

## APPENDIX I-3.

### Gastrointestinal 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 13 tables. A summary of the tables found in this appendix follows.

Appendix I-3 Table	Chapter 13 Table	Dependent Variable
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I-3-2	13-6	Alcohol-Related Chronic Liver Disease and Cirrhosis
I-3-3	13-9	Other Liver Disorders
I-3-4	13-10	Hepatomegaly
I-3-5	13-12	AST (Continuous)
I-3-6	13-13	AST (Discrete)
I-3-7	13-14	ALT (Continuous)
I-3-8	13-15	ALT (Discrete)
I-3-9	13-16	GGT (Continuous)
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I-3-11	13-19	Alkaline Phosphatase (Discrete)
I-3-12	13-20	Total Bilirubin (Continuous)
I-3-13	13-22	Direct Bilirubin
I-3-14	13-23	Lactic Dehydrogenase (LDH) (Continuous)
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I-3-16	13-25	Cholesterol (Continuous)
I-3-17	13-26	Cholesterol (Discrete)
I-3-18	13-27	HDL Cholesterol (Continuous)
I-3-19	13-29	Cholesterol-HDL Ratio (Continuous)
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I-3-21	13-31	Triglycerides (Continuous)

Appendix I-3 Table	Chapter 13 Table	Dependent Variable
I-3-22	13-32	Triglycerides (Discrete)
I-3-23	13-33	Creatine Kinase (Continuous)
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I-3-25	13-35	Serum Amylase (Continuous)
I-3-26	13-36	Serum Amylase (Discrete)
I-3-27	13-37	Antibodies for Hepatitis A
I-3-28	13-38	Serological Evidence of Prior Hepatitis B Infection
I-3-29	13-40	Stool Hemocult
I-3-30	13-41	Prealbumin (Continuous)
I-3-31	13-43	Albumin (Continuous)
I-3-32	13-45	$\alpha$ -1 Acid Glycoprotein (Continuous)
I-3-33	13-46	$\alpha$ -1 Acid Glycoprotein (Discrete)
I-3-34	13-47	$\alpha$ -1 Antitrypsin (Continuous)
I-3-35	13-48	$\alpha$ -1 Antitrypsin (Discrete)
I-3-36	13-49	$\alpha$ -2 Macroglobulin (Continuous)
I-3-37	13-50	$\alpha$ -2 Macroglobulin (Discrete)
I-3-38	13-51	Apolipoprotein B (Continuous)
I-3-39	13-52	Apolipoprotein B (Discrete)
I-3-40	13-53	C <sub>3</sub> Complement (Continuous)
I-3-41	13-54	C <sub>3</sub> Complement (Discrete)
I-3-42	13-55	C <sub>4</sub> Complement (Continuous)
I-3-43	13-56	C <sub>4</sub> Complement (Discrete)
I-3-44	13-57	Haptoglobin (Continuous)
I-3-45	13-58	Haptoglobin (Discrete)
I-3-46	13-59	Transferrin (Continuous)
I-3-47	13-60	Transferrin (Discrete)

**Table I-3-1.**  
**Analysis of Jaundice**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
Dioxin Category	n	Adj. Relative Risk (95% C.I.) <sup>ab</sup>	p-Value	Covariate Remarks
Comparison	1,035			AGE (p=0.021) DC (p=0.115)
Background RH	363	1.36 (0.69,2.70)	0.374	
Low RH	253	0.13 (0.02,0.96)	0.046	
High RH	254	0.27 (0.06,1.16)	0.078	
Low plus High RH	507	0.20 (0.06,0.66)	0.008	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-2.  
Analysis of Chronic Liver Disease and Cirrhosis (Alcohol-Related)  
Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	987			DXCAT*RACE (p=0.017) AGE*DRKYR (p=0.054)
Background RH	347	0.95 (0.55,1.67)**	0.869**	
Low RH	239	0.87 (0.46,1.63)**	0.656**	
High RH	228	0.84 (0.43,1.63)**	0.602**	
Low plus High RH	467	0.85 (0.52,1.40)**	0.529**	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 ( $p \leq 0.05$ ); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table 1-4-1 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 I-3-3.  
Analysis of Other Liver Disorders  
Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>2</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
519	1.10 (0.95,1.28)	0.203	AGE (p=0.444) RACE (p=0.003)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,036			AGE (p=0.803) RACE (p<0.001) DC (p=0.337) DRKYR (p=0.001)
Background RH	365	0.99 (0.75,1.31)	0.927	
Low RH	253	1.02 (0.75,1.39)	0.917	
High RH	253	1.31 (0.97,1.78)	0.077	
Low plus High RH	506	1.16 (0.91,1.46)	0.225	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-3. (Continued)**  
**Analysis of Other Liver Disorders**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED				
Model <sup>a</sup>	Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	n	Adj. Relative Risk (95% C.I.) <sup>b</sup>	p-Value	Covariate Remarks
4	871	1.14 (1.03,1.27)**	0.013**	CURR*DC (p=0.015) AGE (p=0.999) RACE (p=0.051) DRKYR (p=0.039)
5	871	1.14 (1.04,1.25)**	0.005**	CURR*DC (p=0.018) AGE (p=0.980) RACE (p=0.048) DRKYR (p=0.040)
6 <sup>c</sup>	870	1.10 (1.00,1.21)**	0.056**	CURR*DC (p=0.017) AGE (p=0.832) RACE (p=0.037) DRKYR (p=0.045)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\* Log<sub>2</sub> (current dioxin + 1)-by-covariate interaction (p ≤ 0.01); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table I-4-2 for further analysis of this interaction.

**Table I-3-4.  
Analysis of Hepatomegaly  
Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>2</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
506	1.12 (0.66,1.89)	0.675	AGE (p=0.008) DRKYR (p=0.058)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Analysis Results for Log<sub>2</sub> (Current Dioxin + 1)</b>				
<b>Model<sup>a</sup></b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	873	1.08 (0.74,1.59)	0.684	AGE (p=0.016) DRKYR (p=0.065)
5	873	1.00 (0.73,1.38)	0.988	AGE (p=0.040) DRKYR (p=0.031)
6 <sup>c</sup>	872	1.04 (0.72,1.50)	0.831	AGE (p=0.017) DRKYR (p=0.063)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-5.  
Analysis of AST (U/L)  
(Continuous)  
Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	171	22.36**	0.079	0.0130 (0.0124)**	0.294**	INIT*ALC (p=0.006) DC (p=0.267) ALC*IC (p=0.002)
Medium	167	23.30**				
High	170	23.37**				

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of AST versus log<sub>2</sub> (initial dioxin).

\*\* Log<sub>2</sub> (initial dioxin)-by-covariate interaction (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 I-4-3 for further analysis of this interaction.

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

**Table I-3-5. (Continued)**  
**Analysis of AST (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,025	23.50			DRKYR*DC (p=0.011) ALC*IC (p<0.001)
Background RH	362	23.20	-0.30 --	0.559	
Low RH	251	23.13	-0.37 --	0.529	
High RH	251	22.88	-0.62 --	0.298	
Low plus High RH	502	23.01	-0.50 --	0.280	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-3-5. (Continued)**  
**Analysis of AST (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	22.52** (287)	23.65** (290)	22.70** (287)	0.069	0.0082 (0.0087)**	0.346**	CURR*ALC (p=0.003) AGE*DRKYR (p=0.030) ALC*IC (p<0.001) DRKYR*DC (p=0.009)
5	22.47** (290)	23.27** (290)	23.16** (284)	0.069	0.0089 (0.0074)**	0.231**	CURR*ALC (p=0.003) AGE*DRKYR (p=0.030) ALC*IC (p<0.001) DRKYR*DC (p=0.009)
6 <sup>d</sup>	22.61** (289)	23.30** (290)	22.98** (284)	0.071	0.0060 (0.0080)**	0.452**	CURR*ALC (p=0.003) AGE*DRKYR (p=0.024) ALC*IC (p<0.001) DRKYR*DC (p=0.008)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of AST versus log<sub>2</sub> (current dioxin +1).

