

TABLE L-4. (continued)

Exposure Index-by-Covariate Interactions for Cardiovascular Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Diastolic Blood Pressure	Exposure Index-by- Personality Type (Enlisted Groundcrew)	Type A	n	50	56	44	Overall		0.412
			Adj. Mean	79.08	76.86	78.35	M vs. L	—	0.193
			95% C.I.	(75.71, 82.44)	(73.30, 80.44)	(74.87, 81.84)	H vs. L	—	0.679
		Type B	n	78	76	67	Overall		0.020
			Adj. Mean	76.90	80.52	76.80	M vs. L	—	0.014
			95% C.I.	(74.04, 79.77)	(77.63, 83.41)	(73.78, 79.83)	H vs. L	—	0.949

*Small cell size may affect validity of p-value.

—Adjusted relative risk/confidence interval not given due to cells with zero frequency; relative risk not applicable for continuous analysis of a variable.

TABLE L-5.

Cardiovascular Morbidity-Mortality Analysis
(Ranch Hands and Comparisons*)

Endpoint	Status	Ranch Hands (n=1,254)			Comparisons* (n=1,249)		
		Event			Event		
		Yes	No	Total	Yes	No	Total
Death (Any Cause) or Verified Heart Disease	Dead	85	0	85	92	0	92
	Living, Fully Compliant ^a	420	644	1,064	375	577	952
	Living, Not Fully Compliant ^b	41.4 ^c	63.6 ^c	105	80.8 ^c	124.2 ^c	205
	Estimated Percent Events ^b	43.6%			43.9%		
Death (Any Cause) or Verified Myocardial Infarction	Dead	85	0	85	92	0	92
	Living, Fully Compliant ^a	37	1,027	1,064	39	913	952
	Living, Not Fully Compliant ^b	3.7 ^c	101.3 ^c	105	8.4 ^c	196.6 ^c	205
	Estimated Percent Events	10.0%			11.2%		
Fatal or Nonfatal Verified Heart Disease	Dead	42	43	85	41	51	92
	Living, Fully Compliant ^a	420	644	1,064	375	577	952
	Living, Not Fully Compliant ^b	41.4 ^c	63.6 ^c	105	80.8 ^c	124.2 ^c	205
	Estimated Percent Events	40.1%			39.8%		
Fatal or Nonfatal Verified Myocardial Infarction or Fatal Heart Disease	Dead	33	52	85	29	63	92
	Living, Fully Compliant ^a	37	1,027	1,064	39	913	952
	Living, Not Fully Compliant ^b	3.7 ^c	101.3 ^c	105	8.4 ^c	196.6 ^c	205
	Estimated Percent Events	5.9%			6.1%		

*Comparison: first Comparison of the randomly ordered set matched to the Ranch Hands.

^aFully compliant at Baseline, third-year followup, or fifth-year followup examination.^bNot fully compliant at Baseline, third-year followup, and fifth-year followup examinations.^cEstimated using event rate in living, fully compliants.

APPENDIX M

Hematologic Evaluation

Dependent Variable-Covariate Associations for Hematologic Evaluation

Dependent Variable	Level	Age				Race		
		Born >1942	Born 1923- 1941	Born <1922	p- Value	Black	Nonblack	p- Value
RBC (discrete)	Abn. Low	(n=955) 2.3%	(n=1,247) 4.2%	(n=84) 11.9%	<0.001 ^a	(n=137) 8.0%	(n=2,149) 3.4%	0.001
	Normal	96.8%	94.6%	86.9%		85.4%	95.8%	
	Abn. High	0.9%	1.2%	1.2%		6.6%	0.7%	
	(continuous)	—	r=-0.141	—	<0.001	$\bar{x}$ =5.03	$\bar{x}$ =4.94	0.012
WBC ^a (discrete)	Abn. Low	(n=954) 7.4%	(n=1,247) 5.8%	(n=84) 3.6%	0.189	(n=137) 19.0%	(n=2,148) 5.6%	<0.001
	Normal	87.4%	88.2%	94.0%		78.8%	88.7%	
	Abn. High	5.1%	6.0%	2.4%		2.2%	5.7%	
	(continuous)	—	r=-0.003	—	0.871	$\bar{x}$ =6.05	$\bar{x}$ =6.83	<0.001
Hemoglobin (discrete)	Abn. Low	(n=955) 3.8%	(n=1,247) 3.7%	(n=84) 9.5%	0.004	(n=137) 13.9%	(n=2,149) 3.3%	<0.001
	Normal	95.6%	94.2%	89.3%		85.4%	95.2%	
	Abn. High	0.6%	2.1%	1.2%		0.7%	1.5%	
	(continuous)	—	r=-0.063	—	0.002	$\bar{x}$ =15.19	$\bar{x}$ =15.70	<0.001
Hematocrit (discrete)	Abn. Low	(n=955) 1.8%	(n=1,247) 2.2%	(n=84) 3.6%	0.498 ^a	(n=137) 7.3%	(n=2,149) 1.7%	<0.001 ^a
	Normal	98.2%	97.5%	95.2%		92.7%	98.0%	
	Abn. High	0.0%	0.3%	1.2%		0.0%	0.2%	
	(continuous)	—	r=-0.052	—	0.013	$\bar{x}$ =44.36	$\bar{x}$ =45.24	0.002

TABLE M-1. (continued)

Dependent Variable-Covariate Associations for Hematologic Evaluation

Dependent Variable	Level	Age				Race		
		Born >1942	Born 1923- 1941	Born <1922	p- Value	Black	Nonblack	p- Value
MCV (discrete)	Abn. Low	(n=955) 1.4%	(n=1,247) 1.2%	(n=84) 0.0%	0.002	(n=137) 10.2%	(n=2,149) 0.6%	<0.001
	Normal	91.1%	86.3%	84.5%		81.8%	88.6%	
	Abn. High	7.5%	12.5%	15.5%		8.0%	10.7%	
	(continuous)	—	r=0.139	—	<0.001	$\bar{x}$ =88.57	$\bar{x}$ =91.63	<0.001
MCH (discrete)	Abn. Low	(n=955) 0.8%	(n=1,247) 0.5%	(n=84) 0.0%	0.002	(n=137) 5.1%	(n=2,149) 0.3%	<0.001
	Normal	93.8%	89.8%	89.3%		90.5%	91.5%	
	Abn. High	5.3%	9.7%	10.7%		4.4%	8.1%	
	(continuous)	—	r=0.117	—	<0.001	$\bar{x}$ =30.38	$\bar{x}$ =31.82	<0.001
MCHC (discrete)	Abn. Low	(n=955) 0.0%	(n=1,247) 0.0%	(n=84) 0.0%	—	(n=137) 0.0%	(n=2,149) 0.0%	—
	Normal	100.0%	100.0%	100.0%		100.0%	100.0%	
	Abn. High	0.0%	0.0%	0.0%		0.0%	0.0%	
	(continuous)	—	r=-0.052	—	0.013	$\bar{x}$ =34.25	$\bar{x}$ =34.70	<0.001
Platelet Count (discrete)	Abn. Low	(n=955) 0.1%	(n=1,246) 0.5%	(n=84) 1.2%	0.422 ^b	(n=137) 0.0%	(n=2,148) 0.4%	0.568 ^b
	Normal	98.2%	97.0%	96.4%		98.5%	97.4%	
	Abn. High	1.7%	2.5%	2.4%		1.5%	2.2%	
	(continuous)	—	r=-0.086	—	<0.001	$\bar{x}$ =258.39	$\bar{x}$ =262.40	0.433

TABLE M-3 (continued)

Dependent Variable-Covariate Associations for Hematologic Evaluation

Dependent Variable	Level	Occupation			p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew	
RBC		(n=870)	(n=382)	(n=1,034)	
(discrete)	Abn. Low	4.0%	4.2%	3.3%	0.281
	Normal	95.4%	94.8%	95.2%	
	Abn. High	0.6%	1.0%	1.6%	<0.001
(continuous)		$\bar{x}=4.88$	$\bar{x}=4.94$	$\bar{x}=5.00$	
WBC*		(n=870)	(n=381)	(n=1,034)	
(discrete)	Abn. Low	7.5%	5.8%	5.7%	0.248
	Normal	87.9%	89.0%	87.9%	
	Abn. High	4.6%	5.2%	6.4%	<0.001
(continuous)		$\bar{x}=6.34$	$\bar{x}=7.09$	$\bar{x}=7.05$	
Hemoglobin		(n=870)	(n=382)	(n=1,034)	
(discrete)	Abn. Low	4.0%	4.4%	3.7%	0.913
	Normal	94.6%	93.7%	95.0%	
	Abn. High	1.4%	1.8%	1.4%	0.002
(continuous)		$\bar{x}=15.57$	$\bar{x}=15.73$	$\bar{x}=15.73$	
Hematocrit		(n=870)	(n=382)	(n=1,034)	
(discrete)	Abn. Low	1.7%	2.9%	2.0%	0.414 ^a
	Normal	98.0%	96.6%	97.9%	
	Abn. High	0.2%	0.5%	0.1%	<0.001
(continuous)		$\bar{x}=44.82$	$\bar{x}=45.43$	$\bar{x}=45.41$	

TABLE M-1. (continued)

Dependent Variable-Covariate Associations for Hematologic Evaluation

Dependent Variable	Level	Occupation			p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew	
MCV (discrete)	Abn. Low	(n=870) 0.8%	(n=382) 0.8%	(n=1,034) 1.7%	0.122
	Normal	88.2%	86.6%	88.9%	
	Abn. High	11.0%	12.6%	9.4%	
	(continuous)	$\bar{x}$ =91.87	$\bar{x}$ =92.03	$\bar{x}$ =90.87	<0.001
MCH (discrete)	Abn. Low	(n=870) 0.2%	(n=382) 0.5%	(n=1,034) 1.0%	0.037
	Normal	90.7%	90.0%	92.6%	
	Abn. High	9.1%	9.4%	6.4%	
	(continuous)	$\bar{x}$ =31.93	$\bar{x}$ =31.89	$\bar{x}$ =31.51	<0.001
MCHC (discrete)	Abn. Low	(n=870) 0.0%	(n=382) 0.0%	(n=1,034) 0.0%	—
	Normal	100.0%	100.0%	100.0%	
	Abn. High	0.0%	0.0%	0.0%	
	(continuous)	$\bar{x}$ =34.73	$\bar{x}$ =34.63	$\bar{x}$ =34.65	<0.001
Platelet Count (discrete)	Abn. Low	(n=869) 0.4%	(n=382) 0.8%	(n=1,034) 0.2%	0.757 ^b
	Normal	97.7%	96.6%	97.7%	
	Abn. High	2.0%	2.6%	2.1%	
	(continuous)	$\bar{x}$ =256.16	$\bar{x}$ =261.16	$\bar{x}$ =267.57	<0.001

TABLE M-1 (continued)

