

APPENDIX L-3.

Hematology Analysis Tables Occupation Removed from Final Model

This appendix contains results of exposure analyses after occupation has been removed from those final dioxin models (Models 2 through 6) that contained occupation. These analyses are performed to investigate the relationship of the dependent variable to dioxin without removing any effects due to occupation. The format of these tables closely parallels the adjusted panels of Chapter 16 tables. A summary of the tables found in this appendix follows.

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Table L-3-1.
Analysis of Red Blood Cell (RBC) Count (million/mm³) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean^a	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,059	5.066**			DXCAT*CSMOK (p=0.017) AGE (p<0.001) RACE (p=0.014) PACKYR (p=0.037)
Background RH	370	5.050**	-0.016 (-0.061,0.029)**	0.474**	
Low RH	259	5.036**	-0.030 (-0.082,0.021)**	0.247**	
High RH	258	5.039**	-0.027 (-0.079,0.025)**	0.304**	
Low plus High RH	517	5.038**	-0.029 (-0.069,0.011)**	0.157**	

^a Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

** Categorized dioxin-by-covariate interaction (0.01 < p ≤ 0.05); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-1 for further analysis of this interaction.

Note: 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 L-3-2.
Analysis of White Blood Cell (WBC) Count (thousand/mm³) (Continuous)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log₂ (Initial Dioxin)^b			
Initial Dioxin	n	Adj. Mean^{ab}	R²	Adj. Slope (Std. Error)^c	p-Value	Covariate Remarks
Low	174	6.53	0.268	0.0084 (0.0085)**	0.325**	INIT*RACE (p=0.011)
Medium	172	6.76				CSMOK (p<0.001)
High	171	6.74				PACKYR (p=0.018)

^a Transformed from natural logarithm scale.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

^c Slope and standard error based on natural logarithm of WBC count versus log₂ (initial dioxin).

** Log₂ (initial dioxin)-by-covariate interaction (0.01 < p ≤ 0.05); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-2 for further analysis of this interaction.

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

Table L-3-2. (Continued)
Analysis of White Blood Cell (WBC) Count (thousand/mm³) (Continuous)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean^{ab}	Difference of Adj. Mean vs. Comparisons (95% C.I.)^c	p-Value^d	Covariate Remarks
Comparison	1,059	6.69			CSMOK (p < 0.001) PACKYR (p < 0.001) AGE*RACE (p = 0.006)
Background RH	370	6.64	-0.05 --	0.607	
Low RH	259	6.72	0.04 --	0.745	
High RH	258	6.83	0.14 --	0.217	
Low plus High RH	517	6.78	0.09 --	0.311	

^a Transformed from natural logarithm scale.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

^c Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted 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: 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 L-3-2. (Continued)
Analysis of White Blood Cell (WBC) Count (thousand/mm³) (Continuous)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED							
Model ^b	Current Dioxin Category Adjusted Mean ^a /(n)			Analysis Results for Log ₂ (Current Dioxin + 1)			
	Low	Medium	High	R ²	Adj. Slope (Std. Error) ^c	p-Value	Covariate Remarks
4	6.51 (291)	6.59 (299)	6.80 (297)	0.243	0.0111 (0.0059)	0.061	CSMOK (p<0.001) PACKYR (p=0.004) AGE*RACE (p=0.025)
5	6.50 (296)	6.60 (297)	6.83 (294)	0.247	0.0096 (0.0051)**	0.058**	CURR*RACE (p=0.035) CSMOK (p<0.001) PACKYR (p=0.004) AGE*RACE (p=0.031)
6 ^d	6.53 (295)	6.61 (297)	6.81 (294)	0.248	0.0077 (0.0055)**	0.161**	CURR*RACE (p=0.036) CSMOK (p<0.001) PACKYR (p=0.006) AGE*RACE (p=0.027)

^a Transformed from natural logarithm scale.

^b Model 4: Log₂ (lipid-adjusted current dioxin + 1).
 Model 5: Log₂ (whole-weight current dioxin + 1).
 Model 6: Log₂ (whole-weight current dioxin + 1), adjusted for log₂ total lipids.

^c Slope and standard error based on natural logarithm of WBC count versus log₂ (current dioxin + 1).

^d Adjusted for log₂ total lipids in addition to covariates specified under "Covariate Remarks" column.

