Table N-3-24.
Analysis of Serum Insulin (mIU/ml) (Diabetics)
(Continuous)
Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[a]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	31	51.36	0.570	-0.0907 (0.0626)	0.151	RACE (p=0.046) DIABSEV (p=0.712) FAST (p<0.001)
Medium	31	60.57				
High	34	40.38				

[a] Transformed from natural logarithm scale.

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

[c] Slope and standard error based on natural logarithm of serum insulin versus log_2 (initial dioxin).

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

Table N-3-24. (Continued)
Analysis of Serum Insulin (mIU/ml) (Diabetics)
(Continuous)
Body Fat Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	147	40.06			RACE ($p<0.001$) DIABSEV ($p=0.002$) FAST ($p<0.001$) PERS*FAMDIAB ($p=0.040$)
Background RH	39	42.38	2.32 --	0.720	
Low RH	48	53.49	13.43 --	0.039	
High RH	46	37.67	-2.39 --	0.670	
Low plus High RH	94	45.04	4.99 --	0.292	

[a] Transformed from natural logarithm scale.

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

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

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin $\leq$ 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 N-3-24. (Continued)
Analysis of Serum Insulin (mIU/ml) (Diabetics)
(Continuous)
Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	42.61 (26)	51.59 (55)	47.32 (52)	0.535	-0.0320 (0.0559)	0.568	RACE (p=0.028) DIABSEV (p=0.352) FAST (p<0.001) PERS*FAMDIAB (p=0.106)
5	42.07 (24)	54.85 (53)	43.75 (56)	0.535	-0.0224 (0.0463)	0.630	RACE (p=0.029) DIABSEV (p=0.337) FAST (p<0.001) PERS*FAMDIAB (p=0.109)
6[d]	40.24 (24)	54.04 (53)	44.91 (56)	0.536	-0.0090 (0.0530)	0.865	RACE (p=0.027) DIABSEV (p=0.310) FAST (p<0.001) PERS*FAMDIAB (p=0.108)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of serum insulin versus log_2 (current dioxin +1).

[d] Adjusted for log_2 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 N-3-25.
Analysis of Serum Insulin (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Analysis Results for Log_2 (Initial Dioxin)[a]

n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
96	0.63 (0.43,0.92)**	0.013**	AGE (p=0.652) RACE (p=0.075) DIABSEV (p=0.140)

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

[b] Relative risk for a twofold increase in initial dioxin.

** Log_2 (initial 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 N-4-8 for further analysis of this interaction.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	148			DXCAT*AGE (p=0.032) RACE (p=0.053) PERS (p=0.008) DIABSEV (p<0.001)
Background RH	42	1.12 (0.51,2.48)**	0.778**	
Low RH	49	1.78 (0.81,3.92)**	0.151**	
High RH	47	0.70 (0.33,1.51)**	0.368**	
Low plus High RH	96	1.12 (0.62,2.01)**	0.716**	

[a] Relative risk and confidence interval relative to Comparisons.
[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

** 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 N-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 N-3-25. (Continued)
Analysis of Serum Insulin (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	138	0.82 (0.63,1.06)	0.121	DIABSEV (p=0.049)
5	138	0.85 (0.69,1.06)	0.151	DIABSEV (p=0.042)
6[c]	138	0.86 (0.67,1.11)	0.245	DIABSEV (p=0.042)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table N-3-26.
Analysis of Serum Insulin (mIU/ml) (Nondiabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[a]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	142	68.66	0.153	0.0977 (0.0328)	0.003	AGE ($p<0.001$)
Medium	141	74.55				
High	139	87.35				

[a] Transformed from natural logarithm scale.

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

[c] Slope and standard error based on natural logarithm of serum insulin versus log_2 (initial dioxin).

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

Table N-3-26. (Continued)
Analysis of Serum Insulin (Nondiabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.L.)[c]	p-Value[d]	Covariate Remarks
Comparison	897	68.01**			DXCAT*AGE (p=0.038)
					RACE (p=0.961)
Background RH	329	62.07**	-5.94 -- **	0.072**	FAST (p=0.882)
Low RH	203	67.83**	-0.18 -- **	0.965**	PERS*FAMDIAB (p=0.104)
High RH	208	78.72**	10.71 -- **	0.016**	
Low plus High RH	411	73.14**	5.13 -- **	0.120**	

[a] Transformed from natural logarithm scale.