<sup>d</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\* Log<sub>2</sub> (current dioxin + 1)-by-covariate interaction (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 I-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 I-3-6.**  
**Analysis of AST**  
**(Discrete)**  
**Occupation Removed from Final Model**

a) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
Analysis Results for $\text{Log}_2$ (Current Dioxin + 1)				
Model <sup>a</sup>	n	Adj. Relative Risk (95% C.I.) <sup>b</sup>	p-Value	Covariate Remarks
4	864	1.04 (0.76,1.42)**	0.803**	CURR*ALC (p=0.015) IC (p=0.041) DC (p=0.018) DRKYR (p=0.075)
5	864	1.07 (0.81,1.40)**	0.635**	CURR*ALC (p=0.032) IC (p=0.044) DC (p=0.025) DRKYR (p=0.072)
6 <sup>c</sup>	863	1.01 (0.75,1.35)**	0.953**	CURR*ALC (p=0.029) IC (p=0.049) DC (p=0.028) DRKYR (p=0.068)

<sup>a</sup> Model 4:  $\text{Log}_2$  (lipid-adjusted current dioxin + 1).

Model 5:  $\text{Log}_2$  (whole-weight current dioxin + 1).

Model 6:  $\text{Log}_2$  (whole-weight current dioxin + 1), adjusted for  $\text{log}_2$  total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for  $\text{log}_2$  total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\*  $\text{Log}_2$  (current dioxin + 1)-by-covariate interaction ( $p \leq 0.01$ ); adjusted relative risk, confidence interval, and p-values derived from a model fitted after deletion of this interaction; refer to Appendix Table I-4-4 for further analysis of this interaction.

**Table I-3-7.**  
**Analysis of ALT (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS – INITIAL DIOXIN – ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	171	26.89	0.078	0.0062 (0.0161)	0.701	AGE (p < 0.001)
Medium	167	28.30				ALC (p = 0.004)
High	170	27.61				DC (p = 0.266)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of ALT versus log<sub>2</sub> (initial dioxin).

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

**Table I-3-7. (Continued)**  
**Analysis of ALT (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

b) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	25.02 (289)	27.40 (295)	27.46 (291)	0.055	0.0338 (0.0108)	0.002	AGE (p<0.001) ALC (p=0.002) DC (p=0.105)
5	25.17 (292)	26.99 (295)	27.71 (288)	0.057	0.0316 (0.0092)	0.001	AGE (p<0.001) ALC (p=0.002) DC (p=0.121)
6 <sup>d</sup>	25.37 (291)	27.02 (295)	27.51 (288)	0.057	0.0289 (0.0100)	0.004	AGE (p<0.001) ALC (p=0.002) DC (p=0.117)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of ALT versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-8.**  
**Analysis of ALT**  
**(Discrete)**  
**Occupation Removed from Final Model**

a) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED				
Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)				
Model <sup>a</sup>	n	Adj. Relative Risk (95% C.I.) <sup>b</sup>	p-Value	Covariate Remarks
4	875	1.14 (0.93,1.40)	0.220	AGE (p=0.389) DC (p=0.002) ALC (p=0.006)
5	875	1.14 (0.95,1.37)	0.166	AGE (p=0.389) DC (p=0.002) ALC (p=0.006)
6 <sup>c</sup>	874	1.11 (0.91,1.35)	0.316	AGE (p=0.348) DC (p=0.002) ALC (p=0.008)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-9.**  
**Analysis of GGT (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>a,b</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	170	34.24**	0.098	0.0120 (0.0223)**	0.592**	INIT*DC (p=0.042) AGE*DRKYR (p=0.026) AGE*ALC (p=0.072)
Medium	165	36.96**				
High	167	35.94**				

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of GGT versus log<sub>2</sub> (initial dioxin).

\*\* Log<sub>2</sub> (initial dioxin)-by-covariate interaction (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 I-4-5 for further analysis of this interaction.

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

**Table I-3-9. (Continued)**  
**Analysis of GGT (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

b) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	29.37 (289)	33.29 (295)	35.64 (291)	0.079	0.0564 (0.0142)	<0.001	AGE (p=0.286) ALC (p=0.002)
5	29.08 (292)	32.87 (295)	36.56 (288)	0.087	0.0581 (0.0121)	<0.001	AGE (p=0.299) ALC (p<0.001)
6 <sup>d</sup>	32.16 (291)	34.96 (295)	37.10 (288)	0.108	0.0383 (0.0130)	0.003	AGE (p=0.154) RACE (p=0.113) ALC (p<0.001)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of GGT versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-10.**  
**Analysis of Alkaline Phosphatase (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	173	70.19**	0.030	0.0023 (0.0084)**	0.779**	INIT*DC (p=0.009)
Medium	170	72.15**				
High	172	70.90**				

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of alkaline phosphatase versus log<sub>2</sub> (initial dioxin).

\*\* Log<sub>2</sub> (initial dioxin)-by-covariate interaction (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 I-4-6 for further analysis of this interaction.

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

**Table I-3-10. (Continued)**  
**Analysis of Alkaline Phosphatase (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,027	67.68**			DXCAT*DC (p=0.005) AGE (p=0.006) WINE (p=0.002) RACE*IC (p=0.002)
Background RH	366	69.05**	1.37 --**	0.201**	
Low RH	254	71.09**	3.42 --**	0.006**	
High RH	254	70.48**	2.81 --**	0.024**	
Low plus High RH	508	70.79**	3.11 --**	0.001**	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-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 I-3-10. (Continued)**  
**Analysis of Alkaline Phosphatase (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	67.48 (287)	68.78 (291)	68.30 (289)	0.025	-0.0002 (0.0061)	0.974	AGE (p=0.433) LWINE (p=0.005) DC (p=0.002)
5	67.88** (290)	68.06** (291)	68.87** (286)	0.030	-0.0001 (0.0053)**	0.981**	CURR*RACE (p=0.039) AGE (p=0.494) LWINE (p=0.004) DC (p=0.002)
6 <sup>d</sup>	68.42** (289)	68.26** (291)	68.52** (286)	0.034	-0.0034 (0.0057)**	0.552**	CURR*RACE (p=0.036) AGE (p=0.652) LWINE (p=0.005) DC (p=0.003)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of alkaline phosphatase versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\* Log<sub>2</sub> (current dioxin + 1)-by-covariate interaction (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 I-4-6 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 I-3-11.**  
**Analysis of Alkaline Phosphatase**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>2</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
504	1.06 (0.77,1.45)	0.734	AGE (p=0.757) IC (p=0.033) LWINE (p=0.164)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>		<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,043				AGE (p=0.111)
Background RH	369	1.63	(0.89,2.96)	0.111	
Low RH	257	1.80	(0.95,3.39)	0.070	
High RH	258	1.61	(0.81,3.21)	0.175	
Low plus High RH	515	1.71	(1.01,2.91)	0.047	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-11. (Continued)**  
**Analysis of Alkaline Phosphatase**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Analysis Results for <math>\text{Log}_2</math> (Current Dioxin + 1)</b>				
<b>Model<sup>a</sup></b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	884	1.05 (0.85,1.29)	0.666	AGE (p=0.525)
5	884	1.04 (0.87,1.24)	0.692	AGE (p=0.534)
6 <sup>c</sup>	883	0.98 (0.81,1.19)	0.845	AGE (p=0.640)

