

TABLE K-9. (continued)

Unadjusted Continuous and Categorical Analyses for Hepatic Function Variables
and Two Porphyrin Determinations by Group
(Original Comparisons Only)

		Group					
Variable	Statistic	Ranch Hand		Original Comparison		Est. Relative Risk (95% C.I.)	p-Value
Total Bilirubin	n	1,009		952			
	Mean	0.74		0.75		—	0.772
	95% C.I.	(0.73,0.76)		(0.73,0.76)			
	Number/%						
	Normal	982	97.3%	919	96.5%	0.77 (0.46, 1.28)	0.310
	High	27	2.7%	33	3.5%		
Direct Bilirubin	n	1,009		952			
	Mean	0.28		0.28		—	0.795
	95% C.I.	(0.27,0.28)		(0.27,0.28)			
	Number/%						
	Normal	971	96.2%	920	96.6%	1.13 (0.70, 1.82)	0.629
	High	38	3.8%	32	3.4%		
LDH	n	1,009		952			
	Mean	123.5		124.3		—	0.449
	95% C.I.	(122.2,124.8)		(122.8,125.7)			
	Number/%						
	Normal	999	99.0%	941	98.8%	0.86 (0.36,2.02)	0.724
	High	10	1.0%	11	1.2%		
Cholesterol	n	1,009		952			
	Mean	214.3		216.7		—	0.205
	95% C.I.	(211.8,216.8)		(214.0,219.3)			
	Number/%						
	Normal	863	85.5%	778	81.7%	0.76 (0.60,0.96)	0.023
	High	146	14.5%	174	18.3%		