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

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

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

** Categorized dioxin-by-covariate interaction ($0.01 < p \leq 0.05$); 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 N-4-9 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 N-3-26. (Continued)
Analysis of Serum Insulin (mIU/ml) (Nondiabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	33.14 (267)	40.35 (242)	53.85 (244)	0.095	0.1587 (0.0220)	<0.001	AGE (p<0.001) PERS (p=0.871) FAST (p=0.247)
5	33.03 (274)	40.82 (241)	55.58 (238)	0.109	0.1513 (0.0187)	<0.001	AGE (p<0.001) PERS (p=0.839) FAST (p=0.255)
6[b]	35.36 (273)	41.34 (241)	52.47 (238)	0.132	0.1226 (0.0198)	<0.001	AGE (p<0.001) PERS (p=0.577) FAST (p=0.261)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of serum insulin versus log_2 (current dioxin +1).

[d] Adjusted for log_2 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 N-3-27.
Analysis of Serum Insulin (Nondiabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED					
Analysis Results for Log_2 (Initial Dioxin)[a]					
	Low vs. Normal		High vs. Normal		
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
422	0.84 (0.54,1.30)	0.417	1.20 (1.00,1.50)	0.024	AGE ($p<0.001$)

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

[b] Relative risk for a twofold increase in initial dioxin.

Table N-3-27. (Continued)
Analysis of Serum Insulin (Nondiabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED						
		Low vs. Normal		High vs. Normal		
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	897					AGE ($p<0.001$) PERS ($p=0.026$) FAMDIAB ($p=0.048$)
Background RH	329	0.80 (0.45,1.44)	0.461	0.71 (0.54,0.93)	0.013	
Low RH	203	0.88 (0.42,1.82)	0.725	0.86 (0.61,1.20)	0.366	
High RH	208	0.93 (0.43,2.01)	0.844	1.19 (0.85,1.68)	0.314	
Low plus High RH	411	0.90 (0.50,1.60)	0.714	1.01 (0.78,1.31)	0.951	

[a] Relative risk and confidence interval relative to Comparisons.

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-3-27. (Continued)
Analysis of Serum Insulin (Nondiabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED						
		Analysis Results for Log_2 (Current Dioxin + 1)				
		Low vs. Normal		High vs. Normal		
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	753	0.80 (0.62,1.04)	0.093	1.35 (1.20,1.52)	<0.001	AGE (p<0.001) PERS (p=0.832)
5	753	0.83 (0.68,1.01)	0.069	1.35 (1.22,1.50)	<0.001	AGE (p<0.001) PERS (p=0.849)
6[c]	752	0.81 (0.66,1.00)**	0.047**	1.30 (1.17,1.44)	<0.001**	CURR*AGE (p<0.001) PERS (p=0.895)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

** Log_2 (current dioxin + 1)-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 N-4-10 for further analysis of this interaction.

Table N-3-28.
Analysis of Serum Glucagon (pg/ml) (All Participants)
(Continuous)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[a]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	150	58.06	0.049	0.0071 (0.0092)	0.446	RACE (p=0.286) FAST (p<0.001)
Medium	149	61.51				
High	153	60.39				

[a] Transformed from natural logarithm scale.

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

[c] Slope and standard error based on natural logarithm of serum glucagon versus log_2 (initial dioxin).

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

Table N-3-28. (Continued)
Analysis of Serum Glucagon (pg/ml) (All Participants)
(Continuous)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.L.)[c]	p-Value[d]	Covariate Remarks
Comparison	944	61.33**			DXCAT*FAMDIAB (p=0.010) AGE (p=0.001) RACE (p=0.170) FAST (p<0.001)
Background RH	330	59.94**	-1.39 -- **	0.163**	
Low RH	223	60.17**	-1.16 -- **	0.314**	
High RH	218	61.91**	0.58 -- **	0.629**	
Low plus High RH	441	61.04**	-0.29 -- **	0.749**	

[a] Transformed from natural logarithm scale.