Dependent Variable-Covariate Associations for Hematologic Evaluation

Dependent Variable	Level	Lifetime Cigarette Smoking History				Current Cigarette Smoking				
		0	>0-10	>10	p-Value	0 Non-smoker	0 Former Smoker	>0-20	>20	p-Value
RBC (discrete)	Abn. Low	(n=625) 2.6%	(n=631) 2.5%	(n=1,030) 5.2%	0.003	(n=624) 2.6%	(n=905) 4.2%	(n=390) 5.1%	(n=367) 3.0%	0.218
	Normal	96.2%	97.2%	93.4%		96.2%	95.1%	93.3%	95.6%	
	Abn. High	1.3%	0.3%	1.5%		1.3%	0.7%	1.5%	1.4%	
	(continuous)	—	r=-0.033	—	0.111	—	r=0.093	—	—	<0.001
WBC* (discrete)	Abn. Low	(n=625) 9.4%	(n=631) 6.7%	(n=1,029) 4.4%	<0.001	(n=624) 9.3%	(n=905) 8.7%	(n=390) 1.8%	(n=366) 0.6%	<0.001
	Normal	90.1%	88.6%	86.6%		90.2%	89.3%	84.4%	85.5%	
	Abn. High	0.5%	4.8%	9.0%		0.5%	2.0%	13.8%	13.9%	
	(continuous)	—	r=0.309	—	<0.001	—	r=0.510	—	—	<0.001
Hemoglobin (discrete)	Abn. Low	(n=625) 4.2%	(n=631) 3.3%	(n=1,030) 4.2%	0.008	(n=624) 4.0%	(n=905) 4.9%	(n=390) 4.6%	(n=367) 0.8%	<0.001
	Normal	95.4%	95.9%	93.4%		95.5%	94.5%	93.6%	94.6%	
	Abn. High	0.5%	0.8%	2.4%		0.5%	0.7%	1.8%	4.6%	
	(continuous)	—	r=0.070	—	<0.001	—	r=0.247	—	—	<0.001
Hematocrit (discrete)	Abn. Low	(n=625) 2.1%	(n=631) 1.7%	(n=1,030) 2.2%	0.791 ^a	(n=624) 1.9%	(n=905) 2.3%	(n=390) 3.1%	(n=367) 0.5%	0.088 ^a
	Normal	97.8%	98.1%	97.5%		97.9%	97.5%	96.9%	98.9%	
	Abn. High	0.2%	0.2%	0.3%		0.2%	0.2%	0.0%	0.5%	
	(continuous)	—	r=0.087	—	<0.001	—	r=0.265	—	—	<0.001

TABLE M-1. (continued)

Dependent Variable-Covariate Associations for Hematologic Evaluation

Dependent Variable	Level	Lifetime Cigarette Smoking History				Current Cigarette Smoking				
		0	>0-10	>10	p-Value	0 Non-smoker	0 Former Smoker	>0-20	>20	p-Value
MCV		(n=625)	(n=631)	(n=1,030)		(n=624)	(n=905)	(n=390)	(n=367)	
(discrete)	Abn. Low	1.8%	1.0%	1.1%	<0.001	1.6%	1.0%	2.0%	0.3%	<0.001
	Normal	95.2%	88.0%	84.2%		95.4%	90.6%	80.3%	78.8%	
	Abn. High	3.0%	11.1%	14.8%		3.0%	8.4%	17.7%	21.0%	
(continuous)		—	r=0.164	—	<0.001	—	r=0.216	—	—	<0.001
MCH		(n=625)	(n=631)	(n=1,030)		(n=624)	(n=905)	(n=390)	(n=367)	
(discrete)	Abn. Low	0.8%	0.3%	0.7%	<0.001 ^b	0.6%	0.4%	1.3%	0.3%	<0.001 ^b
	Normal	96.3%	91.1%	88.7%		96.5%	93.5%	85.9%	83.9%	
	Abn. High	2.9%	8.6%	10.6%		2.9%	6.1%	12.8%	15.8%	
(continuous)		—	r=0.136	—	<0.001	—	r=0.182	—	—	<0.001
MCHC		(n=625)	(n=631)	(n=1,030)		(n=624)	(n=905)	(n=390)	(n=367)	
(discrete)	Abn. Low	0.0%	0.0%	0.0%	—	0.0%	0.0%	0.0%	0.0%	—
	Normal	100.0%	100.0%	100.0%		100.0%	100.0%	100.0%	100.0%	
	Abn. High	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	
(continuous)		—	r=-0.077	—	<0.001	—	r=-0.080	—	—	<0.001
Platelet Count		(n=625)	(n=631)	(n=1,029)		(n=624)	(n=904)	(n=390)	(n=367)	
(discrete)	Abn. Low	0.3%	0.3%	0.4%	0.013 ^b	0.3%	0.3%	0.3%	0.3%	0.138 ^b
	Normal	98.6%	98.1%	96.5%		98.6%	97.4%	97.4%	96.2%	
	Abn. High	1.1%	1.6%	3.1%		1.1%	2.3%	2.3%	3.3%	
(continuous)		—	r=0.092	—	<0.001	—	r=0.097	—	—	<0.001

^aHigh pooled with normal for chi-squared test.^bLow pooled with normal for chi-squared test.^{*}Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.
Note: Correlations (r) are based on total sample and are not category specific.

Exposure Index-by-Covariate Interactions for Hematologic Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Exposure Index Contrast	p-Value
				Low	Medium	High		
RBC	Exposure Index-by- Age (Enlisted Flyer)	Born ≥ 1942	n	11	18	11	Overall	0.088
			Adj. Mean	5.011	4.816	5.056	H vs. L	0.109
			95% C.I.	(4.658, 5.364)	(4.512, 5.120)	(4.703, 5.409)	H vs. L	0.742
		Born 1923-1941	n	44	43	42	Overall	0.283
			Adj. Mean	4.947	5.013	5.076	H vs. L	0.411
			95% C.I.	(4.771, 5.123)	(4.848, 5.178)	(4.906, 5.246)	H vs. L	0.113
		Born < 1922	n	0	2	0	Overall	—
			Adj. Mean	—	—	—	H vs. L	—
			95% C.I.	—	—	—	H vs. L	—

TABLE M-2. (continued)

Exposure Index-by-Covariate Interactions for Hematologic Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Exposure Index Contrast	p-Value
				Low	Medium	High		
Hemoglobin	Exposure Index-by- Age (Enlisted Flyer)	Born >1942	n	11	18	11	Overall	0.006
			Adj. Mean	16.421	15.527	16.567	M vs. L	0.015
			95% C.I.	(15.378, 17.464)	(14.629, 16.425)	(15.525, 17.609)	H vs. L	0.713
		Born 1923-1941	n	44	43	42	Overall	0.231
			Adj. Mean	15.412	15.735	15.884	M vs. L	0.249
			95% C.I.	(14.798, 16.026)	(15.158, 16.312)	(15.292, 16.476)	H vs. L	0.096
		Born <1922	n	0	2	0	Overall	—
			Adj. Mean	—	—	—	M vs. L	—
			95% C.I.	—	—	—	H vs. L	—
Hemoglobin	Exposure Index-by- Lifetime Cigarette Smoking History (Enlisted Groundcrew)	0 Pack-Years	n	40	37	23	Overall	0.792
			Adj. Mean	15.443	15.433	15.630	M vs. L	0.970
			95% C.I.	(14.983, 15.903)	(14.921, 15.945)	(15.075, 16.185)	H vs. L	0.543
		>0-10 Pack- Years	n	42	53	40	Overall	0.106
			Adj. Mean	15.661	16.016	15.530	M vs. L	0.133
			95% C.I.	(15.243, 16.079)	(15.602, 16.430)	(15.115, 15.945)	H vs. L	0.602
		>10 Pack-Years	n	65	68	77	Overall	0.136
			Adj. Mean	15.508	15.423	15.767	M vs. L	0.647
			95% C.I.	(15.171, 15.845)	(15.096, 15.750)	(15.425, 16.109)	H vs. L	0.151

TABLE M-2. (continued)

Exposure Index-by-Covariate Interactions for Hematologic Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Exposure Index Contrast	p-Value
				Low	Medium	High		
Hematocrit	Exposure Index-by- Age (Enlisted Flyer)	Born >1942	n	11	18	11	Overall	0.003
			Adj. Mean	47.165	44.303	47.469	M vs. L	0.007
			95% C.I.	(44.197, 50.133)	(41.747, 46.859)	(44.503, 50.435)	H vs. L	0.788
		Born 1923-1941	n	44	43	42	Overall	0.268
			Adj. Mean	44.841	45.492	46.165	M vs. L	0.420
			95% C.I.	(43.071, 46.611)	(43.828, 47.156)	(44.458, 47.872)	H vs. L	0.106
		Born <1922	n	0	2	0	Overall	—
			Adj. Mean	—	—	—	M vs. L	—
			95% C.I.	—	—	—	H vs. L	—
Hematocrit	Exposure Index-by- Lifetime Cigarette Smoking History (Enlisted Groundcrew)	0 Pack-Years	n	40	37	23	Overall	0.694
			Adj. Mean	44.506	44.636	45.211	M vs. L	0.863
			95% C.I.	(43.241, 45.771)	(43.228, 46.044)	(43.686, 46.736)	H vs. L	0.405
		>0-10 Pack- Years	n	42	53	40	Overall	0.169
			Adj. Mean	45.392	46.330	45.083	M vs. L	0.172
			95% C.I.	(44.174, 46.610)	(45.124, 47.536)	(43.873, 46.293)	H vs. L	0.672
		>10 Pack-Years	n	65	68	77	Overall	0.091
			Adj. Mean	45.086	44.900	45.992	M vs. L	0.737
			95% C.I.	(44.086, 46.086)	(43.928, 45.872)	(44.977, 47.007)	H vs. L	0.092

TABLE M-2. (continued)

Exposure Index-by-Covariate Interactions for Hematologic Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Exposure Index Contrast	p-Value
				Low	Medium	High		
Platelet Count	Exposure Index-by- Race	Black Nonsmoker	n	0	2	1	Overall	—
			Adj. Mean	—	—	—	M vs. L	—
			95% C.I.	—	—	—	H vs. L	—
	Exposure Index-by- Current Cigarette Smoking History (Enlisted Flyer)	Black Former Smoker	n	1	1	1	Overall	—
			Adj. Mean	—	—	—	M vs. L	—
			95% C.I.	—	—	—	H vs. L	—
		Black Current Smoker >0-20	n	0	1	1	Overall	—
			Adj. Mean	—	—	—	M vs. L	—
			95% C.I.	—	—	—	H vs. L	—
		Black Current Smoker >20	n	0	0	0	Overall	—
			Adj. Mean	—	—	—	M vs. L	—
			95% C.I.	—	—	—	H vs. L	—
		Nonblack Nonsmoker	n	9	8	9	Overall	0.087
			Adj. Mean	230.34	269.97	239.02	M vs. L	0.035
			95% C.I.	(206.56, 254.12)	(244.74, 295.20)	(215.17, 262.87)	H vs. L	0.620
		Nonblack Former Smoker	n	20	23	23	Overall	0.317
			Adj. Mean	249.55	274.96	259.08	M vs. L	0.137
			95% C.I.	(225.50, 273.60)	(252.40, 297.52)	(236.56, 281.60)	H vs. L	0.573

TABLE 1-2 (continued)

Exposure Index-by-Covariate Interactions for Hematologic Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Exposure Index Contrast	p-Value
				Low	Medium	High		
Platelet Count (cont.)		Nonblack	n	9	11	10	Overall	0.080
		Current Smoker	Adj. Mean	321.29	296.61	252.57	M vs. L	0.410
		>0-20	95% C.I.	(279.49, 363.09)	(257.83, 335.39)	(212.39, 292.75)	H vs. L	0.028
		Nonblack	n	16	17	8	Overall	0.145
		Current Smoker	Adj. Mean	299.57	257.09	301.29	M vs. L	0.079
		>20	95% C.I.	(266.86, 332.28)	(225.35, 288.83)	(255.56, 347.02)	H vs. L	0.953

—P-value not given due to cells with zero frequency; sparse cell counts preclude presentation of summary statistics.

