

AIR FORCE HEALTH STUDY

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

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APPENDIX O-1.

Dependent Variable-Covariate Associations for the Immunology Assessment

This appendix contains results of tests of association between each dependent variable and candidate covariates for the adjusted analysis of each dependent variable. Pearson's chi-square test (continuity-adjusted for 2×2 tables) is used for the significance testing of the association between each discrete dependent variable and the candidate covariate. When a candidate covariate is continuous in nature (for example, age), the covariate is discretized prior to the analysis of the discrete dependent variable. Pearson's correlation coefficient is used for significance testing of the associations between each continuous dependent variable and a continuous candidate covariate. When a candidate covariate is discrete in nature, means (transformed back to the original scale, if necessary) are presented and an analysis of variance is used to investigate the difference between the means.

Table O-1-1.
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Age			Race		
		Born ≥1942	Born <1942	p-Value	Black	Non-Black	p-Value
Composite Skin Test Diagnosis	Abnormal	(n=909) 2.3%	(n=1,230) 4.4%	0.014	(n=128) 0.0%	(n=2,011) 3.7%	0.048
CD3 Cells (cells/mm ³) ^a		(n=849) r=-0.069		0.045	(n=48) $\bar{x}$ =1,547.9	(n=801) $\bar{x}$ =1,471.3	0.387
CD4 Cells (cells/mm ³) ^a		(n=849) r=-0.106		0.002	(n=48) $\bar{x}$ =1,005.3	(n=801) $\bar{x}$ =947.8	0.327
CD5 Cells (cells/mm ³) ^a		(n=849) r=-0.091		0.008	(n=48) $\bar{x}$ =1,588.5	(n=801) $\bar{x}$ =1,516.9	0.432
CD8 Cells (cells/mm ³) ^a		(n=849) r=0.019		0.586	(n=48) $\bar{x}$ =672.0	(n=801) $\bar{x}$ =628.6	0.339
CD14 Cells (cells/mm ³) ^a		(n=849) r=0.067		0.050	(n=48) $\bar{x}$ =456.6	(n=801) $\bar{x}$ =523.6	0.005
CD16+56 Cells (cells/mm ³) ^a		(n=849) r=0.088		0.010	(n=48) $\bar{x}$ =257.2	(n=801) $\bar{x}$ =262.8	0.786
CD20 Cells (cells/mm ³) ^b		(n=849) r=-0.227		<0.001	(n=48) $\bar{x}$ =260.8	(n=801) $\bar{x}$ =221.0	0.047
CD25 Cells (cells/mm ³) ^a		(n=849) r=-0.109		0.002	(n=48) $\bar{x}$ =281.7	(n=801) $\bar{x}$ =251.0	0.140
CD4-CD8 Ratio ^a		(n=849) r=-0.121		<0.001	(n=48) $\bar{x}$ =1.50	(n=801) $\bar{x}$ =1.51	0.865
Double Labelled Cells: CD3 with CD25 (cells/mm ³) ^a		(n=849) r=-0.097		0.005	(n=48) $\bar{x}$ =226.5	(n=801) $\bar{x}$ =197.6	0.096
Double Labelled Cells: CD5 with CD20 (continuous-cells/mm ³) ^a	Nonzero	(n=809) r=-0.222		<0.001	(n=47) $\bar{x}$ =64.3	(n=762) $\bar{x}$ =51.6	0.059
(discrete)	Zero	(n=361) 3.3%	(n=488) 5.7%	0.140	(n=48) 2.1%	(n=801) 4.9%	0.593
Double Labelled Cells: CD4 with CD8 (continuous-cells/mm ³) ^a	Nonzero	(n=759) r=0.027		0.464	(n=42) $\bar{x}$ =31.9	(n=717) $\bar{x}$ =28.9	0.355
(discrete)	Zero	(n=361) 13.3%	(n=488) 8.6%	0.037	(n=48) 12.5%	(n=801) 10.5%	0.842

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Occupation			p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew	
Composite Skin Test Diagnosis	Abnormal	(n=829) 4.0%	(n=149) 3.4%	(n=960) 3.1%	0.616
CD3 Cells (cells/mm ³) ^a		(n=330) $\bar{x}$ =1,410.9	(n=149) $\bar{x}$ =1,511.4	(n=370) $\bar{x}$ =1,520.9	0.030
CD4 Cells (cells/mm ³) ^a		(n=330) $\bar{x}$ =918.0	(n=149) $\bar{x}$ =963.9	(n=370) $\bar{x}$ =976.0	0.122
CD5 Cells (cells/mm ³) ^a		(n=330) $\bar{x}$ =1,456.0	(n=149) $\bar{x}$ =1,553.7	(n=370) $\bar{x}$ =1,567.5	0.037
CD8 Cells (cells/mm ³) ^a		(n=330) $\bar{x}$ =604.5	(n=149) $\bar{x}$ =656.1	(n=370) $\bar{x}$ =645.3	0.099
CD14 Cells (cells/mm ³) ^a		(n=330) $\bar{x}$ =506.2	(n=149) $\bar{x}$ =530.3	(n=370) $\bar{x}$ =527.3	0.175
CD16+56 Cells (cells/mm ³) ^a		(n=330) $\bar{x}$ =261.6	(n=149) $\bar{x}$ =261.0	(n=370) $\bar{x}$ =263.9	0.967
CD20 Cells (cells/mm ³) ^b		(n=330) $\bar{x}$ =197.5	(n=149) $\bar{x}$ =232.7	(n=370) $\bar{x}$ =241.9	<0.001
CD25 Cells (cells/mm ³) ^a		(n=330) $\bar{x}$ =241.5	(n=149) $\bar{x}$ =246.7	(n=370) $\bar{x}$ =265.6	0.047
CD4-CD8 Ratio ^a		(n=330) $\bar{x}$ =1.52	(n=149) $\bar{x}$ =1.47	(n=370) $\bar{x}$ =1.51	0.714
Double Labelled Cells: CD3 with CD25 (cells/mm ³) ^a		(n=330) $\bar{x}$ =189.4	(n=149) $\bar{x}$ =194.2	(n=370) $\bar{x}$ =210.4	0.035
Double Labelled Cells: CD5 with CD20 (continuous-cells/mm ³) ^a	Nonzero	(n=309) $\bar{x}$ =46.5	(n=143) $\bar{x}$ =52.0	(n=357) $\bar{x}$ =57.9	0.001
(discrete)	Zero	(n=330) 6.4%	(n=149) 4.0%	(n=370) 3.5%	0.188
Double Labelled Cells: CD4 with CD8 (continuous-cells/mm ³) ^a	Nonzero	(n=295) $\bar{x}$ =28.6	(n=139) $\bar{x}$ =28.7	(n=325) $\bar{x}$ =29.7	0.775
(discrete)	Zero	(n=330) 10.6%	(n=149) 6.7%	(n=370) 12.2%	0.189

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Current Cigarette Smoking (cigarettes/day)				p-Value
		0-Never	0-Former	>0-20	>20	
Composite Skin Test Diagnosis	Abnormal	(n=574) 3.0%	(n=1,025) 3.2%	(n=334) 4.5%	(n=204) 4.9%	0.410
CD3 Cells (cells/mm ³) ^a				(n=848) r=0.289		<0.001
CD4 Cells (cells/mm ³) ^a				(n=848) r=0.309		<0.001
CD5 Cells (cells/mm ³) ^a				(n=848) r=0.277		<0.001
CD8 Cells (cells/mm ³) ^a				(n=848) r=0.171		<0.001
CD14 Cells (cells/mm ³) ^a				(n=848) r=0.347		<0.001
CD16+56 Cells (cells/mm ³) ^a				(n=848) r=-0.103		0.003
CD20 Cells (cells/mm ³) ^b				(n=848) r=0.196		<0.001
CD25 Cells (cells/mm ³) ^a				(n=848) r=0.355		<0.001
CD4-CD8 Ratio ^a				(n=848) r=0.105		0.002
Double Labelled Cells: CD3 with CD25 (cells/mm ³) ^a				(n=848) r=0.354		<0.001
Double Labelled Cells: CD5 with CD20 (continuous-cells/mm ³) ^a	Nonzero			(n=808) r=0.001		0.968
(discrete)	Zero	(n=233) 6.0%	(n=407) 3.2%	(n=137) 5.8%	(n=71) 7.0%	0.240
Double Labelled Cells: CD4 with CD8 (continuous-cells/mm ³) ^a	Nonzero			(n=758) r=0.191		<0.001
(discrete)	Zero	(n=233) 12.5%	(n=407) 10.1%	(n=137) 10.2%	(n=71) 8.5%	0.724