** Log₂ (current dioxin + 1)-by-covariate interaction (0.01 < p ≤ 0.05); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-2 for further analysis of this interaction.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
 Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

**Table L-3-3.
Analysis of White Blood Cell (WBC) Count (Discrete)
Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS – INITIAL DIOXIN – ADJUSTED					
Analysis Results for Log₂ (Initial Dioxin)^a					
n	Abnormal Low vs. Normal		Abnormal High vs. Normal		Covariate Remarks
	Adj. Relative Risk (95% C.I.)^b	p-Value	Adj. Relative Risk (95% C.I.)^b	p-Value	
517	0.87 (0.60,1.27)	0.476	0.74 (0.52,1.05)	0.096	AGE (p=0.030) RACE (p=0.020) CSMOK (p<0.001)

^a Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

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

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

Table L-3-3. (Continued)
Analysis of White Blood Cell (WBC) Count (Discrete)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY – ADJUSTED						
Dioxin Category	n	Abnormal Low vs. Normal		Abnormal High vs. Normal		Covariate Remarks
		Adj. Relative Risk (95% C.I.) ^{a,b}	p-Value	Adj. Relative Risk (95% C.I.) ^{a,b}	p-Value	
Comparison	1,059					AGE (p=0.047) RACE (p<0.001) CSMOK (p<0.001)
Background RH	371	1.11 (0.57,2.17)	0.754	1.03 (0.59,1.79)	0.925	
Low RH	259	1.32 (0.65,2.68)	0.445	1.56 (0.87,2.80)	0.133	
High RH	258	1.25 (0.59,2.65)	0.563	0.88 (0.46,1.68)	0.694	
Low plus High RH	517	1.28 (0.72,2.27)	0.393	1.18 (0.73,1.91)	0.489	

^a Relative risk and confidence interval relative to Comparisons.

^b Adjusted for percent body fat at the time of duty in SEA, change in body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: 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.

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Table L-3-3. (Continued)
Analysis of White Blood Cell (WBC) Count (Discrete)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED						
Model ^a	Analysis Results for Log ₂ (Current Dioxin + 1)					
	n	Abnormal Low vs. Normal		Abnormal High vs. Normal		Covariate Remarks
		Adj. Relative Risk (95% C.I.) ^b	p-Value	Adj. Relative Risk (95% C.I.) ^b	p-Value	
4	887	0.94 (0.74,1.20)	0.622	0.86 (0.71,1.05)	0.136	PACKYR (p<0.001) AGE*RACE (p=0.009)
5	887	0.97 (0.78,1.20)**	0.766**	0.92 (0.78,1.07)**	0.272**	CURR*RACE (p=0.049) PACKYR (p<0.001) AGE*RACE (p=0.005)
6 ^c	886	0.95 (0.76,1.19)**	0.675**	0.87 (0.74,1.03)**	0.105**	CURR*RACE (p=0.037) PACKYR (p<0.001) AGE*RACE (p=0.004)

^a Model 4: Log₂ (lipid-adjusted current dioxin + 1).
 Model 5: Log₂ (whole-weight current dioxin + 1).
 Model 6: Log₂ (whole-weight current dioxin + 1), adjusted for log₂ total lipids.

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

^c Adjusted for log₂ total lipids in addition to covariates specified under "Covariate Remarks" column.

** Log₂ (current dioxin + 1)-by-covariate interaction (0.01 < p ≤ 0.05); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-3 for further analysis of this interaction.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
 Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-4.
Analysis of Hemoglobin (gm/dl) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean^a	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,059	15.65**			DXCAT*CSMOK (p=0.050) AGE (p=0.009) RACE (p<0.001) PACKYR (p=0.068)
Background RH	370	15.66**	0.01 (-0.11,0.13)**	0.862**	
Low RH	259	15.58**	-0.07 (-0.20,0.06)**	0.299**	
High RH	258	15.70**	0.04 (-0.09,0.18)**	0.533**	
Low plus High RH	517	15.64**	-0.01 (-0.12,0.09)**	0.789**	

^a Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

** Categorized dioxin-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-4 for further analysis of this interaction.

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 L-3-5.
Analysis of Hematocrit (percent) (Continuous)
Occupation Removed from Final Model**

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean^a	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,059	45.92**			DXCAT*CSMOK (p=0.027) RACE (p=0.010) PACKYR (p=0.091)
Background RH	370	45.93**	0.02 (-0.35,0.38)**	0.933**	
Low RH	259	45.62**	-0.30 (-0.71,0.11)**	0.155**	
High RH	258	46.08**	0.16 (-0.25,0.58)**	0.434**	
Low plus High RH	517	45.85**	-0.07 (-0.39,0.25)**	0.679**	