<sup>a</sup> Model 4:  $\text{Log}_2$  (lipid-adjusted current dioxin + 1).  
 Model 5:  $\text{Log}_2$  (whole-weight current dioxin + 1).  
 Model 6:  $\text{Log}_2$  (whole-weight current dioxin + 1), adjusted for  $\text{log}_2$  total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for  $\text{log}_2$  total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-12.**  
**Analysis of Total Bilirubin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,027	0.63			AGE (p=0.060) ALC (p<0.001)
Background RH	367	0.63	0.01 --	0.745	
Low RH	254	0.62	-0.01 --	0.635	
High RH	254	0.60	-0.03 --	0.074	
Low plus High RH	508	0.61	-0.02 --	0.142	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-3-12. (Continued)**  
**Analysis of Total Bilirubin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	0.62 (290)	0.63 (298)	0.59 (296)	0.008	-0.0063 (0.0097)	0.514	DC (p=0.799) AGE*RACE (p=0.017)
5	0.62 (294)	0.62 (297)	0.60 (293)	0.007	-0.0025 (0.0081)	0.754	AGE*RACE (p=0.016)
6 <sup>d</sup>	0.63 (293)	0.62 (297)	0.60 (293)	0.010	-0.0076 (0.0088)	0.387	AGE*RACE (p=0.020)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of total bilirubin versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-13.**  
**Analysis of Direct Bilirubin**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,027			IC (p=0.028) RACE*AGE (p=0.065) AGE*ALC (p=0.034)
Background RH	367	0.76 (0.28,2.08)	0.599	
Low RH	254	0.65 (0.22,1.95)	0.442	
High RH	254	0.26 (0.06,1.17)	0.079	
Low plus High RH	508	0.44 (0.17,1.11)	0.083	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-13. (Continued)**  
**Analysis of Direct Bilirubin**  
**Occupation Removed from Final Model**

<b>b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Model<sup>a</sup></b>	<b>Analysis Results for Log<sub>2</sub> (Current Dioxin + 1)</b>			
	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	864	0.86 (0.56,1.31)	0.469	DRKYR (p=0.135)
5	864	0.99 (0.71,1.39)	0.958	DRKYR (p=0.142)
6 <sup>c</sup>	863	0.70 (0.49,1.01)	0.065	DRKYR (p=0.107)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-14.**  
**Analysis of LDH (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	171	146.70	0.021	0.0032 (0.0058)	0.586	RACE*ALC (p=0.024)
Medium	167	143.47				
High	170	148.40				

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of LDH versus log<sub>2</sub> (initial dioxin).

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

**Table I-3-14. (Continued)**  
**Analysis of LDH (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,024	148.25**			DXCAT*AGE (p=0.006) DXCAT*RACE (p=0.035) DXCAT*DRKYR (p=0.044)
Background RH	362	147.74**	-0.51 --**	0.754**	
Low RH	251	148.08**	-0.17 --**	0.927**	
High RH	251	148.70**	0.45 --**	0.809**	
Low plus High RH	502	148.39**	0.14 --**	0.922**	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> P-value is based on difference of means on natural logarithm scale.

\*\* Categorized dioxin-by-covariate interactions ( $p \leq 0.05$ ); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of these interactions; refer to Appendix Table I-4-7 for further analysis of these interactions.

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 I-3-14. (Continued)**  
**Analysis of LDH (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	143.99 (289)	146.76 (295)	145.07 (291)	0.012	0.0037 (0.0033)	0.254	ALC*DC (p=0.020)
5	143.86 (292)	146.23 (295)	145.81 (288)	0.012	0.0037 (0.0034)	0.279	ALC*DC (p=0.021)
6 <sup>d</sup>	144.02 (291)	146.24 (295)	145.65 (288)	0.012	0.0032 (0.0037)	0.388	ALC*DC (p=0.022)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of LDH versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-15.**  
**Analysis of LDH**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,024			DXCAT*DRKYR (p=0.008) RACE (p=0.003) AGE (p=0.131) ALC (p=0.004) DC (p=0.195)
Background RH	362	1.06 (0.74,1.52)**	0.757**	
Low RH	251	0.80 (0.53,1.23)**	0.315**	
High RH	251	1.08 (0.73,1.61)**	0.691**	
Low plus High RH	502	0.94 (0.69,1.29)**	0.695**	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 (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 I-4-8 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 I-3-16.**  
**Analysis of Cholesterol (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,025	215.50			RACE (p=0.395) AGE*DRKYR (p=0.023) ALC*DC (p=0.061)
Background RH	362	215.28	-0.22 --	0.926	
Low RH	251	215.35	-0.15 --	0.955	
High RH	251	219.15	3.65 --	0.183	
Low plus High RH	502	217.24	1.74 --	0.405	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-3-17.**  
**Analysis of Cholesterol**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
Dioxin Category	n	Adj. Relative Risk (95% C.I.) <sup>ab</sup>	p-Value	Covariate Remarks
Comparison	1,027			DXCAT*ALC (p=0.024) AGE (p=0.216) RACE*IC (p=0.018)
Background RH	367	1.09 (0.76,1.56)**	0.630**	
Low RH	254	1.24 (0.83,1.84)**	0.287**	
High RH	254	1.42 (0.97,2.10)**	0.073**	
Low plus High RH	508	1.33 (0.98,1.81)**	0.067**	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 relative risk, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table I-4-9 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 I-3-17. (Continued)**  
**Analysis of Cholesterol**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Analysis Results for <math>\text{Log}_2</math> (Current Dioxin + 1)</b>				
<b>Model<sup>a</sup></b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	864	1.10 (0.96,1.26)	0.178	AGE (p=0.260) DRKYR (p=0.099) RACE*ALC (p=0.016)
5	864	1.21 (1.07,1.37)	0.002	DRKYR (p=0.060) RACE*ALC (p=0.014) DC*AGE (p=0.043)

<sup>a</sup> Model 4:  $\text{Log}_2$  (lipid-adjusted current dioxin + 1).  
 Model 5:  $\text{Log}_2$  (whole-weight current dioxin + 1).

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

**Table I-3-18.**  
**Analysis of HDL Cholesterol (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS – INITIAL DIOXIN – ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	170	41.84	0.186	-0.0146 (0.0079)	0.066	RACE*IC (p=0.033) ALC*DC (p=0.017)
Medium	163	39.74				
High	166	40.17				

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of HDL cholesterol versus log<sub>2</sub> (initial dioxin).

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

**Table I-3-18. (Continued)**  
**Analysis of HDL Cholesterol (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,016	42.46**			DXCAT*ALC (p<0.001) DXCAT*DRKYR (p=0.007) RACE (p<0.001) ALC*IC (p=0.063)
Background RH	358	43.40**	0.93 --**	0.142**	
Low RH	247	42.51**	0.05 --**	0.950**	
High RH	246	40.89**	-1.57 --**	0.027**	
Low plus High RH	493	41.69**	-0.77 --**	0.162**	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> P-value is based on difference of means on natural logarithm scale.

\*\* Categorized dioxin-by-covariate interactions ( $p \leq 0.05$ ); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of these interactions; refer to Appendix Table I-4-10 for further analysis of these interactions.

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 I-3-18. (Continued)**  
**Analysis of HDL Cholesterol (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	44.43** (285)	42.55** (285)	40.27** (281)	0.121	-0.0258 (0.0061)**	<0.001**	CURR*DRKYR (p=0.011) RACE (p=0.042) ALC (p<0.001) AGE*DC (p=0.028)
5	44.85** (290)	42.26** (287)	40.01** (274)	0.130	-0.0252 (0.0052)**	<0.001**	CURR*DRKYR (p=0.002) RACE (p=0.050) ALC (p<0.001) AGE*DC (p=0.030)
6 <sup>d</sup>	43.94** (289)	41.97** (287)	40.54** (274)	0.156	-0.0168 (0.0056)**	0.003**	CURR*DRKYR (p=0.002) CURR*DC (p=0.018) RACE (p=0.094) ALC (p<0.001) AGE*DC (p=0.015)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of HDL cholesterol versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\* Log<sub>2</sub> (current dioxin + 1)-by-covariate interactions (p≤0.05); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of these interactions; refer to Appendix Table I-4-10 for further analysis of these interactions.