APPENDIX N

Renal Assessment

TABLE N-1.

Dependent Variable-Covariate Associations for Renal Assessment

Dependent Variable	Level	Age				Race		
		Born ≥1942	Born 1923- 1941	Born ≤1922	p- Value	Black	Nonblack	p- Value
History of Kidney Disease/ Stones	Yes	(n=956) 7.7%	(n=1,252) 13.1%	(n=84) 15.5%	<0.001	(n=136) 11.8%	(n=2,156) 10.9%	0.838
Urinary Protein	Present	(n=956) 3.5%	(n=1,253) 5.4%	(n=84) 8.3%	0.030	(n=137) 8.8%	(n=2,156) 4.4%	0.047
Urinary Occult Blood	Abnormal	(n=956) 7.1%	(n=1,253) 8.2%	(n=84) 7.1%	0.614	(n=137) 13.9%	(n=2,156) 7.3%	0.015
Urinary White Blood Cell Count	Abnormal	(n=956) 6.1%	(n=1,253) 7.7%	(n=84) 10.7%	0.149	(n=137) 13.9%	(n=2,156) 6.7%	0.006
Blood Urea Nitrogen ^a		--	(n=2,291) r=0.195	--	<0.001	(n=137) x̄=13.5	(n=2,154) x̄=14.8	0.003
Urine Specific Gravity		--	(n=2,293) r=-0.100	-- <0.001	x̄=1.0209	(n=137) x̄=1.0198	(n=2,156) 0.045	

TABLE N-1. (continued)

Dependent Variable-Covariate Associations for Renal Assessment

Dependent Variable	Level	Occupation				Diabetic Class			
		Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value	Normal	Impaired	Diabetic	p-Value
History of Kidney Disease/Stones	Yes	(n=874) 10.3%	(n=382) 11.8%	(n=1,036) 11.2%	0.699	(n=1,744) 10.2%	(n=318) 13.2%	(n=218) 12.8%	0.177
Urinary Protein	Present	(n=874) 3.7%	(n=383) 5.2%	(n=1,036) 5.3%	0.201	(n=1,745) 3.6%	(n=318) 4.7%	(n=219) 12.8%	<0.001
Urinary Occult Blood	Abnormal	(n=874) 6.0%	(n=383) 10.2%	(n=1,036) 8.3%	0.022	(n=1,745) 8.1%	(n=318) 6.0%	(n=219) 7.3%	0.401
Urinary White Blood Cell Count	Abnormal	(n=874) 6.6%	(n=383) 6.0%	(n=1,036) 8.0%	0.295	(n=1,745) 6.4%	(n=318) 9.4%	(n=219) 9.1%	0.073
Blood Urea Nitrogen ^a		(n=873) $\bar{x}$ =15.3	(n=383) $\bar{x}$ =14.2	(n=1,035) $\bar{x}$ =14.3	<0.001	(n=1,745) $\bar{x}$ =14.6	(n=318) $\bar{x}$ =14.5	(n=219) $\bar{x}$ =15.2	0.057
Urine Specific Gravity		(n=874) $\bar{x}$ =1.0189	(n=383) $\bar{x}$ =1.0196	(n=1,036) $\bar{x}$ =1.0209	<0.001	(n=1,745) $\bar{x}$ =1.0200	(n=318) $\bar{x}$ =1.0194	(n=219) $\bar{x}$ =1.0199	0.313

^aTransformed from square root scale.

Note: Correlations (r) are based on total sample and are not category specific.

TABLE N-2.

Summary of Group-by-Covariate Interactions for Renal Variables

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand		Comparison			
Urinary Protein	Group-by-Occupation	Officer	n	377		494		1.63 (0.80,3.35)	0.182
			Number/%						
			Present	18	4.8%	14	2.8%		
		Absent	359	95.2%	480	97.2%	0.30 (0.10,0.93)	0.036	
		Enlisted Flyer	n	171		211			
			Number/%						
			Present	4	2.3%	16	7.6%		
		Absent	167	97.7%	195	92.4%	1.13 (0.65,1.97)	0.670	
		Enlisted Groundcrew	n	442		587			
Number/%									
Present	25		5.7%	29	4.9%				
Absent	417	94.3%	558	95.1%					
Urinary Occult Blood	Group-by-Race	Black	n	57		80		3.75 (1.33,10.60)	0.013
			Number/%						
			Abnormal	13	22.8%	6	7.5%		
		Normal	44	77.2%	74	92.5%	1.03 (0.74,1.43)	0.858	
		Nonblack	n	938		1,218			
			Number/%						
			Abnormal	70	7.5%	88	7.2%		
		Normal	868	92.5%	1,130	92.8%			

TABLE N-2. (continued)

Summary of Group-by-Covariate Interactions for Renal Variables

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Comparison		
Blood Urea Nitrogen	Group-by-Race	Black	n	57	80	—	0.022
			Adj. Mean ^a	13.1	14.5		
			95% C.I. ^a	(12.2,14.1)	(13.7,15.3)		
		Nonblack	n	933	1,212	—	0.506
			Adj. Mean ^a	14.4	14.5		
			95% C.I. ^a	(14.1,14.7)	(14.3,14.8)		

^aTransformed from square root scale.

—Adjusted relative risk not applicable for continuous analysis of a variable.

Note: Refer to Table 17-4 for specification of adjusted model.

TABLE N-3.

Exposure Index-by-Covariate Interactions for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index						Exposure Index Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low		Medium		High				
Urinary White Blood Cell	Exposure Index-by- Age	Born $\geq$ 1942 Normal	n	11		15		9		Overall		0.099
			Number/%									
			Abnormal	2	18.2%	0	0.0%	0	0.0%	M vs. L	—	0.338
				9	81.8%	15	100.0%	9	100.0%	H vs. L	—	0.578
	Exposure Index-by- Diabetic Class (Enlisted Flyer)	Born $\geq$ 1942 Impaired	n	0		1		2		Overall		—
			Number/%									
			Abnormal	0	—	0	0.0%	0	0.0%	M vs. L	—	—
				0	—	1	100.0%	2	100.0%	H vs. L	—	—
		Born $\geq$ 1942 Diabetic	n	0		2		0		Overall		—
			Number/%									
			Abnormal	0	—	0	0.0%	0	—	M vs. L	—	—
				0	—	2	100.0%	0	—	H vs. L	—	—
		Born 1923-1941 Normal	n	31		27		30		Overall		0.099
			Number/%									
			Abnormal	4	12.9%	4	14.8%	0	0.0%	M vs. L	1.17 (0.26,5.23)	0.999
				27	87.1%	23	85.2%	30	100.0%	H vs. L	—	0.121
		Born 1923-1941 Impaired	n	12		8		10		Overall		0.355
			Number/%									
Abnormal			0	0.0%	0	0.0%	1	10.0%	M vs. L	—	—	
			12	100.0%	8	100.0%	9	90.0%	H vs. L	—	0.910	
	Born 1923-1941 Diabetic	n	1		8		2		Overall		—	
		Number/%										
		Abnormal	0	0.0%	0	0.0%	0	0.0%	M vs. L	—	—	
			1	100.0%	8	100.0%	2	100.0%	H vs. L	—	—	

TABLE N-3. (continued)

Exposure Index-by-Covariate Interactions for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Exposure Index Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Urinary White Blood Cell Count (cont.)	Born ≤ 1922 Normal	n	n	0	2	0	Overall		—
			Number/%						
			Abnormal	0	0	0	M vs. L	—	—
		Normal	Normal	0	2	0	H vs. L	—	—
				—	100.0%	—			
				—		—			
	Born ≤ 1922 Impaired	n	n	0	0	0	Overall		—
			Number/%						
			Abnormal	0	0	0	M vs. L	—	—
		Normal	Normal	0	0	0	H vs. L	—	—
				—	—	—			
				—	—	—			
	Born ≤ 1922 Diabetic	n	n	0	0	0	Overall		—
			Number/%						
			Abnormal	0	0	0	M vs. L	—	—
		Normal	Normal	0	0	0	H vs. L	—	—
				—	—	—			
				—	—	—			

TABLE N-3. (continued)

Exposure Index-by-Covariate Interactions for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index						Exposure Index Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low		Medium		High				
Urinary White Blood Cell Count (cont.)	Exposure Index-by- Race	Nonblack Normal	n	100		113		94		Overall		0.053
			Number/% Abnormal	3	3.0%	7	6.2%	11	11.7%	M vs. L	2.14 (0.54,8.49)	0.442
			Normal	97	97.0%	106	93.8%	83	88.3%	H vs. L	4.29 (1.16,15.88)	0.036
	Exposure Index-by- Diabetic Class (Enlisted Groundcrew)	Nonblack Impaired	n	19		16		17		Overall		0.627
			Number/% Abnormal	1	5.3%	0	0.0%	1	5.9%	M vs. L	—	0.999
			Normal	18	94.7%	16	100.0%	16	94.1%	H vs. L	1.13 (0.07,19.50)	0.999
		Nonblack Diabetic	n	11		13		17		Overall		0.049
			Number/% Abnormal	3	27.3%	4	30.8%	0	0.0%	M vs. L	1.19 (0.20,6.99)	0.999
			Normal	8	72.7%	9	69.2%	17	100.0%	H vs. L	—	0.100
		Black Normal	n	14		8		10		Overall		0.428
			Number/% Abnormal	2	14.3%	0	0.0%	2	20.0%	M vs. L	—	0.788
			Normal	12	85.7%	8	100.0%	8	80.0%	H vs. L	1.50 (0.17,12.94)	0.999
		Black Impaired	n	1		2		1		Overall		0.135
			Number/% Abnormal	1	100.0%	0	0.0%	1	100.0%	M vs. L	—	0.666
			Normal	0	0.0%	2	100.0%	0	0.0%	H vs. L	—	—
		Black Diabetic	n	1		4		1		Overall		0.050
			Number/% Abnormal	0	0.0%	0	0.0%	1	100.0%	M vs. L	—	—
			Normal	1	100.0%	4	100.0%	0	0.0%	H vs. L	—	0.999

TABLE N-3. (continued)

Exposure Index-by-Covariate Interactions for Renal Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index			Exposure Index Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low	Medium	High			
Blood Urea Nitrogen	Exposure Index-by- Age (Officer)	Born ≥ 1942	n	46	21	11			
			Adj. Mean ^a	13.5	14.0	14.4	M vs. L	—	0.534
			95% C.I. ^a	(11.8,15.1)	(12.1,16.1)	(12.0,17.1)	H vs. L	—	0.404
		Born 1923-1941	n	79	89	109			
			Adj. Mean ^a	14.2	14.3	14.2	M vs. L	—	0.806
			95% C.I. ^a	(12.7,15.9)	(12.8,15.9)	(12.8,15.8)	H vs. L	—	0.941
		Born ≤ 1922	n	5	14	3			
			Adj. Mean ^a	17.8	16.4	16.9	M vs. L	—	0.478
			95% C.I. ^a	(14.2,21.8)	(14.0,18.9)	(12.6,21.9)	H vs. L	—	0.760
Blood Urea Nitrogen	Exposure Index-by- Age (Enlisted Groundcrew)	Born ≥ 1942	n	83	122	81			
			Adj. Mean ^a	13.8	13.2	12.9	M vs. L	—	0.183
			95% C.I. ^a	(12.9,14.8)	(12.4,14.0)	(12.0,13.8)	H vs. L	—	0.074
		Born 1923-1941	n	60	33	53			
			Adj. Mean ^a	14.0	15.1	13.3	M vs. L	—	0.145
			95% C.I. ^a	(13.0,15.0)	(13.8,16.4)	(12.3,14.3)	H vs. L	—	0.262
		Born ≤ 1922	n	3	1	6			
			Adj. Mean ^a	18.3	26.8	14.7	M vs. L	—	0.084
			95% C.I. ^a	(14.1,23.0)	(18.4,36.9)	(11.9,17.6)	H vs. L	—	0.166

—Percentages not given due to zero participants for a particular exposure index classification; adjusted relative risk not applicable for blood urea nitrogen; relative risk/confidence interval/p-value not given due to cells with zero frequency.

