs. L	0.79 (0.16, 3.90)	0.776	
	Normal		31	29	87.9%	34	91.9% H vs. L	0.58 (0.11, 3.03)	0.515	
Exposure Index-by- Diabetic Class (Enlisted Flyer)	n		8	6	6	Overall		0.222*		
	Number/% Abnormal		0	2	33.3%	1	16.7% H vs. L	9.44 (0.37, 242.18)**	0.165*	
	Normal		8	4	66.7%	5	83.3% H vs. L	4.64 (0.16, 135.57)**	0.429*	

TABLE 0-2. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p Value
				Low	Medium	High			
Blood Urea Nitrogen	Exposure Index-by- Race (Officer)	Nonblack	n	125	127	121	H vs. L	(b)	0.877
			Adj. Mean(c) 95% C.I.(c)	14.65 (13.91, 15.41)	14.71 (13.96, 15.49)	14.55 (13.84, 15.27)	H vs. L	(b)	0.814
		Black	n	2	2	3	H vs. L	(b)	0.035
			Adj. Mean 95% C.I.	16.93 (12.24, 22.38)	10.65 (7.62, 14.19)	19.51 (14.45, 25.33)	H vs. L	(b)	0.494

*Unadjusted estimate of relative risk and confidence interval, or p-value, based on stratified tables.

**Unadjusted estimate of relative risk and confidence interval calculated after adding 0.5 to each cell.

—Zero counts in cells do not allow for calculation of percent, relative risk, confidence interval, or p-value.

(a) Results presented for urinary white blood cell count are based on stratification into the six categories shown. Unadjusted results are presented for all strata except Ranch Hands in normal diabetic class, born before 1942. These results have been adjusted for race.

(b) No relative risk given for variables analyzed continuously.

(c) Transformed from square root scale.

Note: Small sample sizes may affect validity of overall p-value.

Note: Results without (*) or (**) are adjusted for all other main effects in model (age, race, and diabetic class), unless otherwise noted.

TABLE 0-3.

Unadjusted Analyses for Renal Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Kidney Disease	n	1,014		954			
	Yes	94	9.3	94	9.9	0.93 (0.69, 1.26)	0.701
	No	920	90.7	859	90.1		
Urinary Protein	n	1,016		954			
	Abnormal	37	3.6	28	2.9	1.25 (0.76, 2.06)	0.449
	Normal	979	96.4	926	97.1		
Urinary Occult Blood	n	1,015		954			
	Abnormal	182	17.9	155	16.2	1.13 (0.89, 1.43)	0.338
	Normal	833	82.1	799	83.8		
Urinary White Blood Cell Count	n	1,016		954			
	Abnormal	102	10.0	83	8.7	1.17 (0.86, 1.59)	0.316
	Normal	914	90.0	871	91.3		
Blood Urea Nitrogen	n						
	Mean*	1,016		955		--	0.318
	95% C.I.*	14.21 (13.99, 14.43)		14.37 (14.15, 14.59)			
Urine Specific Gravity	n	1,016		954			
	Mean	1.0157 (1.0153, 1.0162)		1.0154 (1.0150, 1.0159)		--	0.365
	95% C.I.						

*Converted from square root scale.

--No relative risk given for variables analyzed continuously.

TABLE 0 4.

Adjusted Analyses for Renal Variables by Group
(Original Comparisons Only)

Variable	Strati- fication	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
			Ranch Hand	Original Comparison			
Kidney Disease		n	1,014	950	0.95 (0.70, 1.28)	0.726	AGE (p=0.001)
Urinary Protein		n	1,016	942	****	****	OCC (p=0.007) AGE*DIAB (p=0.037) GRP*DIAB (p=0.003)
Urinary Occult Blood							GRP*OCC*RACE (p=0.020)
	Nonblack	n	955	887	1.14 (0.89, 1.46)	0.299	AGE (p=0.003) OCC (p<0.001)
	Black Enlisted	n	53	51	1.43 (0.54, 3.76)	0.465	GRP*OCC (p=0.051) AGE*DIAB (p=0.027)

TABLE 0-4. (continued)
Adjusted Analyses for Renal Variables by Group
(Original Comparisons Only)

Variable	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p Value	Covariate Remarks*
			Race	Original Comparison			
Urinary White Blood Cell Count	Nonblack	n	956	893	****	****	GRP*AGE*ACE (p=0.048) GRP*OCC*ACE (p=0.022) OCC (p=0.010) GRP*DIAB (p=0.054) GRP*AGE-(p=0.053)
Blood Urea Nitrogen	Black Enlisted	n	53	51	****	****	GRP*OCC (p=0.015) DIAB (p=0.017) GRP*AGE (p=0.010) AGE (p<0.001) OCC (p=0.025) RACE*DIAB (p=0.049) GRP*ACE (p=0.077)
Urine Specific Gravity		n	1,016	951	--	****	DIAB (p=0.011) OCC (p<0.001) GRP*ACE (p=0.037)

*Abbreviations:

OCC: occupation

DIAB: diabetic class

***Group-by-covariate interaction--adjusted relative risk/group means, p-value, and confidence interval are not presented.

--No relative risk given for variables analyzed continuously.

TABLE 0 5.

Summary of Group by Covariate Interactions for Renal Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p Value
				Rauch Hand	Original Comparison		
Urinary Protein	Diabetic	n	Number/% Abnormal	7/8	76	0.57 (0.20, 1.60)	0.286
			Normal	7	11		
				71	65		
	Group by - Diabetic Class	n	Number/% Abnormal	106	136	0.58 (0.19, 1.75)	0.332
			Normal	5	11		
				101	125		
	Normal	n	Number/% Abnormal	832	739	3.82 (1.56, 9.37)	0.004
			Normal	25	6		
				807	733		
Urinary Occult Blood	Officer	n	Number/% Abnormal	7	7		
			Normal	0	3		
				7	4		
	Group-by - Occupation (Black)	n	Number/% Abnormal	10	12		
			Normal	3	1		
				7	11		
	Enlisted Groundcrew	n	Number/% Abnormal	43	39		
			Normal	13	9		
				30	30		
	Enlisted Groundcrew	n	Number/% Abnormal	13	9		
			Normal	30	23		
				30	30		

TABLE 0-5. (continued)
Summary of Group-by-Covariate Interactions for Renal Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p Value
				Ranch Hand	Original Comparison		
Urinary White Blood Cell Count	Nonblack:	Born $\geq$ 1942 Diabetic	n Abnormal Normal	14	12	0.90 (0.38, 2.10)	0.799
				1	2		
				13	10		
	Group-by-Age	Born $\leq$ 1942 Impaired	n Abnormal Normal	22	33	4.12 (2.06, 8.24)	<0.001
				2	4		
				20	29		
	Group-by-Diabetic Class	Born $\geq$ 1942 Normal	n Abnormal Normal	344	298	2.08 (1.16, 3.71)	0.014
				38	13		
				306	285		
		Born $<$ 1942 Diabetic	n Abnormal Normal	57	57	0.38 (0.14, 1.04)	0.059
				6	12		
				51	45		
		Born $<$ 1942 Impaired	n Abnormal Normal	80	89	1.77 (0.75, 4.17)	0.191
				14	6		
				66	83		
		Born $<$ 1942 Normal	n Abnormal Normal	439	404	0.89 (0.55, 1.44)	0.639
				31	37		
				408	367		

TABLE 0-5. (continued)

Summary of Group by Covariate Interactions for Renal Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p Value
				Ranch Hand	Original Comparison		
Urinary White Blood Cell Count	Group by- Occupation (Black)	Officer	n	7	7		
			Number/%				
			Abnormal	0	2	28.6%	
	Enlisted Flyer		Normal	7	5	71.4%	
			n	10	12		
			Number/%				
Urinary White Blood Cell Count	Group by- Age (Black Enlisted)	Enlisted Groundcrew	Abnormal	3	0	0.0%	
			Normal	7	12	100.0%	
			n	43	39		
	Born >1942		Number/%				
			Abnormal	7	7	17.9%	
			Normal	36	32	82.1%	
Urinary White Blood Cell Count	Group by- Age (Black Enlisted)	Born >1942	n	29	26		
			Number/%				
			Abnormal	4	5	19.2%	0.565
	Born <1942		Normal	25	21	80.8%	
			n	24	25		
			Number/%				
Urinary White Blood Cell Count			Abnormal	6	2	8.0%	0.088
			Normal	18	23	92.0%	

TABLE 0 5. (continued)

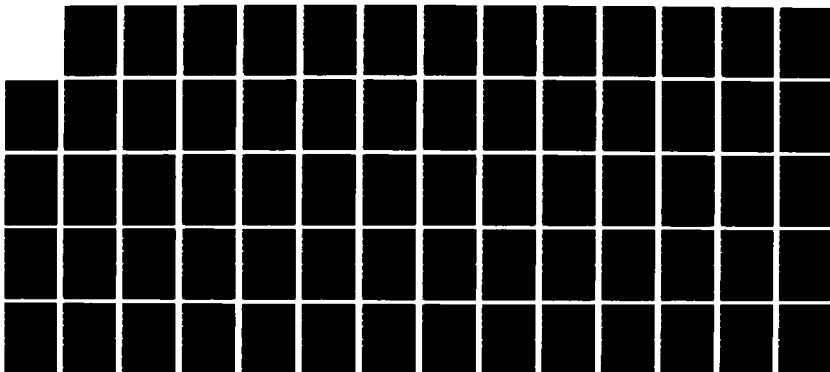
Summary of Group-by Covariate Interactions for Renal Variables
(Original Comparisons Only)

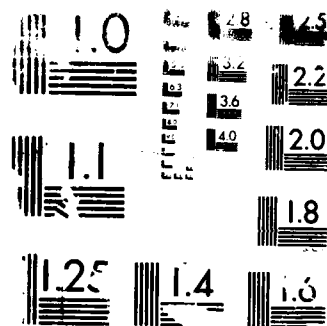
Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p Value
				Ranch Hand	Original Comparison		
Blood Urea Nitrogen	Group-by-Race	Nonblack	n	956	894	--	0.726
			Adj. Mean* 95% C.I.*	14.16 (13.86, 14.47)	14.22 (13.92, 14.53)		
		Black	n	60	58	--	0.057
			Adj. Mean* 95% C.I.*	12.43 (11.41, 13.51)	13.63 (12.66, 14.64)		
Urine Specific Gravity	Group-by-Race	Nonblack	n	956	893	--	0.104
			Adj. Mean 95% C.I.	1.0163 (1.0157, 1.0169)	1.0158 (1.0151, 1.0164)		
		Black	n	60	58	--	0.081
			Adj. Mean 95% C.I.	1.0154 (1.0135, 1.0173)	1.0177 (1.0158, 1.0196)		

No relative risk given for variables analyzed continuously. Also, no relative risk or p-value given for interactions involving occupation for urinary occult blood and urinary white blood cell count; tables presented only for illustrative purposes.