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		Original Comparison	Est. Relative Risk (95% C.I.)	p-Value
		Ranch Hand				
Triglycerides	n	1,009		952	—	0.908
	Mean	118.5		118.1		
	95% C.I.	(113.8,123.3)		(113.4,122.9)		
	Number/%				1.06 (0.74,1.51)	0.767
	Normal	941	93.3%	891 93.6%		
High	68	6.7%	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			
SGOT	CC	n Adj. Mean 95% C.I.	1,003 34.69 (33.66,35.75)	949 34.64 (33.61,35.70)		0.908	ALC*DC (p<0.001) AGE*ALC (p=0.033) RACE (p=0.003)
	CD	n Adj. Mean 95% C.I.	1,003 35.97 (34.82,37.17)	949 35.99 (34.83,37.18)		0.974	RACE (p=0.004) ALC (p<0.001) IC (p=0.032) DC (p=0.044)
	DD	n	1,003	949	0.93 (0.66,1.29)	0.655	AGE*ALC (p<0.001) OOC*ALC (p<0.001) RACE (p=0.026)
SGPT	CC	n Adj. Mean 95% C.I.	1,003 21.52 (20.89,22.17)	949 22.53 (21.86,23.23)		0.035	ALC*DC (p=0.002) AGE*ALC (p=0.006)
	CD	n Adj. Mean 95% C.I.	1,003 21.49 (20.21,22.86)	949 22.52 (21.18,23.96)		0.032	ALC*DC (p=0.043) AGE*ALC (p=0.008)
	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	CC	n Adj. Mean 95% C.I.	1,003 37.47 (34.93,40.20)	949 37.39 (34.84,40.12)	—	0.941	ALC*DC (p<0.001) AGE*DC (p=0.029) RACE*IC (p=0.005)
	CD	n Adj. Mean 95% C.I.	1,003 42.35 (38.17,46.98)	949 42.24 (38.08,46.86)	—	0.932	AGE*ALC (p=0.006) RACE (p<0.001)
	DD	n	1,003	949	0.94 (0.68,1.28)	0.680	AGE*ALC (p=0.005) RACE (p=0.049)
Alkaline Phosphatase	CC	n Adj. Mean 95% C.I.	1,003 91.5 (89.1,93.9)	950 89.1 (86.8, 91.5)	—	0.020	RACE*IC (p=0.002) WINE (p<0.001) AGE (p<0.001) OCC (p<0.001)
	CD	n Adj. Mean 95% C.I.	1,003 **** ****	950 **** ****	—	****	GRP*IC (p=0.006) AGE*IC (p=0.040) RACE*IC (p=0.002) WINE (p<0.001) OCC (p<0.001)
	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) OCC*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	CC	n	1,003	949		0.714	CCC*RACE (p=0.002) ALC*RACE (p=0.008) AGE*DC (p=0.043)
		Adj. Mean	0.78	0.78			
		95% C.I.	(0.75,0.81)	(0.75,0.82)			
	CD	n	1,003	949		0.774	CCC*RACE (p=0.003) CCC*ALC (p=0.047) RACE*ALC (p=0.002)
		Adj. Mean	0.84	0.84			
		95% C.I.	(0.80,0.88)	(0.80,0.88)			
DD	n	1,009	952	0.77 (0.46,1.29)	0.314	RACE (p<0.001)	
Direct Bilirubin	CC	n	1,003	949		0.746	ALC (p<0.001)
		Adj. Mean	(0.278)	0.276			
		95% C.I.	(0.271,0.285)	(0.269,0.283)			
	CD	n	1,003	949		0.673	IC*DC (p=0.014) ALC*DC (p=0.012) ALC*RACE (p=0.030) ALC*CCC (p=0.007)
		Adj. Mean	0.308	0.305			
		95% C.I.	(0.291,0.325)	(0.288,0.323)			
	DD	n	1,003	949	****	****	GRP*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	CC	n Adj. Mean 95% C.I.	1,009 **** ****	952 **** ****	—	****	GRP*AGE (p=0.038) IC*RACE (p=0.029) IC*OCC (p=0.049)
	CD	n Adj. Mean 95% C.I.	1,009 129.4 (126.5,132.2)	952 130.0 (127.2,132.9)	—	0.555	AGE (p<0.001) RACE (p=0.006)
	ID	n	1,003	949	0.85 (0.36,2.01)	0.706	ALC (p=0.046)
Cholesterol	CC	n Adj. Mean 95% C.I.	1,003 219.3 (214.1,224.6)	949 221.3 (216.0,226.6)	—	0.301	OCC*RACE (p=0.003) DC*RACE (p=0.006) AGE (p<0.001) ALC (p<0.001) IC (p=0.016)
	CD	n Adj. Mean 95% C.I.	1,003 223.7 (217.3,230.3)	949 226.0 (219.6,232.5)	—	0.243	OCC*RACE (p=0.029) ALC (p<0.001) AGE (p<0.001)
	ID	n	1,003	949	0.74 (0.58,0.94)	0.015	RACE*ALC (p=0.009) AGE (p=0.020) OCC (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			
Triglycerides	CC	n Adj. Mean 95% C.I.	1,003 **** ****	949 **** ****	—	****	GRP*AGE (p=0.012) ALC (p<0.001) RACE (p<0.001) OCC (p<0.001)
	CD	n Adj. Mean 95% C.I.	1,003 112.7 (103.4,122.9)	949 112.3 (103.1,122.4)	—	0.904	OCC (p<0.001) RACE (p<0.001) AGE (p<0.001) ALC (p=0.007)
	DD	n	1,003	949	1.06 (0.74,1.51)	0.770	AGE*ALC (p=0.023) RACE (p=0.044)
Uroporphyrin	CC	n Adj. Mean 95% C.I.	1,000 **** ****	946 **** ****	—	****	GRP*BUN (p=0.014) OCC*DC (p=0.006) ALC (p=0.048)