^aTransformed from square root scale.

Notes: Relative risks/confidence intervals and p-values given for urinary white blood cell count based on stratified, unadjusted analyses. Adjusted means/confidence intervals and p-values for blood urea nitrogen based on adjusted analyses. Small sample sizes may affect validity of overall p-value.

APPENDIX 0

Endocrine Assessment

TABLE 0-1.

Dependent Variable-Covariate Associations for Endocrine Assessment

Dependent Variable	Level	Age				Race		
		Born ≥1942	Born 1923- 1941	Born ≤1922	p- Value	Black	Nonblack	p- Value
T₃ % Uptake (continuous) ^a (discrete)	High	(n=945) 3.5%	(n=1,224) r=-0.007 3.7%	(n=79) 7.6%	0.752 0.179	(n=137) x̄=30.7 4.4%	(n=2,111) x̄=30.5 3.7%	0.227 0.812
TSH (continuous) ^b (discrete)	High	-- (n=945) 1.4%	(n=1,864) r=0.173 (n=1,224) 2.4%	-- (n=79) 2.5%	<0.001 0.236	(n=110) x̄=0.87 (n=137) 0.7%	(n=1,754) x̄=1.00 (n=2,111) 2.0%	0.001 0.478
FSH (continuous) ^a (discrete)	Low	(n=956) 11.1%	(n=2,291) r=0.281 (n=1,251) 6.3%	(n=84) 2.4%	<0.001	(n=137) x̄=6.67 (n=137) 11.7%	(n=2,154) x̄=7.78 (n=2,154) 7.9%	0.016
	High	(n=956) 4.7%	(n=1,251) 13.4%	(n=84) 33.3%	<0.001	(n=137) 11.0%	(n=2,154) 10.5%	0.121 0.866
Testosterone (continuous) ^c (discrete)	Low	(n=955) 1.3%	(n=1,242) r=-0.293 1.7%	(n=84) 7.1%	<0.001 <0.001	(n=136) x̄=553.2 2.2%	(n=2,145) x̄=527.6 1.7%	0.078 0.828
2-Hour Post-prandial Glucose (continuous) ^a (discrete)	Normal	(n=918) 88.9%	(n=1,125) r=0.191 78.3%	(n=70) 68.6%	<0.001	(n=123) x̄=109.8 82.9%	(n=1,990) x̄=110.5 82.6%	0.792
	Impaired	9.3%	18.8%	30.0%	<0.001	13.8%	15.1%	0.754
	Diabetic	1.9%	2.8%	1.4%		3.3%	2.3%	
Composite Diabetes Indicator (discrete)	Yes	(n=950) 4.8%	(n=1,242) 11.8%	(n=83) 14.5%	<0.001	(n=137) 13.1%	(n=2,138) 8.7%	0.124

TABLE 0-1. (continued)

Dependent Variable-Covariate Associations for Endocrine Assessment

Dependent Variable	Level	Occupation			p-Value	Personality Type		p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew		Type A	Type B	
T ₃ % Uptake (continuous) ^a (discrete)	High	(n=850) $\bar{x}$ =30.9 4.7%	(n=378) $\bar{x}$ =30.1 2.9%	(n=1,020) $\bar{x}$ =30.3 3.2%	<0.001 0.161	(n=938) $\bar{x}$ =30.5 3.7%	(n=1,197) $\bar{x}$ =30.5 3.8%	0.742 0.988
TSH (continuous) ^b (discrete)	High	(n=722) $\bar{x}$ =1.02 2.5%	(n=307) $\bar{x}$ =0.99 1.9%	(n=835) $\bar{x}$ =0.96 1.6%	0.062 0.369	(n=777) $\bar{x}$ =1.00 1.9%	(n=998) $\bar{x}$ =0.98 2.0%	0.390 0.999
PSH (continuous) ^a (discrete)	Low	(n=873) $\bar{x}$ =8.25 6.8%	(n=383) $\bar{x}$ =7.99 7.3%	(n=1,035) $\bar{x}$ =7.18 9.7%	<0.001 0.056	-- --	-- --	-- --
	High	(n=873) 13.3%	(n=383) 11.8%	(n=1,035) 7.7%	<0.001	--	--	--
Testosterone (continuous) ^c (discrete)	Low	(n=869) $\bar{x}$ =504.4 2.1%	(n=381) $\bar{x}$ =529.6 1.8%	(n=1,031) $\bar{x}$ =550.3 1.4%	<0.001 0.479	(n=948) $\bar{x}$ =537.6 1.3%	(n=1,216) $\bar{x}$ =522.5 2.1%	0.031 0.214
2-Hour Post-prandial Glucose (continuous) ^a (discrete)	Normal Impaired Diabetic	(n=806) $\bar{x}$ =109.5 84.4%	(n=355) $\bar{x}$ =114.4 77.7%	(n=952) $\bar{x}$ =109.8 82.9%	0.024 0.004	(n=884) $\bar{x}$ =108.4 84.6%	(n=1,116) $\bar{x}$ =112.3 80.6%	0.004 0.051
Composite Diabetes Indicator	Yes	(n=869) 8.2%	(n=382) 8.6%	(n=1,025) 9.9%	0.423	(n=949) 9.0%	(n=1,209) 9.3%	0.816

TABLE 0-1. (continued)

Dependent Variable-Covariate Associations for Endocrine Assessment

Dependent Variable	Level	Percent Body Fat		p-Value
		Normal/Lean	Obese	
T ₃ % Uptake (continuous) ^a (discrete)	High	-- -- --	-- -- --	-- -- --
TSH (continuous) ^b (discrete)	High	-- -- --	-- -- --	-- -- --
FSH (continuous) ^a (discrete)	Low High	-- -- --	-- -- --	-- -- --
Testosterone (continuous) ^c (discrete)	Low	(n=1,804) 1.1%	(n=477) 4.2%	<0.001 <0.001
$r = -0.366$				
2-Hour Post-prandial Glucose (continuous) ^a (discrete)	Normal Impaired Diabetic	(n=1,708) 85.8% 12.8% 1.4%	(n=405) 68.9% 24.4% 6.7%	<0.001 <0.001
$r = 0.303$				
Composite Diabetes Indicator	Yes	(n=1,802) 6.0%	(n=473) 20.3%	<0.001

^aTransformed from natural logarithm (log) scale.^bTransformed from log (X-0.4) scale; statistics based only on TSH values at or above detection limit of 0.5 μ IU/ml.^cTransformed from square root scale.

--Correlations (r) are based on total sample and are not category specific; covariate not investigated for dependent variable.

TABLE 0-2.

Summary of Group-by-Covariate Interactions for Endocrine Variables

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Comparison		
Testosterone	Group-by-Occupation	Officer	n	374	495		
			Number/%				
			Low	7 1.9%	11 2.2%	0.86 (0.32, 2.32) ^a	0.765 ^a
			Normal	367 98.1%	484 97.8%		
		Enlisted Flyer	n	166	200		
			Number/%			2.81 (0.48, 16.32) ^b	0.234 ^b
			Low	5 3.0%	2 1.0%		
			Normal	161 97.0%	198 99.0%		
		Enlisted Groundcrew	n	425	554		
			Number/%				
			Low	7 1.6%	7 1.3%	****	****
			Normal	418 98.4%	547 98.7%		

TABLE 0-2. (continued)

Summary of Group-by-Covariate Interactions for Endocrine Variables

Variable	Interaction	Stratification	Statistic	Group				Adj. Relative Risk (95% C.I.)	p-Value		
				Ranch		Band				Comparison	
Testosterone (Enlisted Groundcrew)	Group-by-Age	Born $\geq$ 1942 Type A	n	125		158		1.27 (0.18,9.13) ^c	0.999 ^c		
			Number/%								
	Group-by-Personality Type			Low	2	1.6%	2	1.3%			
				Normal	123	98.4%	156	98.7%			
		Born 1923-1941 Type A	n	44		73					
			Number/%								
					Low	2	4.5%	0	0.0%	--	0.278 ^c
					Normal	42	95.5%	73	100.0%		
		Born $\leq$ 1922 Type A	n	1		3					
			Number/%								
					Low	0	0.0%	0	0.0%	--	--
					Normal	1	100.0%	3	100.0%		
		Born $\geq$ 1942 Type B	n	152		203					
			Number/%								
					Low	0	0.0%	3	1.5%	--	0.372 ^c
					Normal	152	100.0%	200	98.5%		
		Born 1923-1941 Type B	n	93		104					
			Number/%								
					Low	0	0.0%	2	1.9%	--	0.554 ^c
					Normal	93	100.0%	102	98.1%		
		Born $\leq$ 1922 Type B	n	10		13					
			Number/%								
					Low	3	30.0%	0	0.0%	--	0.136 ^c
					Normal	7	70.0%	13	100.0%		

TABLE 0-2. (continued)

Summary of Group-by-Covariate Interactions for Endocrine Variables

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Comparison		
Composite Diabetes Indicator	Group-by-Percent Body Fat	Normal/Lean	n	797	1,005		
			Number/%				
			Yes	56 7.0%	53 5.3%	1.40 (0.94,2.09)	0.093
			No	741 93.0%	952 94.7%		
		Obese	n	190	283		
			Number/%				
			Yes	36 18.9%	60 21.2%	0.82 (0.51,1.31)	0.405
			No	154 81.1%	223 78.8%		

^aRelative risk, confidence interval, and p-value based on model adjusted for age and percent body fat.

^bRelative risk, confidence interval, and p-value based on model adjusted for percent body fat and personality type.

****Group-by-age interaction ($p \leq 0.01$) and group-by-personality type interaction ($0.01 < p \leq 0.05$)--adjusted relative risk and p-value not presented.

^cUnadjusted relative risk and p-value based on stratified table.

--Relative risk/confidence interval/p-value not given due to cells with zero frequency.

Note: Refer to Table 18-5 for specification of adjusted models.

TABLE 0-3.