*Transformed from square root scale.

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RESOLUTION TEST CHART

APPENDIX P
Endocrine Assessment

APPENDIX P: Endocrine Assessment

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TABLE P-1.

Summary of Group-by-Covariate Interactions for Endocrinological Variables

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch Hand	Comparison	
Testosterone	Group-by- % Body Fat	<10%	n	6	4	
			Mean	522.6	1044.8	
			Adj. Mean	654.4	1042.8	0.012
		10-25%	95% C.I.	(484.7, 849.5)	(803.5, 1313.2)	
			n	815	1026	
			Mean	627.8	605.7	
Differential Cortisol	Group-by- Race-by- Age	>25%	Adj. Mean	603.3	582.4	0.023
			95% C.I.	(583.4, 623.5)	(563.9, 601.3)	
			n	179	257	
			Mean	470.5	470.3	
			Adj. Mean	463.0	456.7	0.706
			95% C.I.	(435.0, 491.9)	(432.9, 481.2)	
Differential Cortisol	Group-by- Race-by- Age	Nonblack Born ≥1942	n	374	500	
			Mean	2.07	2.44	
			Adj. Mean	1.58	1.97	0.156
		Nonblack Born <1942	95% C.I.	(0.64, 2.51)	(1.06, 2.88)	
			n	572	697	
			Mean	2.53	2.46	
Differential Cortisol	Group-by- Race-by- Age	Black Born ≥1942	Adj. Mean	2.08	1.99	0.708
			95% C.I.	(1.18, 2.97)	(1.10, 2.88)	
		Black Born <1942	n	32	47	
			Mean	0.17	2.78	
			Adj. Mean	-0.46	2.33	0.003
			95% C.I.	(-2.11, 1.18)	(0.89, 3.76)	
Differential Cortisol	Group-by- Race-by- Age	Black Born ≥1942	n	26	36	
			Mean	3.24	2.30	
			Adj. Mean	2.94	1.89	0.312
		Black Born <1942	95% C.I.	(1.22, 4.67)	(0.32, 3.46)	
			n	374	500	
			Mean	2.07	2.44	

TABLE P-2.

Unadjusted Exposure Index Analyses for Endocrinological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
T ₃ Uptake	Officer	n	126	124	122	Overall	0.250
		Mean	28.01	28.35	27.96	M vs. L	0.177
		95% C.I.	(27.66, 28.36)	(28.00, 28.71)	(27.61, 28.32)	H vs. L	0.857
	Enlisted Flyer	n	55	65	55	Overall	0.362
		Mean	27.31	27.59	27.83	M vs. L	0.411
		95% C.I.	(26.82, 27.81)	(27.14, 28.06)	(27.32, 28.34)	H vs. L	0.155
	Enlisted Groundcrew	n	153	161	142	Overall	0.775
		Mean	27.68	27.65	27.53	M vs. L	0.865
		95% C.I.	(27.37, 28.00)	(27.34, 27.95)	(27.21, 27.85)	H vs. L	0.493
TSH	Officer	n	126	124	122	Overall	0.283
		Mean	1.181	1.167	1.278	M vs. L	0.843
		95% C.I.	(1.089, 1.286)	(1.076, 1.271)	(1.173, 1.397)	H vs. L	0.203
	Enlisted Flyer	n	55	65	55	Overall	0.181
		Mean	1.033	1.153	1.204	M vs. L	0.178
		95% C.I.	(0.924, 1.162)	(1.035, 1.292)	(1.068, 1.367)	H vs. L	0.075
	Enlisted Groundcrew	n	153	161	142	Overall	0.738
		Mean	1.117	1.124	1.160	M vs. L	0.899
		95% C.I.	(1.043, 1.199)	(1.051, 1.204)	(1.079, 1.250)	H vs. L	0.465

TABLE P-2. (continued)
Unadjusted Exposure Index Analyses for Endocrinological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
Testosterone	Officer	n	125	128	118	Overall	0.099
		Mean	599.4	547.4	558.0	M vs. L	0.041
		95% C.I.	(563.8, 636.1)	(513.8, 582.1)	(522.7, 594.4)	H vs. L	0.112
Testosterone	Enlisted Flyer	n	55	63	57	Overall	0.363
		Mean	588.7	637.4	584.9	M vs. L	0.244
		95% C.I.	(531.6, 648.6)	(581.8, 695.6)	(529.1, 643.6)	H vs. L	0.929
Testosterone	Enlisted Groundcrew	n	162	153	139	Overall	0.276
		Mean	609.3	641.4	603.4	M vs. L	0.205
		95% C.I.	(574.7, 644.9)	(606.9, 676.9)	(567.3, 640.6)	H vs. L	0.820
Initial Cortisol	Officer	n	124	130	121	Overall	0.186
		Mean	11.97	11.43	12.28	M vs. L	0.239
		95% C.I.	(11.33, 12.65)	(10.83, 12.07)	(11.61, 12.99)	H vs. L	0.531
Initial Cortisol	Enlisted Flyer	n	55	65	57	Overall	0.276
		Mean	11.97	11.08	11.13	M vs. L	0.001
		95% C.I.	(11.09, 12.91)	(10.33, 11.88)	(10.33, 11.99)	H vs. L	0.092
Initial Cortisol	Enlisted Groundcrew	n	154	161	142	Overall	0.699
		Mean	11.69	11.33	11.50	M vs. L	0.397
		95% C.I.	(11.09, 12.32)	(10.76, 11.92)	(10.89, 12.15)	H vs. L	0.678

TABLE P-2. (continued)

Unadjusted Exposure Index Analyses for Endocrinological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
2-Hour Cortisol	Officer	n	124	130	121	Overall	0.416
		Mean	9.27	9.16	9.69	M vs. L	0.789
		95% C.I.	(8.72, 9.86)	(8.63, 9.73)	(9.10, 10.32)	H vs. L	0.324
2-Hour Cortisol	Enlisted Flyer	n	55	65	57	Overall	0.200
		Mean	8.43	9.48	9.06	M vs. L	0.074
		95% C.I.	(7.67, 9.26)	(8.69, 10.34)	(8.25, 9.94)	H vs. L	0.286
2-Hour Cortisol	Enlisted Groundcrew	n	154	161	142	Overall	0.453
		Mean	9.64	9.29	9.17	M vs. L	0.358
		95% C.I.	(9.11, 10.19)	(8.79, 9.81)	(8.65, 9.72)	H vs. L	0.229
Differential Cortisol	Officer	n	124	130	121	Overall	0.709
		Mean	2.69	2.31	2.59	M vs. L	0.424
		95% C.I.	(2.02, 3.36)	(1.66, 2.96)	(1.91, 3.26)	H vs. L	0.829
Differential Cortisol	Enlisted Flyer	n	55	65	57	Overall	0.003
		Mean	3.43	1.20	2.30	M vs. L	<0.001
		95% C.I.	(2.50, 4.36)	(0.34, 2.06)	(1.39, 3.22)	H vs. L	0.092
Differential Cortisol	Enlisted Groundcrew	n	154	161	142	Overall	0.726
		Mean	1.96	2.12	2.37	M vs. L	0.740
		95% C.I.	(1.26, 2.66)	(1.44, 2.81)	(1.64, 3.09)	H vs. L	0.425

TABLE P-2. (continued)
Unadjusted Exposure Index Analyses for Endocrinological Variables by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
Officer		n	121	113	124	Overall	0.892
		Mean	109.0	107.5	107.6	M vs. L	0.666
		95% C.I.	(104.3, 113.8)	(103.0, 112.3)	(102.9, 112.6)	H vs. L	0.694
2-Hour Post-prandial Glucose	Enlisted Flyer	n	54	62	56	Overall	0.051
		Mean	100.9	118.0	110.9	M vs. L	0.015
		95% C.I.	(92.1, 110.6)	(108.3, 128.5)	(101.4, 121.4)	H vs. L	0.149
Enlisted Groundcrew		n	150	156	140	Overall	0.674
		Mean	105.5	106.7	109.1	M vs. L	0.750
		95% C.I.	(100.1, 111.1)	(101.4, 112.4)	(103.3, 115.2)	H vs. L	0.380

TABLE P-3.