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 I-3-19.**  
**Analysis of Cholesterol-HDL Ratio**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	169	5.09**	0.143	0.0243 (0.0097)**	0.012**	INIT*ALC (p=0.008)
Medium	161	5.28**				AGE (p=0.193)
High	163	5.36**				RACE*IC (p=0.016) DRKYR*IC (p=0.047) ALC*DC (p=0.042)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of cholesterol-HDL ratio versus log<sub>2</sub> (initial dioxin).

\*\* Log<sub>2</sub> (initial dioxin)-by-covariate interaction (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 I-4-11 for further analysis of this interaction.

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

**Table I-3-19. (Continued)**  
**Analysis of Cholesterol-HDL Ratio**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,018	5.09**			DXCAT*ALC (p=0.015) RACE (p=0.010)
Background RH	363	4.97**	-0.12 --**	0.163**	
Low RH	250	5.09**	0.00 --**	0.992**	
High RH	249	5.37**	0.28 --**	0.006**	
Low plus High RH	499	5.23**	0.14 --**	0.078**	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-4-11 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 I-3-20.**  
**Analysis of Cholesterol-HDL Ratio**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
Analysis Results for Log <sub>e</sub> (Initial Dioxin) <sup>a</sup>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
499	1.13 (0.97,1.32)	0.116	AGE (p=0.263) ALC (p<0.001) RACE*IC (p=0.006) RACE*DC (p=0.026)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,018			RACE (p=0.054) DC (p=0.001) ALC (p<0.001)
Background RH	363	0.94 (0.73,1.21)	0.632	
Low RH	250	1.03 (0.78,1.38)	0.816	
High RH	249	1.40 (1.03,1.89)	0.030	
Low plus High RH	499	1.19 (0.95,1.50)	0.122	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-21.**  
**Analysis of Triglycerides (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS -- INITIAL DIOXIN -- ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	173	129.02	0.051	0.0329 (0.0189)	0.083	RACE (p=0.003)
Medium	170	143.36				
High	172	140.37				

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of triglycerides versus log<sub>2</sub> (initial dioxin).

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

**Table I-3-21. (Continued)**  
**Analysis of Triglycerides (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,025	131.01			RACE (p < 0.001) AGE*DRKYR (p = 0.014)
Background RH	362	125.14	-5.87 --	0.173	
Low RH	251	132.51	1.50 --	0.767	
High RH	251	146.33	15.32 --	0.004	
Low plus High RH	502	139.25	8.24 --	0.040	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-3-21. (Continued)**  
**Analysis of Triglycerides (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	116.76 (290)	128.23 (298)	147.60 (296)	0.039	0.0648 (0.0129)	<0.001	RACE (p=0.001)
5	108.82** (290)	128.94** (290)	159.69** (284)	0.095	0.0944 (0.0112)**	<0.001**	CURR*DRKYR (p=0.033) RACE (p=0.002) AGE*DRKYR (p=0.039)
6 <sup>d</sup>	130.73** (289)	137.21** (290)	142.23** (284)	0.394	0.0212 (0.0097)**	0.029**	CURR*DRKYR (p=0.040) RACE (p=0.017) ALC (p=0.156)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of triglycerides versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\* Log<sub>2</sub> (current dioxin + 1)-by-covariate interaction (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 I-4-12 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 I-3-22.**  
**Analysis of Triglycerides**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Model<sup>a</sup></b>	<b>Analysis Results for Log<sub>2</sub> (Current Dioxin + 1)</b>			
	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	884	1.19 (1.04,1.37)	0.014	RACE (p=0.015)
5	884	1.34 (1.19,1.52)	<0.001	RACE (p=0.018)
6 <sup>c</sup>	883	1.04 (0.89,1.22)	0.627	DC (p=0.074)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-23.**  
**Analysis of Creatine Kinase (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,025	170.63**			DXCAT*RACE (p=0.013) DXCAT*DRKYR (p=0.026) AGE (p=0.002) RACE*DRKYR (p=0.019)
Background RH	362	171.22**	0.58 --**	0.914**	
Low RH	251	166.94**	-3.69 --**	0.547**	
High RH	251	171.18**	0.55 --**	0.930**	
Low plus High RH	502	169.05**	-1.58 --**	0.740**	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> P-value is based on difference of means on natural logarithm scale.

\*\* Categorized dioxin-by-covariate interactions ( $p \leq 0.05$ ); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of these interactions; refer to Appendix Table I-4-13 for further analysis of these interactions.

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 I-3-23. (Continued)**  
**Analysis of Creatine Kinase (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>							
<b>Model<sup>b</sup></b>	<b>Current Dioxin Category Adjusted Mean<sup>a</sup>/(n)</b>			<b>Analysis Results for Log<sub>2</sub> (Current Dioxin + 1)</b>			
	<b>Low</b>	<b>Medium</b>	<b>High</b>	<b>R<sup>2</sup></b>	<b>Adj. Slope (Std. Error)<sup>c</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	147.72 (287)	157.52 (290)	163.04 (287)	0.074	0.0306 (0.0119)	0.010	AGE (p=0.110) DC (p=0.019) RACE*DRKYR (p<0.001)
5	147.63 (290)	158.74 (290)	161.44 (284)	0.076	0.0281 (0.0101)	0.006	AGE (p=0.099) DC (p=0.017) RACE*DRKYR (p<0.001)
6 <sup>d</sup>	148.72 (289)	158.89 (290)	160.85 (284)	0.074	0.0250 (0.0110)	0.023	AGE (p=0.095) DC (p=0.021) RACE*DRKYR (p<0.001)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of creatine kinase versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-24.**  
**Analysis of Creatine Kinase**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>e</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
502	1.05 (0.85,1.30)	0.649	ALC (p=0.255) AGE*DRKYR (p=0.002) RACE*DRKYR (p<0.001)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,025			DXCAT*RACE (p=0.005) DXCAT*DRKYR (p=0.031)
Background RH	362	1.11 (0.76,1.64)**	0.583**	RACE*ALC (p<0.001)
Low RH	251	0.83 (0.53,1.29)**	0.404**	IC*ALC (p=0.067)
High RH	251	1.12 (0.74,1.69)**	0.584**	DC*ALC (p<0.001)
Low plus High RH	502	0.97 (0.70,1.35)**	0.858**	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 interactions (0.01 < p ≤ 0.05); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of these interactions; refer to Appendix Table I-4-14 for further analysis of these interactions.

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 I-3-24. (Continued)**  
**Analysis of Creatine Kinase**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Model<sup>a</sup></b>	<b>Analysis Results for Log<sub>2</sub> (Current Dioxin + 1)</b>			
	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	864	1.08 (0.94,1.24)	0.283	ALC (p=0.849) RACE*DRKYR (p=0.003) AGE*DRKYR (p=0.004)
5	864	1.06 (0.94,1.20)	0.325	ALC (p=0.863) RACE*DRKYR (p=0.003) AGE*DRKYR (p=0.004)
6 <sup>c</sup>	863	1.07 (0.94,1.22)	0.324	ALC (p=0.851) RACE*DRKYR (p=0.003) AGE*DRKYR (p=0.004)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-25.**  
**Analysis of Serum Amylase (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Mean<sup>ab</sup></b>	<b>Difference of Adj. Mean vs. Comparisons (95% C.I.)<sup>c</sup></b>	<b>p-Value<sup>d</sup></b>	<b>Covariate Remarks</b>
Comparison	1,027	82.73			RACE (p<0.001) ALC (p=0.005) IC (p=0.113) AGE*DC (p=0.113)
Background RH	367	80.54	-2.18 --	0.211	
Low RH	254	85.26	2.53 --	0.216	
High RH	254	81.01	-1.71 --	0.395	
Low plus High RH	508	83.11	0.38 --	0.807	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-3-25. (Continued)**  
**Analysis of Serum Amylase (U/L)**  
**(Continuous)**  
**Occupation Removed from Final Model**