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Lifetime Cigarette Smoking History (pack-years)			p-Value
		0	>0-10	>10	
Composite Skin Test Diagnosis	Abnormal	(n=574) 3.0%	(n=663) 3.5%	(n=899) 3.9%	0.014
CD3 Cells (cells/mm ³) ^a			(n=848) r=0.127		<0.001
CD4 Cells (cells/mm ³) ^a			(n=848) r=0.148		<0.001
CD5 Cells (cells/mm ³) ^a			(n=848) r=0.111		0.001
CD8 Cells (cells/mm ³) ^a			(n=848) r=0.069		0.044
CD14 Cells (cells/mm ³) ^a			(n=848) r=0.181		<0.001
CD16+56 Cells (cells/mm ³) ^a			(n=848) r=-0.023		0.500
CD20 Cells (cells/mm ³) ^b			(n=848) r=0.052		0.128
CD25 Cells (cells/mm ³) ^a			(n=848) r=0.199		<0.001
CD4-CD8 Ratio ^a			(n=848) r=0.064		0.063
Double Labelled Cells: CD3 with CD25 (cells/mm ³) ^a			(n=848) r=0.208		<0.001
Double Labelled Cells: CD5 with CD20 (continuous-cells/mm ³) ^a	Nonzero		(n=808) r=-0.091		0.009
(discrete)	Zero	(n=233) 6.0%	(n=255) 4.7%	(n=360) 3.9%	0.493
Double Labelled Cells: CD4 with CD8 (continuous-cells/mm ³) ^a	Nonzero		(n=758) r=0.014		0.696
(discrete)	Zero	(n=233) 12.5%	(n=255) 10.2%	(n=360) 9.7%	0.556

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Current Alcohol Use (drinks/day)			p-Value
		0-1	>1-4	>4	
Composite Skin Test Diagnosis	Abnormal	(n=1,668) 3.4%	(n=389) 3.9%	(n=55) 5.5%	0.679
CD3 Cells (cells/mm ³) ^a			(n=841) r=0.003		0.931
CD4 Cells (cells/mm ³) ^a			(n=841) r=0.031		0.369
CD5 Cells (cells/mm ³) ^a			(n=841) r=-0.007		0.845
CD8 Cells (cells/mm ³) ^a			(n=841) r=-0.005		0.887
CD14 Cells (cells/mm ³) ^a			(n=841) r=0.048		0.161
CD16+56 Cells (cells/mm ³) ^a			(n=841) r=0.017		0.616
CD20 Cells (cells/mm ³) ^b			(n=841) r=-0.067		0.051
CD25 Cells (cells/mm ³) ^a			(n=841) r=0.073		0.034
CD4-CD8 Ratio ^a			(n=841) r=0.035		0.309
Double Labelled Cells: CD3 with CD25 (cells/mm ³) ^a			(n=841) r=0.073		0.035
Double Labelled Cells: CD5 with CD20 (continuous-cells/mm ³) ^a	Nonzero		(n=801) r=-0.125		<0.001
(discrete)	Zero	(n=661) 4.1%	(n=161) 6.2%	(n=19) 15.8%	0.038
Double Labelled Cells: CD4 with CD8 (continuous-cells/mm ³) ^a	Nonzero		(n=753) r=-0.003		0.943
(discrete)	Zero	(n=661) 11.0%	(n=161) 8.1%	(n=19) 10.5%	0.544

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Lifetime Alcohol History (drink-years)			p-Value
		0	>0-40	>40	
Composite Skin Test Diagnosis		(n=125)	(n=1,426)	(n=548)	
	Abnormal	1.6%	3.3%	4.7%	0.141
CD3 Cells (cells/mm ³) ^a			(n=836)		
			r=0.027		0.428
CD4 Cells (cells/mm ³) ^a			(n=836)		
			r=0.046		0.185
CD5 Cells (cells/mm ³) ^a			(n=836)		
			r=0.015		0.674
CD8 Cells (cells/mm ³) ^a			(n=836)		
			r=-0.007		0.832
CD14 Cells (cells/mm ³) ^a			(n=836)		
			r=0.111		0.001
CD16+56 Cells (cells/mm ³) ^a			(n=836)		
			r=-0.034		0.327
CD20 Cells (cells/mm ³) ^b			(n=836)		
			r=-0.056		0.105
CD25 Cells (cells/mm ³) ^a			(n=836)		
			r=0.057		0.101
CD4-CD8 Ratio ^a			(n=836)		
			r=0.052		0.133
Double Labelled Cells: CD3 with CD25 (cells/mm ³) ^a			(n=836)		
			r=0.066		0.057
Double Labelled Cells: CD5 with CD20 (continuous-cells/mm ³) ^a	Nonzero		(n=797)		
			r=-0.093		0.009
(discrete)	Zero	(n=52)	(n=576)	(n=208)	
		5.8%	3.8%	6.7%	0.216
Double Labelled Cells: CD4 with CD8 (continuous-cells/mm ³) ^a	Nonzero		(n=748)		
			r=0.039		0.289
(discrete)	Zero	(n=52)	(n=576)	(n=208)	
		17.3%	9.7%	11.1%	0.223

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Physical Activity Index			p-Value
		Sedentary	Moderate	Active	
Composite Skin Test Diagnosis	Abnormal	(n=1,213) 3.9%	(n=395) 2.5%	(n=529) 3.4%	0.447
CD3 Cells (cells/mm ³) ^a		(n=479) $\bar{x}$ =1,508.0	(n=165) $\bar{x}$ =1,433.0	(n=204) $\bar{x}$ =1,437.1	0.195
CD4 Cells (cells/mm ³) ^a		(n=479) $\bar{x}$ =974.0	(n=165) $\bar{x}$ =925.5	(n=204) $\bar{x}$ =920.9	0.156
CD5 Cells (cells/mm ³) ^a		(n=479) $\bar{x}$ =1,558.7	(n=165) $\bar{x}$ =1,473.9	(n=204) $\bar{x}$ =1,474.0	0.125
CD8 Cells (cells/mm ³) ^a		(n=479) $\bar{x}$ =637.0	(n=165) $\bar{x}$ =622.8	(n=204) $\bar{x}$ =623.5	0.798
CD14 Cells (cells/mm ³) ^a		(n=479) $\bar{x}$ =527.1	(n=165) $\bar{x}$ =533.4	(n=204) $\bar{x}$ =492.9	0.025
CD16+56 Cells (cells/mm ³) ^a		(n=479) $\bar{x}$ =261.3	(n=165) $\bar{x}$ =260.3	(n=204) $\bar{x}$ =268.2	0.821
CD20 Cells (cells/mm ³) ^b		(n=479) $\bar{x}$ =230.1	(n=165) $\bar{x}$ =214.6	(n=204) $\bar{x}$ =210.3	0.110
CD25 Cells (cells/mm ³) ^a		(n=479) $\bar{x}$ =258.1	(n=165) $\bar{x}$ =253.7	(n=204) $\bar{x}$ =239.7	0.243
CD4-CD8 Ratio ^a		(n=479) $\bar{x}$ =1.53	(n=165) $\bar{x}$ =1.49	(n=204) $\bar{x}$ =1.48	0.551
Double Labelled Cells: CD3 with CD25 (cells/mm ³) ^a		(n=479) $\bar{x}$ =202.7	(n=165) $\bar{x}$ =202.7	(n=204) $\bar{x}$ =188.7	0.270
Double Labelled Cells: CD5 with CD20 (continuous-cells/mm ³) ^a	Nonzero	(n=459) $\bar{x}$ =54.1	(n=153) $\bar{x}$ =51.4	(n=196) $\bar{x}$ =48.6	0.275
(discrete)	Zero	(n=479) 4.2%	(n=165) 7.3%	(n=204) 3.9%	0.223
Double Labelled Cells: CD4 with CD8 (continuous-cells/mm ³) ^a	Nonzero	(n=426) $\bar{x}$ =29.1	(n=149) $\bar{x}$ =30.5	(n=183) $\bar{x}$ =27.9	0.481
(discrete)	Zero	(n=479) 11.1%	(n=165) 9.7%	(n=204) 10.3%	0.873