Interaction Summaries of Adjusted Exposure Index Analyses for Endocrinological Variables

Variable	Interaction (Occupation)	Stratifi- cation	Statistic	Exposure Index			Contrast	p-Value
				Low	Medium	High		
Testosterone	<10%	Exposure Index-by- % Body Fat	n	1	2	3		
			Adj. Mean	72.7	828.8	684.5	M vs. L	<0.001
			95% C.I.	(0.3, 273.0)	(537.8, 1182.5)	(465.4, 945.8)	H vs. L	<0.001
	10-25%	(Enlisted Groundcrew)	n	125	128	105		
			Adj. Mean	630.0	646.2	644.7	M vs. L	0.527
			95% C.I.	(586.1, 675.5)	(601.6, 692.5)	(598.2, 692.9)	H vs. L	0.585
2-Hour Cortisol	>25%	Exposure Index-by- % Body Fat (Officer)	n	27	31	29		
			Adj. Mean	501.8	503.0	467.5	M vs. L	0.980
			95% C.I.	(433.9, 574.7)	(437.6, 573.0)	(400.7, 539.6)	H vs. L	0.471
	10-25%	Nonblack	n	102	110	99		
			Adj. Mean	8.31	8.50	9.05	M vs. L	0.629
			95% C.I.	(7.20, 9.58)	(7.41, 9.76)	(7.86, 10.43)	H vs. L	0.079
2-Hour Cortisol	>25%	Black	n	22	20	20		
			Adj. Mean	10.03	7.46	8.26	M vs. L	0.006
			95% C.I.	(8.27, 12.18)	(6.12, 9.10)	(6.77, 10.07)	H vs. L	0.068
	Nonblack	Exposure Index-by- Race	n	138	146	129		
			Adj. Mean	9.30	9.33	9.32	M vs. L	0.921
			95% C.I.	(8.30, 10.42)	(8.38, 10.41)	(8.33, 10.43)	H vs. L	0.961
2-Hour Cortisol	Black	(Enlisted Groundcrew)	n	16	14	11		
			Adj. Mean	12.89	9.36	8.41	M vs. L	0.013
			95% C.I.	(10.59, 15.67)	(7.61, 11.52)	(7.48, 10.48)	H vs. L	0.002

TABLE P-3. (continued)

Interaction Summaries of Adjusted Exposure Index Analyses for Endocrinological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	p-Value
				Low	Medium	High		
Initial Cortisol	Exposure Index-by-% Body Fat (Officer)	10-25%	n	102	110	99		
			Adj. Mean	11.51	11.19	12.25	M vs. L	0.514
			95% C.I.	(10.13, 13.08)	(9.89, 12.66)	(10.80, 13.91)	H vs. L	0.154
	>25%		n	22	20	20		
			Adj. Mean	12.28	9.59	10.26	M vs. L	0.010
			95% C.I.	(10.33, 14.60)	(8.03, 11.45)	(8.59, 12.26)	H vs. L	0.060
Differential Cortisol	Exposure Index-by-Race-by-Personality Type (Enlisted Groundcrew)	Nonblack Type A	n	49	63	53		
			Adj. Mean	0.96	1.94	2.00	M vs. L	0.237
			95% C.I.	(-0.74, 2.66)	(0.38, 3.49)	(0.32, 3.68)	H vs. L	0.223
		Nonblack Type B	n	89	83	76		
			Adj. Mean	2.29	1.36	1.64	M vs. L	0.158
			95% C.I.	(0.80, 3.78)	(-0.12, 2.84)	(0.14, 3.14)	H vs. L	0.336
	Black Type A	Black Type A	n	8	5	4		
			Adj. Mean	-5.49	3.27	3.10	M vs. L	<0.001
			95% C.I.	(-8.70, -2.28)	(-0.71, 7.25)	(-1.30, 7.49)	H vs. L	0.001
		Black Type B	n	8	9	7		
			Adj. Mean	1.16	2.99	0.48	M vs. L	0.384
			95% C.I.	(-2.04, 4.37)	(-0.07, 6.05)	(-2.80, 3.76)	H vs. L	0.762

TABLE P-4.

Unadjusted Continuous and Categorical Analyses for Laboratory Endocrinological Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group		Contrast	Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand	Original Comparison			
T ₃ Uptake	n	1,003	936			
	Mean	27.79	27.68			0.203
	95% C.I.	(27.67, 27.91)	(27.55, 27.80)			
	Number/%					
	Low	7 0.7%	13 1.4%	Overall		0.322
TSH	Normal	969 96.6%	898 95.9%	Low vs. Normal	0.50 (0.20, 1.26)	0.177
	High	27 2.7%	25 2.7%	High vs. Normal	1.00 (0.58, 1.74)	0.999
	n	1,003	936			
	Mean	1.16	1.11		--	0.040
	95% C.I.	(1.13, 1.19)	(1.08, 1.14)			
Testosterone	Number/%					
	Normal	996 99.3%	931 99.5%		1.31 (0.41, 4.14)	0.775
	High	7 0.7%	5 0.5%			
	n	1,000	952			
	Mean	597.31	570.90		--	0.006
Initial Cortisol	95% C.I.	(583.97, 610.80)	(557.69, 584.27)			
	Number/%					
	Low	38 3.8%	37 3.9%	Overall		0.955
	Normal	949 94.9%	904 95.0%	Low vs. Normal	0.98 (0.62, 1.55)	0.999
	High	13 1.3%	11 1.2%	High vs. Normal	1.13 (0.50, 2.53)	0.839
	n	1,009	949			
	Mean	11.62	11.67		--	0.729
	95% C.I.	(11.39, 11.85)	(11.44, 11.91)			
	Number/%					
	Low	52 5.2%	44 4.6%	Overall		0.864
	Normal	950 94.2%	898 94.6%	Low vs. Normal	1.12 (0.74, 1.69)	0.603
	High	7 0.7%	7 0.7%	High vs. Normal	0.95 (0.33, 2.71)	0.999

TABLE P-4. (continued)
Unadjusted Continuous and Categorical Analyses for Laboratory Endocrinological Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group		Contrast	Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand	Original Comparison			
2-Hour Cortisol	n	1,009	949			
	Mean	9.30	9.32		--	0.924
	95% C.I.	(9.10, 9.51)	(9.11, 9.52)			
	Number/%					
	Low	0	0	0.0%		
Differential Cortisol	Normal	1,005	946	99.7%		
	High	4	3	0.3%	1.26 (0.28, 5.62)	0.999
2-Hour Post-prandial Glucose	n	1,009	949			
	Mean	2.30	2.38		--	0.692
	95% C.I.	(2.05, 2.55)	(2.12, 2.64)			
	Number/%					
	Normal	976	909			
Diabetes (Composite Indicator)	Impaired	107.93	110.03			
	Diabetic	(105.90, 110.01)	(108.03, 112.07)			
Diabetes (Composite Indicator)	n	836	748	Overall		
	Mean	106	137	Impaired vs. Normal	0.69 (0.53, 0.91)	0.009
	95% C.I.	34	24	Diabetic vs. Normal	1.27 (0.75, 2.16)	0.423
	Number/%					
	Yes	1,016	955			
Diabetes (Composite Indicator)	No	74	67			
		942	888		1.04 (0.74, 1.47)	0.861

-- No relative risk or confidence interval given for continuous analysis.

TABLE P-5.

Adjusted Continuous and Categorical Analyses for Laboratory Endocrinological Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group		Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
		Ranch Hand	Original Comparison				
T_3 Uptake	n	998	933	Overall	—	0.332	00C (p=0.025)
				Low vs. Normal	0.52 (0.45, 2.36)	0.153	PERSTYPE (p=0.035)
				High vs. Normal	1.03 (0.59, 1.78)	0.916	
TSH	n	1,003	936				
	Adj. Mean	1.16	1.11		—	0.020	AGE (p<0.001)
	95% C.I.	(1.13, 1.19)	(1.08, 1.14)				
Testosterone	n	1,000	951	High vs. Normal	1.31 (0.41, 4.14)	0.775	
	Adj. Mean	****	****			****	RACE (p=0.015)
	95% C.I.	****	****				AGE*BFAT (p=0.039)
Initial Cortisol	n	1,000	951				GRP*BFAT (p=0.022)
	Adj. Mean	11.35	11.38	Overall		0.998	AGE (p<0.001)
	95% C.I.	(10.49, 12.27)	(10.52, 12.32)	Low vs. Normal	1.01 90.63, 1.61)	0.980	ZBFAT (p<0.001)
Differential Cortisol	n	1,004	945	High vs. Normal	1.02 (0.42, 2.52)	0.958	PERSTYPE (p=0.028)
	Adj. Mean	****	****			0.820	00C*RACE (p=0.026)
	95% C.I.	****	****				GRP*AGE*RACE (p=0.016)
Differential Cortisol	n	1,004	945			****	PERSTYPE (p=0.002)
	Adj. Mean	****	****				ZBFAT (p=0.006)
	95% C.I.	****	****				

TABLE P-5. (continued)
Adjusted Continuous and Categorical Analyses for Laboratory Endocrinological Variables by Group
(Original Comparisons Only)

Variable	Group			Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
	Statistic	Rank	Original Comparison				
2-Hour Post-prandial Glucose	n	976	908	Overall Impaired vs. Normal Diabetic vs. Normal	0.71 (0.54, 0.93) 1.29 (0.71, 2.38)	0.430	%BFAT (p<0.001) OCC (p=0.002) AGE*RACE (p=0.002)
	Adj. Mean	114.8	116.0				
	95% C.I.	(107.2, 122.9)	(108.3, 124.2)				
Diabetes (Composite Indicator)	n	1,016	954	Overall Impaired vs. Normal Diabetic vs. Normal	1.13 (0.80, 1.61)	0.484	AGE (p<0.001) %BFAT (p<0.001) RACE (p=0.015)
	Adj. Mean						
	95% C.I.						

***Group-by-covariate interaction—adjusted mean/relative risk, confidence interval, and p-value are not presented.
—No relative risk or confidence interval given for continuous analyses.

GRP: Group
OCC: Occupation
PERTYPE: Personality type (A or B)
%BFAT: Percent body fat

TABLE P-6.

**Summary of Group-by-Covariate Interactions for Endocrinological Variables
(Original Comparisons Only)**

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch Hand	Original Comparison	
Testosterone	<10%		n	6	3	
			Mean	522.6	1173.8	
			Adj. Mean	640.1	1074.7	0.014
	10-25%		95% C.I.	(472.2, 833.5)	(794.4, 1397.2)	
			n	815	757	
			Mean	627.8	595.9	
			Adj. Mean	602.3	577.7	0.013
	>25%		95% C.I.	(581.2, 623.7)	(556.7, 599.1)	
			n	179	191	
Differential Cortisol	Nonblack Born ≥1942		Mean	470.5	470.7	
			Adj. Mean	461.5	459.1	0.891
			95% C.I.	(432.9, 491.1)	(431.8, 487.2)	
	Nonblack Born <1942		n	374	342	
			Mean	2.07	2.34	
			Adj. Mean	1.36	1.65	0.331
	Black Born ≥1942		95% C.I.	(0.38, 2.34)	(0.67, 2.64)	
			n	572	545	
			Mean	2.53	2.36	
Differential Cortisol	Nonblack Born <1942		Adj. Mean	1.85	1.66	0.419
			95% C.I.	(0.92, 2.79)	(0.71, 2.60)	
	Black Born ≥1942		n	32	27	
			Mean	0.17	3.05	
			Adj. Mean	-0.68	2.41	0.004
	Black Born <1942		95% C.I.	(-2.35, 0.99)	(0.64, 4.17)	
			n	26	31	
			Mean	3.24	2.22	
			Adj. Mean	2.72	1.54	0.274
			95% C.I.	(0.98, 4.47)	(-0.14, 3.23)	

APPENDIX Q
Immunological Evaluation

APPENDIX Q: Immunological Evaluation

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TABLE Q-1.