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	83.84 (290)	83.44 (298)	80.91 (296)	0.038	-0.0137 (0.0082)	0.096	AGE (p=0.067) RACE (p<0.001)
5	83.43 (294)	84.07 (297)	80.27 (293)	0.039	-0.0136 (0.0070)	0.053	AGE (p=0.066) RACE (p<0.001)
6 <sup>d</sup>	82.15 (293)	83.69 (297)	81.03 (293)	0.043	-0.0075 (0.0076)	0.321	AGE (p=0.041) RACE (p<0.001)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of serum amylase versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-26.**  
**Analysis of Serum Amylase**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>2</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
508	0.92 (0.65,1.31)	0.636	AGE (p<0.001) RACE (p<0.001) DC (p=0.026) ALC (p=0.172)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,043			DXCAT*RACE (p=0.015) AGE (p=0.003) DC (p=0.376)
Background RH	369	0.77 (0.48,1.24)**	0.285**	
Low RH	257	0.79 (0.46,1.36)**	0.389**	
High RH	258	0.66 (0.35,1.25)**	0.202**	
Low plus High RH	515	0.73 (0.47,1.14)**	0.166**	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 (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 I-4-15 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 I-3-26. (Continued)**  
**Analysis of Serum Amylase**  
**(Discrete)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
Analysis Results for $\text{Log}_2$ (Current Dioxin + 1)				
Model <sup>a</sup>	n	Adj. Relative Risk (95% C.I.) <sup>b</sup>	p-Value	Covariate Remarks
4	884	0.89 (0.72,1.11)	0.288	AGE (p=0.003) RACE (p<0.001) DC (p=0.024)
5	884	0.90 (0.75,1.08)	0.259	AGE (p=0.003) RACE (p<0.001) DC (p=0.024)
6 <sup>c</sup>	883	0.93 (0.77,1.13)	0.495	AGE (p=0.002) RACE (p<0.001) DC (p=0.022)

<sup>a</sup> Model 4:  $\text{Log}_2$  (lipid-adjusted current dioxin + 1).  
 Model 5:  $\text{Log}_2$  (whole-weight current dioxin + 1).  
 Model 6:  $\text{Log}_2$  (whole-weight current dioxin + 1), adjusted for  $\text{log}_2$  total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for  $\text{log}_2$  total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-27.**  
**Analysis of Antibodies for Hepatitis A**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>e</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
507	1.14 (0.97,1.33)	0.107	AGE (p<0.001) RACE*DC (p=0.004) RACE*DRKYR (p<0.001) IC*DRKYR (p=0.004)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,063			RACE*AGE (p=0.071)
Background RH	374	0.79 (0.61,1.03)	0.083	
Low RH	260	0.91 (0.68,1.21)	0.543	
High RH	260	1.35 (1.00,1.82)	0.052	
Low plus High RH	520	1.10 (0.87,1.39)	0.418	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-27. (Continued)**  
**Analysis of Antibodies for Hepatitis A**  
**Occupation Removed from Final Model**

<b>e) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Model<sup>a</sup></b>	<b>Analysis Results for Log<sub>2</sub> (Current Dioxin + 1)</b>			
	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	874	1.18 (1.06,1.32)	0.002	RACE*AGE (p=0.027) RACE*DRKYR (p=0.033)
5	874	1.15 (1.05,1.26)	0.002	RACE*AGE (p=0.030) RACE*DRKYR (p=0.036)
6 <sup>c</sup>	873	1.16 (1.05,1.28)	0.004	RACE*AGE (p=0.031) RACE*DRKYR (p=0.040)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-28.**  
**Analysis of Serological Evidence of Prior Hepatitis B Infection**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>2</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
507	1.31 (1.05,1.63)	0.016	AGE (p=0.093) RACE*DRKYR (p<0.001)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,045			DXCAT*AGE (p=0.044) RACE (p<0.001) DRKYR (p=0.014)
Background RH	367	0.63 (0.42,0.93)**	0.020**	
Low RH	254	0.58 (0.37,0.91)**	0.018**	
High RH	253	0.82 (0.54,1.24)**	0.344**	
Low plus High RH	507	0.69 (0.50,0.96)**	0.028**	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 (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 I-4-17 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 I-3-28. (Continued)**  
**Analysis of Serological Evidence of Prior Hepatitis B Infection**  
**Occupation Removed from Final Model**

<b>c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Model<sup>a</sup></b>	<b>n</b>	<b>Analysis Results for Log<sub>2</sub> (Current Dioxin + 1)</b>		
		<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	874	1.11 (0.96,1.29)	0.156	RACE*DRKYR (p=0.001)
5	874	1.09 (0.96,1.24)	0.180	RACE*DRKYR (p=0.001)
6 <sup>c</sup>	873	1.09 (0.95,1.25)	0.226	RACE*DRKYR (p=0.001)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-29.**  
**Analysis of Stool Hemocult**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	987			RACE*DRKYR (p=0.015) IC*ALC (p<0.001) DC*DRKYR (p=0.074)
Background RH	351	0.93 (0.35,2.43)	0.876	
Low RH	241	2.33 (1.01,5.40)	0.049	
High RH	236	1.00 (0.32,3.13)	0.995	
Low plus High RH	477	1.68 (0.79,3.55)	0.177	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-29. (Continued)**  
**Analysis of Stool Hemocult**  
**Occupation Removed from Final Model**

<b>b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Analysis Results for Log<sub>2</sub> (Current Dioxin + 1)</b>				
<b>Model<sup>a</sup></b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	828	1.04 (0.75,1.43)	0.835	DRKYR (p=0.049) RACE*ALC (p=0.014) IC*ALC (p=0.021)
5	828	1.07 (0.81,1.42)	0.625	DRKYR (p=0.050) RACE*ALC (p=0.015) IC*ALC (p=0.020)
6 <sup>c</sup>	827	1.00 (0.74,1.36)	0.978	DRKYR (p=0.049) RACE*ALC (p=0.021) IC*ALC (p=0.024)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-30.**  
**Analysis of Prealbumin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY – ADJUSTED</b>					
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Mean<sup>a</sup></b>	<b>Difference of Adj. Mean vs. Comparisons (95% C.I.)</b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,025	27.72**			DXCAT*IC (p=0.013) ALC (p<0.001) AGE*DRKYR (p=0.008)
Background RH	362	27.67**	-0.05 (-0.59,0.48)**	0.843**	
Low RH	251	27.80**	0.08 (-0.53,0.68)**	0.799**	
High RH	251	27.72**	0.00 (-0.62,0.61)**	0.992**	
Low plus High RH	502	27.76**	0.04 (-0.43,0.51)**	0.875**	

<sup>a</sup> 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 I-4-17 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 I-3-30. (Continued)**  
**Analysis of Prealbumin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>a</sup>	Current Dioxin Category Adjusted Mean/(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
5	27.80** (290)	27.83** (290)	27.78** (284)	0.051	0.1017 (0.0918)**	0.268**	CURR*DC (p=0.010) ALC (p<0.001) DRKYR (p=0.072) AGE*DC (p=0.024)

<sup>a</sup> Log<sub>2</sub> (whole-weight current dioxin + 1).

\*\* Log<sub>2</sub> (current dioxin+1)-by covariate interaction (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 I-4-17 for further analysis of this interaction.