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

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

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

** Categorized dioxin-by-covariate interaction ($p \leq 0.05$); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table N-4-11 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 N-3-28. (Continued)
Analysis of Serum Glucagon (pg/ml) (All Participants)
(Continuous)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	**** (258)	**** (262)	**** (251)	****	****	****	CURR*FAMDIAB (p=0.003) AGE (p=0.011) RACE (p=0.083) FAST (p<0.001)
5	57.36 (267)	58.66 (263)	60.79 (258)	0.067	0.0149 (0.0054)	0.006	AGE (p=0.007) RACE (p=0.086) FAST (p<0.001)
6[d]	57.76 (266)	58.73 (263)	60.47 (258)	0.069	0.0119 (0.0058)	0.040	AGE (p=0.009) RACE (p=0.112) FAST (p<0.001)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of serum glucagon versus log_2 (current dioxin + 1).

[d] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

**** Log_2 (current dioxin + 1) interaction ($p<0.01$); adjusted relative risk, confidence interval, and p-value not presented; refer to Appendix Table N-4-11 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 N-3-29.
Analysis of Serum Glucagon (All Participants)
(Discrete)
Body Fat Removed from Final Model

a) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	788	1.11 (0.46,2.67)	0.818	AGE (p=0.041)
5	788	1.04 (0.48,2.26)	0.915	AGE (p=0.042)
6[c]	787	1.18 (0.50,2.76)	0.710	AGE (p=0.039)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table N-3-30.
Analysis of Serum Glucagon (pg/ml) (Diabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[b]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	28	61.33	0.049	-0.0095 (0.0267)	0.723	DIABSEV (p=0.548) FAST (p=0.302)
Medium	27	71.79				
High	28	63.99				

[a] Transformed from natural logarithm scale.

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

[c] Slope and standard error based on natural logarithm of serum glucagon versus log_2 (initial dioxin).

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

Table N-3-30. (Continued)
Analysis of Serum Glucagon (pg/ml) (Diabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	132	68.73**			DXCAT*DIABSEV (p=0.001) AGE (p=0.348) FAST (p=0.210)
Background RH	38	71.11**	2.38 -- **	0.575**	
Low RH	45	68.56**	-0.18 -- **	0.963**	
High RH	38	65.26**	-3.47 -- **	0.392**	
Low plus High RH	83	67.03**	-1.71 -- **	0.579**	

[a] Transformed from natural logarithm scale.

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

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

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

** Categorized dioxin-by-covariate interaction ($p \leq 0.05$); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table N-4-12 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 N-3-30. (Continued)
Analysis of Serum Glucagon (pg/ml) (Diabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	65.57 (27)	64.02 (49)	70.24 (45)	0.061	0.0075 (0.0202)	0.710	DIABSEV (p=0.138) FAST (p=0.514)
5	65.34 (25)	65.94 (47)	68.08 (49)	0.064	0.0128 (0.0167)	0.445	DIABSEV (p=0.107) FAST (p=0.107)
6[d]	66.65 (25)	66.24 (47)	66.73 (49)	0.070	0.0058 (0.0189)	0.759	DIABSEV (p=0.177) FAST (p=0.503)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of serum glucagon versus log_2 (current dioxin +1).

[d] Adjusted for log_2 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 N-3-31.
Analysis of Serum Glucagon (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODELS 4 AND 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	121	0.87 (0.41,1.82)	0.706	DIABSEV (p=0.791)
5	116	0.86 (0.39,1.89)	0.712	AGE (p=0.133) RACE (p=0.107) FAMDIAB (p=0.626) DIABSEV (p=0.934)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).

[b] Relative risk for a twofold increase in current dioxin.

Table N-3-32.
Analysis of Serum Glucagon (Nondiabetics)
(Continuous)
Occupation Removed from Final Model

a) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	54.64 (236)	55.07 (217)	58.04 (214)	0.020	0.0173 (0.0065)	0.008	AGE (p=0.046) RACE (p=0.063) FAST (p=0.603)
5	54.63 (242)	55.50 (216)	57.85 (209)	0.021	0.0158 (0.0056)	0.005	AGE (p=0.047) RACE (p=0.067) FAST (p=0.598)
6[d]	54.85 (241)	55.55 (216)	57.75 (209)	0.021	0.0144 (0.0060)	0.017	AGE (p=0.054) RACE (p=0.075) FAST (p=0.600)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of serum glucagon versus log_2 (current dioxin +1).