Summary of Group-by-Covariate Interactions for Immunological Variables

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch Hand	Comparison	
Total T Cells	Group-by-Race	Nonblack	n	424	532	0.619
			Adj. Mean	1,616	1,599	
			95% C.I.	(1,564, 1,669)	(1,554, 1,646)	
		Black	n	18	35	0.039
			Adj. Mean	1,566	1,888	
			95% C.I.	(1,340, 1,810)	(1,705, 2,080)	
B Cells (Nonblacks Only)	Group-by- Lifetime Smoking (Pack-years)	0	n	128	149	0.004
			Adj. Mean	153.8	189.9	
			95% C.I.	(135.6, 173.3)	(170.9, 210.0)	
		>0-20	n	200	265	0.998
			Adj. Mean	199.5	199.6	
			95% C.I.	(182.9, 216.9)	(185.3, 214.3)	
		>20-40	n	74	94	0.109
			Adj. Mean	200.4	172.8	
			95% C.I.	(174.0, 228.7)	(151.5, 195.4)	
		>40	n	32	29	0.857
			Adj. Mean	219.9	214.4	
			95% C.I.	(178.0, 266.3)	(172.5, 260.9)	
Monocytes	Group-by- Occupation Group-by- Current Alcohol Use (Drinks/day)	Officer 0	n	35	30	0.060
			Adj. Mean	44.19	32.33	
			95% C.I.	(34.72, 56.23)	(24.88, 42.03)	
		Officer >0-2	n	100	131	0.569
			Adj. Mean	40.43	38.38	
			95% C.I.	(34.35, 47.59)	(33.00, 44.64)	
		Officer >2-4	n	31	37	0.689
			Adj. Mean	41.53	44.35	
			95% C.I.	(32.00, 53.91)	(35.02, 56.17)	
		Officer >4	n	13	17	0.608
			Adj. Mean	37.65	33.12	
			95% C.I.	(25.58, 55.43)	(25.18, 43.56)	
		Enlisted Flyer 0	n	21	27	0.232
			Adj. Mean	35.65	45.10	
			95% C.I.	(26.32, 48.28)	(34.36, 59.20)	

TABLE Q-1. (continued)

Summary of Group-by-Covariate Interactions for Immunological Variables

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch Hand	Comparison	
Monocytes (Cont.)	Enlisted Flyer	>0-2	n Adj. Mean 95% C.I.	35 34.95 (27.53, 44.36)	50 43.22 (35.00, 53.37)	0.159
		>2-4	n Adj. Mean 95% C.I.	8 32.71 (20.35, 52.56)	9 56.23 (36.38, 86.89)	0.097
		>4	n Adj. Mean 95% C.I.	5 41.10 (22.28, 75.80)	11 36.17 (23.99, 54.54)	0.729
	Enlisted Groundcrew	0	n Adj. Mean 95% C.I.	76 45.04 (37.89, 53.54)	96 48.98 (41.73, 57.50)	0.421
		>0-2	n Adj. Mean 95% C.I.	81 42.42 (35.81, 50.24)	120 41.59 (36.10, 47.91)	0.839
		>2-4	n Adj. Mean 95% C.I.	19 45.15 (33.05, 61.67)	17 37.37 (27.08, 51.57)	0.397
		>4	n Adj. Mean 95% C.I.	16 68.86 (49.04, 96.68)	23 35.32 (26.42, 47.23)	0.003
HLA-DR Cells	Group-by- Current Alcohol Use (Drinks/day)	0	n Adj. Mean 95% C.I.	142 593.1 (555.1, 632.2)	158 581.0 (544.4, 618.9)	0.650
		>0-2	n Adj. Mean 95% C.I.	223 559.5 (529.5, 590.3)	306 582.8 (557.0, 609.2)	0.232
		>2-4	n Adj. Mean 95% C.I.	58 553.4 (497.8, 611.9)	65 565.9 (512.7, 621.7)	0.750
		>4	n Adj. Mean 95% C.I.	36 563.7 (491.7, 640.6)	51 472.7 (417.7, 531.0)	0.052

TABLE Q-1. (continued)

Summary of Group-by-Covariate Interactions for Immunological Variables

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch Hand	Comparison	
MLC Net Response	Group-by- Lifetime Smoking (Pack-years)	0	n	129	156	0.053
			Adj. Mean	68,921	77,232	
			95% C.I.	(56,625, 82,424)	(64,572, 91,025)	
		>0-20	n	201	277	0.057
			Adj. Mean	67,976	74,333	
			95% C.I.	(56,990, 79,930)	(62,947, 86,665)	
		>20-40	n	71	88	0.128
			Adj. Mean	76,511	67,758	
			95% C.I.	(63,097, 91,216)	(55,676, 81,025)	
		>40	n	29	29	0.444
			Adj. Mean	71,116	63,991	
			95% C.I.	(54,784, 89,576)	(48,837, 81,189)	

TABLE Q-2.

Unadjusted Exposure Index Analyses for Cell Surface Markers by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
Total T Cells	Officer	n	62	63	56	Overall	0.885
		Mean	1,594	1,550	1,578	M vs. L	0.626
		95% C.I.	(1471, 1723)	(1429, 1676)	(1449, 1713)	H vs. L	0.865
Total T Cells	Enlisted Flyer	n	24	20	28	Overall	0.923
		Mean	1,677	1,659	1,622	M vs. L	0.901
		95% C.I.	(1477, 1889)	(1464, 1866)	(1439, 1815)	H vs. L	0.697
Total T Cells	Enlisted Groundcrew	n	69	78	59	Overall	0.076
		Mean	1,759	1,555	1,586	M vs. L	0.032
		95% C.I.	(1623, 1901)	(1434, 1680)	(1446, 1732)	H vs. L	0.091
Total T Cells	Officer	n	62	63	55	Overall	0.970
		Mean	838.3	839.6	852.7	M vs. L	0.983
		95% C.I.	(755.8, 925.1)	(757.7, 925.8)	(764.5, 945.8)	H vs. L	0.821
Helper T Cells	Enlisted Flyer	n	24	26	27	Overall	0.832
		Mean	917.5	888.3	861.7	M vs. L	0.755
		95% C.I.	(789.3, 1055.3)	(767.1, 1018.5)	(744.5, 987.5)	H vs. L	0.545
Helper T Cells	Enlisted Groundcrew	n	69	76	59	Overall	0.296
		Mean	948.9	865.4	874.6	M vs. L	0.146
		95% C.I.	(867.6, 1033.9)	(791.3, 942.7)	(790.4, 963.1)	H vs. L	0.227

TABLE Q-2. (continued)
Unadjusted Exposure Index Analyses for Cell Surface Markers by Occupation

Variable	Occupation	Statistic	Exposure Index		Contrast	p-Value
			Low	High		
Suppressor T Cells	Officer	n	62	56	Overall	0.287
		Mean	522.6	497.3	M vs. L	0.117
		95% C.I.	(467.9, 583.6)	(442.7, 558.7)	H vs. L	0.546
	Enlisted Flyer	n	24	28	Overall	0.891
		Mean	528.1	557.7	M vs. L	0.930
		95% C.I.	(443.1, 629.3)	(474.1, 656.0)	H vs. L	0.656
	Enlisted Groundcrew	n	69	59	Overall	0.123
		Mean	575.5	505.5	M vs. L	0.063
		95% C.I.	(518.9, 638.3)	(451.9, 565.3)	H vs. L	0.097
B Cells	Officer	n	62	55	Overall	0.453
		Mean	167.4	176.8	M vs. L	0.445
		95% C.I.	(143.5, 193.2)	(150.7, 205.0)	H vs. L	0.618
	Enlisted Flyer	n	24	26	Overall	0.262
		Mean	233.2	183.3	M vs. L	0.897
		95% C.I.	(185.4, 286.6)	(142.7, 228.9)	H vs. L	0.144
	Enlisted Groundcrew	n	69	59	Overall	0.966
		Mean	202.4	199.2	M vs. L	0.792
		95% C.I.	(173.3, 233.8)	(168.8, 226.8)	H vs. L	0.889

TABLE Q-2. (continued)
Unadjusted Exposure Index Analyses for Cell Surface Markers by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
Monocytes	Officer	n	62	64	55	Overall	0.799
		Mean	43.32	46.85	47.39	M vs. L	0.584
		95% C.I.	(35.48, 52.89)	(38.49, 57.02)	(38.34, 58.58)	H vs. L	0.546
Monocytes	Enlisted Flyer	n	24	26	27	Overall	0.816
		Mean	36.91	37.52	41.76	M vs. L	0.940
		95% C.I.	(27.27, 49.97)	(28.05, 50.20)	(31.38, 55.56)	H vs. L	0.563
Monocytes	Enlisted Groundcrew	n	69	76	59	Overall	0.975
		Mean	46.97	47.03	48.18	M vs. L	0.992
		95% C.I.	(39.65, 55.64)	(40.02, 55.27)	(40.12, 57.87)	H vs. L	0.842
HLA-DR Cells	Officer	n	62	63	56	Overall	0.750
		Mean	527.5	544.1	564.9	M vs. L	0.727
		95% C.I.	(463.9, 595.1)	(480.0, 612.2)	(495.8, 638.7)	H vs. L	0.449
HLA-DR Cells	Enlisted Flyer	n	24	26	28	Overall	0.932
		Mean	570.3	547.1	568.3	M vs. L	0.739
		95% C.I.	(475.4, 673.9)	(457.7, 644.5)	(480.3, 663.7)	H vs. L	0.977
HLA-DR Cells	Enlisted Groundcrew	n	69	76	58	Overall	0.973
		Mean	578.0	587.3	580.7	M vs. L	0.820
		95% C.I.	(521.7, 637.1)	(533.2, 644.0)	(519.4, 645.6)	H vs. L	0.949

TABLE Q-2. (continued)
Unadjusted Exposure Index Analyses for Cell Surface Markers by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
T ₄ /T ₈ Ratio	Officer	n	62	63	55	Overall	0.207
		Mean	1.732	2.002	1.758	M vs. L	0.106
		95% C.I.	(1.500, 1.964)	(1.773, 2.232)	(1.512, 2.004)	H vs. L	0.881
	Enlisted Flyer	n	24	26	27	Overall	0.692
		Mean	1.793	1.781	1.625	M vs. L	0.955
		95% C.I.	(1.478, 2.108)	(1.478, 2.083)	(1.328, 1.922)	H vs. L	0.449
	Enlisted Groundcrew	n	69	76	59	Overall	0.965
		Mean	1.751	1.780	1.780	M vs. L	0.812
		95% C.I.	(1.580, 1.922)	(1.617, 1.943)	(1.595, 1.965)	H vs. L	0.822

TABLE Q-3.