Exposure Index-by-Covariate Interactions for Endocrine Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index						Exposure Index Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low		Medium		High				
T ₃ % Uptake	Exposure Index-by- Race (Officer)	Nonblack	n	119		112		113				
			Adj. Mean ^a	30.8		31.1		30.5		M vs. L	—	0.446
			95% C.I. ^a	(30.4,31.3)		(30.6,31.6)		(30.1,31.0)		H vs. L	—	0.385
		Black	n	2		3		2				
			Adj. Mean ^a	35.5		28.9		30.2		M vs. L	—	0.008
			95% C.I. ^a	(31.6,39.8)		(26.4,31.8)		(26.9,33.9)		H vs. L	—	0.055
Composite Diabetes Indicator	Exposure Index-by- Race Exposure Index-by- Personality Type (Enlisted Flyer)	Nonblack Type A	n	26		17		22		Overall		0.002
			Number/%									
			Yes	0	0.0%	4	23.5%	0	0.0%	M vs. L	—	0.039
		No	26	100.0%	13	76.5%	22	100.0%	H vs. L	—	—	
		Black Type A	n	1		0		2		Overall		—
			Number/%									
			Yes	0	0.0%	0	—	0	0.0%	M vs. L	—	—
		No	1	100.0%	0	—	2	100.0%	H vs. L	—	—	
		Nonblack Type B	n	26		42		26		Overall		0.197
			Number/%									
			Yes	1	3.8%	6	14.3%	1	3.8%	M vs. L	4.17 (0.47,36.77)	0.338
		No	25	96.2%	36	85.7%	25	96.2%	H vs. L	1.00 (0.06,16.89)	0.999	
		Black Type B	n	0		4		1		Overall		—
			Number/%									
			Yes	0	—	0	0.0%	1	100.0%	M vs. L	—	—
No	0	—	4	100.0%	0	0.0%	H vs. L	—	—			

TABLE 0-3. (continued)

Exposure Index-by-Covariate Interactions for Endocrine Variables

Variable	Interaction (Occupation)	Stratification	Statistic	Exposure Index						Exposure Index Contrast	Adj. Relative Risk (95% C.I.)	p-Value
				Low		Medium		High				
Composite Diabetes Indicator	Exposure Index-by- Percent Body Fat (Enlisted Groundcrew)	Normal/Lean	n	111		122		101		Overall		0.926
			Number/%									
			Yes	8	7.2%	8	6.6%	8	7.9%	M vs. L	0.90 (0.33,2.49)	0.999
		Obese	No	103	92.8%	114	93.4%	93	92.1%	H vs. L	1.11 (0.40,3.07)	0.999
			n	31		27		32		Overall		0.046
			Number/%									
			Yes	2	6.5%	6	22.2%	10	31.3%	M vs. L	4.14 (0.76,22.59)	0.174
			No	29	93.5%	21	77.8%	22	68.7%	H vs. L	6.59 (1.31,33.18)	0.026

—Adjusted relative risk not applicable for T_3 % Uptake. Percentages not given due to zero participants for a particular exposure index classification. Relative risk/confidence interval/p-value not given due to cells with zero frequency.

*Transformed from natural logarithm scale.

Notes: Relative risks/confidence intervals and p-values for composite diabetes indicator based on stratified, unadjusted analyses. Adjusted means/confidence intervals and p-values for T_3 % Uptake based on adjusted analyses. Small sample sizes may affect validity of overall p-value.

APPENDIX P

Immunologic Evaluation

TABLE P-1.

Summary Statistics for Scale Evaluation

Variable	Scale	Skewness	Kurtosis	D:Normal*
CD2 Cells	Original	0.57	0.42	0.061
	Log	-0.59	1.34	0.039
CD4 Cells	Original	0.88	1.37	0.084
	Log	-0.64	2.21	0.040
CD8 Cells	Original	1.23	2.35	0.079
	Log	-0.32	0.34	0.045
CD20 Cells	Original	7.35	116.64	0.136
	Log	-0.15	1.22	0.032
CD14 Cells	Original	2.31	8.51	0.131
	Log	-0.26	0.32	0.028
CD25 Cells	Original	15.72	328.20	0.362
	Log	0.20	0.43	0.024
HLA-DR Cells	Original	3.63	32.34	0.109
	Log	0.09	1.06	0.024
CD4/CD8 Ratio	Original	7.24	106.88	0.121
	Log	0.04	1.39	0.025
TLC	Original	0.62	.42	0.058
	Log	-0.39	0.62	0.037
IgG	Original	0.74	1.68	0.054
	Log	-0.10	0.41	0.022
IgA	Original	2.30	18.17	0.077
	Log	-0.80	5.56	0.031
IgM	Original	2.32	10.76	0.100
	Log	0.19	0.73	0.018
Unstimulated PHA Response (day 1)	Original	1.72	4.93	0.110
	Log	0.00	-0.25	0.022
Unstimulated PHA Response (day 2)	Original	1.72	4.93	0.110
	Log	-0.01	-0.31	0.018
PHA Net Response (day 1, conc. 1)	Original	1.05	1.69	0.071
	Log	-0.87	1.34	0.069

TABLE P-1. (continued)
Summary Statistics for Scale Evaluation

Variable	Scale	Skewness	Kurtosis	D:Normal*
PHA Net Response (day 1, conc. 2)	Original Log	0.41 -0.91	-0.42 1.50	0.045 0.071
PHA Net Response (day 1, conc. 3)	Original Log	0.47 -1.02	-0.06 2.13	0.055 0.075
PHA Net Response (day 2, conc. 1)	Original Log	0.13 -1.66	-0.31 4.11	0.023 0.127
PHA Net Response (day 2, conc. 2)	Original Log	0.17 -1.79	0.33 5.96	0.037 0.119
PHA Net Response (day 2, conc. 3)	Original Log	0.64 -1.33	0.67 4.20	0.052 0.077
Maximum PHA Net Response	Original Log	0.02 -1.45	-0.14 3.81	0.026 0.104
Unstimulated MLC Response	Original Log	2.44 -0.19	9.70 -0.14	0.145 0.028
MLC Net Response	Original Log	0.62 -1.60	0.44 4.18	0.064 0.100
NKCA 50/1 Net Response	Original Log	0.57 -0.94	0.29 1.51	0.054 0.069
NKCA 50/1 Percent Release	Original Log	0.05 -1.21	-0.62 1.92	0.052 0.095
NKCI 50/1 Net Response	Original Log	0.35 -0.70	0.31 1.84	0.067 0.059
NKCI 50/1 Percent Release	Original Log	-1.45 -2.74	3.81 10.97	0.137 0.182

Notes: Scale in bold was used for analyses. Log denotes natural logarithm scale.

*Kolomogorov D statistic.

TABLE P-2.

Dependent Variable-Covariate Associations* for the Immunologic Evaluation

Dependent Variable	Level	Age				Race		
		Born ≥1942	Born 1923-1941	Born ≤1922	p- Value	Black	Nonblack	p- Value
Composite Skin Test Diagnosis	Abnormal	(n=706) 4.8%	(n=966) 5.5%	(n=63) 7.9%	0.530	(n=103) 5.5%	(n=1,632) 2.9%	0.380
CD2 Cells ^a		(n=350) $\bar{x}$ =1,674.5	(n=462) $\bar{x}$ =1,566.9	(n=33) $\bar{x}$ =1,300.6	<0.001	(n=44) $\bar{x}$ =1,615.9	(n=801) $\bar{x}$ =1,599.6	0.852
CD4 Cells ^a		(n=355) $\bar{x}$ =955.1	(n=462) $\bar{x}$ =872.7	(n=33) $\bar{x}$ =665.5	<0.001	(n=43) $\bar{x}$ =911.4	(n=807) $\bar{x}$ =897.4	0.806
CD8 Cells ^a		(n=355) $\bar{x}$ =504.4	(n=461) $\bar{x}$ =469.3	(n=33) $\bar{x}$ =396.6	0.011	(n=44) $\bar{x}$ =487.9	(n=805) $\bar{x}$ =480.8	0.847
CD20 Cells ^a		(n=355) $\bar{x}$ =170.4	(n=463) $\bar{x}$ =144.1	(n=33) $\bar{x}$ =105.7	<0.001	(n=44) $\bar{x}$ =198.5	(n=807) $\bar{x}$ =151.3	0.002
CD14 Cells ^a		(n=356) $\bar{x}$ =29.9	(n=464) $\bar{x}$ =32.7	(n=34) $\bar{x}$ =34.2	0.233	(n=45) $\bar{x}$ =23.2	(n=809) $\bar{x}$ =32.0	0.006
CD25 Cells ^{a, b}		(n=261) $\bar{x}$ =13.3	(n=322) $\bar{x}$ =12.4	(n=25) $\bar{x}$ =8.1	0.081	(n=31) $\bar{x}$ =11.4	(n=577) $\bar{x}$ =12.6	0.601
HLA-DR Cells ^a		(n=355) $\bar{x}$ =450.1	(n=464) $\bar{x}$ =418.0	(n=34) $\bar{x}$ =346.9	<0.001	(n=45) $\bar{x}$ =444.7	(n=808) $\bar{x}$ =427.8	0.538
CD4/CD8 Ratio ^a		(n=355) $\bar{x}$ =1.91	(n=460) $\bar{x}$ =1.84	(n=33) $\bar{x}$ =1.68	0.295	(n=43) $\bar{x}$ =1.94	(n=805) $\bar{x}$ =1.86	0.595

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for the Immunologic Evaluation

Dependent Variable	Level	Age				Race		
		Born >1942	Born 1923-1941	Born <1922	P- Value	Black	Nonblack	P- Value
TLC ^a		(n=356) $\bar{x}$ =2,066.5	(n=464) $\bar{x}$ =1,966.7	(n=34) $\bar{x}$ =1,651.5	<0.001	(n=45) $\bar{x}$ =2,067.0	(n=809) $\bar{x}$ =1,989.8	0.520
IgG		(n=931) $\bar{x}$ =1,054.7	(n=1,198) $\bar{x}$ =1,032.0	(n=77) $\bar{x}$ =1,081.7	0.028	(n=133) $\bar{x}$ =1,264.2	(n=2,073) $\bar{x}$ =1,029.1	<0.001
IgA ^a		(n=931) $\bar{x}$ =204.77	(n=1,198) $\bar{x}$ =211.75	(n=77) $\bar{x}$ =221.98	0.103	(n=133) $\bar{x}$ =226.06	(n=2,073) $\bar{x}$ =208.08	0.035
IgM ^a		(n=930) $\bar{x}$ =113.80	(n=1,197) $\bar{x}$ =109.09	(n=77) $\bar{x}$ =106.58	0.088	(n=133) $\bar{x}$ =96.70	(n=2,071) $\bar{x}$ =111.95	<0.001
Unstimulated PHA Response (day 1) ^a		(n=354) $\bar{x}$ =2,043	(n=459) $\bar{x}$ =1,844	(n=34) $\bar{x}$ =1,629	0.002	(n=44) $\bar{x}$ =2,308	(n=803) $\bar{x}$ =1,902	0.007
Unstimulated PHA Response (day 2) ^a		(n=349) $\bar{x}$ =2,224	(n=459) $\bar{x}$ =1,918	(n=34) $\bar{x}$ =1,604	<0.001	(n=45) $\bar{x}$ =2,749	(n=797) $\bar{x}$ =2,001	<0.001
PHA Net Response (day 1, conc. 1)		(n=353) $\bar{x}$ =111,953	(n=459) $\bar{x}$ =91,675	(n=34) $\bar{x}$ =86,669	<0.001	(n=44) $\bar{x}$ =116,774	(n=802) $\bar{x}$ =99,550	0.014
PHA Net Response (day 1, conc. 2)		(n=353) $\bar{x}$ =177,443	(n=459) $\bar{x}$ =149,059	(n=34) $\bar{x}$ =129,819	<0.001	(n=44) $\bar{x}$ =177,087	(n=802) $\bar{x}$ =159,905	0.035
PHA Net Response (day 1, conc. 3)		(n=353) $\bar{x}$ =162,016	(n=459) $\bar{x}$ =135,851	(n=34) $\bar{x}$ =110,263	<0.001	(n=44) $\bar{x}$ =166,867	(n=802) $\bar{x}$ =145,282	0.005