[d] Adjusted for log_2 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 N-3-33.
Analysis of α-1-C Hemoglobin (percent) (All Participants)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[b]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	171	7.51	0.142	0.0187 (0.0062)	0.003	AGE ($p<0.001$) RACE*FAMDIAB ($p=0.393$)
Medium	167	7.75				
High	168	7.87				

[a] Transformed from natural logarithm scale.

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

[c] Slope and standard error based on natural logarithm of α-1-C hemoglobin versus log_2 (initial dioxin).

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

Table N-3-33. (Continued)
Analysis of α-1-C Hemoglobin (percent) (All Participants)
(Continuous)
Occupation and Body Fat Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.L.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,045	7.59			RACE*FAMDIAB (p=0.077) AGE (p<0.001)
Background RH	368	7.54	-0.05 --	0.467	
Low RH	252	7.55	-0.04 --	0.631	
High RH	254	7.76	0.17 --	0.047	
Low plus High RH	506	7.66	0.07 --	0.322	

[a] Transformed from natural logarithm scale.

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

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

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-3-33. (Continued)
Analysis of α-1-C Hemoglobin (percent) (All Participants)
(Continuous)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	7.37 (290)	7.49 (294)	7.75 (290)	0.087	0.0167 (0.0038)	<0.001	AGE (p<0.001) RACE (p=0.001) FAMDIAB (p<0.001)
5	7.38 (296)	7.43 (290)	7.84 (288)	0.091	0.0157 (0.0033)	<0.001	AGE (p<0.001) RACE (p=0.001) FAMDIAB (p<0.001)
6[d]	7.48 (295)	7.45 (290)	7.78 (288)	0.106	0.0108 (0.0035)	0.002	AGE (p<0.001) RACE (p<0.001) FAMDIAB (p<0.001)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of α-1-C hemoglobin versus log_2 (current dioxin +1).

[d] Adjusted for log_2 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 N-3-34.
Analysis of α-1-C Hemoglobin (All Participants)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Analysis Results for Log_2 (Initial Dioxin)[a]

n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
506	1.11 (0.94,1.30)	0.205	AGE (p=0.001) RACE (p=0.030) FAMDIAB (p=0.002)

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

[b] Relative risk for a twofold increase in initial dioxin.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,045			AGE (p<0.001) RACE (p<0.001) FAMDIAB (p<0.001)
Background RH	368	0.96 (0.72,1.29)	0.794	
Low RH	252	1.03 (0.75,1.41)	0.867	
High RH	254	1.18 (0.86,1.64)	0.305	
Low plus High RH	506	1.10 (0.86,1.41)	0.449	

[a] Relative risk and confidence interval relative to Comparisons.

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin >10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin >10 ppt, Initial Dioxin > 143 ppt.

Table N-3-34. (Continued)
Analysis of α-1-C Hemoglobin (All Participants)
(Discrete)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	873	1.15 (1.03,1.28)	0.013	AGE ($p<0.001$) RACE ($p=0.005$) PERS ($p=0.076$) FAMDIAB ($p<0.001$)
5	873	1.16 (1.05,1.28)	0.002	AGE ($p<0.001$) RACE ($p=0.004$) PERS ($p=0.078$) FAMDIAB ($p<0.001$)
6[c]	872	1.08 (0.97,1.20)	0.143	AGE ($p<0.001$) RACE ($p=0.002$) PERS ($p=0.040$) FAMDIAB ($p<0.001$)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table N-3-35.
Analysis of α-1-C Hemoglobin (percent) (Diabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[b]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	31	10.72	0.327	0.0313 (0.0184)	0.092	RACE (p=0.009) DIABSEV (p<0.001)
Medium	31	10.41				
High	34	11.91				

[a] Transformed from natural logarithm scale.

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

[c] Slope and standard error based on natural logarithm of α-1-C hemoglobin versus log_2 (initial dioxin).

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

Table N-3-35. (Continued)
Analysis of α-1-C Hemoglobin (percent) (Diabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	148	10.46			AGE (p=0.423) RACE (p=0.001) DIABSEV (p<0.001)
Background RH	42	10.19	-0.27 --	0.541	
Low RH	49	10.24	-0.22 --	0.586	
High RH	47	11.11	0.65 --	0.142	
Low plus High RH	96	10.66	0.20 --	0.560	

[a] Transformed from natural logarithm scale.