Unadjusted Exposure Index Analyses for Functional Stimulation Tests by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
Unstimulated Response (PHA)	Officer	n	61	64	56	Overall	0.047
		Mean	1,705	1,428	1,809	M vs. L	0.071
		95% C.I.	(1487,1955)	(1249,1632)	(1568,2087)	H vs. L	0.557
Unstimulated Response (PHA)	Enlisted Flyer	n	24	26	28	Overall	0.466
		Mean	1,668	1,973	1,642	M vs. L	0.320
		95% C.I.	(1315,2114)	(1571,2478)	(1318,2045)	H vs. L	0.926
Unstimulated Response (PHA)	Enlisted Groundcrew	n	69	78	58	Overall	0.818
		Mean	1,814	1,923	1,843	M vs. L	0.541
		95% C.I.	(1583,2079)	(1691,2186)	(1588,2139)	H vs. L	0.877
PHA Net Response	Officer	n	61	64	55	Overall	0.853
		Mean	213,383	205,057	209,661	M vs. L	0.575
		95% C.I.	(192,608, 234,158)	(184,775, 225,339)	(187,782, 231,539)	H vs. L	0.809
PHA Net Response	Enlisted Flyer	n	24	26	28	Overall	0.297
		Mean	245,179	209,656	219,358	M vs. L	0.131
		95% C.I.	(212,269, 278,089)	(178,038, 241,275)	(188,890, 249,827)	H vs. L	0.263
PHA Net Response	Enlisted Groundcrew	n	69	78	58	Overall	0.414
		Mean	227,062	221,793	208,537	M vs. L	0.690
		95% C.I.	(208,219, 245,905)	(204,070, 239,515)	(187,984, 229,089)	H vs. L	0.194

TABLE Q-3. (continued)
Unadjusted Exposure Index Analyses for Functional Stimulation Tests by Occupation

Variable	Occupation	Statistic	Exposure Index			Contrast	p-Value
			Low	Medium	High		
Pokeweed Net Response	Officer	n	62	64	56	Overall	0.633
		Mean	85,479	86,250	96,107	M vs. L	0.947
		95% C.I.	(70,144, 102,328)	(71,074, 102,894)	(78,992, 114,899)	H vs. L	0.388
Pokeweed Net Response	Enlisted Flyer	n	24	26	28	Overall	0.004
		Mean	92,847	101,256	55,480	M vs. L	0.619
		95% C.I.	(71,008, 117,610)	(79,227, 125,985)	(40,058, 73,410)	H vs. L	0.011
Pokeweed Net Response	Enlisted Groundcrew	n	69	78	58	Overall	0.345
		Mean	77,859	92,188	87,540	M vs. L	0.151
		95% C.I.	(64,872, 92,030)	(78,815, 106,610)	(72,540, 103,950)	H vs. L	0.360
MLC Net Response	Officer	n	58	63	54	Overall	0.940
		Mean	74,175	78,069	76,486	M vs. L	0.727
		95% C.I.	(59,443, 90,536)	(63,516, 94,123)	(61,000, 93,722)	H vs. L	0.841
MLC Net Response	Enlisted Flyer	n	23	26	26	Overall	0.724
		Mean	71,959	74,217	62,391	M vs. L	0.892
		95% C.I.	(50,336, 97,436)	(53,426, 98,416)	(43,471, 84,721)	H vs. L	0.550
MLC Net Response	Enlisted Groundcrew	n	68	77	57	Overall	0.248
		Mean	69,460	85,901	81,091	M vs. L	0.102
		95% C.I.	(56,591, 83,647)	(72,345, 100,620)	(65,912, 97,842)	H vs. L	0.275

TABLE Q-4.

Interaction Summaries of Adjusted Exposure Index Analyses for Immunological Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	p-Value
				Low	Medium	High		
Unstimulated Response (PHA)	Exposure Index-by- Lifetime	0	n	4	0	5	M vs. L	--
			Adj. Mean	3,273	--	1,557	H vs. L	0.031
	Alcohol Use (Drink/years) (Officer)	>0-5	n	22	22	16	M vs. L	0.655
			Adj. Mean	2,118	1,975	2,770	H vs. L	0.125
	>5-30		n	24	22	15	M vs. L	0.071
			Adj. Mean	2,752	2,069	2,788	H vs. L	0.941
PHA Net Response	Exposure Index-by- Age (Officer)	Born ≥1942	n	18	9	7	M vs. L	0.002
			Adj. Mean	261,397	153,534	299,002	H vs. L	0.302
	Born 1923-1941		n	40	43	46	M vs. L	0.943
			Adj. Mean	234,921	236,262	223,373	H vs. L	0.534
	Born ≤1922		n	3	11	1	M vs. L	0.095
			Adj. Mean	139,307	229,757	191,111	H vs. L	0.632

TABLE Q-5.

Unadjusted Analyses for Cell Surface Markers by Group
(Original Comparisons Only)

Variable	Statistic	Group		p-Value
		Ranch Hand	Original Comparison	
Total T Cells	n	464	424	0.711
	Mean	1,606	1,592	
	95% C.I.	(1551,1662)	(1537,1648)	
Helper T Cells	n	461	423	0.765
	Mean	868.1	861.0	
	95% C.I.	(833.3,903.6)	(826.4,896.3)	
Suppressor T Cells	n	465	425	0.630
	Mean	521.9	529.7	
	95% C.I.	(498.5,546.5)	(505.7,554.8)	
B Cells	n	457	418	0.708
	Mean	185.2	188.1	
	95% C.I.	(173.8,197.0)	(176.5,200.1)	
Monocytes	n	462	424	0.744
	Mean	46.19	45.47	
	95% C.I.	(43.05,49.56)	(42.39,48.79)	
HLA-DR Cells	n	462	424	0.917
	Mean	571.6	569.9	
	95% C.I.	(547.6,596.2)	(546.1,594.3)	
T ₄ /T ₈ Ratio	n	461	421	0.410
	Mean	1.597	1.558	
	95% C.I.	(1.528,1.669)	(1.491,1.629)	

TABLE Q-6.

Adjusted Analyses for Cell Surface Markers by Group
(Original Comparisons Only)

Variable	Statistic	Group		p-Value	Covariate Remarks*
		Ranch Hand	Original Comparison		
Total T Cells	n	442	414		BATCH (p<0.001)
	Adj. Mean	****	****	****	GRP*RACE (p=0.028)
	95% C.I.	****	****		DRKYR*PACKYR (p=0.004)
					CSMOK (p<0.001)
Helper Cells	n	439	413		BATCH (p=0.014)
	Adj. Mean	862.9	867.5	0.835	DAY (BATCH) (p=0.007)
	95% C.I.	(829.8, 896.6)	(834.6, 901.1)		AGE (p<0.001)
					CSMOK (p<0.001)
Suppressor T Cells	n	465	425		ALC*OCC (p=0.025)
	Adj. Mean	****	****	****	DRKYR*PACKYR (p=0.001)
	95% C.I.	****	****		BATCH (p<0.001)
					GRP*RACE (p=0.010)
B Cells	n	455	416		OCC (p=0.021)
	Adj. Mean	185.5	191.1	0.451	AGE (p=0.006)
	95% C.I.	(174.2, 197.1)	(179.6, 202.9)		CSMOK (p<0.001)
					BATCH (p<0.001)
Monocytes	n	440	414		OCC (p=0.041)
	Adj. Mean	****	****	****	AGE (p=0.005)
	95% C.I.	****	****		ALC (p=0.002)
					CSMOK (p<0.001)
HLA-DR Cells	n	461	423		PACKYR (p=0.020)
	Adj. Mean	570.5	568.2	0.887	BATCH (p<0.001)
	95% C.I.	(546.9, 594.5)	(545.0, 592.0)		DAY (BATCH) (p=0.014)
					OCC (p=0.017)

TABLE Q-6. (continued)

Adjusted Analyses for Cell Surface Markers by Group
(Original Comparisons Only)

Variable	Statistic	Group		p-Value	Covariate Remarks*
		Ranch Hand	Original Comparison		
T ₄ /T ₈ Ratio	n	461	421		BATCH (p<0.001)
	Adj. Mean	****	****	****	OCC (p=0.002)
	95% C.I.	****	****		GRP*CSMOK (p=0.016)

*Abbreviations:

BATCH: batch-to-batch variation among examination groups

DAY (BATCH): blood-draw day variation

ALC: current alcohol use

CSMOK: current smoking

OCC: occupation

GRP: group

DRKYR: lifetime alcohol use (drink-years)

PACKYR: lifetime smoking (pack-years)

****Group-by-covariate interaction - adjusted mean, confidence interval, and p-value not presented.

TABLE Q-7.