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for the Immunologic Evaluation

Dependent Variable	Level	Age			p-Value	Race		p-Value
		Born >>1942	Born 1923-1941	Born <<1922		Black	Nonblack	
PHA Net Response (day 2, conc. 1)		(n=348) $\bar{x}$ =165,370	(n=458) $\bar{x}$ =159,549	(n=34) $\bar{x}$ =144,773	0.040	(n=45) $\bar{x}$ =168,353	(n=795) $\bar{x}$ =161,138	0.323
PHA Net Response (day 2, conc. 2)		(n=348) $\bar{x}$ =190,416	(n=458) $\bar{x}$ =174,418	(n=34) $\bar{x}$ =152,011	<0.001	(n=45) $\bar{x}$ =187,207	(n=795) $\bar{x}$ =180,109	0.325
PHA Net Response (day 2, conc. 3)		(n=348) $\bar{x}$ =134,016	(n=458) $\bar{x}$ =123,717	(n=34) $\bar{x}$ =100,378	<0.001	(n=45) $\bar{x}$ =146,588	(n=795) $\bar{x}$ =126,291	0.005
Maximum PHA Net Response		(n=346) $\bar{x}$ =220,904	(n=452) $\bar{x}$ =196,253	(n=34) $\bar{x}$ =163,872	<0.001	(n=44) $\bar{x}$ =215,213	(n=788) $\bar{x}$ =204,621	0.108
Unstimulated MLC Response*		(n=347) $\bar{x}$ =4,647	(n=457) $\bar{x}$ =3,516	(n=33) $\bar{x}$ =2,541	<0.001	(n=45) $\bar{x}$ =6,246	(n=792) $\bar{x}$ =3,831	<0.001
MLC Net Response		(n=347) $\bar{x}$ =90,828	(n=457) $\bar{x}$ =84,924	(n=33) $\bar{x}$ =78,324	0.063	(n=45) $\bar{x}$ =95,963	(n=792) $\bar{x}$ =86,811	0.125
NKCA 50/1 Net Response		(n=343) $\bar{x}$ =401.9	(n=460) $\bar{x}$ =428.8	(n=34) $\bar{x}$ =409.6	0.139	(n=45) $\bar{x}$ =420.8	(n=792) $\bar{x}$ =416.3	0.874
NKCA 50/1 Percent Release		(n=343) $\bar{x}$ =34.4	(n=460) $\bar{x}$ =36.5	(n=34) $\bar{x}$ =34.9	0.153	(n=45) $\bar{x}$ =35.8	(n=792) $\bar{x}$ =35.5	0.887
NKCI 50/1 Net Response		(n=353) $\bar{x}$ =802.5	(n=457) $\bar{x}$ =818.2	(n=33) $\bar{x}$ =808.9	0.144	(n=44) $\bar{x}$ =788.7	(n=799) $\bar{x}$ =811.9	0.172
NKCI 50/1 Percent Release		(n=353) $\bar{x}$ =66.1	(n=457) $\bar{x}$ =67.4	(n=33) $\bar{x}$ =66.6	0.121	(n=44) $\bar{x}$ =64.9	(n=799) $\bar{x}$ =66.9	0.130

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for Immunologic Evaluation

Dependent Variable	Level	Occupation			p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew	
Composite Skin Test Diagnosis	Abnormal	(n=680) 4.6%	(n=281) 7.5%	(n=774) 5.2%	0.181
CD2 Cells ^a		(n=318) $\bar{x}$ =1,538.5	(n=157) $\bar{x}$ =1,652.6	(n=370) $\bar{x}$ =1,634.0	0.042
CD4 Cells ^a		(n=318) $\bar{x}$ =855.8	(n=158) $\bar{x}$ =930.1	(n=374) $\bar{x}$ =922.5	0.030
CD8 Cells ^a		(n=317) $\bar{x}$ =462.4	(n=158) $\bar{x}$ =498.1	(n=374) $\bar{x}$ =490.5	0.196
CD20 Cells ^a		(n=318) $\bar{x}$ =139.0	(n=158) $\bar{x}$ =159.1	(n=375) $\bar{x}$ =164.0	<0.001
CD14 Cells ^a		(n=319) $\bar{x}$ =31.0	(n=159) $\bar{x}$ =32.0	(n=376) $\bar{x}$ =31.7	0.902
CD25 Cells ^{a, b}		(n=235) $\bar{x}$ =11.8	(n=112) $\bar{x}$ =13.0	(n=261) $\bar{x}$ =13.0	0.567
HLA-DR Cells ^a		(n=319) $\bar{x}$ =402.5	(n=159) $\bar{x}$ =448.1	(n=375) $\bar{x}$ =443.6	0.005
CD4/CD8 Ratio ^a		(n=317) $\bar{x}$ =1.85	(n=158) $\bar{x}$ =1.83	(n=373) $\bar{x}$ =1.90	0.662

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for Immunologic Evaluation

Dependent Variable	Level	Occupation			p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew	
TLC ^a		(n=319) $\bar{x}$ =1,905.1	(n=159) $\bar{x}$ =2,065.6	(n=376) $\bar{x}$ =2,041.5	0.016
IgG		(n=828) $\bar{x}$ =1,020.8	(n=374) $\bar{x}$ =1,027.9	(n=1,004) $\bar{x}$ =1,067.6	<0.001
IgA ^a		(n=828) $\bar{x}$ =203.56	(n=374) $\bar{x}$ =210.24	(n=1,004) $\bar{x}$ =213.40	0.070
IgM ^a		(n=826) $\bar{x}$ =109.53	(n=374) $\bar{x}$ =110.87	(n=1,004) $\bar{x}$ =112.19	0.551
Unstimulated PHA Response (day 1) ^a		(n=315) $\bar{x}$ =1,809	(n=158) $\bar{x}$ =1,851	(n=374) $\bar{x}$ =2,050	0.002
Unstimulated PHA Response (day 2) ^a		(n=316) $\bar{x}$ =1,904	(n=158) $\bar{x}$ =1,955	(n=368) $\bar{x}$ =2,184	0.003
PHA Net Response (day 1, conc. 1)		(n=313) $\bar{x}$ =100,304	(n=158) $\bar{x}$ =94,434	(n=375) $\bar{x}$ =102,937	0.154
PHA Net Response (day 1, conc. 2)		(n=313) $\bar{x}$ =154,669	(n=158) $\bar{x}$ =158,066	(n=375) $\bar{x}$ =166,943	0.012
PHA Net Response (day 1, conc. 3)		(n=313) $\bar{x}$ =138,662	(n=158) $\bar{x}$ =145,781	(n=375) $\bar{x}$ =152,947	0.002

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for Immunologic Evaluation

Dependent Variable	Level	Occupation			p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew	
PHA Net Response (day 2, conc. 1)		(n=316) $\bar{x}$ =165,673	(n=157) $\bar{x}$ =153,648	(n=367) $\bar{x}$ =161,299	0.046
PHA Net Response (day 2, conc. 2)		(n=316) $\bar{x}$ =175,499	(n=157) $\bar{x}$ =180,597	(n=367) $\bar{x}$ =184,678	0.055
PHA Net Response (day 2, conc. 3)		(n=316) $\bar{x}$ =121,213	(n=157) $\bar{x}$ =131,229	(n=367) $\bar{x}$ =130,709	0.023
Maximum PHA Net Response		(n=309) $\bar{x}$ =199,887	(n=156) $\bar{x}$ =198,386	(n=367) $\bar{x}$ =212,528	0.008
Unstimulated NLC Response*		(n=313) $\bar{x}$ =3,635	(n=154) $\bar{x}$ =3,573	(n=370) $\bar{x}$ =4,359	0.002
NLC Net Response		(n=313) $\bar{x}$ =88,850	(n=154) $\bar{x}$ =84,852	(n=370) $\bar{x}$ =86,877	0.593
NKCA 50/1 Net Response		(n=317) $\bar{x}$ =439.1	(n=158) $\bar{x}$ =405.0	(n=362) $\bar{x}$ =401.4	0.032
NKCA 50/1 Percent Release		(n=317) $\bar{x}$ =37.3	(n=158) $\bar{x}$ =34.4	(n=362) $\bar{x}$ =34.4	0.039
NKCI 50/1 Net Response		(n=312) $\bar{x}$ =816.3	(n=157) $\bar{x}$ =822.7	(n=374) $\bar{x}$ =801.2	0.077
NKCI 50/1 Percent Release		(n=312) $\bar{x}$ =67.3	(n=157) $\bar{x}$ =67.5	(n=374) $\bar{x}$ =66.1	0.130

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for the Immunologic Evaluation

Dependent Variable	Level	Current Cigarette Smoking				p-Value	Lifetime Cigarette Smoking History				p-Value
		0-Never	0-Former	>0-20	>20		0	>0-10	>10		
Composite Skin Test Diagnosis	Abnormal	(n=498) 5.0%	(n=684) 4.8%	(n=278) 5.8%	(n=275) 6.5%	0.717	(n=499) 5.0%	(n=474) 5.9%	(n=762) 5.1%	0.786	
CD2 Cells ^a		(n=227) $\bar{x}=1,490.5$	(n=327) $\bar{x}=1,506.7$	(n=152) $\bar{x}=1,793.0$	(n=139) $\bar{x}=1,858.6$	<0.001	(n=227) $\bar{x}=1,491.3$	(n=228) $\bar{x}=1,614.2$	(n=390) $\bar{x}=1,667.4$	<0.001	
CD4 Cells ^a		(n=227) $\bar{x}=798.8$	(n=331) $\bar{x}=835.8$	(n=153) $\bar{x}=1,051.4$	(n=139) $\bar{x}=1,111.1$	<0.001	(n=227) $\bar{x}=799.8$	(n=231) $\bar{x}=920.2$	(n=392) $\bar{x}=955.0$	<0.001	
CD8 Cells ^a		(n=228) $\bar{x}=458.8$	(n=330) $\bar{x}=457.0$	(n=153) $\bar{x}=523.9$	(n=138) $\bar{x}=540.4$	<0.001	(n=228) $\bar{x}=459.0$	(n=230) $\bar{x}=474.7$	(n=391) $\bar{x}=500.2$	0.104	
CD20 Cells ^a		(n=228) $\bar{x}=139.6$	(n=331) $\bar{x}=138.1$	(n=153) $\bar{x}=186.9$	(n=139) $\bar{x}=186.6$	<0.001	(n=228) $\bar{x}=140.8$	(n=231) $\bar{x}=156.4$	(n=392) $\bar{x}=160.2$	0.025	
CD14 Cells ^a		(n=228) $\bar{x}=26.0$	(n=334) $\bar{x}=28.7$	(n=153) $\bar{x}=40.1$	(n=139) $\bar{x}=43.1$	<0.001	(n=228) $\bar{x}=26.2$	(n=232) $\bar{x}=29.9$	(n=394) $\bar{x}=36.7$	<0.001	
CD25 Cells ^{a, b}		(n=163) $\bar{x}=11.7$	(n=233) $\bar{x}=11.8$	(n=117) $\bar{x}=14.2$	(n=95) $\bar{x}=13.9$	0.251	(n=163) $\bar{x}=11.8$	(n=168) $\bar{x}=13.3$	(n=277) $\bar{x}=12.5$	0.560	
HLA-DR Cells ^a		(n=228) $\bar{x}=378.8$	(n=334) $\bar{x}=396.9$	(n=153) $\bar{x}=515.6$	(n=138) $\bar{x}=527.6$	<0.001	(n=228) $\bar{x}=381.3$	(n=232) $\bar{x}=427.9$	(n=393) $\bar{x}=463.4$	<0.001	
CD4/CD8 Ratio ^a		(n=227) $\bar{x}=1.75$	(n=330) $\bar{x}=1.86$	(n=153) $\bar{x}=2.00$	(n=138) $\bar{x}=1.97$	0.043	(n=227) $\bar{x}=1.75$	(n=230) $\bar{x}=1.97$	(n=391) $\bar{x}=1.89$	0.041	