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

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

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-3-35. (Continued)
Analysis of α-1-C Hemoglobin (percent) (Diabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	10.00 (26)	10.64 (55)	10.99 (52)	0.364	0.0321 (0.0149)	0.034	AGE (p=0.223) RACE (p=0.054) FAMDIAB*DIABSEV (p=0.110)
5	10.17 (24)	10.15 (53)	11.43 (56)	0.369	0.0291 (0.0123)	0.020	AGE (p=0.224) RACE (p=0.050) FAMDIAB*DIABSEV (p=0.116)
6[d]	10.37 (24)	10.13 (53)	11.37 (56)	0.367	0.0259 (0.0136)	0.059	RACE (p=0.032) FAMDIAB*DIABSEV (p=0.141)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of α-1-C hemoglobin versus log_2 (current dioxin +1).

[d] Adjusted for log_2 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 N-3-36.
Analysis of α-1-C Hemoglobin (Diabetics)
(Discrete)
Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	**n**	**Adj. Relative Risk (95% C.I.)[ab]**	**p-Value**	**Covariate Remarks**
Comparison	148			AGE (p=0.031) RACE (p=0.016) DIABSEV (p<0.001)
Background RH	42	1.03 (0.43,2.43)	0.950	
Low RH	49	1.45 (0.60,3.53)	0.414	
High RH	47	2.19 (0.82,5.84)	0.118	
Low plus High RH	96	1.75 (0.86,3.58)	0.123	

[a] Relative risk and confidence interval relative to Comparisons.

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin >10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin >10 ppt, Initial Dioxin > 143 ppt.

Table N-3-36. (Continued)
Analysis of α-1-C Hemoglobin (Diabetics)
(Discrete)
Body Fat Removed from Final Model

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	138	1.49 (1.01,2.20)	0.035	AGE (p=0.019) RACE (p=0.166) DIABSEV (p<0.001)
5	138	1.49 (1.06,2.12)	0.016	DIABSEV (p<0.001) AGE*RACE (p=0.030)
6[c]	138	1.28 (0.87,1.89)	0.199	DIABSEV (p<0.001) AGE*RACE (p=0.015)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table N-3-37.
Analysis of α-1-C Hemoglobin (percent) (Nondiabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[b]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	140	6.92	0.058	0.0031 (0.0033)	0.346	AGE ($p<0.001$) RACE ($p=0.139$) FAMDIAB ($p=0.003$)
Medium	137	7.11				
High	135	6.96				

[a] Transformed from natural logarithm scale.

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

[c] Slope and standard error based on natural logarithm of α-1-C hemoglobin versus log_2 (initial dioxin).

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

Table N-3-37. (Continued)
Analysis of α-1-C Hemoglobin (percent) (Nondiabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	898	7.11			AGE ($p<0.001$) RACE ($p<0.001$) FAMDIAB ($p=0.004$)
Background RH	329	7.09	-0.02 --	0.534	
Low RH	204	7.05	-0.06 --	0.199	
High RH	208	7.08	-0.03 --	0.430	
Low plus High RH	412	7.07	-0.04 --	0.179	

[a] Transformed from natural logarithm scale.

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

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

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin $\leq$ 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 N-3-37. (Continued)
Analysis of α-1-C Hemoglobin (Percent) (Nondiabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	7.03 (264)	7.00 (239)	7.05 (238)	0.035	0.0011 (0.0023)	0.651	AGE ($p<0.001$) RACE ($p=0.018$) FAMDIAB ($p=0.006$)
5	7.03 (272)	7.00 (237)	7.04 (232)	0.035	0.0015 (0.0020)	0.450	AGE ($p<0.001$) RACE ($p=0.017$) FAMDIAB ($p=0.006$)
6[d]	7.05 (271)	7.01 (237)	7.03 (232)	0.038	0.0003 (0.0021)	0.880	AGE ($p<0.001$) RACE ($p=0.013$) FAMDIAB ($p=0.007$)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of α-1-C hemoglobin versus log_2 (current dioxin +1).