^a Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

** Categorized dioxin-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-5 for further analysis of this interaction.

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 L-3-6.
Analysis of Platelet Count (thousand/mm³) (Continuous)
Occupation Removed from Final Model

a) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED							
Model ^b	Current Dioxin Category Adjusted Mean ^a /(n)			Analysis Results for Log ₂ (Current Dioxin + 1)			
	Low	Medium	High	R ²	Adj. Slope (Std. Error) ^c	p-Value	Covariate Remarks
4	248.4 (291)	247.2 (299)	255.1 (297)	0.044	0.0479 (0.0397)	0.228	AGE (p<0.001) PACKYR (p<0.001)
5	246.8 (296)	250.4 (297)	253.5 (294)	0.045	0.0524 (0.0338)	0.122	AGE (p<0.001) PACKYR (p<0.001)
6 ^d	247.5 (295)	250.5 (297)	252.3 (294)	0.047	0.0428 (0.0367)	0.244	AGE (p<0.001) PACKYR (p<0.001)

^a Transformed from square root scale.

^b Model 4: Log₂ (lipid-adjusted current dioxin + 1).
 Model 5: Log₂ (whole-weight current dioxin + 1).
 Model 6: Log₂ (whole-weight current dioxin + 1), adjusted for log₂ total lipids.

^c Slope and standard error based on square root of platelet count versus log₂ (current dioxin + 1).

^d Adjusted for log₂ total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
 Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-7.
Analysis of Prothrombin Time (seconds) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean ^{ab}	Difference of Adj. Mean vs. Comparisons (95% C.I.) ^c	p-Value ^d	Covariate Remarks
Comparison	977	11.98**			DXCAT*AGE (p=0.004) RACE (p=0.006) CSMOK (p<0.001)
Background RH	341	12.01**	0.03 --**	0.298**	
Low RH	234	11.92**	-0.05 --**	0.121**	
High RH	240	11.97**	0.00 --**	0.931**	
Low plus High RH	474	11.95**	-0.03 --**	0.293**	

^a Transformed from natural logarithm scale.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

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

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

** Categorized dioxin-by-covariate interaction ($p \leq 0.05$); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-6 for further analysis of this interaction.

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 L-3-8.
Analysis of Prothrombin Time (Discrete)
Occupation Removed from Final Model**

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)^{ab}	p-Value	Covariate Remarks
Comparison	977			AGE (p=0.004) PACKYR (p=0.521)
Background RH	341	2.67 (0.58,12.35)	0.208	
Low RH	234	1.92 (0.39,9.41)	0.419	
High RH	240	1.10 (0.12,10.24)	0.936	
Low plus High RH	474	1.60 (0.37,6.88)	0.525	

^a Relative risk and confidence interval relative to Comparisons.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

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 L-3-9.
Analysis of RBC Morphology
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)^{ab}	p-Value	Covariate Remarks
Comparison	1,061			AGE (p<0.001) RACE (p=0.010)
Background RH	371	0.78 (0.61,1.00)	0.048	
Low RH	259	0.90 (0.68,1.19)	0.462	
High RH	258	1.04 (0.78,1.37)	0.800	
Low plus High RH	517	0.97 (0.78,1.20)	0.749	

^a Relative risk and confidence interval relative to Comparisons.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: 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 L-3-9. (Continued)
Analysis of RBC Morphology
Occupation Removed from Final Model

b) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED				
Model^a	n	Analysis Results for Log₂ (Current Dioxin + 1)		
		Adj. Relative Risk (95% C.I.)^b	p-Value	Covariate Remarks
4	888	1.06 (0.97,1.17)	0.207	AGE (p<0.001) RACE (p=0.181)
5	888	1.05 (0.97,1.14)	0.218	AGE (p<0.001) RACE (p=0.178)
6 ^c	887	1.07 (0.98,1.17)	0.118	AGE (p<0.001) RACE (p=0.193)

^a Model 4: Log₂ (lipid-adjusted current dioxin + 1).
 Model 5: Log₂ (whole-weight current dioxin + 1).
 Model 6: Log₂ (whole-weight current dioxin + 1), adjusted for log₂ total lipids.

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

^c Adjusted for log₂ total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
 Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-10.
Analysis of Absolute Neutrophils (segs) (thousand/mm³)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS – INITIAL DIOXIN – ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log ₂ (Initial Dioxin) ^b			
Initial Dioxin	n	Adj. Mean ^{ab}	R ²	Adj. Slope (Std. Error) ^c	p-Value	Covariate Remarks
Low	174	3.606**	0.215	0.0093 (0.0116)**	0.426**	INIT*RACE (p=0.043) CSMOK (p<0.001) PACKYR (p=0.032)
Medium	172	3.616**				
High	171	3.681**				

^a Transformed from natural logarithm scale.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

^c Slope and standard error based on natural logarithm of absolute neutrophils (segs) versus log₂ (initial dioxin).