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Age			Race		
		Born ≥1942	Born <1942	p-Value	Black	Non-Black	p-Value
Double Labelled Cells:							
CD3 with CD16+56 (continuous-cells/mm ³) ^a	Nonzero	(n=820) r=0.124		<0.001	(n=47) x̄=119.8	(n=773) x̄=68.7	<0.001
(discrete)	Zero	(n=361) 4.4%	(n=488) 2.7%	0.226	(n=48) 2.1%	(n=801) 3.5%	0.909
Total Lymphocyte Count (TLC) (cells/mm ³) ^a		(n=849) r=-0.095		0.005	(n=48) x̄=2,175.4	(n=801) x̄=2,052.7	0.241
IgA (mg/dl) ^a		(n=2,200) r=0.065		0.002	(n=129) x̄=231.5	(n=2,071) x̄=217.0	0.128
IgG (mg/dl) ^a		(n=2,200) r=-0.011		0.595	(n=129) x̄=1,268.4	(n=2,071) x̄=1,030.7	<0.001
IgM (mg/dl) ^a		(n=2,200) r=-0.067		0.002	(n=129) x̄=91.1	(n=2,071) x̄=105.8	0.003
Lupus Panel							
ANA Test	Present	(n=942) 10.7%	(n=1,258) 18.6%	<0.001	(n=129) 17.8%	(n=2,071) 15.1%	0.471
Thyroid Microsomal Antibody	Present	(n=942) 3.4%	(n=1,258) 3.5%	0.992	(n=129) 2.3%	(n=2,071) 3.5%	0.635
MSK Smooth Muscle Antibody	Present	(n=942) 1.9%	(n=1,258) 4.0%	0.008	(n=129) 5.4%	(n=2,071) 3.0%	0.188
MSK Mitochondrial Antibody	Present	(n=942) 0.2%	(n=1,258) 0.2%	0.999	(n=129) 0.0%	(n=2,071) 0.2%	0.999
MSK Parietal Antibody	Present	(n=942) 2.2%	(n=1,258) 2.7%	0.572	(n=129) 2.3%	(n=2,071) 2.5%	0.999
Rheumatoid Factor	Present	(n=942) 13.2%	(n=1,258) 18.2%	0.002	(n=129) 18.6%	(n=2,071) 15.9%	0.489
B Cell Clones Detected by Serum Protein Electrophoresis	Present	(n=942) 1.2%	(n=1,258) 2.6%	0.024	(n=129) 0.8%	(n=2,071) 2.1%	0.484
Other Antibodies	Present	(n=939) 2.8%	(n=1,254) 4.3%	0.074	(n=129) 0.8%	(n=2,064) 3.8%	0.121
Summary Index	Abnormal	(n=939) 30.4%	(n=1,257) 45.1%	<0.001	(n=129) 45.0%	(n=2,067) 38.4%	0.165

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Occupation			p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew	
Double Labelled Cells: CD3 with CD16+56 (continuous-cells/mm ³) ^a	Nonzero	(n=316) $\bar{x}$ =73.2	(n=147) $\bar{x}$ =71.5	(n=357) $\bar{x}$ =68.9	0.694
(discrete)	Zero	(n=330) 4.2%	(n=149) 1.3%	(n=370) 3.5%	0.268
Total Lymphocyte Count (TLC) (cells/mm ³) ^a		(n=330) $\bar{x}$ =1,960.6	(n=149) $\bar{x}$ =2,081.9	(n=370) $\bar{x}$ =2,142.4	0.002
IgA (mg/dl) ^a		(n=855) $\bar{x}$ =213.0	(n=360) $\bar{x}$ =214.5	(n=985) $\bar{x}$ =223.5	0.069
IgG (mg/dl) ^a		(n=855) $\bar{x}$ =1,027.2	(n=360) $\bar{x}$ =1,027.4	(n=985) $\bar{x}$ =1,063.4	0.002
IgM (mg/dl) ^a		(n=855) $\bar{x}$ =103.8	(n=360) $\bar{x}$ =105.3	(n=985) $\bar{x}$ =105.6	0.779
Lupus Panel					
ANA Test	Present	(n=855) 17.0%	(n=360) 16.4%	(n=985) 13.3%	0.074
Thyroid Microsomal Antibody	Present	(n=855) 3.7%	(n=360) 3.1%	(n=985) 3.4%	0.812
MSK Smooth Muscle Antibody	Present	(n=855) 4.1%	(n=360) 2.2%	(n=985) 2.5%	0.092
MSK Mitochondrial Antibody	Present	(n=855) 0.4%	(n=360) 0.0%	(n=985) 0.2%	0.491
MSK Parietal Antibody	Present	(n=855) 2.5%	(n=360) 1.9%	(n=985) 2.7%	0.706
Rheumatoid Factor	Present	(n=855) 17.7%	(n=360) 15.6%	(n=985) 14.8%	0.245
B Cell Clones Detected by Serum Protein Electrophoresis	Present	(n=855) 2.3%	(n=360) 3.3%	(n=985) 1.2%	0.033
Other Antibodies	Present	(n=852) 4.0%	(n=359) 4.7%	(n=982) 3.0%	0.242
Summary Index	Abnormal	(n=855) 42.6%	(n=359) 38.7%	(n=982) 35.5%	0.009

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Current Cigarette Smoking (cigarettes/day)				p-Value
		0-Never	0-Former	>0-20	>20	
Double Labelled Cells:						
CD3 with CD16+56 (continuous-cells/mm ³) ^a	Nonzero		(n=819) r=0.046			0.188
(discrete)	Zero	(n=233) 4.7%	(n=407) 2.7%	(n=137) 2.9%	(n=71) 4.2%	0.558
Total Lymphocyte Count (TLC) (cells/mm ³) ^a			(n=848) r=0.286			<0.001
IgA (mg/dl) ^a			(n=2,198) r=-0.015			0.475
IgG (mg/dl) ^a			(n=2,198) r=-0.144			<0.001
IgM (mg/dl) ^a			(n=2,198) r=0.009			0.675
Lupus Panel						
ANA Test	Present	(n=602) 17.6%	(n=1,041) 13.9%	(n=345) 14.2%	(n=210) 15.7%	0.228
Thyroid Microsomal Antibody	Present	(n=602) 3.2%	(n=1,041) 3.9%	(n=345) 2.3%	(n=210) 3.8%	0.512
MSK Smooth Muscle Antibody	Present	(n=602) 3.2%	(n=1,041) 3.2%	(n=345) 2.6%	(n=210) 2.9%	0.955
MSK Mitochondrial Antibody	Present	(n=602) 0.3%	(n=1,041) 0.1%	(n=345) 0.6%	(n=210) 0.0%	0.328
MSK Parietal Antibody	Present	(n=602) 2.0%	(n=1,041) 2.8%	(n=345) 2.3%	(n=210) 2.9%	0.768
Rheumatoid Factor	Present	(n=602) 14.8%	(n=1,041) 16.1%	(n=345) 16.5%	(n=210) 18.6%	0.622
B Cell Clones Detected by Serum Protein Electrophoresis	Present	(n=602) 1.2%	(n=1,041) 1.8%	(n=345) 4.3%	(n=210) 1.4%	0.006
Other Antibodies	Present	(n=599) 3.0%	(n=1,038) 4.2%	(n=344) 3.5%	(n=210) 2.9%	0.545
Summary Index	Abnormal	(n=601) 38.9%	(n=1,039) 38.6%	(n=344) 37.8%	(n=210) 40.5%	0.937

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Lifetime Cigarette Smoking History			p-Value
		0 Pack-years	>0-10 Pack-years	>10 Pack-years	
Double Labelled Cells: CD3 with CD16+56 (continuous-cells/mm ³) ^a	Nonzero		(n=819) r=0.015		0.669
(discrete)	Zero	(n=233) 4.7%	(n=255) 4.3%	(n=360) 1.9%	0.123
Total Lymphocyte Count (TLC) (cells/mm ³) ^a			(n=848) r=0.127		<0.001
IgA (mg/dl) ^a			(n=2,197) r=0.031		0.143
IgG (mg/dl) ^a			(n=2,197) r=-0.108		<0.001
IgM (mg/dl) ^a			(n=2,197) r=0.013		0.551
Lupus Panel					
ANA Test	Present	(n=602) 17.6%	(n=676) 13.3%	(n=919) 14.9%	0.098
Thyroid Microsomal Antibody	Present	(n=602) 3.2%	(n=676) 3.7%	(n=919) 3.5%	0.868
MSK Smooth Muscle Antibody	Present	(n=602) 3.2%	(n=676) 2.7%	(n=919) 3.3%	0.775
MSK Mitochondrial Antibody	Present	(n=602) 0.3%	(n=676) 0.1%	(n=919) 0.2%	0.785
MSK Parietal Antibody	Present	(n=602) 2.0%	(n=676) 2.5%	(n=919) 2.8%	0.594
Rheumatoid Factor	Present	(n=602) 14.8%	(n=676) 16.6%	(n=919) 16.5%	0.603
B Cell Clones Detected by Serum Protein Electrophoresis	Present	(n=602) 1.2%	(n=676) 1.3%	(n=919) 3.0%	0.012
Other Antibodies	Present	(n=599) 3.0%	(n=673) 3.6%	(n=918) 4.1%	0.510
Summary Index	Abnormal	(n=601) 38.9%	(n=673) 36.0%	(n=919) 40.7%	0.158