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for the Immunologic Evaluation

Dependent Variable	Level	Current Cigarette Smoking				p-Value	Lifetime Cigarette Smoking History				p-Value
		0-Never	0-Former	>0-20	>20		0	>0-10	>10		
TLC ^a		(n=228) $\bar{x}$ =1,849.7	(n=334) $\bar{x}$ =1,862.5	(n=153) $\bar{x}$ =2,251.5	(n=139) $\bar{x}$ =2,323.2	<0.001	(n=228) $\bar{x}$ =1,849.7	(n=232) $\bar{x}$ =2,008.3	(n=393) $\bar{x}$ =2,073.4	0.001	
IgG		(n=607) $\bar{x}$ =1094.2	(n=863) $\bar{x}$ =1,043.4	(n=376) $\bar{x}$ =1,015.5	(n=360) $\bar{x}$ =986.3	<0.001	(n=608) $\bar{x}$ =1,094.1	(n=604) $\bar{x}$ =1,041.2	(n=994) $\bar{x}$ =1,013.4	<0.001	
IgA ^a		(n=607) $\bar{x}$ =213.46	(n=863) $\bar{x}$ =211.81	(n=376) $\bar{x}$ =208.03	(n=360) $\bar{x}$ =196.97	0.032	(n=608) $\bar{x}$ =212.39	(n=604) $\bar{x}$ =205.55	(n=994) $\bar{x}$ =208.73	0.327	
IgM ^a		(n=606) $\bar{x}$ =110.79	(n=862) $\bar{x}$ =112.74	(n=376) $\bar{x}$ =107.99	(n=360) $\bar{x}$ =110.21	0.506	(n=607) $\bar{x}$ =110.84	(n=604) $\bar{x}$ =108.73	(n=993) $\bar{x}$ =112.43	0.384	
Unstimulated PHA Response (day 1) ^a		(n=227) $\bar{x}$ =1,949	(n=332) $\bar{x}$ =1,843	(n=151) $\bar{x}$ =2,020	(n=137) $\bar{x}$ =1,939	0.209	(n=227) $\bar{x}$ =1,953	(n=231) $\bar{x}$ =1,865	(n=389) $\bar{x}$ =1,930	0.540	
Unstimulated PHA Response (day 2) ^a		(n=226) $\bar{x}$ =2,060	(n=332) $\bar{x}$ =1,955	(n=149) $\bar{x}$ =2,148	(n=135) $\bar{x}$ =2,031	0.312	(n=226) $\bar{x}$ =2,064	(n=229) $\bar{x}$ =2,014	(n=387) $\bar{x}$ =2,018	0.855	
PHA Net Response (day 1, conc. 1)		(n=226) $\bar{x}$ =100,844	(n=331) $\bar{x}$ =101,965	(n=152) $\bar{x}$ =101,289	(n=137) $\bar{x}$ =94,237	0.402	(n=226) $\bar{x}$ =100,829	(n=231) $\bar{x}$ =103,140	(n=389) $\bar{x}$ =98,337	0.435	
PHA Net Response (day 1, conc. 2)		(n=226) $\bar{x}$ =160,487	(n=331) $\bar{x}$ =162,763	(n=152) $\bar{x}$ =159,486	(n=137) $\bar{x}$ =157,004	0.757	(n=226) $\bar{x}$ =160,493	(n=231) $\bar{x}$ =166,479	(n=389) $\bar{x}$ =157,360	0.113	
PHA Net Response (day 1, conc. 3)		(n=226) $\bar{x}$ =143,630	(n=330) $\bar{x}$ =146,961	(n=152) $\bar{x}$ =149,135	(n=138) $\bar{x}$ =146,309	0.773	(n=226) $\bar{x}$ =143,768	(n=231) $\bar{x}$ =153,032	(n=389) $\bar{x}$ =143,911	0.055	

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for the Immunologic Evaluation

Dependent Variable	Level	Current Cigarette Smoking				p-Value	Lifetime Cigarette Smoking History				p-Value
		0-Never	0-Former	>0-20	>20		0	>0-10	>10		
PHA Net Response (day 2, conc. 1)		(n=226) $\bar{x}$ =163,835	(n=330) $\bar{x}$ =166,067	(n=149) $\bar{x}$ =152,397	(n=135) $\bar{x}$ =156,143	0.019	(n=226) $\bar{x}$ =163,526	(n=228) $\bar{x}$ =163,763	(n=386) $\bar{x}$ =158,701	0.343	
PHA Net Response (day 2, conc. 2)		(n=226) $\bar{x}$ =181,189	(n=330) $\bar{x}$ =181,821	(n=149) $\bar{x}$ =176,810	(n=135) $\bar{x}$ =179,802	0.762	(n=226) $\bar{x}$ =181,118	(n=228) $\bar{x}$ =183,002	(n=386) $\bar{x}$ =178,435	0.499	
PHA Net Response (day 2, conc. 3)		(n=226) $\bar{x}$ =123,944	(n=330) $\bar{x}$ =127,037	(n=149) $\bar{x}$ =126,486	(n=135) $\bar{x}$ =135,047	0.202	(n=226) $\bar{x}$ =124,039	(n=228) $\bar{x}$ =131,044	(n=386) $\bar{x}$ =127,117	0.292	
Maximum PHA Net Response		(n=224) $\bar{x}$ =205,098	(n=326) $\bar{x}$ =208,960	(n=148) $\bar{x}$ =196,066	(n=134) $\bar{x}$ =206,196	0.303	(n=224) $\bar{x}$ =205,098	(n=226) $\bar{x}$ =213,174	(n=382) $\bar{x}$ =200,502	0.459	
Unstimulated MLC Response ^a		(n=224) $\bar{x}$ =3,772	(n=328) $\bar{x}$ =3,728	(n=149) $\bar{x}$ =4,258	(n=136) $\bar{x}$ =4,331	0.114	(n=224) $\bar{x}$ =3,789	(n=225) $\bar{x}$ =4,128	(n=388) $\bar{x}$ =3,888	0.453	
MLC Net Response		(n=224) $\bar{x}$ =81,169	(n=328) $\bar{x}$ =84,935	(n=149) $\bar{x}$ =91,349	(n=136) $\bar{x}$ =99,745	<0.001	(n=224) $\bar{x}$ =81,368	(n=225) $\bar{x}$ =86,642	(n=388) $\bar{x}$ =91,447	0.012	
NKCA 50/1 Net Response		(n=225) $\bar{x}$ =436.4	(n=329) $\bar{x}$ =429.7	(n=149) $\bar{x}$ =382.3	(n=134) $\bar{x}$ =384.6	0.007	(n=225) $\bar{x}$ =435.3	(n=225) $\bar{x}$ =413.7	(n=387) $\bar{x}$ =405.6	0.190	
NKCA 50/1 Percent Release		(n=225) $\bar{x}$ =37.0	(n=329) $\bar{x}$ =36.7	(n=149) $\bar{x}$ =32.5	(n=134) $\bar{x}$ =33.1	0.007	(n=225) $\bar{x}$ =36.9	(n=225) $\bar{x}$ =35.2	(n=387) $\bar{x}$ =34.7	0.249	
NKCI 50/1 Net Response		(n=225) $\bar{x}$ =827.7	(n=330) $\bar{x}$ =817.4	(n=150) $\bar{x}$ =787.0	(n=138) $\bar{x}$ =789.9	<0.001	(n=225) $\bar{x}$ =827.0	(n=231) $\bar{x}$ =806.3	(n=387) $\bar{x}$ =802.7	0.034	
NKCI 50/1 Percent Release		(n=225) $\bar{x}$ =68.2	(n=330) $\bar{x}$ =67.3	(n=150) $\bar{x}$ =65.0	(n=138) $\bar{x}$ =65.0	<0.001	(n=225) $\bar{x}$ =68.2	(n=231) $\bar{x}$ =66.6	(n=387) $\bar{x}$ =66.0	0.019	

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for the Immunologic Evaluation

Dependent Variable	Level	Current Alcohol Use				Lifetime Alcohol History			
		0-1	>1-4	>4	p-Value	0	>0-40	>40	p-Value
Composite Skin Test Diagnosis	Abnormal	(n=1,379) 5.4%	(n=299) 4.3%	(n=52) 7.7%	0.554	(n=155) 3.9%	(n=1,190) 5.3%	(n=379) 5.8%	0.662
CD2 Cells ^a		(n=671) $\bar{x}$ =1,590.1	(n=143) $\bar{x}$ =1,635.7	(n=29) $\bar{x}$ =1,608.4	0.686	(n=72) $\bar{x}$ =1,500.1	(n=574) $\bar{x}$ =1,603.6	(n=196) $\bar{x}$ =1,623.6	0.255
CD4 Cells ^a		(n=675) $\bar{x}$ =886.1	(n=144) $\bar{x}$ =951.4	(n=29) $\bar{x}$ =911.3	0.166	(n=72) $\bar{x}$ =804.7	(n=579) $\bar{x}$ =897.9	(n=196) $\bar{x}$ =940.0	0.022
CD8 Cells ^a		(n=675) $\bar{x}$ =481.8	(n=143) $\bar{x}$ =476.9	(n=29) $\bar{x}$ =448.5	0.741	(n=72) $\bar{x}$ =460.6	(n=578) $\bar{x}$ =486.7	(n=196) $\bar{x}$ =465.4	0.433
CD20 Cells ^a		(n=676) $\bar{x}$ =155.6	(n=144) $\bar{x}$ =145.7	(n=29) $\bar{x}$ =122.4	0.053	(n=72) $\bar{x}$ =145.6	(n=579) $\bar{x}$ =156.1	(n=197) $\bar{x}$ =147.1	0.324
CD14 Cells ^a		(n=677) $\bar{x}$ =30.6	(n=146) $\bar{x}$ =34.5	(n=29) $\bar{x}$ =44.0	0.020	(n=72) $\bar{x}$ =31.5	(n=580) $\bar{x}$ =30.5	(n=199) $\bar{x}$ =35.2	0.082
CD25 Cells ^{a,b}		(n=475) $\bar{x}$ =12.7	(n=108) $\bar{x}$ =11.4	(n=23) $\bar{x}$ =12.4	0.635	(n=54) $\bar{x}$ =11.8	(n=408) $\bar{x}$ =12.6	(n=143) $\bar{x}$ =12.5	0.910
HLA-DR Cells ^a		(n=676) $\bar{x}$ =427.1	(n=146) $\bar{x}$ =435.5	(n=29) $\bar{x}$ =416.3	0.817	(n=72) $\bar{x}$ =415.5	(n=579) $\bar{x}$ =429.9	(n=199) $\bar{x}$ =430.8	0.799
CD4/CD8 Ratio ^a		(n=674) $\bar{x}$ =1.85	(n=143) $\bar{x}$ =1.93	(n=29) $\bar{x}$ =2.04	0.412	(n=72) $\bar{x}$ =1.73	(n=578) $\bar{x}$ =1.85	(n=195) $\bar{x}$ =2.01	0.050
TLC ^a		(n=677) $\bar{x}$ =1,996.4	(n=146) $\bar{x}$ =1,974.0	(n=29) $\bar{x}$ =1,992.8	0.940	(n=72) $\bar{x}$ =1,901.1	(n=580) $\bar{x}$ =2,000.5	(n=199) $\bar{x}$ =2,008.0	0.161