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			
Coproporphyrin	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
 OCC: 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	0.001
			Mean	94.8	90.0	
			Adj. Mean	96.9	92.1	
			95% C.I.	(93.5,100.6)	(88.8,95.5)	
		Not Exposed to Industrial Chemicals	n	499	444	0.608
			Mean	88.9	89.5	
			Adj. Mean	92.5	93.3	
			95% C.I.	(89.3,95.8)	(90.0,96.7)	
LDH	Group-by-Age	Born ≥ 1942	n	408	369	0.756
			Mean	122.2	121.7	
			Adj. Mean	124.1	123.6	
			95% C.I.	(121.1,127.1)	(120.6,126.7)	
		Born 1923-1941	n	565	538	0.295
			Mean	123.8	125.2	
			Adj. Mean	126.4	127.8	
			95% C.I.	(123.7,129.1)	(125.1,130.5)	
		Born ≤ 1922	n	36	45	0.913
			Mean	135.1	134.6	
			Adj. Mean	138.0	137.4	
			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	0.055
			Mean	107.14	110.24	
			Adj. Mean	95.55	98.49	
			95% C.I.	(87.62, 104.20)	(90.12, 107.63)	
		Born 1923-1941	n	561	536	0.824
			Mean	125.98	124.23	
			Adj. Mean	116.13	115.14	
			95% C.I.	(107.59, 125.35)	(106.64, 124.31)	
		Born ≤ 1922	n	36	45	0.510
			Mean	139.00	106.00	
			Adj. Mean	129.40	98.40	
			95% C.I.	(104.04, 160.94)	(80.80, 119.83)	
Uroporphyrin	Group-by-BUN	BUN ≤ 14	n	547	509	0.005
			Mean	16.23	18.18	
			Adj. Mean	16.39	18.45	
			95% C.I.	(15.41, 17.44)	(17.33, 19.65)	
		BUN > 14	n	453	547	0.479
			Mean	17.79	17.15	
			Adj. Mean	18.02	17.45	
			95% C.I.	(16.85, 19.27)	(16.30, 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		1.96 (1.02,3.80)	0.045
			High	27	5.3	14	2.8		
			Normal	480	94.7	492	97.2		
		Not Exposed to Industrial Chemicals	n	496		443		0.53 (0.25,1.15)	0.107
			High	11	2.2	18	4.1		
			Normal	485	97.8	425	95.9		

TABLE K-13.

Unadjusted Analysis for Interval History of Skin Bruises,
Skin Patches, or Skin Sensitivity by Group
(Original Comparisons Only)

Group	<u>Bruises, Patches, or Sensitivity</u>				Total	p-Value
	<u>Yes</u>		<u>No</u>			
	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	

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		0.98 (0.41,2.38)	0.999
		Abnormal	12	4.5	9	4.6		
		Normal	252	95.5	186	95.4		
	Skin Patch, Bruise, or Sensitivity Not Reported	n	742		754		1.07 (0.69,1.67)	0.821
		Abnormal	42	5.7	40	5.3		
		Normal	700	94.3	714	94.7		

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
		Normal	120	94.5	117	90.0	108	87.8	H vs. L	2.38 (0.94,6.06)	0.075
	Enlisted Flyer	n	55		65		57		Overall		0.401
		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
	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
		Normal	132	85.7	134	82.2	109	76.8	H vs. L	1.82 (1.00,3.30)	0.053
Depigmentation	Officer	n	127		130		123		Overall		0.008
		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
	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
		Normal	45	81.8	58	89.2	49	86.0	H vs. L	0.74 (0.27,2.03)	0.613
	Enlisted Groundcrew	n	154		163		142		Overall		0.045
		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 Flyer	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
	Enlisted Groundcrew	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
Dermatology Index	Officer	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 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*
		Nonblack, 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
	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	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, 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 (Enlisted Groundcrew)	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
		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 (Enlisted Groundcrew)	No pre-SEA Acne	n	101		105		99		Overall		0.314*
			Abnormal	13	12.9	7	6.7	11	11.1	M 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*
		Pre-SEA Acne	n	51		57		41		Overall		0.006*
			Abnormal	2	3.9	0	0.0	6	14.6	M 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	M 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	M 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	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, pre-SEA Acne	n	1		1		1		Overall		0.223*
			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	—	—

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 Original Comparison	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
	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		0.90 (0.74,1.11)	0.352
	Abnormal	250	24.6	253	26.5		
	Normal	766	75.4	701	73.5		
Acneiform Lesions	n	1,016		954		1.14 (0.90,1.43)	0.288
	Abnormal	188	18.5	159	16.7		
	Normal	828	81.5	795	83.3		
Acneiform Scars	n	1,016		954		1.12 (0.87,1.44)	0.401
	Abnormal	150	14.8	128	13.4		
	Normal	866	85.2	826	86.6		
Depigmentation	n	1,016		954		0.83 (0.63,1.10)	0.219
	Abnormal	102	10.0	113	11.8		
	Normal	914	90.0	841	88.2		
Inclusion Cysts	n	1,016		954		0.90 (0.68,1.18)	0.442
	Abnormal	114	11.2	118	12.4		
	Normal	902	88.8	836	87.6		
Hyperpigmentation	n	1,016		954		0.95 (0.77,1.18)	0.668
	Abnormal	228	22.4	222	23.3		
	Normal	788	77.6	732	76.7		