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Current Alcohol Use (drinks/day)			p-Value
		0-1	>1-4	>4	
Double Labelled Cells:					
CD3 with CD16+56 (continuous-cells/mm ³) ^a	Nonzero		(n=813) r=-0.050		0.155
(discrete)	Zero	(n=661) 3.0%	(n=161) 4.4%	(n=19) 5.3%	0.628
Total Lymphocyte Count (TLC) (cells/mm ³) ^a			(n=841) r=0.004		0.911
IgA (mg/dl) ^a			(n=2,172) r=0.037		0.082
IgG (mg/dl) ^a			(n=2,172) r=-0.052		0.016
IgM (mg/dl) ^a			(n=2,172) r=0.048		0.026
Lupus Panel					
ANA Test	Present	(n=1,717) 15.2%	(n=397) 14.9%	(n=58) 13.8%	0.947
Thyroid Microsomal Antibody	Present	(n=1,717) 3.7%	(n=397) 2.3%	(n=58) 3.4%	0.356
MSK Smooth Muscle Antibody	Present	(n=1,717) 3.1%	(n=397) 3.5%	(n=58) 0.0%	0.349
MSK Mitochondrial Antibody	Present	(n=1,717) 0.2%	(n=397) 0.5%	(n=58) 0.0%	0.437
MSK Parietal Antibody	Present	(n=1,717) 2.9%	(n=397) 1.0%	(n=58) 1.7%	0.086
Rheumatoid Factor	Present	(n=1,717) 15.6%	(n=397) 17.1%	(n=58) 20.7%	0.468
B Cell Clones Detected by Serum Protein Electrophoresis	Present	(n=1,717) 1.8%	(n=397) 3.0%	(n=58) 1.7%	0.296
Other Antibodies	Present	(n=1,712) 3.8%	(n=395) 3.0%	(n=58) 5.2%	0.643
Summary Index	Abnormal	(n=1,715) 38.8%	(n=395) 37.7%	(n=58) 43.1%	0.727

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Lifetime Alcohol History (drink-years)			p-Value
		0	>0-40	>40	
Double Labelled Cells:					
CD3 with CD16+56 (continuous-cells/mm ³) ^a	Nonzero		(n=808) r=-0.008		0.814
(discrete)	Zero	(n=52) 1.9%	(n=576) 3.3%	(n=208) 3.9%	0.783
Total Lymphocyte Count (TLC) (cells/mm ³) ^a			(n=836) r=0.022		0.532
IgA (mg/dl) ^a			(n=2,158) r=0.046		0.031
IgG (mg/dl) ^a			(n=2,158) r=-0.045		0.039
IgM (mg/dl) ^a			(n=2,158) r=0.005		0.806
Lupus Panel					
ANA Test	Present	(n=131) 15.3%	(n=1,467) 15.6%	(n=560) 13.8%	0.578
Thyroid Microsomal Antibody	Present	(n=131) 3.8%	(n=1,467) 3.8%	(n=560) 2.3%	0.246
MSK Smooth Muscle Antibody	Present	(n=131) 4.6%	(n=1,467) 2.9%	(n=560) 3.2%	0.572
MSK Mitochondrial Antibody	Present	(n=131) 0.8%	(n=1,467) 0.2%	(n=560) 0.2%	0.424
MSK Parietal Antibody	Present	(n=131) 2.3%	(n=1,467) 2.7%	(n=560) 2.1%	0.743
Rheumatoid Factor	Present	(n=131) 19.1%	(n=1,467) 15.2%	(n=560) 17.7%	0.250
B Cell Clones Detected by Serum Protein Electrophoresis	Present	(n=131) 2.3%	(n=1,467) 1.7%	(n=560) 2.7%	0.362
Other Antibodies	Present	(n=131) 3.8%	(n=1,461) 3.6%	(n=559) 4.1%	0.839
Summary Index	Abnormal	(n=131) 43.5%	(n=1,463) 38.3%	(n=560) 38.8%	0.509

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

Table O-1-1. (Continued)
Dependent Variable-Covariate Associations for the Immunology Assessment

Dependent Variable	Level	Physical Activity Index			p-Value
		Sedentary	Moderate	Active	
Double Labelled Cells:					
CD3 with (CD16+56)		(n=464)	(n=156)	(n=199)	
(continuous-cells/mm ³) ^a	Nonzero	$\bar{x}$ =73.7	$\bar{x}$ =68.7	$\bar{x}$ =66.7	0.395
(discrete)	Zero	(n=479) 3.1%	(n=165) 5.5%	(n=204) 2.5%	0.251
Total Lymphocyte Count (TLC)		(n=479)	(n=165)	(n=204)	
(cells/mm ³) ^a		$\bar{x}$ =2,088.4	$\bar{x}$ =2,022.6	$\bar{x}$ =2,025.6	0.402
IgA (mg/dl) ^a		(n=1,250) $\bar{x}$ =218.0	(n=402) $\bar{x}$ =220.7	(n=546) $\bar{x}$ =215.2	0.707
IgG (mg/dl) ^a		(n=1,250) $\bar{x}$ =1,041.3	(n=402) $\bar{x}$ =1,049.0	(n=546) $\bar{x}$ =1,043.0	0.856
IgM (mg/dl) ^a		(n=1,250) $\bar{x}$ =103.9	(n=402) $\bar{x}$ =104.7	(n=546) $\bar{x}$ =106.9	0.606
Lupus Panel					
ANA Test	Present	(n=1,250) 15.5%	(n=402) 13.9%	(n=546) 15.2%	0.741
Thyroid Microsomal Antibody	Present	(n=1,250) 4.2%	(n=402) 2.5%	(n=546) 2.4%	0.070
MSK Smooth Muscle Antibody	Present	(n=1,250) 3.0%	(n=402) 3.0%	(n=546) 3.3%	0.927
MSK Mitochondrial Antibody	Present	(n=1,250) 0.4%	(n=402) 0.0%	(n=546) 0.0%	0.150
MSK Parietal Antibody	Present	(n=1,250) 2.6%	(n=402) 1.5%	(n=546) 3.1%	0.282
Rheumatoid Factor	Present	(n=1,250) 15.9%	(n=402) 17.4%	(n=546) 15.4%	0.688
B Cell Clones Detected by Serum Protein Electrophoresis	Present	(n=1,250) 2.1%	(n=402) 1.7%	(n=546) 2.0%	0.915
Other Antibodies	Present	(n=1,247) 4.1%	(n=399) 4.5%	(n=545) 2.0%	0.059
Summary Index	Abnormal	(n=1,248) 40.0%	(n=400) 39.0%	(n=546) 35.7%	0.231

^a Means transformed from natural logarithm scale; correlations based on natural logarithm versus covariate.

^b Means transformed from natural logarithm (X+1) scale; correlations based on natural logarithm (X+1) versus covariate.

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

APPENDIX O-2.

Interaction Tables for the Immunology Assessment

This appendix contains exposure analyses results of interactions between covariates and group or dioxin. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Means are transformed back to the original scale, if necessary. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The covariate involved in the interaction and a reference to the analysis table in Chapter 19 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix O-2 Table	Chapter 19 Table	Dependent Variable	Model	Covariate
O-2-1	19-4	Composite Skin Test Diagnosis	3 6	Current Alcohol Use Occupation
O-2-2	19-5	CD3 Cells	2 3	Occupation Age, Occupation
O-2-3	19-6	CD4 Cells	3	Age, Occupation
O-2-4	19-7	CD5 Cells	2 3	Occupation Age, Occupation
O-2-5	19-8	CD8 Cells	2 3 4	Occupation Age, Occupation Occupation
O-2-6	19-9	CD14 Cells	3	Age
O-2-7	19-10	CD16 + 56 Cells	2 3	Occupation, Physical Activity Index Occupation, Lifetime Alcohol History, Physical Activity Index
O-2-8	19-11	CD20 Cells	1 2	Lifetime Alcohol History Age
O-2-9	19-12	CD25 Cells	3 6	Age, Occupation, Lifetime Cigarette Smoking History, Lifetime Alcohol History Lifetime Cigarette Smoking History
O-2-10	19-13	CD4-CD8 Ratio	1	Physical Activity Index

Appendix O-2 Table	Chapter 19 Table	Dependent Variable	Model	Covariate
O-2-11	19-14	Double Labelled Cells: CD3 with CD25	3 6	Occupation, Lifetime Cigarette Smoking History, Lifetime Alcohol History Lifetime Cigarette Smoking History
O-2-12	19-16	Double Labelled Cells: CD4 with CD8	2 3	Race, Current Cigarette Smoking, Lifetime Alcohol History Age, Race, Occupation
O-2-13	19-17	Double Labelled Cells: CD3 with CD16 + 56	2 4 5 6	Occupation Physical Activity Index Physical Activity Index Physical Activity Index
O-2-14	19-18	TLC	2 3	Physical Activity Index Age
O-2-15	19-19	IgA	3	Race
O-2-16	19-20	IgG	3	Occupation
O-2-17	19-21	IgM	1 3 4	Race, Physical Activity Index Physical Activity Index Current Alcohol Use
O-2-18	19-22	Lupus Panel: Antinuclear Antibody (ANA)	3 4 5 6	Lifetime Alcohol History Race, Lifetime Alcohol History Race, Lifetime Alcohol History Race, Lifetime Alcohol History
O-2-19	19-23	Lupus Panel: Thyroid Microsomal Antibody	1 2 3 4	Current Cigarette Smoking, Current Alcohol Use, Lifetime Alcohol History Current Cigarette Smoking, Lifetime Alcohol History Current Cigarette Smoking, Current Alcohol Use, Lifetime Alcohol History Current Alcohol Use
O-2-20	19-26	Lupus Panel: Parietal Antibody	1	Race
O-2-21	19-27	Lupus Panel: Rheumatoid Factor	2 3	Age, Occupation Occupation, Physical Activity Index
O-2-22	19-28	Lupus Panel: B Cell Clones Detected By Serum Protein Electrophoresis	5 6	Current Alcohol Use Current Alcohol Use
O-2-23	19-29	Lupus Panel: Other Antibodies (ANA and MSK)	6	Race