Summary of Group-by-Covariate Interactions for Cell Surface Markers
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch Hand	Original Comparison	
Total T Cells	Group-by-Race	Nonblack	n	424	391	0.324
			Adj. Mean	1,601.7	1,567.3	
			95% C.I.	(1,554.6, 1,649.6)	(1,518.6, 1,161.6)	
		Black	n	18	23	0.043
			Adj. Mean	1,558.3	1,888.6	
			95% C.I.	(1,338.6, 1,794.8)	(1,673.1, 2,117.1)	
Suppressor T Cells	Group-by-Race	Nonblack	n	444	402	0.960
			Adj. Mean	530.0	530.8	
			95% C.I.	(505.5, 555.6)	(506.2, 556.6)	
		Black	n	21	23	0.008
			Adj. Mean	497.5	708.8	
			95% C.I.	(411.0, 602.2)	(589.6, 852.2)	
Monocytes	Group-by-Age	Born ≥ 1942	n	174	162	0.048
			Adj. Mean	41.39	48.02	
			95% C.I.	(36.88, 46.44)	(42.89, 53.76)	
		Born 1923-1941	n	247	232	0.058
			Adj. Mean	48.20	42.82	
			95% C.I.	(44.04, 52.76)	(39.02, 46.99)	
		Born ≤ 1922	n	19	20	0.924
			Adj. Mean	47.88	46.90	
			95% C.I.	(35.06, 65.40)	(34.85, 63.13)	
T ₄ /T ₈ Ratio	Group-by- Current Smoking (Cigarettes/ day)	0	n	277	273	0.454
			Adj. Mean	1.44	1.48	
			95% C.I.	(1.36, 1.52)	(1.40, 1.56)	
		>0-20	n	78	69	0.811
			Adj. Mean	1.70	1.73	
			95% C.I.	(1.54, 1.88)	(1.56, 1.92)	
		>20-40	n	90	71	0.004
			Adj. Mean	1.84	1.51	
			95% C.I.	(1.68, 2.01)	(1.36, 1.67)	
		>40	n	16	8	0.895
			Adj. Mean	1.70	1.75	
			95% C.I.	(1.38, 2.11)	(1.30, 2.35)	

TABLE Q-8.

Unadjusted Analyses for Functional
Stimulation Tests by Group
(Original Comparisons Only)

Variable	Statistic	Group		p-Value
		Ranch Hands	Original Comparison	
Unstimulated Response (PHA)	n	464	426	0.608
	Mean	1,669	1,640	
	95% C.I.	(1,578, 1,755)	(1,559, 1,724)	
PHA Net Response	n	463	425	0.168
	Mean	212,481	206,796	
	95% C.I.	(206,424, 218,539)	(200,733, 212,858)	
Pokeweed Net Response	n	465	426	0.522
	Mean	85,559	83,724	
	95% C.I.	(81,373, 89,849)	(79,579, 87,974)	
MLC Net Response	n	452	415	0.285
	Mean	79,451	82,387	
	95% C.I.	(75,485, 83,519)	(78,363, 86,512)	

TABLE Q-9.

Adjusted Analyses for Functional Stimulation Tests by Group
(Original Comparisons Only)

Variable	Statistic	Group		p-Value	Covariate Remarks
		Ranch Hand	Original Comparison		
Unstimulated Response (PHA)	n	464	426	0.613	BATCH (p<0.001)
	Adj. Mean	1,813	1,783		DAY (BATCH) (p<0.001)
	95% C.I.	(1,645, 1,997)	(1,620, 1,962)		RACE (p<0.001) AGE (p<0.001)
PHA Net Response	n	461	423	****	BATCH (p<0.001)
	Adj. Mean	****	****		DAY (BATCH) (p<0.001)
	95% C.I.	****	****		GRP*OCC (p=0.017) RACE (p=0.005) AGE (p=0.001) ALC*CSMOK (p=0.037)
Pokeweed Net Response	n	465	426	0.746	BATCH (p<0.001)
	Adj. Mean	92,684	91,738		DAY (BATCH) (p<0.001)
	95% C.I.	(86,712, 98,855)	(85,660, 98,023)		OCC (p=0.046) CSMOK (p<0.001)
MLC Net Response	n	431	405	0.197	BATCH (p<0.001)
	Adj. Mean	79,412	82,916		DAY (BATCH) (p<0.001)
	95% C.I.	(73,680, 85,359)	(76,848, 89,214)		ALC (p<0.001) DRKYR (p=0.001) CSMOK (p<0.001)

****Group-by-covariate interaction - adjusted mean, confidence interval, and p-value not presented.

TABLE Q-10.

Summary of Group-by-Covariate Interactions for Functional Stimulation Tests
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		p-Value
				Ranch Hand	Original Comparison	
PHA Net Response	Group-by-Occupation	Officer	n	180	163	
			Adj. Mean	217,397	210,363	0.280
			95% C.I.	(201,412, 233,382)	(193,843, 226,883)	
		Enlisted Flyer	n	78	77	
			Adj. Mean	230,597	202,077	0.003
			95% C.I.	(212,032, 249,162)	(183,749, 220,405)	
		Enlisted Groundcrew	n	203	183	
			Adj. Mean	208,347	212,473	0.504
			95% C.I.	(193,386, 223,308)	(197,550, 227,397)	
MLC Net Response	Group-by-Lifetime Smoking (Pack-years)	0	n	129	109	
			Adj. Mean	78,900	87,110	0.107
			95% C.I.	(69,737, 88,627)	(77,309, 97,496)	
		>0-20	n	201	206	
			Adj. Mean	76,689	83,468	0.079
			95% C.I.	(69,735, 83,973)	(76,169, 91,101)	
		>20-40	n	71	67	
			Adj. Mean	86,904	75,456	0.086
			95% C.I.	(77,241, 97,135)	(65,854, 85,711)	
		>40	n	29	23	
			Adj. Mean	80,525	75,984	0.679
			95% C.I.	(66,260, 96,180)	(60,806, 92,850)	

APPENDIX R
Pulmonary Disease

APPENDIX R: Pulmonary Disease

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APPENDIX R: Pulmonary Disease

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TABLE R-1.
Unadjusted Analyses of Respiratory Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Asthma	n	1,016		954			
	Abnormal Normal	44 972	4.3 95.7	42 912	4.4 95.6	0.98 (0.64,1.51)	0.92
Bronchitis	n	1,015		954			
	Abnormal Normal	129 886	12.7 87.3	131 823	13.7 86.3	0.91 (0.71,1.19)	0.50
Pleurisy	n	1,016		953			
	Abnormal Normal	47 969	4.6 95.4	45 908	4.7 95.3	0.98 (0.65,1.49)	0.92
Pneumonia	n	1,016		953			
	Abnormal Normal	195 821	19.2 80.8	191 762	20.0 80.0	0.95 (0.76,1.18)	0.64
Tuberculosis	n	1,015		954			
	Abnormal Normal	7 1,008	0.7 99.3	5 949	0.5 99.5	1.32 (0.43,3.97)	0.64
Thorax & Lungs	n	1,015		955			
	Abnormal Normal	61 954	6.0 94.0	45 910	4.7 95.3	1.29 (0.87,1.92)	0.20

TABLE K-1. (continued)

Unadjusted Analyses of Respiratory Variables by Group
(Original Comparisons Only)

Variable	Statistic	Group				Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand		Original Comparison			
		Number	Percent	Number	Percent		
Asymmetrical Exp.	n	1,015		955			
	Abnormal	2	0.2	2	0.2	0.94 (0.16, 5.49)	0.95
	Normal	1,013	99.8	953	99.8		
Hyperresonance	n	1,015		955			
	Abnormal	30	3.0	28	2.9	1.01 (0.60, 1.69)	0.98
	Normal	985	97.0	927	97.1		
Dullness	n	1,015		955			
	Abnormal	2	0.2	0	0.0	--	0.17
	Normal	1,013	99.8	955	100.0		
Wheezes	n	1,015		955			
	Abnormal	24	2.4	16	1.7	1.42 (0.76, 2.67)	0.28
	Normal	991	97.6	939	98.3		
Rales	n	1,015		955			
	Abnormal	6	0.6	4	0.4	1.41 (0.42, 4.70)	0.59
	Normal	1,009	99.4	951	99.6		
X ray	n	1,012		951			
	Abnormal	102	10.1	113	11.9	0.83 (0.63, 1.10)	0.20
	Normal	910	89.9	838	88.1		

TABLE R-2.

Adjusted Analyses of Respiratory Variables by Group
(Original Comparisons Only)

Variable	Group		Original Comparison	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
	Ranch	Hand				
Asthma	1,012		953	****	****	PACKYR (p=0.02) GRP*PACKYR (p=0.03)
Bronchitis	1,011		953	0.91 (0.70,1.18)	0.44	GRP*PACKYR (Borderline: p=0.09)
Pleurisy	1,012		952	****	****	GRP*PACKYR (p=0.0006)
Pneumonia	1,012		952	0.97 (0.77,1.22)	0.74	AGE (p=0.002)
Tuberculosis	1,011		953	1.32 (0.43,3.98)	0.60	GRP*PACKYR (Borderline: p=0.06)
Thorax and Lungs	1,011		954	1.33 (0.88,2.01)	0.14	AGE (p<0.0001) PACKYR (p<0.0001)
Asymmetrical Exp.	1,011		954	0.94 (0.16,5.50)	0.97	AGE*PACKYR (Borderline: p=0.08)
Hyperresonance	1,011		954	1.00 (0.58,1.74)	0.87	AGE (p<0.0001) PACKYR (p<0.0001) GRP*PACKYR (Borderline: p=0.09)

TABLE R-2. (continued)

Adjusted Analyses of Respiratory Variables by Group
(Original Comparisons Only)

Variable	Group		Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks*
	Ranch Hand	Original Comparison			
Dullness	1,011	954	--	--	None
Wheezes	1,011	954	1.43 (0.75, 2.76)	0.25	PACKYR (p<0.0006)
Rales	1,011	954	1.42 (0.39, 5.18)	0.59	AGE*PACKYR (p=0.04) GRP*AGE (p=0.09)
X Ray	1,008	950	0.86 (0.64, 1.16)	0.31	AGE (p<0.0001) PACKYR (p=0.02) GRP*PACKYR (Borderline: p=0.07)

*Abbreviations

PACKYR: lifetime smoking history (pack-years)

GRP: group

TABLE R-3.