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 Hand		Original Comparison				
				Number	Percent	Number	Percent			
Dermatology Index	Group-by-presence-of-pre-SEA acne	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

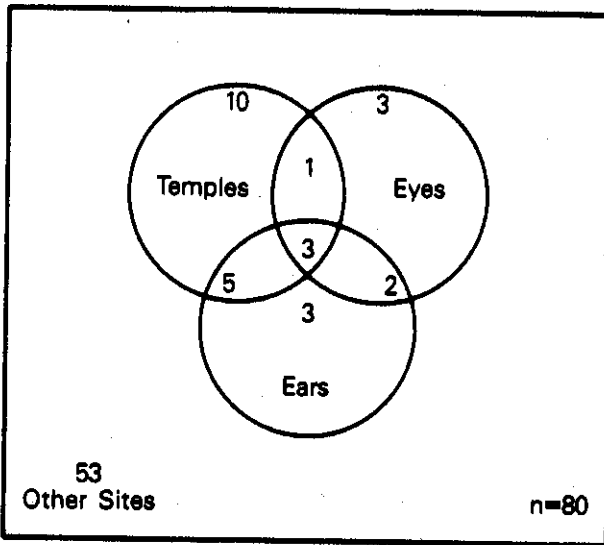
TABLE L-11.

**Longitudinal Analysis of the Dermatology Index:
A Contrast of Baseline and First Followup Examination Abnormalities
(Original Comparisons Only)**

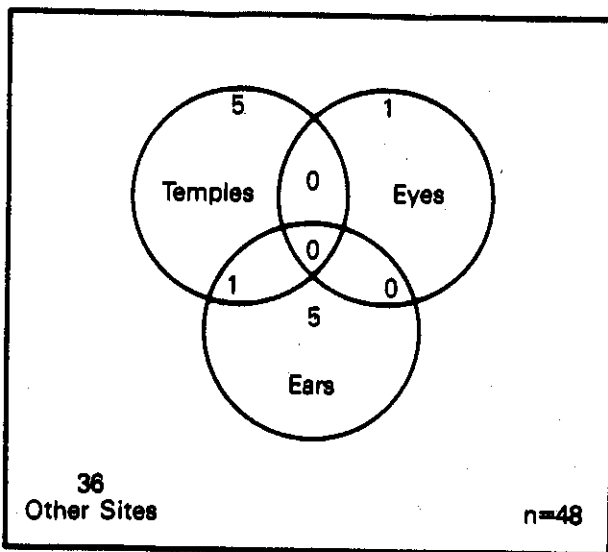
Group	1982 Baseline Exam	1985 Followup Exam		Odds Ratio (OR)*	p-Value (OR _{RH} vs. OR _{OC})
		Abnormal	Normal		
Ranch Hand	Abnormal	241	136	1.68	0.53
	Normal	228	366		
Original Comparison	Abnormal	222	109	1.85	
	Normal	202	339		

*Odds Ratio:
$$\frac{\text{Number Normal Baseline, Abnormal Followup}}{\text{Number Abnormal Baseline, Normal Followup}}$$

Ranch Hand



Original Comparison

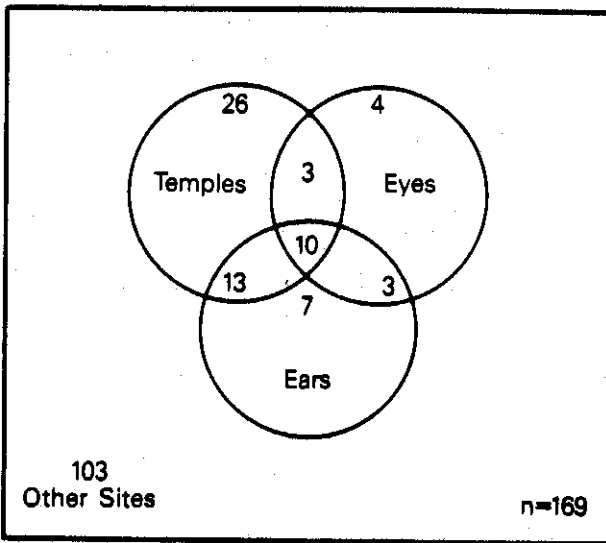


$p = 0.374$
(8 Categories)