Table O-2-1.
Interaction Table for Composite Skin Test Diagnosis

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Current Alcohol Use: Table 19-4)					
Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)^a	p-Value
0-1 Drinks/Day	Comparison	797	2.8		
	Background RH	274	5.5	1.71 (0.86,3.38)	0.126
	Low RH	191	4.7	1.74 (0.78,3.90)	0.177
	High RH	205	2.4	1.04 (0.38,2.84)	0.935
	Low plus High RH	396	3.5	1.41 (0.70,2.82)	0.334
>1 Drinks/Day	Comparison	207	3.9		
	Background RH	82	8.5	1.96 (0.67,5.71)	0.217
	Low RH	58	1.7	0.51 (0.06,4.20)	0.532
	High RH	45	0.0	--	--
	Low plus High RH	103	1.0	0.28 (0.03,2.29)	0.234

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 19-4)					
Current Dioxin Category Summary Statistics				Analysis Results for Log₂ (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)^b	p-Value
Officer	Low	185	4.3	1.26 (0.74,2.12)	0.395
	Medium	130	6.9		
	High	20	0.0		
Enlisted Flyer	Low	32	6.3	0.50 (0.26,0.96)	0.038
	Medium	54	7.4		
	High	60	0.0		
Enlisted Groundcrew	Low	70	11.4	0.74 (0.56,0.97)	0.029
	Medium	102	2.0		
	High	210	1.9		

^a Relative risk and confidence interval relative to Comparisons.

^b Relative risk for a twofold increase in current dioxin.

--: Relative risk, confidence interval, and p-value not presented due to sparse number of abnormalities.

Note: Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Model 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table O-2-2.
Interaction Table for CD3 Cells (cells/mm³)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 19-5)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_e (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean^a	Adjusted Slope (Std. Error)^b	p-Value
Officer	Low	31	1,545.4	0.036 (0.091)	0.718
	Medium	13	1,949.2		
	High	1	2,208.7		
Enlisted Flyer	Low	16	1,614.5	-0.128 (0.108)	0.276
	Medium	20	1,523.9		
	High	11	1,662.0		
Enlisted Groundcrew	Low	17	1,516.4	-0.025 (0.036)	0.502
	Medium	32	1,472.7		
	High	59	1,393.0		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 19-5)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^c	p-Value^d
Born ≥ 1942	Comparison	183	1,453.6		
	Background RH	47	1,410.8	-42.8 --	0.654
	Low RH	21	1,621.4	167.8 --	0.235
	High RH	65	1,509.9	56.3 --	0.511
	Low plus High RH	86	1,536.4	82.8 --	0.291
Born < 1942	Comparison	217	1,443.4		
	Background RH	93	1,562.1	118.7 --	0.114
	Low RH	74	1,360.4	-83.0 --	0.272
	High RH	41	1,481.9	38.5 --	0.703
	Low plus High RH	115	1,402.5	-40.9 --	0.537

Table O-2-1.
Interaction Table for Composite Skin Test Diagnosis

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Current Alcohol Use: Table 19-4)					
Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)^a	p-Value
0-1 Drinks/Day	Comparison	797	2.8		
	Background RH	274	5.5	1.71 (0.86,3.38)	0.126
	Low RH	191	4.7	1.74 (0.78,3.90)	0.177
	High RH	205	2.4	1.04 (0.38,2.84)	0.935
	Low plus High RH	396	3.5	1.41 (0.70,2.82)	0.334
>1 Drinks/Day	Comparison	207	3.9		
	Background RH	82	8.5	1.96 (0.67,5.71)	0.217
	Low RH	58	1.7	0.51 (0.06,4.20)	0.532
	High RH	45	0.0	--	--
	Low plus High RH	103	1.0	0.28 (0.03,2.29)	0.234

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 19-4)					
Current Dioxin Category Summary Statistics				Analysis Results for Log₂ (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)^b	p-Value
Officer	Low	185	4.3	1.26 (0.74,2.12)	0.395
	Medium	130	6.9		
	High	20	0.0		
Enlisted Flyer	Low	32	6.3	0.50 (0.26,0.96)	0.038
	Medium	54	7.4		
	High	60	0.0		
Enlisted Groundcrew	Low	70	11.4	0.74 (0.56,0.97)	0.029
	Medium	102	2.0		
	High	210	1.9		

^a Relative risk and confidence interval relative to Comparisons.

^b Relative risk for a twofold increase in current dioxin.

--: Relative risk, confidence interval, and p-value not presented due to sparse number of abnormalities.

Note: Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Model 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table O-2-2. (Continued)
Interaction Table for CD3 Cells (cells/mm³)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 19-5)					
Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^c	p-Value ^d
Officer	Comparison	139	1,422.7		
	Background RH	99	1,486.1	63.4 --	0.400
	Low RH	39	1,420.3	-2.4 --	0.981
	High RH	6	2,555.4	1,132.7 --	<0.001
	Low plus High RH	45	1,536.0	113.3 --	0.497
Enlisted Flyer	Comparison	74	1,521.3		
	Background RH	13	1,511.0	-10.3 --	0.954
	Low RH	25	1,406.8	-114.5 --	0.397
	High RH	22	1,356.4	-164.9 --	0.235
	Low plus High RH	47	1,383.0	-138.3 --	0.192
Enlisted Groundcrew	Comparison	187	1,425.5		
	Background RH	28	1,585.2	159.7 --	0.184
	Low RH	31	1,432.4	6.9 --	0.951
	High RH	78	1,458.5	33.0 --	0.668
	Low plus High RH	109	1,451.0	25.5 --	0.730

^a Transformed from natural logarithm scale.

^b Slope and standard error based on natural logarithm of CD3 cells versus log₂ dioxin.

^c Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^d P-value is based on difference of means on natural logarithm scale.

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table O-2-3.
Interaction Table for CD4 Cells (cells/mm³)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 19-6)					
Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^b	p-Value ^c
Born ≥ 1942	Comparison	183	933.6		
	Background RH	47	912.2	-21.4 --	0.733
	Low RH	21	1,082.9	149.3 --	0.114
	High RH	65	977.3	43.7 --	0.437
	Low plus High RH	86	1,002.1	68.5 --	0.186
Born < 1942	Comparison	220	917.6		
	Background RH	94	986.2	68.6 --	0.154
	Low RH	74	861.8	-55.8 --	0.251
	High RH	43	958.4	40.8 --	0.526
	Low plus High RH	117	896.1	-21.5 --	0.614

Table O-2-3. (Continued)
Interaction Table for CD4 Cells (cells/mm³)

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 19-6)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
Officer	Comparison	141	934.1		
	Background RH	99	966.0	31.9 --	0.522
	Low RH	39	916.1	-18.0 --	0.789
	High RH	6	1,618.7	684.6 --	0.001
	Low plus High RH	45	988.3	54.2 --	0.415
Enlisted Flyer	Comparison	74	957.8		
	Background RH	14	964.5	6.7 --	0.953
	Low RH	25	897.2	-60.6 --	0.488
	High RH	23	881.0	-76.8 --	0.386
	Low plus High RH	48	889.4	-68.4 --	0.321
Enlisted Groundcrew	Comparison	188	896.2		
	Background RH	28	994.3	98.1 --	0.202
	Low RH	31	942.2	46.0 --	0.523
	High RH	79	930.9	34.7 --	0.481
	Low plus High RH	110	934.1	37.9 --	0.396

^a Transformed from natural logarithm scale.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Note: RH = Ranch Hand.

Comparison: Current Dioxin $\leq$ 10 ppt.