[d] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

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

Table N-3-38.
Analysis of α-1-C Hemoglobin (Nondiabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Analysis Results for Log_2 (Initial Dioxin)[a]

n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
412	1.02 (0.83,1.24)	0.874	RACE (p=0.438) FAMDIAB (p=0.056)

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

[b] Relative risk for a twofold increase in initial dioxin.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	898			AGE (p=0.001) RACE (p<0.001) FAMDIAB (p=0.036)
Background RH	329	1.00 (0.71,1.40)	0.991	
Low RH	204	0.86 (0.58,1.30)	0.485	
High RH	208	0.92 (0.61,1.39)	0.697	
Low plus High RH	412	0.89 (0.65,1.22)	0.474	

[a] Relative risk and confidence interval relative to Comparisons.

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin $\leq$ 10 ppt.
Background (Ranch Hand): Current Dioxin $\leq$ 10 ppt.
Low (Ranch Hand): Current Dioxin $>$10 ppt, 10 ppt $<$ Initial Dioxin $\leq$ 143 ppt.
High (Ranch Hand): Current Dioxin $>$10 ppt, Initial Dioxin $>$ 143 ppt.

Table N-3-38. (Continued)
Analysis of α-1-C Hemoglobin (Nondiabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	740	0.97 (0.85,1.11)	0.685	RACE (p=0.056) PERS (p=0.145) FAMDIAB (p=0.017)
5	740	1.00 (0.89,1.12)	0.973	RACE (p=0.056) PERS (p=0.153) FAMDIAB (p=0.018)
6[c]	739	0.96 (0.85,1.08)	0.486	RACE (p=0.038) PERS (p=0.115) FAMDIAB (p=0.018)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table N-3-39.
Analysis of Serum Proinsulin (ng/ml) (Diabetics)
(Continuous)
Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[b]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	29	0.747	0.475	-0.004 (0.025)	0.874	PERS (p=0.052) FAST (p<0.001) DIABSEV (p=0.349)
Medium	29	0.953				
High	33	0.816				

[a] Transformed from square root scale.

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

[c] Slope and standard error based on square root of serum proinsulin versus log_2 (initial dioxin).

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	143	0.708			RACE (p=0.005) PERS (p=0.025) FAST (p<0.001) FAMDIAB*DIABSEV (p=0.019)
Background RH	36	0.602	-0.106 --	0.438	
Low RH	45	0.661	-0.047 --	0.703	
High RH	44	0.715	0.007 --	0.960	
Low plus High RH	89	0.687	-0.021 --	0.832	

[a] Transformed from square root scale.

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

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not presented because analysis was performed on square root scale.

[d] P-value is based on difference of means on square root 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 N-3-39. (Continued)
Analysis of Serum Proinsulin (ng/ml) (Diabetics)
(Continuous)
Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	0.645 (26)	0.765 (52)	0.910 (52)	0.409	0.017 (0.021)	0.420	PERS (p=0.021) DIABSEV (p=0.260) FAST (p<0.001)
5	0.585 (24)	0.764 (50)	0.924 (56)	0.414	0.023 (0.017)	0.186	PERS (p=0.020) DIABSEV (p=0.314) FAST (p<0.001)
6[d]	0.643 (24)	0.783 (50)	0.869 (56)	0.432	0.004 (0.020)	0.831	PERS (p=0.013) DIABSEV (p=0.224) FAST (p<0.001)

[a] Transformed from square root scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on square root of serum proinsulin versus log_2 (current dioxin +1).

[d] Adjusted for log_2 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 N-3-40.
Analysis of Serum Proinsulin (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED			
Analysis Results for Log_2 (Initial Dioxin)[a]			
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
91	1.12 (0.77,1.62)	0.560	AGE (p=0.240) DIABSEV (p=0.047)

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

[b] Relative risk for a twofold increase in initial dioxin.

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	125	1.14 (0.85,1.54)	0.379	AGE (p=0.319) RACE (p=0.399) FAMDIAB (p=0.933) DIABSEV (p=0.002)
5	130	1.17 (0.92,1.50)	0.176	AGE (p=0.386) DIABSEV (p=0.003)
6[c]	130	1.02 (0.77,1.34)**	0.905**	CURR*DIABSEV (p=0.034) AGE (p=0.428) RACE (p=0.307) PERS (p=0.594)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

** Log_2 (current dioxin + 1)-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted relative risk, confidence interval, and p-value derived after deletion of this interaction; refer to Appendix Table N-4-14 for further analysis of this interaction.