**Table I-3-31.**  
**Analysis of Albumin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Mean*</b>	<b>Difference of Adj. Mean vs. Comparisons (95% C.I.)</b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,027	3,910.54			RACE (p=0.003) ALC (p=0.129) AGE*IC (p=0.005)
Background RH	367	3,893.03	-17.50 (-53.42,18.41)	0.340	
Low RH	254	3,894.74	-15.80 (-56.78,25.19)	0.450	
High RH	254	3,930.05	19.52 (-21.78,60.82)	0.354	
Low plus High RH	508	3,912.40	1.86 (-29.89,33.60)	0.909	

<sup>a</sup> 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 I-3-31. (Continued)**  
**Analysis of Albumin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

b) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED							
Model <sup>a</sup>	Current Dioxin Category Adjusted Mean/(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
4	3,930.18** (289)	3,881.96** (295)	3,924.83** (291)	0.033	-1.8788 (7.2988)**	0.797**	CURR*DC (p=0.011) RACE (p=0.048) ALC (p=0.928) AGE*IC (p=0.030)
5	3,925.49** (292)	3,889.38** (295)	3,922.70** (288)	0.033	1.0628 (6.2292)**	0.865**	CURR*DC (p=0.010) RACE (p=0.051) ALC (p=0.956) AGE*IC (p=0.031)
6 <sup>b</sup>	3,937.09** (291)	3,893.20** (295)	3,915.43** (288)	0.037	-3.6291 (6.7292)**	0.590**	CURR*DC (p=0.010) RACE (p=0.068) ALC (p=0.929) AGE*IC (p=0.036)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\* Log<sub>2</sub> (current dioxin + 1)-by covariate interaction (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 I-4-18 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 I-3-32.**  
**Analysis of  $\alpha$ -1 Acid Glycoprotein (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS – INITIAL DIOXIN – ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	170	54.36**	0.046	0.0009 (0.0071)**	0.898**	INIT*DRKYR (p=0.002) RACE (p=0.018) IC (p=0.753)
Medium	165	56.02**				
High	167	55.39**				

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of  $\alpha$ -1 acid glycoprotein versus log<sub>2</sub> (initial dioxin).

\*\* Log<sub>2</sub> (initial dioxin)-by-covariate interaction (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 I-4-19 for further analysis of this interaction.

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

**Table I-3-32. (Continued)**  
**Analysis of  $\alpha$ -1 Acid Glycoprotein (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Mean<sup>ab</sup></b>	<b>Difference of Adj. Mean vs. Comparisons (95% C.I.)<sup>c</sup></b>	<b>p-Value<sup>d</sup></b>	<b>Covariate Remarks</b>
Comparison	1,025	54.54**			DXCAT*DRKYR (p=0.014) RACE (p=0.027) AGE*ALC (p=0.057) ALC*DRKYR (p=0.024) IC*DC (p=0.023)
Background RH	362	53.46**	-1.09 --**	0.137**	
Low RH	251	55.34**	0.80 --**	0.347**	
High RH	251	55.65**	1.10 --**	0.199**	
Low plus High RH	502	55.49**	0.95 --**	0.148**	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> P-value is based on difference of means on natural logarithm scale.

\*\* 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 I-4-19 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 I-3-32. (Continued)**  
**Analysis of  $\alpha$ -1 Acid Glycoprotein (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	53.68** (287)	54.62** (290)	55.57** (287)	0.031	0.0060 (0.0051)**	0.245**	CURR*DRKYR (p=0.012) AGE (p=0.085) RACE (p=0.030) ALC (p=0.081) IC (p=0.414)
5	53.73 (290)	54.18 (290)	56.24 (284)	0.026	0.0077 (0.0044)	0.078	AGE (p=0.085) RACE (p=0.029) ALC (p=0.116) DRKYR (p=0.034) IC (p=0.451)
6 <sup>d</sup>	54.39 (289)	54.42 (290)	55.77 (284)	0.039	0.0027 (0.0047)	0.572	AGE (p=0.038) RACE (p=0.049) ALC (p=0.177) DRKYR (p=0.037) IC (p=0.460)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of  $\alpha$ -1 acid glycoprotein versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\* Log<sub>2</sub> (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 I-4-19 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 I-3-33.**  
**Analysis of  $\alpha$ -1 Acid Glycoprotein**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for <math>\text{Log}_2</math> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
515	1.14 (0.70,1.85)	0.597	AGE (p=0.270) DC (p=0.136)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Analysis Results for <math>\text{Log}_2</math> (Current Dioxin + 1)</b>				
<b>Model<sup>a</sup></b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	864	1.07 (0.79,1.47)	0.660	AGE (p=0.430) DRKYR (p=0.180)
5	864	1.05 (0.80,1.38)	0.715	AGE (p=0.411) DRKYR (p=0.178)
6 <sup>c</sup>	863	1.09 (0.81,1.46)	0.566	AGE (p=0.451) DRKYR (p=0.169)

<sup>a</sup> Model 4:  $\text{Log}_2$  (lipid-adjusted current dioxin + 1).

Model 5:  $\text{Log}_2$  (whole-weight current dioxin + 1).

Model 6:  $\text{Log}_2$  (whole-weight current dioxin + 1), adjusted for  $\text{log}_2$  total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for  $\text{log}_2$  total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-34.**  
**Analysis of  $\alpha$ -1 Antitrypsin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>a</sup>			
Initial Dioxin	n	Adj. Mean <sup>a</sup>	R <sup>2</sup>	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
Low	170	143.54**	0.089	1.1039 (0.9378)**	0.240**	INIT*DC (p=0.009) INIT*IC (p=0.023)
Medium	165	148.28**				AGE (p=0.025) RACE (p=0.034)
High	167	147.31**				DRKYR (p=0.006) IC*WINE (p=0.014)

<sup>a</sup> 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.

\*\* Log<sub>2</sub> (initial dioxin)-by-covariate interaction (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 I-4-20 for further analysis of this interaction.

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

**Table I-3-34. (Continued)**  
**Analysis of  $\alpha$ -1 Antitrypsin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Mean<sup>a</sup></b>	<b>Difference of Adj. Mean vs. Comparisons (95% C.I.)</b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,025	146.48			
Background RH	362	149.15	2.67 (-0.58,5.92)	0.108	AGE (p<0.001) RACE (p=0.092) DRKYR (p<0.001) WINE (p<0.001) DC (p<0.001)
Low RH	251	147.54	1.07 (-2.63,4.76)	0.572	
High RH	251	148.75	2.27 (-1.47,6.01)	0.235	
Low plus High RH	502	148.15	1.67 (-1.20,4.53)	0.254	

<sup>a</sup> 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 I-3-34. (Continued)**  
**Analysis of  $\alpha$ -1 Antitrypsin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>a</sup>	Current Dioxin Category Adjusted Mean/(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
4	149.41** (287)	145.58** (290)	146.40** (287)	0.060	-0.7535 (0.6573)**	0.252**	CURR*DC (p=0.022) AGE (p<0.001) RACE (p=0.048) DRKYR (p=0.001) IC*WINE (p=0.188)
5	149.98** (290)	144.34** (290)	147.78** (284)	0.063	-1.0583 (0.5609)**	0.060**	CURR*DC (p=0.020) AGE (p<0.001) RACE (p=0.043) DRKYR (p=0.001) IC*WINE (p=0.187)
6 <sup>b</sup>	149.00** (289)	144.16** (290)	148.34** (284)	0.061	-0.6061 (0.6043)**	0.316**	CURR*DC (p=0.038) AGE (p<0.001) RACE (p=0.039) DRKYR (p<0.001) IC*WINE (p=0.187)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\* Log<sub>2</sub> (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 I-4-20 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 I-3-35.**  
**Analysis of  $\alpha$ -1 Antitrypsin**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>						
Dioxin Category	n	Low vs. Normal		High vs. Normal		Covariate Remarks
		Adj. Relative Risk (95% C.I.) <sup>ab</sup>	p-Value	Adj. Relative Risk (95% C.I.) <sup>ab</sup>	p-Value	
Comparison	1,043					AGE (p=0.025) RACE (p=0.039)
Background RH	369	1.52 (0.71,3.24)	0.282	1.60 (0.65,3.94)	0.308	
Low RH	257	0.88 (0.29,2.60)	0.810	1.14 (0.39,3.32)	0.809	
High RH	258	0.80 (0.27,2.40)	0.695	0.27 (0.03,2.14)	0.214	
Low plus High RH	515	0.84 (0.37,1.92)	0.677	0.75 (0.28,2.05)	0.576	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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  $\leq$  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 I-3-36.**  
**Analysis of  $\alpha$ -2 Macroglobulin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY – ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,025	130.54			AGE (p<0.001) RACE (p=0.003) DRKYR (p=0.023) ALC (p<0.001)
Background RH	362	129.09	-1.46 --	0.386	
Low RH	251	127.63	-2.91 --	0.127	
High RH	251	130.79	0.25 --	0.897	
Low plus High RH	502	129.20	-1.34 --	0.367	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-3-36. (Continued)**  
**Analysis of  $\alpha$ -2 Macroglobulin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

b) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	130.55 (287)	127.57 (290)	130.35 (287)	0.089	-0.0028 (0.0050)	0.574	AGE (p<0.001) RACE (p=0.041) DRKYR (p=0.005) ALC (p=0.007)
5	130.97 (290)	126.89 (290)	131.08 (284)	0.089	-0.0025 (0.0043)	0.564	AGE (p<0.001) RACE (p=0.041) DRKYR (p=0.005) ALC (p=0.007)
6 <sup>d</sup>	131.29 (289)	127.07 (290)	130.76 (284)	0.090	-0.0034 (0.0047)	0.472	AGE (p<0.001) RACE (p=0.051) DRKYR (p=0.005) ALC (p=0.005)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of  $\alpha$ -2 macroglobulin versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-37.**  
**Analysis of  $\alpha$ -2 Macroglobulin**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY -- ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,027			AGE (p=0.012) DC (p=0.068) ALC (p=0.069)
Background RH	367	0.36 (0.04,3.13)	0.355	
Low RH	254	--	--	
High RH	254	1.63 (0.29,9.28)	0.584	
Low plus High RH	508	0.59 (0.11,3.16)	0.533	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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.

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

**Table I-3-38.**  
**Analysis of Apolipoprotein B (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Mean<sup>ab</sup></b>	<b>Difference of Adj. Mean vs. Comparisons (95% C.I.)<sup>c</sup></b>	<b>p-Value<sup>d</sup></b>	<b>Covariate Remarks</b>
Comparison	1,025	148.23			RACE (p=0.457) ALC (p=0.080) DC (p=0.006) AGE*DRKYR (p=0.050)
Background RH	362	145.55	-2.69 --	0.220	
Low RH	251	146.25	-1.98 --	0.428	
High RH	251	152.43	4.20 --	0.105	
Low plus High RH	502	149.31	1.07 --	0.583	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-3-39.**  
**Analysis of Apolipoprotein B**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>2</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
515	1.15 (0.97,1.35)**	0.104**	INIT*AGE (p=0.006) DC (p=0.336)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

\*\* Log<sub>2</sub> (initial dioxin)-by-covariate interaction (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 I-4-21 for further analysis of this interaction.

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>a,b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,025			RACE (p=0.988) ALC (p=0.095) AGE*DRKYR (0.021)
Background RH	362	0.94 (0.72,1.23)	0.646	
Low RH	251	1.01 (0.74,1.38)	0.942	
High RH	251	1.42 (1.02,1.98)	0.038	
Low plus High RH	502	1.19 (0.93,1.53)	0.165	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-40.**  
**Analysis of C<sub>3</sub> Complement (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,043	116.54			AGE (p=0.010) RACE (p=0.001) DC (p=0.002)
Background RH	369	113.79	-2.75 --	0.007	
Low RH	257	117.61	1.07 --	0.364	
High RH	258	118.72	2.18 --	0.069	
Low plus High RH	515	118.16	1.62 --	0.077	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-3-40. (Continued)**  
**Analysis of C<sub>3</sub> Complement (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> (n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	112.13 (287)	116.03 (290)	120.73 (287)	0.068	0.0243 (0.0035)	<0.001	AGE (p=0.024) RACE (p=0.029) DRKYR*IC (p=0.038)
5	112.02 (294)	116.58 (297)	121.99 (293)	0.087	0.0246 (0.0029)	<0.001	AGE (p=0.022) RACE (p=0.008) IC (p=0.134)
6 <sup>d</sup>	114.05 (289)	116.75 (290)	120.08 (284)	0.139	0.0162 (0.0031)	<0.001	AGE (p=0.096) RACE (p=0.005) DRKYR*IC (p=0.028)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of C<sub>3</sub> complement versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-41.**  
**Analysis of C<sub>3</sub> Complement**  
**(Discrete)**  
**Occupation Removed from Final Model**

a) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
Model <sup>a</sup>	Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	n	Adj. Relative Risk (95% C.I.) <sup>b</sup>	p-Value	Covariate Remarks
4	875	0.64 (0.46,0.89)**	0.006**	CURR*ALC (p=0.014) DC (p=0.645) AGE (p=0.153)
5	875	0.66 (0.52,0.83)	<0.001	AGE (p=0.572) DC (p=0.113) IC*ALC (p=0.049)
6 <sup>c</sup>	874	0.82 (0.62,1.08)	0.162	AGE (p=0.707) DC (p=0.128) IC*ALC (p=0.039)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.

\*\* Log<sub>2</sub> (current dioxin + 1)-by-covariate interaction (0.01 < p ≤ 0.05); adjusted relative risk, confidence interval, and p-value derived after deletion of this interaction; refer to Appendix Table I-4-22 for further analysis of this interaction.

**Table I-3-42.**  
**Analysis of C<sub>4</sub> Complement (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS – INITIAL DIOXIN – ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	171	22.38	0.025	0.0031 (0.0089)	0.727	AGE (p=0.532) RACE (p=0.018)
Medium	167	23.20				ALC (p=0.263) IC (p=0.211)
High	170	23.18				

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of C<sub>4</sub> complement versus log<sub>2</sub> (initial dioxin).

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

**Table I-3-42. (Continued)**  
**Analysis of C<sub>4</sub> Complement (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>ab</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.) <sup>c</sup>	p-Value <sup>d</sup>	Covariate Remarks
Comparison	1,025	23.16			AGE (p=0.349) RACE (p<0.001) DRKYR (p=0.044)
Background RH	362	22.77	-0.39 --	0.255	
Low RH	251	23.27	0.11 --	0.784	
High RH	251	23.14	-0.02 --	0.961	
Low plus High RH	502	23.20	0.04 --	0.884	

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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 I-3-42. (Continued)**  
**Analysis of C<sub>4</sub> Complement (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	22.33 (287)	22.80 (290)	23.10 (287)	0.026	0.0100 (0.0057)	0.080	RACE (p=0.001) IC (p=0.084) ALC*DRKYR (p=0.047)
5	22.19 (290)	22.68 (290)	23.45 (284)	0.032	0.0140 (0.0049)	0.004	RACE (p<0.001) IC (p=0.116) ALC*DRKYR (p=0.034)
6 <sup>d</sup>	22.79 (289)	22.87 (290)	23.09 (284)	0.065	0.0034 (0.0052)	0.516	RACE (p<0.001) IC (p=0.074) ALC*DRKYR (p=0.041)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of C<sub>4</sub> complement versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-43.**  
**Analysis of C<sub>4</sub> Complement**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
Dioxin Category	n	Adj. Relative Risk (95% C.I.) <sup>ab</sup>	p-Value	Covariate Remarks
Comparison	1,027			ALC (p=0.148)
Background RH	367	0.99 (0.26,3.82)	0.992	
Low RH	254	0.97 (0.20,4.65)	0.973	
High RH	254	0.50 (0.06,4.03)	0.511	
Low plus High RH	508	0.74 (0.19,2.84)	0.659	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-44.**  
**Analysis of Haptoglobin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS – INITIAL DIOXIN – ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>a</sup>			
Initial Dioxin	n	Adj. Mean <sup>a</sup>	R <sup>2</sup>	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
Low	170	103.04**	0.047	1.8653 (1.5912)**	0.242**	INIT*AGE (p=0.011) INIT*DRKYR (p=0.018) RACE (p=0.058)
Medium	165	112.03**				
High	167	113.74**				

<sup>a</sup> 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.