Background (Ranch Hand): Current Dioxin $\leq$ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin $\leq$ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table O-2-4.
Interaction Table for CD5 Cells (cells/mm³)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 19-7)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log₂ (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean^a	Adjusted Slope (Std. Error)^b	p-Value
Officer	Low	31	1,599.1	0.029 (0.110)	0.809
	Medium	13	2,003.7		
	High	1	2,325.2		
Enlisted Flyer	Low	16	1,662.5	-0.129 (0.105)	0.258
	Medium	20	1,568.1		
	High	11	1,730.6		
Enlisted Groundcrew	Low	17	1,577.5	-0.024 (0.035)	0.502
	Medium	32	1,550.4		
	High	59	1,445.2		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 19-7)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^c	p-Value^d
Born ≥ 1942	Comparison	183	1,515.2		
	Background RH	47	1,447.9	-67.3 --	0.498
	Low RH	21	1,683.1	167.9 --	0.256
	High RH	65	1,581.9	66.7 --	0.459
	Low plus High RH	86	1,606.0	90.8 --	0.270
Born < 1942	Comparison	217	1,469.7		
	Background RH	93	1,600.7	131.0 --	0.090
	Low RH	74	1,392.2	-77.5 --	0.317
	High RH	41	1,540.4	70.7 --	0.498
	Low plus High RH	115	1,443.4	-26.3 --	0.700

Table O-2-4. (Continued)
Interaction Table for CD5 Cells (cells/mm³)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 19-7)					
Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^c	p-Value ^d
Officer	Comparison	139	1,469.2		
	Background RH	99	1,531.2	62.0 --	0.426
	Low RH	39	1,466.7	-2.5 --	0.981
	High RH	6	2,730.2	1,261.0 --	<0.001
	Low plus High RH	45	1,593.3	124.1 --	0.235
Enlisted Flyer	Comparison	74	1,566.3		
	Background RH	13	1,576.8	10.5 --	0.956
	Low RH	25	1,440.3	-126.0 --	0.367
	High RH	22	1,418.8	-147.5 --	0.308
	Low plus High RH	47	1,430.2	-136.1 --	0.220
Enlisted Groundcrew	Comparison	187	1,458.8		
	Background RH	28	1,609.6	150.8 --	0.220
	Low RH	31	1,484.7	25.9 --	0.820
	High RH	78	1,505.1	46.3 --	0.558
	Low plus High RH	109	1,499.3	40.5 --	0.569

^a Transformed from natural logarithm scale.

^b Slope and standard error based on natural logarithm of CD5 cells versus log₂ dioxin.

^c Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^d P-value is based on difference of means on natural logarithm scale.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.

Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table O-2-5.
Interaction Table for CD8 Cells (cells/mm³)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 19-8)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log₂ (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean^a	Adjusted Slope (Std. Error)^b	p-Value
Officer	Low	31	604.3	0.493 (0.172)	0.007
	Medium	13	861.3		
	High	1	1,284.9		
Enlisted Flyer	Low	16	657.5	-0.077 (0.062)	0.225
	Medium	20	536.5		
	High	11	552.3		
Enlisted Groundcrew	Low	17	592.6	0.002 (0.032)	0.958
	Medium	33	576.2		
	High	59	623.6		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 19-8)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^c	p-Value^d
Born ≥ 1942	Comparison	183	618.5		
	Background RH	47	594.3	-24.2 --	0.612
	Low RH	21	677.3	58.8 --	0.397
	High RH	65	606.9	-11.6 --	0.780
	Low plus High RH	86	623.4	4.9 --	0.899
Born < 1942	Comparison	217	646.1		
	Background RH	93	676.4	30.3 --	0.439
	Low RH	74	594.5	-51.6 --	0.184
	High RH	41	625.4	-20.7 --	0.689
	Low plus High RH	115	605.4	-40.7 --	0.231

Table O-2-5. (Continued)
Interaction Table for CD8 Cells (cells/mm³)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 19-8)					
Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^c	p-Value ^d
Officer	Comparison	139	611.2		
	Background RH	99	607.9	-3.3 --	0.928
	Low RH	39	597.0	-14.2 --	0.778
	High RH	6	1,186.8	575.6 --	0.001
	Low plus High RH	45	654.2	43.0 --	0.394
Enlisted Flyer	Comparison	74	693.4		
	Background RH	13	620.6	-72.8 --	0.426
	Low RH	25	611.5	-81.9 --	0.238
	High RH	22	533.1	-160.3 --	0.020
	Low plus High RH	47	573.5	-119.9 --	0.027
Enlisted Groundcrew	Comparison	187	623.9		
	Background RH	28	750.2	126.3 --	0.050
	Low RH	31	609.3	-14.6 --	0.792
	High RH	78	618.1	-5.8 --	0.882
	Low plus High RH	109	615.6	-8.3 --	0.811

Table O-2-5. (Continued)
Interaction Table for CD8 Cells (cells/mm³)

d) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 19-8)					
Current Dioxin Category Summary Statistics				Analysis Results for Log₂ (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean^a	Adjusted Slope (Std. Error)^b	p-Value
Officer	Low	84	604.3	0.111 (0.061)	0.074
	Medium	54	669.3		
	High	6	692.5		
Enlisted Flyer	Low	11	699.2	-0.043 (0.052)	0.421
	Medium	24	606.2		
	High	25	522.4		
Enlisted Groundcrew	Low	20	664.5	-0.029 (0.023)	0.210
	Medium	29	685.5		
	High	88	605.4		

^a Transformed from natural logarithm scale.

^b Slope and standard error based on natural logarithm of CD8 cells versus log₂ dioxin.

^c Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^d P-value is based on difference of means on natural logarithm scale.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.

Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Model 4: Low = ≤ 8.1 ppt; Medium = > 8.1-20.5 ppt; High = > 20.5 ppt.

Table O-2-6.
Interaction Table for CD14 Cells (cells/mm³)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 19-9)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
Born ≥ 1942	Comparison	183	473.0		
	Background RH	47	468.9	-4.1 --	0.867
	Low RH	21	500.6	27.6 --	0.429
	High RH	65	480.5	7.5 --	0.728
	Low plus High RH	86	485.3	12.3 --	0.531
Born < 1942	Comparison	220	508.7		
	Background RH	94	534.7	26.0 --	0.198
	Low RH	74	454.8	-53.9 --	0.008
	High RH	43	460.8	-47.9 --	0.061
	Low plus High RH	117	457.0	-51.7 --	0.003

^a Transformed from natural logarithm scale.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Note: Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table O-2-7.
Interaction Table for CD16 + 56 Cells (cells/mm³)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 19-10)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log₂ (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean^a	Adjusted Slope (Std. Error)^b	p-Value
Officer	Low	31	245.6	0.515 (0.188)	0.007
	Medium	13	275.8		
	High	1	1,023.8		
Enlisted Flyer	Low	16	247.6	-0.098 (0.103)	0.345
	Medium	20	233.1		
	High	12	197.4		
Enlisted Groundcrew	Low	17	244.9	0.008 (0.053)	0.885
	Medium	34	234.4		
	High	59	246.9		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Physical Activity Index: Table 19-10)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log₂ (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean^a	Adjusted Slope (Std. Error)^b	p-Value
Sedentary	Low	25	268.8	-0.002 (0.063)	0.980
	Medium	39	270.1		
	High	50	265.2		
Moderate	Low	14	156.3	0.175 (0.105)	0.099
	Medium	14	231.9		
	High	11	257.2		
Very Active	Low	25	284.8	-0.054 (0.092)	0.559
	Medium	14	205.0		
	High	11	279.0		

Table O-2-7. (Continued)
Interaction Table for CD16 + 56 Cells (cells/mm³)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 19-10)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^c	p-Value^d
Officer	Comparison	138	240.5		
	Background RH	98	240.7	0.2 --	0.993
	Low RH	39	195.8	-44.7 --	0.044
	High RH	6	405.7	165.2 --	0.023
	Low plus High RH	45	215.7	-24.7 --	0.260
Enlisted Flyer	Comparison	74	255.4		
	Background RH	13	255.2	-0.2 --	0.997
	Low RH	25	236.4	-19.0 --	0.558
	High RH	22	188.6	-66.8 --	0.027
	Low plus High RH	47	212.7	-42.7 --	0.081
Enlisted Groundcrew	Comparison	187	255.4		
	Background RH	28	236.1	-19.3 --	0.491
	Low RH	30	241.2	-14.2 --	0.606
	High RH	78	249.8	-5.6 --	0.772
	Low plus High RH	108	247.4	-8.0 --	0.643

Table O-2-7. (Continued)
Interaction Table for CD16 + 56 Cells (cells/mm³)

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Alcohol History: Table 19-10)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^c	p-Value^d
0 Drink-years	Comparison	20	235.5		
	Background RH	10	336.4	100.9 --	0.105
	Low RH	4	204.3	-31.2 --	0.635
	High RH	9	386.5	151.0 --	0.026
	Low plus High RH	13	317.6	82.1 --	0.128
>0-40 Drink-years	Comparison	276	245.2		
	Background RH	98	241.5	-3.7 --	0.824
	Low RH	63	207.4	-37.8 --	0.037
	High RH	72	217.8	-27.4 --	0.121
	Low plus High RH	135	212.9	-32.3 --	0.020
>40 Drink-years	Comparison	103	243.5		
	Background RH	31	207.4	-36.1 --	0.170
	Low RH	27	240.8	-2.7 --	0.925
	High RH	25	228.8	-14.7 --	0.615
	Low plus High RH	52	235.0	-8.5 --	0.702

Table O-2-7. (Continued)
Interaction Table for CD16 + 56 Cells (cells/mm³)

e) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Physical Activity Index: Table 19-10)					
Stratum	Dioxin Category	n	Adjusted Mean ^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.) ^c	p-Value ^d
Sedentary	Comparison	225	240.7		
	Background RH	76	236.6	-4.1 --	0.827
	Low RH	42	231.0	-9.7 --	0.660
	High RH	69	241.1	0.4 --	0.985
	Low plus High RH	111	237.2	-3.5 --	0.823
Moderate	Comparison	85	265.8		
	Background RH	26	261.6	-4.2 --	0.899
	Low RH	21	157.1	-108.7 --	<0.001
	High RH	18	238.3	-27.5 --	0.449
	Low plus High RH	39	190.4	-75.4 --	0.002
Very Active	Comparison	89	240.4		
	Background RH	37	233.9	-6.5 --	0.803
	Low RH	31	246.2	5.8 --	0.836
	High RH	19	212.9	-27.5 --	0.387
	Low plus High RH	50	233.0	-7.5 --	0.753

^a Transformed from natural logarithm scale.