Table N-3-41.
Analysis of Serum C Peptide (ng/ml) (Diabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[a]	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	143	6.37			RACE ($p<0.001$) FAMDIAB ($p=0.147$) DIABSEV ($p=0.022$) FAST ($p<0.001$)
Background RH	36	6.25	-0.12 (-1.72,1.48)	0.886	
Low RH	45	8.24	1.87 (0.47,3.28)	0.010	
High RH	44	6.76	0.39 (-1.05,1.83)	0.595	
Low plus High RH	89	7.51	1.14 (0.02,2.26)	0.046	

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

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.

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED

	Current Dioxin Category Adjusted Mean/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	Low	Medium	High	R^2	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
4	6.82 (24)	7.94 (51)	7.59 (50)	0.661	-0.087 (0.261)	0.738	RACE ($p=0.042$) FAMDIAB ($p=0.205$) DIABSEV ($p=0.006$) FAST ($p<0.001$)
5	6.88 (22)	8.12 (49)	7.40 (54)	0.661	-0.072 (0.216)	0.739	RACE ($p=0.042$) FAMDIAB ($p=0.207$) DIABSEV ($p=0.006$) FAST ($p<0.001$)
6[b]	6.55 (22)	8.00 (49)	7.55 (54)	0.662	0.001 (0.247)	0.998	RACE ($p=0.039$) FAMDIAB ($p=0.209$) DIABSEV ($p=0.007$) FAST ($p<0.001$)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Adjusted for log_2 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 N-3-42.
Analysis of Serum C Peptide (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Analysis Results for Log_2 (Initial Dioxin)[a]			
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
89	0.73 (0.50,1.08)	0.099	RACE (p=0.081) PERS*FAMDIAB (p=0.001) PERS*DIABSEV (p=0.050)

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

[b] Relative risk for a twofold increase in initial dioxin.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	143			DXCAT*AGE (p<0.001) PERS (p=0.412) AGE*DIABSEV (p=0.006)
Background RH	39	****	****	
Low RH	46	****	****	
High RH	45	****	****	
Low plus High RH	91	****	****	

[a] Relative risk and confidence interval relative to Comparisons.

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

**** Categorized dioxin-by-covariate interaction ($p \leq 0.01$); adjusted relative risk, confidence interval, and p-value not presented; refer to Appendix Table N-4-14 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 N-3-42. (Continued)
Analysis of Serum C Peptide (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	125	1.02 (0.78,1.32)	0.895	RACE (p=0.134) DIABSEV (p<0.001) PERS*FAMDIAB (p=0.123)
5	125	1.03 (0.82,1.29)**	0.824**	CURR*DIABSEV (p=0.018) AGE (p=0.817) RACE (p=0.142) PERS*FAMDIAB (p=0.101)
6[c]	125	1.07 (0.83,1.39)**	0.576**	CURR*DIABSEV (p=0.022) AGE (p=0.821) RACE (p=0.127) PERS*FAMDIAB (p=0.093)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

** Log_2 (current dioxin + 1)-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted relative risk, confidence interval, and p-value derived after deletion of this interaction; refer to Appendix Table N-4-14 for further analysis of this interaction.

Table N-3-43.
Analysis of Total Testosterone (ng/dl)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[a]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	171	528.0	0.131	-0.0382 (0.1348)	0.777	AGE (p=0.026) RACE (p=0.029) PERS (p=0.374)
Medium	170	510.1				
High	173	505.5				

[a] Transformed from square root scale.

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

[c] Slope and standard error based on square root of total testosterone versus log_2 (initial dioxin).

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

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,056	516.9			AGE (p<0.001) RACE (p=0.017)
Background RH	364	544.2	27.3 --	0.012	
Low RH	256	530.4	13.5 --	0.272	
High RH	259	504.0	-12.9 --	0.290	
Low plus High RH	515	517.0	0.1 --	0.988	

[a] Transformed from square root scale.

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

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not presented because analysis was performed on square root scale.

[d] P-value is based on difference of means on square root 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 N-3-43. (Continued)
Analysis of Total Testosterone (ng/dl)
(Continuous)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	561.4 (287)	522.8 (295)	489.3 (297)	0.038	-0.4629 (0.0969)	<0.001	AGE*RACE (p=0.033)
5	565.3 (292)	517.8 (293)	487.9 (294)	0.050	-0.4824 (0.0821)	<0.001	AGE*RACE (p=0.032)
6[d]	550.8 (291)	513.3 (293)	494.3 (294)	0.056	-0.3680 (0.0886)	<0.001	AGE*RACE (p=0.022)

[a] Transformed from square root scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on square root of total testosterone versus log_2 (current dioxin +1).