Summary of Group-by-Covariate Interactions for Respiratory Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group			Adj. Relative Risk (95% C.I.)	p-Value	
				Ranch Hand		Original Comparison			
				Number	Percent				
Asthma	Group-by-Pack-Year	0	n	291	268				
			Abnormal	11	3.78	2	1.12	4.78 (1.39,15.56)	0.04
			Normal	280	96.22	265	98.88		
	>0-10		n	284	280				
			Abnormal	16	5.63	12	4.29	1.33 (0.63,2.83)	0.46
			Normal	268	94.37	268	95.71		
>10		n	437	405					
		Abnormal	17	3.89	27	6.67	0.57 (0.31,1.05)	0.07	
		Normal	420	96.11	378	93.33			
Bronchitis	Group-by-Pack-Year	0	n	291	268				
			Abnormal	38	13.06	25	9.33	1.46 (0.86,2.48)	0.16
			Normal	253	86.94	243	90.67		
	>0-10		n	284	280				
			Abnormal	38	13.38	40	14.29	0.93 (0.58,1.49)	0.75
			Normal	246	86.62	240	85.71		
>10		n	436	405					
		Abnormal	52	11.93	66	16.30	0.70 (0.47,1.03)	0.07	
		Normal	384	88.07	339	83.70			

TABLE R-3. (continued)

Summary of Group-by-Covariate Interactions for Respiratory Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group		Original Comparison	Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand				
				Number	Percent.			
Pleurisy	Group-by-Pack-Year	0	n	291	267			
			Abnormal	8	2.75	5	1.87	0.49
			Normal	283	97.25	262	98.13	
	>0-10	n	284	280				
		Abnormal	18	6.34	4	1.43	<0.001	
		Normal	266	93.66	276	98.57		
Tuberculosis	Group-by-Pack-Year	0	n	437	405			
			Abnormal	21	4.81	36	8.89	0.02
			Normal	416	95.19	369	91.11	
	>0-10	n	290	268				
		Abnormal	1	0.34	3	1.12	0.28	
		Normal	289	99.66	265	98.88		
Pleurisy	Group-by-Pack-Year	>0-10	n	284	280			
			Abnormal	4	1.41	0	0.00	0.05
			Normal	280	98.59	280	100.00	
	>10	n	437	405				
		Abnormal	2	0.46	2	0.49	0.92	
		Normal	435	99.54	403	99.51		

TABLE R-3. (continued)

Summary of Group-by-Covariate Interactions for Respiratory Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
Hyper-resonance	Group-by-Pack-Year	0	n	291		268			
			Abnormal	2	0.69	0	0.00		0.17
		Normal	289	99.31	268	100.00			
		>0-10	n	283		281			
			Abnormal	8	2.83	3	1.07		0.13
		Normal	275	97.17	278	98.93			
Rales	Group-by-Age	>10	n	437		405			
			Abnormal	20	4.58	25	6.17		0.30
			Normal	417	95.42	380	93.83		
		Born >1942	n	384		341			
			Abnormal	1	0.26	0	0.00		0.35
			Normal	383	99.74	341	100.00		
		Born 1922-1942	n	600		577			
			Abnormal	5	0.83	4	0.69		0.78
			Normal	595	99.17	573	99.31		
		Born <1922	n	27		36			
			Abnormal	0	0.00	0	0.00		—
			Normal	27	100.00	36	100.00		

TABLE R-3. (continued)

Summary of Group-by-Covariate Interactions for Respiratory Variables
(Original Comparisons Only)

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Original Comparison			
				Number	Percent	Number	Percent		
X Ray	Group-by-Pack-Year	0	n	290		266			
			Abnormal	15	5.17	29	10.90	0.45 (0.24,0.85)	0.01
		Normal	275	94.83	237	89.10			
		>0-10	n	282		281			
	Abnormal		28	9.93	26	9.25	1.08 (0.62, 1.89)	0.79	
	Normal		254	90.07	255	90.75			
	>10	n	436		403				
		Abnormal	59	13.53	58	14.39	0.93 (0.63, 1.37)	0.72	
		Normal	377	86.47	345	85.61			

OFFICERS

The statistically significant bronchitis-by-exposure-by-age-by-pack-year interaction ($p=0.009$) shown in Table 20-5 is described here in Table R-4.

TABLE R-4.
Cross Tabulation of Bronchitis- (Abnormal, Total) by-Exposure Index
Category-by-Age Category-by-Pack-Year Category for Ranch Hand Officers

Pack-Years	Age	Exposure Index					
		Low		Medium		High	
		Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent
0	Born >1942	4	21 19	0	10 0	1	3 33
	Born 1922-1942	3	32 9	7	36 19	8	44 10
	Born <1922	0	3 0	0	3 0	0	0 0
>0-10	Born >1942	1	14 7	2	7 29	0	0 0
	Born 1922-1942	2	15 13	5	19 26	1	26 4
	Born <1922	0	0 0	0	3 0	0	1 0
>10	Born >1942	0	3 0	2	4 50	0	4 0
	Born 1922-1942	8	39 21	3	43 7	4	44 9
	Born <1922	0	0 0	1	5 20	0	1 0

TABLE R-5.

Cross Tabulation of Pneumonia- (Abnormal, Total) by-Exposure Index Category-by-Age Category-by-Pack-Year Category for Ranch Hand Officers

Exposure Index											
Pack-Years		Age	Low			Medium			High		
			Abnormal	Total	Percent	Abnormal	Total	Percent	Abnormal	Total	Percent
0	Born	>1942	6	21	29	0	10	0	1	3	33
	Born	1922-1942	6	22	19	6	36	17	10	44	23
	Born	<1922	0	3	0	1	3	33	0	0	
>0-10	Born	>1942	1	14	7	1	7	14	0	0	
	Born	1922-1942	4	15	27	4	19	21	9	26	35
	Born	<1922	0	0		0	3	0	1	1	100
>10	Born	>1942	0	3	0	1	4	25	0	4	0
	Born	1922-1942	9	39	23	6	43	14	8	44	18
	Born	<1922	0	0		1	5	20	0	1	0

The statistically significant hyperresonance-by-exposure-by-pack-year interaction (p=0.07) seen in Table 20-5 is tabulated in Table R-6.

TABLE R-6.

Cross Tabulation of Hyperresonance- (Abnormal, Total) by-Exposure Index Category-
by-Pack-Year Category for Ranch Hand Officers

Pack-Years	Exposure Index					
	Low		Medium		High	
	Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent
0	0	56	0	49	1	47
>0-10	0	29	1	29	1	27
>10	5	42	1	52	0	49

The statistically significant thorax- and lung-by-exposure category interaction ($p=0.05$) shown in Table 20-5 is tabulated in Table R-7.

TABLE R-7.
Cross Tabulation of Thorax and Lung- (Abnormal, Total) by- Exposure
Index Category for Ranch Hand Officers

		Exposure Index					
		Low		Medium		High	
		Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent
9	127	7	3	130	2	5	123
							4

R-13

**Cross Tabulation of X Ray- (Abnormal, Total) by-Exposure Index Category-
by-Age Category-by-Pack-Year Category for Ranch Hand Officers**

		Exposure Index								
Pack-Years	Age	Low			Medium			High		
		Abnormal	Total	Percent	Abnormal	Total	Percent	Abnormal	Total	Percent
0	Born >1942	1	21	5	0	10	0	0	3	0
	Born 1922-1942	3	32	9	1	36	3	2	44	5
	Born <1922	0	3	0	0	3	0	0	0	
>0-10	Born >1942	0	14	0	0	6	0	0	0	
	Born 1922-1942	3	15	20	3	19	16	2	26	8
	Born <1922	0	0		1	3	33	0	1	0
>10	Born >1942	0	3	0	0	4	0	0	4	0
	Born 1922-1942	7	39	18	7	43	16	2	44	5
	Born <1922	0	0		1	5	20	1	1	100

ENLISTED FLYERS

The statistically significant bronchitis-by-exposure-by-age-by-pack-year interaction ($p=0.005$) seen in Table 20-6 is tabulated in Table R-9.

TABLE R-9.

Cross Tabulation of Bronchitis- (Abnormal, Total) by-Exposure Index
Category-by-Age Category-by-Pack-Year Category for Ranch Hand Enlisted Flyers

Pack-Years	Age	Exposure Index					
		Low		Medium		High	
		Abnormal	Total	Abnormal	Total	Abnormal	Total
0	Born >1942	2	3	0	3	0	3
	Born <1942	0	6	0	6	1	11
>0-10	Born >1942	1	4	1	6	2	2
	Born <1942	1	13	1	9	0	7
>10	Born >1942	0	2	0	7	0	2
	Born <1942	3	26	6	32	3	31
							10

R-15

Cross Tabulation of Pleurisy- (Abnormal, Total) by-Exposure Index Category-by-Age Category-by-Pack-Year Category for Ranch Hand Enlisted Flyers

		Exposure Index						
Pack-Years	Age	Low		Medium		High		
		Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent	
0	Born >1942	0	3	0	3	0	3	0
	Born <1942	0	6	0	6	0	11	0
>0-10	Born >1942	1	4	25	6	0	2	50
	Born <1942	1	13	8	9	11	7	0
>10	Born >1942	1	2	50	7	0	2	0
	Born <1942	1	26	4	32	3	32	6

The statistically borderline significant pneumonia-by-exposure-by-age interaction ($p=0.08$) shown in Table 20-6 is tabulated in Table R-11.

TABLE R-11.

Cross Tabulation of Pneumonia- (Abnormal, Total) -by-Exposure Index
Category-by-Age Category for Ranch Hand Enlisted Flyers

Age	Exposure Index					
	Low		Medium		High	
	Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent
Born >1942	4	9	2	16	0	7
Born ≤1942	10	44	10	47	13	50
		22		21		26

The statistically borderline significant hyperresonance-by-exposure-by-pack-year category interaction ($p=0.08$) shown in Table 20-6 is tabulated in Table R-12.

TABLE R-12.

Cross Tabulation of Hyperresonance- (Abnormal, Total) by-Exposure Index
Category-by-Pack-Year Category for Ranch Hand Enlisted Flyers

Pack-Years	Exposure Index					
	Low		Medium		High	
	Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent
0	0	9	0	9	0	14
>0-10	0	17	2	15	0	9
>10	3	28	4	39	0	34

The statistically significant ($p=0.04$) thorax and lung-by-exposure interaction shown in Table 20-6 is tabulated in Table R-13.

TABLE R-13.
Cross Tabulation of Thorax and Lung Abnormalities- (Abnormal, Total)
by-Exposure Index Category for Ranch Hand Enlisted Flyers

		Exposure Index					
		Low		Medium		High	
Abnormal	Total	Percent	Abnormal	Total	Percent	Abnormal	Total
7	54	13	10	63	16	2	57
							4

ENLISTED GROUND

The statistically significant asthma-by-exposure-by-age-by-pack-year interaction ($p=0.02$) shown in Table 20-7 is tabulated in Table R-14.

TABLE R-14.