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for the Immunologic Evaluation

Dependent Variable	Level	Current Alcohol Use				Lifetime Alcohol History			
		0-1	>1-4	>4	p-Value	0	>0-40	>40	p-Value
IgG		(n=1,746) $\bar{x}$ =1,049.2	(n=380) $\bar{x}$ =1,016.2	(n=74) $\bar{x}$ =1,039.0	0.043	(n=193) $\bar{x}$ =1,079.0	(n=1,502) $\bar{x}$ =1,043.8	(n=498) $\bar{x}$ =1,028.7	0.040
IgA ^a		(n=1,746) $\bar{x}$ =207.36	(n=380) $\bar{x}$ =213.07	(n=74) $\bar{x}$ =232.37	0.060	(n=193) $\bar{x}$ =197.06	(n=1,502) $\bar{x}$ =207.24	(n=498) $\bar{x}$ =220.52	0.003
IgM ^a		(n=1,746) $\bar{x}$ =110.08	(n=378) $\bar{x}$ =111.91	(n=74) $\bar{x}$ =129.93	0.011	(n=193) $\bar{x}$ =112.12	(n=1,501) $\bar{x}$ =110.34	(n=497) $\bar{x}$ =113.12	0.568
Unstimulated PHA Response (day 1) ^a		(n=670) $\bar{x}$ =1,936	(n=146) $\bar{x}$ =1,807	(n=29) $\bar{x}$ =2,053	0.196	(n=70) $\bar{x}$ =2,105	(n=575) $\bar{x}$ =1,893	(n=199) $\bar{x}$ =1,925	0.208
Unstimulated PHA Response (day 2) ^a		(n=677) $\bar{x}$ =2,057	(n=144) $\bar{x}$ =1,843	(n=29) $\bar{x}$ =2,375	0.018	(n=72) $\bar{x}$ =2,247	(n=569) $\bar{x}$ =1,977	(n=198) $\bar{x}$ =2,105	0.079
PHA Net Response (day 1, conc. 1)		(n=670) $\bar{x}$ =100,501	(n=145) $\bar{x}$ =100,628	(n=29) $\bar{x}$ =91,943	0.624	(n=69) $\bar{x}$ =100,741	(n=576) $\bar{x}$ =99,968	(n=198) $\bar{x}$ =101,467	0.924
PHA Net Response (day 1, conc. 2)		(n=670) $\bar{x}$ =160,411	(n=145) $\bar{x}$ =164,828	(n=29) $\bar{x}$ =142,684	0.126	(n=69) $\bar{x}$ =155,862	(n=576) $\bar{x}$ =161,322	(n=198) $\bar{x}$ =160,589	0.730
PHA Net Response (day 1, conc. 3)		(n=670) $\bar{x}$ =146,050	(n=145) $\bar{x}$ =149,795	(n=29) $\bar{x}$ =129,190	0.131	(n=69) $\bar{x}$ =141,666	(n=576) $\bar{x}$ =146,731	(n=198) $\bar{x}$ =146,501	0.733
PHA Net Response (day 2, conc. 1)		(n=665) $\bar{x}$ =161,458	(n=144) $\bar{x}$ =162,921	(n=29) $\bar{x}$ =147,467	0.289	(n=71) $\bar{x}$ =157,555	(n=569) $\bar{x}$ =161,450	(n=197) $\bar{x}$ =162,759	0.749
PHA Net Response (day 2, conc. 2)		(n=665) $\bar{x}$ =180,779	(n=144) $\bar{x}$ =181,440	(n=29) $\bar{x}$ =165,635	0.250	(n=71) $\bar{x}$ =173,105	(n=569) $\bar{x}$ =182,214	(n=197) $\bar{x}$ =178,350	0.246

TABLE P-2. (continued)

Dependent Variable-Covariate Associations* for the Immunologic Evaluation

Dependent Variable	Level	Current Alcohol Use				Lifetime Alcohol History			
		0-1	>1-4	>4	p-Value	0	>0-40	>40	p-Value
PHA Net Response (day 2, conc. 3)		(n=665) $\bar{x}$ =127,350	(n=144) $\bar{x}$ =128,112	(n=29) $\bar{x}$ =116,717	0.493	(n=71) $\bar{x}$ =123,846	(n=569) $\bar{x}$ =127,222	(n=197) $\bar{x}$ =128,776	0.765
Maximum PHA Net Response		(n=658) $\bar{x}$ =204,307	(n=143) $\bar{x}$ =208,602	(n=29) $\bar{x}$ =207,013	0.546	(n=68) $\bar{x}$ =211,846	(n=565) $\bar{x}$ =206,364	(n=196) $\bar{x}$ =199,714	0.606
Unstimulated MLC Response ^a		(n=664) $\bar{x}$ =3,990	(n=143) $\bar{x}$ =3,694	(n=28) $\bar{x}$ =3,276	0.263	(n=71) $\bar{x}$ =4,181	(n=568) $\bar{x}$ =3,917	(n=195) $\bar{x}$ =3,829	0.709
MLC Net Response		(n=664) $\bar{x}$ =86,453	(n=143) $\bar{x}$ =90,744	(n=28) $\bar{x}$ =89,247	0.491	(n=71) $\bar{x}$ =83,096	(n=568) $\bar{x}$ =86,949	(n=195) $\bar{x}$ =89,018	0.564
NKCA 50/1 Net Response		(n=661) $\bar{x}$ =408.1	(n=145) $\bar{x}$ =443.9	(n=29) $\bar{x}$ =506.1	0.006	(n=70) $\bar{x}$ =388.9	(n=570) $\bar{x}$ =412.8	(n=194) $\bar{x}$ =445.8	0.048
NKCA 50/1 Percent Release		(n=661) $\bar{x}$ =34.9	(n=145) $\bar{x}$ =37.4	(n=29) $\bar{x}$ =41.8	0.022	(n=70) $\bar{x}$ =33.7	(n=570) $\bar{x}$ =35.3	(n=194) $\bar{x}$ =37.4	0.161
NKCI 50/1 Net Response		(n=669) $\bar{x}$ =809.5	(n=143) $\bar{x}$ =813.8	(n=29) $\bar{x}$ =834.2	0.500	(n=72) $\bar{x}$ =826.1	(n=573) $\bar{x}$ =806.0	(n=196) $\bar{x}$ =820.4	0.143
NKCI 50/1 Percent Release		(n=669) $\bar{x}$ =66.7	(n=143) $\bar{x}$ =67.2	(n=29) $\bar{x}$ =68.7	0.467	(n=72) $\bar{x}$ =67.0	(n=573) $\bar{x}$ =66.4	(n=196) $\bar{x}$ =67.7	0.104

^aTransformed from natural logarithm scale.^bCD25 cell counts contained both zero values and positive values. Dependent variable-covariate associations were based on positive CD25 cell counts only.

*Dependent variable-covariate associations were adjusted for batch-to-batch variation for CD2 cells, CD4 cells, and CD8 cells. Associations were adjusted for batch-to-batch variation and blood draw day-to-day variation for all other dependent variables except composite skin test diagnosis, which was not adjusted by any covariates.

TABLE P-3.

Summary of Group-by-Covariate Interactions for Immunologic Variables

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Comparison		
Composite Skin Test Diagnosis	Group-by-Lifetime Cigarette Smoking History	0	n	208	290		
			Number/%				
			Abnormal	12 5.8%	13 4.5%	1.32 (0.59,2.97)	0.497
			Normal	196 94.2%	277 95.5%		
		>0 - 10	n	200	272		
			Number/%			1.24 (0.57,2.68)	0.590
			Abnormal	13 6.5%	15 5.5%		
			Normal	187 93.5%	257 94.5%		
		>10	n	335	425	2.66 (1.35,5.27)	0.005
			Number/%				
			Abnormal	26 7.8%	13 3.1%		
			Normal	309 92.2%	412 96.9%		
PHA Net Response (day 1, conc. 1)	Group-by-Current Alcohol Use	0-1	n	304	366	—	0.305
			Adj. Mean	109,902	106,264		
			95% C.I.	(101,738, 118,066)	(98,435, 114,093)		
		>1-4	n	60	85	—	0.489
			Adj. Mean	104,644	109,786		
			95% C.I.	(91,735, 117,552)	(98,544, 121,027)		
		>4	n	8	21	—	0.024
			Adj. Mean	73,793	114,309		
			95% C.I.	(42,986, 104,600)	(93,907, 134,710)		

TABLE P-3. (continued)

Summary of Group-by-Covariate Interactions for Immunologic Variables

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Comparison		
MLC Net Response	Group-by-Race	Nonblack	n	350	442	—	0.341
			Adj. Mean 95% C.I.	87,867 (83,517, 92,256)	85,200 (81,357, 89,044)		
		Black	n	20	25	—	0.059
			Adj. Mean 95% C.I.	87,383 (70,302, 104,464)	109,376 (94,048, 124,705)		
NRCA 50/1 Net Response	Group-by-Race	Nonblack	n	350	441	—	0.268
			Adj. Mean 95% C.I.	410.0 (389.1,430.8)	424.7 (406.3,443.1)		
		Black	n	19	25	—	0.065
			Adj. Mean 95% C.I.	467.1 (384.1,550.2)	359.3 (280.2,438.4)		
NRCA 50/1 Percent Release	Group-by-Race	Nonblack	n	350	441	—	0.392
			Adj. Mean 95% C.I.	35.1 (33.3,36.8)	36.0 (34.5,37.5)		
		Black	n	19	25	—	0.031
			Adj. Mean 95% C.I.	40.4 (33.6,47.2)	30.1 (23.7,36.6)		

TABLE P-3. (continued)

Summary of Group-by-Covariate Interactions for Immunologic Variables

Variable	Interaction	Stratification	Statistic	Group		Adj. Relative Risk (95% C.I.)	p-Value
				Ranch Hand	Comparison		
NKCI 50/1 Net Response	Group-by- Race	Nonblack	n	351	448	—	0.146
			Adj. Mean	809.2	820.5		
			95% C.I.	(796.9,821.5)	(809.7,831.2)		
		Black	n	20	24	—	0.007
			Adj. Mean	828.6	734.7		
			95% C.I.	(780.7,876.6)	(686.5,782.9)		
NKCI 50/1 Percent Release	Group-by- Race	Nonblack	n	351	448	—	0.069
			Adj. Mean	66.5	67.7		
			95% C.I.	(65.6,67.5)	(66.8,68.5)		
		Black	n	20	24	—	0.008
			Adj. Mean	67.9	60.5		
			95% C.I.	(64.0,71.7)	(56.7,64.3)		

—Adjusted relative risk not applicable for continuous analysis of a variable.

Note: Refer to Tables 19-6 and 19-10 for specification of adjusted model.