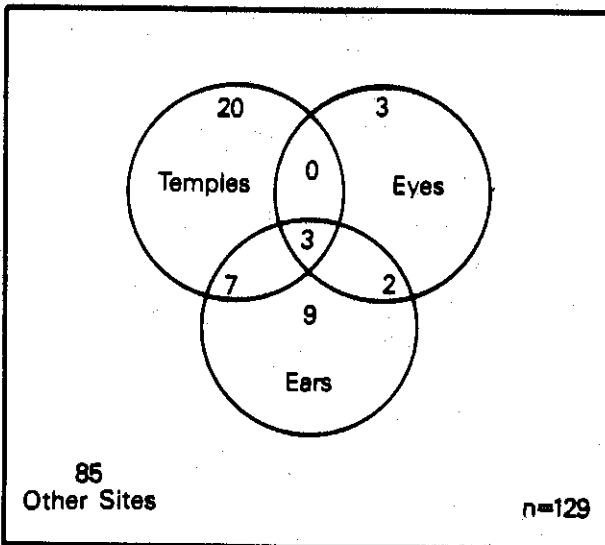
$p = 0.310$
(7 Categories;
Other Sites
Deleted)

Figure L-1.
Location of Post-SEA and Pre- and
Post-SEA Acne by Group
(Original Comparisons Only)

Ranch Hand



Original Comparison



$p = 0.492$
(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	6.74 (0.72,63.40)	0.095
		Nonblack	0.55 (0.28,1.12)	0.099
Dorsalis Pedis Pulses (Manual)	Group-by-Occupation	Officer	0.70 (0.45,1.09)	0.116
		Enlisted Flyer	1.70 (0.86,3.34)	0.124
		Enlisted Groundcrew	1.32 (0.84,2.06)	0.222
Posterior Tibial Pulses (Manual)	Group-by-Occupation	Officer	0.33 (0.09,1.18)	0.087
		Enlisted Flyer	4.33 (1.14,16.50)	0.032
		Enlisted Groundcrew	1.22 (0.58,2.57)	0.603
Leg Pulses (Manual)	Group-by-Occupation (21% Body Fat)	Officer	0.62 (0.41,0.94)	0.026
		Enlisted Flyer	1.55 (0.87,2.76)	0.136
		Enlisted Groundcrew	1.24 (0.85,1.81)	0.271
	Group-by-Percent Body Fat (Officer)	Nonobese ($\leq 25\%$)	0.66 (0.42,1.04)	0.084
		Obese ($>25\%$)	0.44 (0.17,1.12)	0.072
	Group-by-Percent Body Fat (Enlisted Flyer)	Nonobese ($\leq 25\%$)	1.36 (0.73,2.55)	0.177
		Obese ($>25\%$)	1.83 (0.76,4.38)	0.332
Peripheral Pulses (Manual)	Group-by-Occupation	Officer	0.64 (0.42,0.96)	0.030
		Enlisted Flyer	1.45 (0.82,2.56)	0.204
		Enlisted Groundcrew	1.16 (0.80,1.69)	0.441
All Pulses (Manual)	Group-by-Occupation	Officer	0.64 (0.42,0.96)	0.030
		Enlisted Flyer	1.45 (0.82,2.57)	0.204
		Enlisted Groundcrew	1.14 (0.78,1.66)	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

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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	
		Normal	118	99.2	118	96.7	108	99.1	H vs. L	1.09 (0.07,17.7)	0.952	
	Enlisted Flyer	n	54		56		53		Overall		0.061	
		Abnormal	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	—	—	
	Enlisted Groundcrew	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	
		Normal	145	98.0	149	98.7	126	96.9	H vs. L	1.53 (0.34,6.98)	0.582	
	Verified Myocardial Infarction	Officer	n	119		122		109		Overall		—
			Abnormal	0	0.0	4	3.3	0	0.0	M vs. L	—	—
			Normal	119	100.0	118	96.7	109	100.0	H vs. L	—	—
Enlisted Flyer		n	54		56		53		Overall		—	
		Abnormal	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	—	—	
Enlisted Groundcrew		n	148		151		130		Overall		—	
		Abnormal	2	1.4	0	0.0	1	0.8	M vs. L	—	—	
		Normal	146	98.6	151	100.0	129	99.2	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	H 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	H 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	H 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