Cross Tabulation of Asthma- (Abnormal, Total) by-Exposure Index Category-by-Age Category-by-Pack-Year Category for Ranch Hand Enlisted Groundcrew

Pack-Years Age		Exposure Index					
		Low		Medium		High	
		Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent
0	Born >1942	1	24	1	35	1	15
	Born 1922-1942	0	18	0	6	0	9
	Born <1922	0	0	0	0	0	0
>0-10	Born >1942	0	37	2	47	4	36
	Born 1922-1942	1	16	1	7	0	13
	Born <1922	0	0	0	0	0	1
>10	Born >1942	0	22	4	46	0	25
	Born 1922-1942	4	33	0	21	2	37
	Born <1922	0	3	0	1	1	5

The statistically significant pleurisy-by-exposure-by-age interaction ($p=0.03$) shown in Table 20-7 is tabulated in Table R-15.

TABLE R-15.

Cross Tabulation of Pleurisy-(Abnormal, Total) by-Exposure Index Category-by-Age Category for Ranch Hand Enlisted Groundcrew

Age	Exposure Index					
	Low		Medium		High	
	Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent
Born >1942	5	83	5	128	0	76
Born 1922-1942	7	67	0	34	5	59
Born <1922	0	3	0	1	0	6

The statistically significant wheeze-by-exposure-by-age interaction ($p=0.009$) shown in Table 20-7 is tabulated in Table R-16.

TABLE R-16.

Cross Tabulation of Wheezes- (Abnormal, Total) by-Exposure Index Category-by-Age Category for Ranch Hand Enlisted Groundcrew

Age	Exposure Index					
	Low		Medium		High	
	Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent
Born >1942	2	83	1	127	3	76
Born 1922-1942	1	67	3	34	2	59
Born <1922	0	3	0	1	0	6

The statistically significant wheeze-by-exposure-by-pack-year interaction ($p=0.02$) shown in Table 20-7 is tabulated in Table R-17.

TABLE R-17.

Cross Tabulation of Wheezes- (Abnormal, Total) by-Exposure Index Category-by-Pack-Year Category for Ranch Hand Enlisted Groundcrew

Pack-Years	Exposure Index					
	Low		Medium		High	
	Abnormal	Total Percent	Abnormal	Total Percent	Abnormal	Total Percent
0	0	42	0	41	0	24
>0-10	2	53	3	53	1	50
>10	1	58	1	68	4	67

The statistically borderline significant bronchitis-by-exposure category interaction ($p=0.08$) shown in Table 20-7 is tabulated in Table R-18.

TABLE R-18.
Cross Tabulation of Bronchitis- (Abnormal, Total) by-Exposure Index
Category for Ranch Hand Enlisted Groundcrew

Exposure Index								
Low			Medium		High			
Abnormal	Total	Percent	Abnormal	Total	Percent	Abnormal	Total	Percent
25	153	16	19	163	12	11	141	8

APPENDIX S

Glossary of Abbreviations

APPENDIX S: Glossary of Abbreviations

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TABLE S-1

GLOSSARY OF TECHNICAL AND MEDICAL ABBREVIATIONS

-A-		CHECO	- contemporary historical evaluation and combat operations
A	- replacement Comparisons interviewed by Air Force staff	CHOL	- cholesterol
ACA®	- Automated Chemical Analyser	CMI	- Cornell Medical Index
ACTH	- adrenocorticotrophic hormone	CNS	- central nervous system
AFHS	- Air Force Health Study	COPRO	- coproporphyrins
ALA	- delta-aminolevulinic acid	CPK	- creatine phosphokinase
ALKPHOS	- alkaline phosphatase	cpm	- counts per minute
-B-		CUSUM	- cumulative sum
BA	- Bachelor of Arts	CV	- coefficient of variation
BMDP-4F®	- log-linear program	-D-	
BMDP-LR®	- logistic regression program	DBP	- diastolic blood pressure
BS	- Bachelor of Science	DNA	- deoxyribonucleic acid
BSL-2	- National Institutes of Health Biosafety Level 2	-E-	
BUN	- blood urea nitrogen	E	- erythema
-C-		ECG	- electrocardiograph
CAD	- coronary artery disease	EEG	- electroencephalogram
CAP	- College of American Pathology	-F-	
CATI	- computer-aided telephone interview	FC	- fully compliant
CBC	- complete blood count	FEF ₂₅₋₇₅	- forced midexpiratory flow rate
CFU	- colony forming unit	FEV	- forced expiratory volume
CHD	- coronary heart disease	FEV ₁	- forced expiratory volume in one second
		FIR CUSUM	- fast initial response cumulative sum

TABLE S-1 (continued)

GLOSSARY OF TECHNICAL AND MEDICAL ABBREVIATIONS

FSH	- follicle stimulating hormone	ICD-9-CMD	- International Classification of Disease 9th Revision, Clinical Modification
FTA	- fluorescent treponemal antibody		
FTI	- free thyroxine index	IQ	- intelligence quotient
FVC	- forced vital capacity		-K-
	-G-	K-S	- Kolmogorov-Smirnov
GED	- General Equivalency Diploma		-L-
GGTP	- gamma-glutamyl transpeptidase	LBBB	- left bundle branch block
GLUC	- glucose	LDH	- lactic dehydrogenase
	-H-	LH	- leuteinizing hormone
HB _s Ag	- hepatitis B surface antigen		-M-
HCT	- hematocrit	MCH	- mean corpuscular hemoglobin
HD	- Hodgkin's Disease	MCHC	- mean corpuscular hemoglobin concentration
HDL	- high density lipoprotein	MCV	- mean corpuscular volume
HGB	- hemoglobin	MI	- myocardial infarction
HLA	- histocompatibility antigens	ML	- malignant lymphoma
HPF	- high-power field	MLC	- mixed lymphocyte culture
HRB	- Halstead-Reitan battery	MMPI	- Minnesota Multiphasic Personality Inventory
	-I-	MMPID	- MMPI depression scale
I	- induration		-N-
IARC	- International Agency for Research on Cancer	NIOSH	- National Institute for Occupational Safety and Health
ICD	- International Classification of Disease		

TABLE S-1 (continued)

GLOSSARY OF TECHNICAL AND MEDICAL ABBREVIATIONS

NC	- noncompliant	PULM	- FEV ₁ /FVC ratio
NCI	- National Cancer Institute	PULSE	- pulse index
NCVA	- nerve conduction velocity above the ankle	PWM	- pokeweed mitogen
NCVE	- nerve conduction velocity above the elbow		-Q-
NHL	- non-Hodgkin's lymphoma	QA	- quality assurance
NKC	- natural killer cell	QC	- quality control
NORC	- National Opinion Research Center	QRC	- Quality Review Committee
NOS	- not otherwise specified		-R-
	-O-	R	- replacement Comparisons
O	- original Comparisons	RBBB	- right bundle branch block
OMR	- Optical Mark Recognition	RBC	- red blood cell
	-P-	RIA	- radioimmunoassay
PBM	- peripheral blood mononuclear	RPR	- rapid plasma reagin
PC	- partially compliant	RVN	- Republic of Vietnam
PCB	- polychlorinated biphenyl		-S-
PCT	- porphyria cutanea tarda	S	- shifted original Comparisons
PHA	- phytohemagglutinin	SAIC	- Science Applications International Corporation
PLAT	- platelet count	SAS®	- Statistical Analysis System
PLT	- platelet count	SAS®-GLM	- Statistical Analysis System general linear model
PMR	- proportionate mortality ratio	SCRF	- Scripps Clinic and Research Foundation
POMS	- profile of mood states	SEA	- Southeast Asia
PTSD	- post-traumatic stress disorder		

TABLE S-1 (continued)

GLOSSARY OF TECHNICAL AND MEDICAL ABBREVIATIONS

SED	- sedimentation rate		-W-
SEMEN	- semen count	WAIS	- Wechsler Adult Intelligence Scale
SGOT	- serum glutamic-oxaloacetic transaminase	WBC	- white blood cell
SGPT	- serum glutamic-pyruvic transaminase		
SIRL	- Scripps Immunology Reference Laboratory		
SKIN	- skin index		
STS	- soft tissue sarcoma		
-T-			
T ₃	- triiodothyronine		
T ₄	- total thyroxine		
TBILI	- total bilirubin		
TCDD	- 2,3,7,8-tetrachlorodibenzo-p-dioxin		
TEST	- testosterone		
TLC	- total lymphocyte count		
TSH	- thyroid stimulating hormone		
-U-			
USG	- urine specific gravity		
-V-			
VA	- Veterans Administration		

TABLE S-2.

Glossary of Covariate and Statistical Abbreviations

-A-		d.f.	- degrees of freedom
ALC	- current alcohol use (drinks/day)	DIAB	- diabetic class
Adj. RR	- adjusted relative risk	DIFCORT	- differential cortisol
-B-		DRKYR	- lifetime alcohol history (drink-years)
BATCH	- batch-to-batch variation among examination groups	-E-	
BUN	- blood urea nitrogen	EDUC	- education
-C-		Est. RR	- estimated relative risk
C.I.	- confidence interval	-G-	
CC	- continuous dependent variable, adjusted by continuous covariates	GRP	- group
-D-		-H-	
CD	- continuous dependent variable, adjusted by discrete covariates	H	- high exposure index level
CHOL	- cholesterol	HDL	- high density lipoprotein cholesterol
CHOL/HDL	- cholesterol to HDL ratio	-I-	
CI	- combat index	IC	- exposure to industrial chemicals
CSMOK	- current smoking (packs/day)	INS	- exposure to insecticides
-D-		-L-	
DAY(BATCH)	- blood-draw day variation within batch	L	- low exposure index level
DC	- exposure to degreasing chemicals	LAT	- average lifetime residential latitude
DD	- discrete dependent variable, adjusted by discrete covariates	LOG	- logarithmic

TABLE S-2. (continued)

Glossary of Covariate and Statistical Abbreviations

-M-

M - medium exposure index level

-N-

NS - not significant

-O-

OCC - occupation

OR - odds ratio

-P-

PACKYR - lifetime smoking history (pack-years)

%BFAT - percent body fat

PERSTYPE - personality type

PS - personality score

PTSD - post-traumatic stress disorder

-R-

RR - relative risk

-S-

SE - standard error

SEA ACNE - presence of pre-SEA acne

SKIN - skin color

SQRT - square root

SUNREAC - sun-reaction index

-W-

WINE - wine consumption

EWID
DATE
FILMED
3-1988
DTIC