** Log₂ (initial dioxin)-by-covariate interaction (0.01 < p ≤ 0.05); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-7 for further analysis of this interaction.

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

Table L-3-10. (Continued)
Analysis of Absolute Neutrophils (segs) (thousand/mm³)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean^{ab}	Difference of Adj. Mean vs. Comparisons (95% C.I.)^c	p-Value^d	Covariate Remarks
Comparison	1,059	3.614			CSMOK (p<0.001) PACKYR (p=0.002) AGE*RACE (p=0.015)
Background RH	370	3.563	-0.051 --	0.477	
Low RH	259	3.627	0.013 --	0.870	
High RH	258	3.724	0.110 --	0.186	
Low plus High RH	517	3.675	0.061 --	0.334	

^a Transformed from natural logarithm scale.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

^c Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted 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: 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 L-3-10. (Continued)
Analysis of Absolute Neutrophils (segs) (thousand/mm³)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED								
Model ^b	Current Dioxin Category Adjusted Mean ^a /(n)			Analysis Results for Log ₂ (Current Dioxin + 1)				
	Low	Medium	High	R ²	Adj. Slope (Std. Error) ^c	p-Value	Covariate Remarks	
4	3.424 (291)	3.463 (299)	3.663 (297)	0.189	0.0174 (0.0080)	0.029	AGE (p=0.274) RACE (p<0.001) CSMOK (p<0.001) PACKYR (p=0.046)	
5	3.421** (296)	3.476** (297)	3.662** (294)	0.194	0.0143 (0.0068)**	0.036**	CURR*RACE (p=0.021) AGE (p=0.351) CSMOK (p<0.001) PACKYR (p=0.045)	
6 ^d	3.430** (295)	3.480** (297)	3.653** (294)	0.194	0.0135 (0.0074)**	0.068**	CURR*RACE (p=0.022) AGE (p=0.386) CSMOK (p<0.001) PACKYR (p=0.051)	

^a Transformed from natural logarithm scale.

^b Model 4: Log₂ (lipid-adjusted current dioxin + 1).
 Model 5: Log₂ (whole-weight current dioxin + 1).
 Model 6: Log₂ (whole-weight current dioxin + 1), adjusted for log₂ total lipids.

^c Slope and standard error based on natural logarithm of absolute neutrophils (segs) versus log₂ (current dioxin + 1).

^d Adjusted for log₂ total lipids in addition to covariates specified under "Covariate Remarks" column.

** Log₂ (current dioxin + 1)-by-covariate interaction (0.01 < p ≤ 0.05); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-7 for further analysis of this interaction.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
 Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-11.
Analysis of Absolute Neutrophils (bands) (thousand/mm³)
(Continuous) (Nonzero Measurements)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log ₂ (Initial Dioxin) ^b			
Initial Dioxin	n	Adj. Mean ^{ab}	R ²	Adj. Slope (Std. Error) ^c	p-Value	Covariate Remarks
Low	140	0.142	0.101	-0.0167 (0.0291)	0.566	CSMOK (p<0.001) RACE (p=0.001)
Medium	144	0.159				
High	144	0.146				

^a Transformed from natural logarithm scale.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

^c Slope and standard error based on natural logarithm of absolute neutrophils (bands) versus log₂ (initial dioxin).

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

Table L-3-11. (Continued)
Analysis of Absolute Neutrophils (bands) (thousand/mm³)
(Continuous) (Nonzero Measurements)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY – ADJUSTED					
Dioxin Category	n	Adj. Mean ^{ab}	Difference of Adj. Mean vs. Comparisons (95% C.I.) ^c	p-Value ^d	Covariate Remarks
Comparison	884	0.157			AGE (p=0.008) CSMOK*RACE (p=0.041)
Background RH	308	0.153	-0.004 --	0.642	
Low RH	213	0.159	0.002 --	0.792	
High RH	215	0.158	0.001 --	0.917	
Low plus High RH	428	0.158	0.001 --	0.812	

^a Transformed from natural logarithm scale.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

^c Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted 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: 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 L-3-11. (Continued)
Analysis of Absolute Neutrophils (bands) (thousand/mm³)
(Continuous)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model ^b	Current Dioxin Category Adjusted Mean ^a /(n)			Analysis Results for Log ₂ (Current Dioxin + 1)			
	Low	Medium	High	R ²	Adj. Slope (Std. Error) ^c	p-Value	Covariate Remarks
4	0.155 (243)	0.154 (243)	0.158 (250)	0.071	0.0028 (0.0200)	0.890	AGE (p=0.102) CSMOK (p<0.001) RACE (p=0.004)
5	0.157 (244)	0.147 (243)	0.168 (249)	0.071	0.0030 (0.0168)	0.857	AGE (p=0.098) CSMOK (p<0.001) RACE (p=0.004)
6 ^d	0.160 (243)	0.147 (243)	0.166 (249)	0.074	-0.0090 (0.0185)	0.627	AGE (p=0.145) CSMOK (p<0.001) RACE (p=0.005)

^a Transformed from natural logarithm scale.