^b Slope and standard error based on natural logarithm of CD16+56 cells versus log₂ dioxin.

^c Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^d P-value is based on difference of means on natural logarithm scale.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.

Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table O-2-8.
Interaction Table for CD20 Cells (cells/mm³)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Lifetime Alcohol History: Table 19-11)						
Stratum	Occupational Category	Group	n	Adjusted Mean ^a	Difference of Adjusted Means (95% C.I.) ^b	p-Value ^c
0 Drink-years	All	Ranch Hand	23	258.6	50.8 --	0.144
		Comparison	29	207.8		
> 0-40 Drink-years	All	Ranch Hand	249	232.4	6.9 --	0.502
		Comparison	327	225.5		
> 40 Drink-years	All	Ranch Hand	89	227.9	25.3 --	0.116
		Comparison	119	202.6		
0 Drink-years	Officer	Ranch Hand	9	298.2	121.8 --	0.052
		Comparison	7	176.4		
	Enlisted Flyer	Ranch Hand	4	242.0	9.1 --	0.915
		Comparison	5	232.9		
	Enlisted Groundcrew	Ranch Hand	10	227.2	13.3 --	0.779
		Comparison	17	213.9		
> 0-40 Drink-years	Officer	Ranch Hand	104	221.2	15.1 --	0.325
		Comparison	122	206.1		
	Enlisted Flyer	Ranch Hand	42	238.6	-15.5 --	0.577
		Comparison	49	254.1		
	Enlisted Groundcrew	Ranch Hand	103	234.2	6.6 --	0.677
		Comparison	156	227.6		
> 40 Drink-years	Officer	Ranch Hand	40	213.1	12.7 --	0.602
		Comparison	44	200.4		
	Enlisted Flyer	Ranch Hand	17	219.9	11.1 --	0.752
		Comparison	29	208.8		
	Enlisted Groundcrew	Ranch Hand	32	244.1	45.8 --	0.095
		Comparison	46	198.3		

Table O-2-8. (Continued)
Interaction Table for CD20 Cells (cells/mm³)

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Age: Table 19-11)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log ₂ (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean ^a	Adjusted Slope (Std. Error) ^d	p-Value
Born ≥ 1942	Low	10	323.5	-0.044 (0.049)	0.366
	Medium	29	249.7		
	High	47	239.3		
Born < 1942	Low	54	190.1	0.053 (0.047)	0.260
	Medium	36	212.4		
	High	24	218.1		

^a Transformed from natural logarithm (X+1) scale.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm (X+1) scale.

^c P-value is based on difference of means on natural logarithm (X+1) scale.

^d Slope and standard error based on natural logarithm (X+1) of CD20 cells versus log₂ dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.

Table O-2-9.
Interaction Table for CD25 Cells (cells/mm³)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 19-12)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
Born ≥ 1942	Comparison	183	270.1		
	Background RH	47	254.1	-16.0 --	0.444
	Low RH	21	326.6	56.5 --	0.083
	High RH	65	265.7	-4.4 --	0.815
	Low plus High RH	86	279.5	9.4 --	0.584
Born < 1942	Comparison	216	268.4		
	Background RH	92	289.8	21.4 --	0.199
	Low RH	73	249.4	-19.0 --	0.257
	High RH	41	282.1	13.7 --	0.547
	Low plus High RH	114	260.7	-7.7 --	0.612

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 19-12)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
Officer	Comparison	138	266.5		
	Background RH	98	276.3	9.8 --	0.560
	Low RH	39	257.6	-8.9 --	0.693
	High RH	6	454.0	187.5 --	0.006
	Low plus High RH	45	277.8	11.3 --	0.609
Enlisted Flyer	Comparison	74	284.0		
	Background RH	13	274.7	-9.3 --	0.817
	Low RH	25	245.8	-38.2 --	0.193
	High RH	22	229.1	-54.9 --	0.062
	Low plus High RH	47	237.8	-46.2 --	0.043
Enlisted Groundcrew	Comparison	187	266.2		
	Background RH	28	285.8	19.6 --	0.458
	Low RH	30	301.3	35.1 --	0.182
	High RH	78	274.4	8.2 --	0.631
	Low plus High RH	108	281.7	15.5 --	0.322

Table O-2-9. (Continued)
Interaction Table for CD25 Cells (cells/mm³)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Cigarette Smoking History: Table 19-12)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
0 Pack-years	Comparison	107	240.8		
	Background RH	44	232.0	-8.8 --	0.664
	Low RH	21	238.7	-2.1 --	0.937
	High RH	27	259.9	19.1 --	0.466
	Low plus High RH	48	251.8	11.0 --	0.634
>0-10 Pack-years	Comparison	113	272.1		
	Background RH	38	256.0	-16.1 --	0.495
	Low RH	25	292.1	20.0 --	0.509
	High RH	43	258.0	-14.1 --	0.532
	Low plus High RH	68	270.1	-2.0 --	0.917
>10 Pack-years	Comparison	179	280.8		
	Background RH	57	322.0	41.2 --	0.060
	Low RH	48	272.3	-8.5 --	0.689
	High RH	36	290.6	9.8 --	0.688
	Low plus High RH	84	280.0	-0.8 --	0.963

Table O-2-9. (Continued)
Interaction Table for CD25 Cells (cells/mm³)

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Alcohol History: Table 19-12)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
0 Drink-years	Comparison	20	228.1		
	Background RH	10	284.9	56.8 --	0.228
	Low RH	4	327.1	99.0 --	0.151
	High RH	9	437.0	208.9 --	0.001
	Low plus High RH	13	399.7	171.6 --	0.001
>0-40 Drink-years	Comparison	276	270.1		
	Background RH	98	280.7	10.6 --	0.499
	Low RH	63	258.6	-11.5 --	0.519
	High RH	72	240.4	-29.7 --	0.069
	Low plus High RH	135	248.7	-21.4 --	0.106
>40 Drink-years	Comparison	103	265.6		
	Background RH	31	256.0	-9.6 --	0.708
	Low RH	27	269.4	3.8 --	0.888
	High RH	25	298.1	32.5 --	0.263
	Low plus High RH	52	282.9	17.3 --	0.422

Table O-2-9. (Continued)
Interaction Table for CD25 Cells (cells/mm³)

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Lifetime Cigarette Smoking History: Table 19-12)					
Current Dioxin Category Summary Statistics				Analysis Results for Log ₂ (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean ^a	Adjusted Slope (Std. Error) ^d	p-Value
0 Pack-years	Low	36	240.9	-0.005 (0.034)	0.889
	Medium	27	252.6		
	High	31	243.1		
>0-10 Pack-years	Low	35	254.6	0.001 (0.029)	0.985
	Medium	29	271.0		
	High	42	251.5		
>10 Pack-years	Low	41	341.1	-0.041 (0.031)	0.184
	Medium	60	266.7		
	High	43	291.4		

^a Transformed from natural logarithm scale.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

^d Slope and standard error based on natural logarithm of CD25 cells versus log₂ dioxin.