\*\* Log<sub>2</sub> (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 I-4-23 for further analysis of this interaction.

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

**Table I-3-44. (Continued)**  
**Analysis of Haptoglobin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>					
Dioxin Category	n	Adj. Mean <sup>a</sup>	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,025	103.82			RACE (p=0.051) AGE*DRKYR (p=0.021) ALC*DRKYR (p=0.003) ALC*IC (p=0.023) ALC*DC (p=0.027)
Background RH	362	106.25	2.43 (-2.96,7.83)	0.377	
Low RH	251	106.05	2.24 (-3.90,8.37)	0.475	
High RH	251	113.18	9.36 (3.16,15.56)	0.003	
Low plus High RH	502	109.62	5.80 (1.05,10.55)	0.017	

<sup>a</sup> 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 I-3-44. (Continued)**  
**Analysis of Haptoglobin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS – CURRENT DIOXIN – ADJUSTED							
Model <sup>a</sup>	Current Dioxin Category Adjusted Mean/(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
4	105.24 (287)	105.78 (290)	110.33 (287)	0.033	0.9483 (1.0643)	0.373	AGE (p=0.032) RACE (p=0.087) DRKYR (p=0.023) IC (p=0.140) DC (p<0.001)
5	106.19 (290)	103.67 (290)	112.81 (284)	0.034	0.9364 (0.9071)	0.302	AGE (p=0.031) RACE (p=0.089) DRKYR (p=0.023) IC (p=0.139) DC (p<0.001)
6 <sup>b</sup>	107.42 (289)	104.16 (290)	111.98 (284)	0.038	0.4269 (0.9788)	0.663	AGE (p=0.051) RACE (p=0.116) DRKYR (p=0.028) IC (p=0.143) DC (p<0.001)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).  
 Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).  
 Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Adjusted for log<sub>2</sub> 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 I-3-45.**  
**Analysis of Haptoglobin**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>e</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
502	1.04 (0.86,1.27)	0.918	RACE (p=0.134) DRKYR (p=0.011)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED</b>				
<b>Dioxin Category</b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>ab</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
Comparison	1,025			AGE (p=0.003) DC (p=0.028) IC (p=0.323) ALC*DRKYR (p=0.050)
Background RH	362	1.07 (0.73,1.57)	0.713	
Low RH	251	0.94 (0.60,1.47)	0.790	
High RH	251	1.47 (0.98,2.22)	0.065	
Low plus High RH	502	1.18 (0.85,1.65)	0.312	

<sup>a</sup> Relative risk and confidence interval relative to Comparisons.

<sup>b</sup> 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 I-3-45. (Continued)**  
**Analysis of Haptoglobin**  
**(Discrete)**  
**Occupation Removed from Final Model**

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
Analysis Results for $\text{Log}_2$ (Current Dioxin + 1)				
Model <sup>a</sup>	n	Adj. Relative Risk (95% C.I.) <sup>b</sup>	p-Value	Covariate Remarks
4	864	0.99 (0.86,1.14)	0.882	AGE (p=0.188) DRKYR (p=0.004)
5	864	1.02 (0.91,1.16)	0.706	AGE (p=0.137) ALC*DRKYR (p=0.049)
6 <sup>c</sup>	863	0.96 (0.84,1.09)	0.517	AGE (p=0.229) DRKYR (p=0.005)

<sup>a</sup> Model 4:  $\text{Log}_2$  (lipid-adjusted current dioxin + 1).  
 Model 5:  $\text{Log}_2$  (whole-weight current dioxin + 1).  
 Model 6:  $\text{Log}_2$  (whole-weight current dioxin + 1), adjusted for  $\text{log}_2$  total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for  $\text{log}_2$  total lipids in addition to covariates specified under "Covariate Remarks" column.

**Table I-3-46.**  
**Analysis of Transferrin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log <sub>2</sub> (Initial Dioxin) <sup>b</sup>			
Initial Dioxin	n	Adj. Mean <sup>ab</sup>	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
Low	171	295.90	0.016	0.0040 (0.0045)	0.384	ALC (p=0.073) DC (p=0.100) IC (p=0.824)
Medium	167	295.07				
High	170	299.83				

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> 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.

<sup>c</sup> Slope and standard error based on natural logarithm of transferrin versus log<sub>2</sub> (initial dioxin).

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

**Table I-3-46. (Continued)**  
**Analysis of Transferrin (mg/dl)**  
**(Continuous)**  
**Occupation Removed from Final Model**

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
Model <sup>b</sup>	Current Dioxin Category Adjusted Mean <sup>a</sup> /(n)			Analysis Results for Log <sub>2</sub> (Current Dioxin + 1)			
	Low	Medium	High	R <sup>2</sup>	Adj. Slope (Std. Error) <sup>c</sup>	p-Value	Covariate Remarks
4	290.51 (287)	291.92 (290)	296.60 (287)	0.031	0.0090 (0.0032)	0.005	ALC*RACE (p=0.023) DRKYR*DC (p=0.049)
5	289.51 (290)	292.80 (290)	298.72 (284)	0.037	0.0098 (0.0027)	<0.001	ALC*RACE (p=0.026) DRKYR*DC (p=0.042)
6 <sup>d</sup>	291.76 (289)	292.98 (290)	296.89 (284)	0.046	0.0067 (0.0029)	0.022	ALC*RACE (p=0.039) DRKYR*DC (p=0.042)

<sup>a</sup> Transformed from natural logarithm scale.

<sup>b</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>c</sup> Slope and standard error based on natural logarithm of transferrin versus log<sub>2</sub> (current dioxin + 1).

<sup>d</sup> Adjusted for log<sub>2</sub> 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 I-3-47.**  
**Analysis of Transferrin**  
**(Discrete)**  
**Occupation Removed from Final Model**

<b>a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED</b>			
<b>Analysis Results for Log<sub>2</sub> (Initial Dioxin)<sup>a</sup></b>			
<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
508	0.92 (0.73,1.16)	0.458	DC (p=0.398) ALC (p=0.127)

<sup>a</sup> 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.

<sup>b</sup> Relative risk for a twofold increase in initial dioxin.

<b>b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED</b>				
<b>Analysis Results for Log<sub>2</sub> (Current Dioxin + 1)</b>				
<b>Model<sup>a</sup></b>	<b>n</b>	<b>Adj. Relative Risk (95% C.I.)<sup>b</sup></b>	<b>p-Value</b>	<b>Covariate Remarks</b>
4	864	0.88 (0.75,1.03)	0.111	IC*DRKYR (p=0.024) AGE*DC (p=0.006) DC*DRKYR (p<0.001)
5	864	0.90 (0.78,1.02)	0.102	IC*DRKYR (p=0.024) AGE*DC (p=0.006) DC*DRKYR (p<0.001)
6 <sup>c</sup>	863	0.89 (0.77,1.02)	0.098	IC*DRKYR (p=0.024) AGE*DC (p=0.006) DC*DRKYR (p<0.001)

<sup>a</sup> Model 4: Log<sub>2</sub> (lipid-adjusted current dioxin + 1).

Model 5: Log<sub>2</sub> (whole-weight current dioxin + 1).

Model 6: Log<sub>2</sub> (whole-weight current dioxin + 1), adjusted for log<sub>2</sub> total lipids.

<sup>b</sup> Relative risk for a twofold increase in current dioxin.

<sup>c</sup> Adjusted for log<sub>2</sub> total lipids in addition to covariates specified under "Covariate Remarks" column.