^b Model 4: Log₂ (lipid-adjusted current dioxin + 1).
 Model 5: Log₂ (whole-weight current dioxin + 1).
 Model 6: Log₂ (whole-weight current dioxin + 1), adjusted for log₂ total lipids.

^c Slope and standard error based on natural logarithm of absolute neutrophils (bands) versus log₂ (current dioxin + 1).

^d Adjusted for log₂ total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
 Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-12.
Analysis of Absolute Lymphocytes (thousand/mm³)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log ₂ (Initial Dioxin) ^b			
Initial Dioxin	n	Adj. Mean ^{ab}	R ²	Adj. Slope (Std. Error) ^c	p-Value	Covariate Remarks
Low	174	1.917	0.076	0.0057 (0.0131)	0.663	CSMOK (p < 0.001) AGE*RACE (p = 0.263)
Medium	172	1.940				
High	171	1.978				

^a Transformed from natural logarithm scale.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

^c Slope and standard error based on natural logarithm of absolute lymphocytes versus log₂ (initial dioxin).

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

Table L-3-12. (Continued)
Analysis of Absolute Lymphocytes (thousand/mm³)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean^{ab}	Difference of Adj. Mean vs. Comparisons (95% C.I.)^c	p-Value^d	Covariate Remarks
Comparison	1,059	1.935			CSMOK (p < 0.001) PACKYR (p = 0.110)
Background RH	370	1.912	-0.023 --	0.558	
Low RH	259	1.914	-0.021 --	0.642	
High RH	258	1.941	0.006 --	0.907	
Low plus High RH	517	1.927	-0.008 --	0.822	

^a Transformed from natural logarithm scale.

^b Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

^c Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted 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: 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 L-3-12. (Continued)
Analysis of Absolute Lymphocytes (thousand/mm³)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model ^b	Current Dioxin Category Adjusted Mean ^a /(n)			Analysis Results for Log ₂ (Current Dioxin + 1)			
	Low	Medium	High	R ²	Adj. Slope (Std. Error) ^c	p-Value	Covariate Remarks
4	1.934 (291)	1.976 (299)	1.961 (297)	0.090	0.0039 (0.0084)	0.648	CSMOK (p<0.001) PACKYR (p=0.052) AGE*RACE (p=0.115)
5	1.927 (296)	1.979 (297)	1.963 (294)	0.090	0.0045 (0.0072)	0.536	CSMOK (p<0.001) PACKYR (p=0.052) AGE*RACE (p=0.116)
6 ^d	1.947 (295)	1.988 (297)	1.951 (294)	0.092	0.0010 (0.0078)	0.899	CSMOK (p<0.001) PACKYR (p=0.067) AGE*RACE (p=0.102)

^a Transformed from natural logarithm scale.

^b Model 4: Log₂ (lipid-adjusted current dioxin + 1).
 Model 5: Log₂ (whole-weight current dioxin + 1).
 Model 6: Log₂ (whole-weight current dioxin + 1), adjusted for log₂ total lipids.

^c Slope and standard error based on natural logarithm of absolute lymphocytes versus log₂ (current dioxin + 1).

^d Adjusted for log₂ total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
 Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-13.
Analysis of Absolute Eosinophils
(Zero versus Nonzero)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED			
Analysis Results for Log₂ (Initial Dioxin)^a			
n	Adj. Relative Risk (95% C.I.)^b	p-Value	Covariate Remarks
517	1.04 (0.84,1.29)	0.722	AGE (p=0.973) RACE (p=0.079)

^a Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

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

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

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
Analysis Results for Log₂ (Current Dioxin + 1)				
Model^a	n	Adj. Relative Risk (95% C.I.)^b	p-Value	Covariate Remarks
6 ^c	887	1.13 (0.98,1.29)	0.095	RACE*CSMOK (p=0.015)

^a Model 6: Log₂ (whole-weight current dioxin + 1), adjusted for log₂ total lipids.

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

^c Adjusted for log₂ total lipids in addition to covariates specified under "Covariate Remarks" column.

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