Note: Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Model 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table O-2-10.
Interaction Table for CD4-CD8 Ratio

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Physical Activity Index: Table 19-13)						
Stratum	Occupational Category	Group	n	Adjusted Mean ^a	Difference of Adjusted Means (95% C.I.) ^b	p-Value ^c
<i>Sedentary</i>	<i>All</i>	<i>Ranch Hand</i>	201	1.515	-0.027 --	0.651
		<i>Comparison</i>	268	1.542		
<i>Moderate</i>	<i>All</i>	<i>Ranch Hand</i>	66	1.658	0.282 --	0.005
		<i>Comparison</i>	99	1.376		
<i>Very Active</i>	<i>All</i>	<i>Ranch Hand</i>	94	1.522	0.091 --	0.294
		<i>Comparison</i>	108	1.431		
<i>Sedentary</i>	<i>Officer</i>	<i>Ranch Hand</i>	81	1.640	0.007 --	0.950
		<i>Comparison</i>	79	1.633		
	<i>Enlisted Flyer</i>	<i>Ranch Hand</i>	31	1.455	-0.016 --	0.906
		<i>Comparison</i>	51	1.471		
	<i>Enlisted Groundcrew</i>	<i>Ranch Hand</i>	89	1.442	-0.062 --	0.461
		<i>Comparison</i>	138	1.504		
<i>Moderate</i>	<i>Officer</i>	<i>Ranch Hand</i>	28	1.647	0.278 --	0.067
		<i>Comparison</i>	43	1.369		
	<i>Enlisted Flyer</i>	<i>Ranch Hand</i>	13	1.773	0.229 --	0.378
		<i>Comparison</i>	15	1.544		
	<i>Enlisted Groundcrew</i>	<i>Ranch Hand</i>	25	1.641	0.295 --	0.060
		<i>Comparison</i>	41	1.346		
<i>Very Active</i>	<i>Officer</i>	<i>Ranch Hand</i>	44	1.560	-0.042 --	0.755
		<i>Comparison</i>	51	1.602		
	<i>Enlisted Flyer</i>	<i>Ranch Hand</i>	19	1.598	0.379 --	0.051
		<i>Comparison</i>	17	1.219		
	<i>Enlisted Groundcrew</i>	<i>Ranch Hand</i>	31	1.470	0.108 --	0.443
		<i>Comparison</i>	40	1.362		

^a Transformed from natural logarithm scale.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

Table O-2-11.
Interaction Table for Double Labelled Cells: CD3 with CD25 (cells/mm³)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 19-14)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
Officer	Comparison	138	206.9		
	Background RH	98	216.9	10.0 --	0.469
	Low RH	39	203.1	-3.8 --	0.838
	High RH	6	385.0	178.1 --	0.002
	Low plus High RH	45	221.1	14.2 --	0.438
Enlisted Flyer	Comparison	74	224.3		
	Background RH	13	217.8	-6.5 --	0.848
	Low RH	25	188.4	-35.9 --	0.139
	High RH	22	183.3	-41.0 --	0.099
	Low plus High RH	47	186.0	-38.3 --	0.046
Enlisted Groundcrew	Comparison	187	217.1		
	Background RH	28	236.6	19.5 --	0.396
	Low RH	30	245.5	28.4 --	0.211
	High RH	78	222.5	5.4 --	0.715
	Low plus High RH	108	228.6	11.5 --	0.393

Table O-2-11. (Continued)
Interaction Table for Double Labelled Cells: CD3 with CD25 (cells/mm³)

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Cigarette Smoking History: Table 19-14)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
0 Pack-years	Comparison	107	187.9		
	Background RH	44	183.9	-4.0 --	0.813
	Low RH	21	181.3	-6.6 --	0.762
	High RH	27	198.0	10.1 --	0.638
	Low plus High RH	48	190.5	2.6 --	0.874
>0-10 Pack-years	Comparison	113	215.7		
	Background RH	38	205.9	-9.8 --	0.626
	Low RH	25	234.8	19.1 --	0.454
	High RH	43	207.6	-8.1 --	0.673
	Low plus High RH	68	217.2	1.5 --	0.927
>10 Pack-years	Comparison	179	223.6		
	Background RH	57	257.0	33.4 --	0.072
	Low RH	48	218.1	-5.5 --	0.760
	High RH	36	234.8	11.2 --	0.590
	Low plus High RH	84	225.1	1.5 --	0.918

Table O-2-11. (Continued)
Interaction Table for Double Labelled Cells: CD3 with CD25 (cells/mm³)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Alcohol History: Table 19-14)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
0 Drink-years	Comparison	20	172.6		
	Background RH	10	245.8	73.2 --	0.070
	Low RH	4	266.7	94.1 --	0.103
	High RH	9	335.3	162.7 --	0.001
	Low plus High RH	13	312.4	139.8 --	0.001
>0-40 Drink-years	Comparison	276	215.2		
	Background RH	98	223.7	8.5 --	0.522
	Low RH	63	202.4	-12.8 --	0.388
	High RH	72	189.9	-25.3 --	0.067
	Low plus High RH	135	195.7	-19.5 --	0.078
>40 Drink-years	Comparison	103	210.1		
	Background RH	31	203.4	-6.7 --	0.757
	Low RH	27	219.0	8.9 --	0.699
	High RH	25	245.6	35.5 --	0.155
	Low plus High RH	52	231.4	21.3 --	0.246

Table O-2-11. (Continued)
Interaction Table for Double Labelled Cells: CD3 with CD25 (cells/mm³)

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Lifetime Cigarette Smoking History: Table 19-14)					
Current Dioxin Category Summary Statistics				Analysis Results for Log₂ (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean^a	Adjusted Slope (Std. Error)^d	p-Value
0 Pack-years	Low	36	185.8	-0.013 (0.036)	0.712
	Medium	27	191.1		
	High	31	179.8		
>0-10 Pack-years	Low	35	197.2	0.001 (0.031)	0.988
	Medium	29	219.2		
	High	42	198.4		
>10 Pack-years	Low	41	271.4	-0.043 (0.033)	0.196
	Medium	60	214.0		
	High	43	235.9		

^a Transformed from natural logarithm scale.

^b Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

^c P-value is based on difference of means on natural logarithm scale.

^d Slope and standard error based on natural logarithm of CD3 with CD25 cells versus log₂ dioxin.

Note: Model 3: RH = Ranch Hand.

Comparison: Current Dioxin ≤ 10 ppt.

Background (Ranch Hand): Current Dioxin ≤ 10 ppt.

Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.

High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Model 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table O-2-12.
Interaction Table for Double Labelled Cells: CD4 with CD8
(Zero vs. Nonzero)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Race: Table 19-16)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log₂ (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Zero	Adjusted Relative Risk (95% C.I.)^a	p-Value
Black	Low	5	20.0	--	--
	Medium	2	0.0		
	High	5	0.0		
Non-Black	Low	59	11.9	1.00 (0.70,1.43)	0.982
	Medium	63	7.9		
	High	66	15.2		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Current Cigarette Smoking: Table 19-16)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log₂ (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Zero	Adjusted Relative Risk (95% C.I.)^a	p-Value
0-Never Smoked	Low	15	13.3	0.86 (0.46,1.59)	0.626
	Medium	10	10.0		
	High	23	13.0		
0-Former Smoker	Low	42	14.3	0.91 (0.55,1.50)	0.713
	Medium	38	10.5		
	High	26	19.2		
>0 Cigarettes/Day	Low	4	0.0	5.15 (0.73,36.17)	0.099
	Medium	10	0.0		
	High	16	12.5		
>0-20 Cigarettes/Day	Low	3	0.0	--	--
	Medium	7	0.0		
	High	6	0.0		

^a Relative risk for a twofold increase in initial dioxin.

--: Adjusted relative risk, confidence interval, and p-value not presented due to the sparse number of abnormalities.

Note: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.

Table O-2-12. (Continued)
Interaction Table for Double Labelled Cells: CD4 with CD8 (cells/mm³)
(Nonzero Measurements)

c) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Lifetime Alcohol History: Table 19-16)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log ₂ (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean ^a	Adjusted Slope (Std. Error) ^b	p-Value
0 Drink-years	Low	2	27.6	0.066 (0.134)	0.625
	Medium	3	25.9		
	High	5	30.9		
>0-40 Drink-years	Low	40	25.6	0.028 (0.045)	0.532
	Medium	39	28.0		
	High	40	25.7		
>40 Drink-years	Low	14	29.4	-0.038 (0.075)	0.616
	Medium	18	26.1		
	High	16	30.2		

^a Transformed from natural logarithm scale.

^b Slope and standard error based on natural logarithm of CD4 with CD8 versus log₂ dioxin.

Note: Analysis based on measurements above 0 cells/mm³ only.

Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.

Table O-2-12. (Continued)
Interaction Table for Double Labelled Cells: CD4 with CD8 (cells/mm³)
(Nonzero Measurements)

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 19-16)					
Stratum	Dioxin Category	n	Adjusted Mean^a	Difference of Adjusted Mean vs. Comparisons (95% C.I.)^b	p-Value^c
Born ≥ 1942	Comparison	159	30.3		
	Background RH	38	30.4	0.1 --	0.975
	Low RH	20	39.7	9.4 --	0.089
	High RH	55	28.9	-1.4 --	0.649
	Low plus High RH	75	31.5	1.2 --	0.695
Born < 1942	Comparison	201	33.5		
	Background RH	88	37.7	4.2 --	0.180
	Low RH	65	27.1	-6.4 --	0.027
	High RH	40	30.7	-2.8 --	0.466
	Low plus High RH	105	28.4	-5.1 --	0.044