[d] Adjusted for log_2 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 N-3-44.
Analysis of Total Testosterone
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Analysis Results for Log_2 (Initial Dioxin)[a]			
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
515	1.04 (0.80,1.37)	0.756	RACE (p=0.051)

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

[b] Relative risk for a twofold increase in initial dioxin.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,055			DXCAT*PERS (p=0.019) AGE (p=0.039) RACE (p=0.084)
Background RH	364	0.66 (0.33,1.32)**	0.238**	
Low RH	255	0.67 (0.33,1.34)**	0.254**	
High RH	259	1.23 (0.69,2.18)**	0.478**	
Low plus High RH	514	0.94 (0.58,1.52)**	0.801**	

[a] Relative risk and confidence interval relative to Comparisons.

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

** 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 N-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 N-3-44. (Continued)
Analysis of Total Testosterone
(Discrete)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	878	1.26 (1.03,1.55)	0.027	RACE (p=0.029) PERS (p=0.185)
5	878	1.27 (1.06,1.53)	0.011	RACE (p=0.031) PERS (p=0.182)
6[c]	877	1.22 (1.00,1.48)	0.055	RACE (p=0.037) PERS (p=0.214)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table N-3-45.
Analysis of Free Testosterone (pg/ml)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[a]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	172	19.75	0.154	-0.009 (0.023)	0.682	AGE ($p<0.001$) RACE ($p=0.018$)
Medium	170	19.37				
High	173	19.44				

[a] Transformed from square root scale.

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

[c] Slope and standard error based on square root of free testosterone versus log_2 (initial dioxin).

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

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,055	18.72			AGE ($p<0.001$) RACE ($p=0.166$) PERS ($p=0.089$)
Background RH	364	18.97	0.25 --	0.467	
Low RH	255	19.10	0.38 --	0.343	
High RH	259	19.00	0.28 --	0.482	
Low plus High RH	514	19.05	0.33 --	0.285	

[a] Transformed from square root scale.

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

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not presented because analysis was performed on square root scale.

[d] P-value is based on difference of means on square root 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 N-3-45. (Continued)
Analysis of Free Testosterone (pg/ml)
(Continuous)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	19.85 (287)	19.76 (294)	19.06 (297)	0.093	-0.033 (0.016)	0.037	AGE ($p<0.001$) RACE ($p=0.019$) PERS ($p=0.204$)
5	20.15 (292)	19.38 (292)	19.23 (294)	0.093	-0.029 (0.013)	0.033	AGE ($p<0.001$) RACE ($p=0.020$) PERS ($p=0.197$)
6[d]	20.16 (291)	19.39 (292)	19.21 (294)	0.093	-0.030 (0.015)	0.044	AGE ($p<0.001$) RACE ($p=0.019$) PERS ($p=0.214$)

[a] Transformed from square root scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on square root of free testosterone versus log_2 (current dioxin +1).

[d] Adjusted for log_2 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 N-3-46.
Analysis of Free Testosterone
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Analysis Results for Log_2 (Initial Dioxin)[a]

n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
514	1.10 (0.92,1.32)	0.305	AGE*RACE (p=0.013) RACE*PERS (p=0.006)

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

[b] Relative risk for a twofold increase in initial dioxin.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,055			AGE (p=0.007) PERS (p=0.091)
Background RH	364	0.77 (0.55,1.09)	0.136	
Low RH	255	0.72 (0.49,1.06)	0.097	
High RH	259	0.85 (0.59,1.21)	0.353	
Low plus High RH	514	0.79 (0.59,1.04)	0.095	

[a] Relative risk and confidence interval relative to Comparisons.

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-3-46. (Continued)
Analysis of Free Testosterone
(Discrete)
Occupation and Body Fat Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	879	1.20 (1.06,1.35)	0.004	
5	878	1.13 (1.01,1.26)	0.026	AGE (p=0.165) PERS (p=0.206)
6[c]	878	1.21 (1.07,1.36)	0.002	

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table N-3-47.
Analysis of Sex Hormone Binding Globulin
Occupation and Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED			
Analysis Results for Log_2 (Initial Dioxin)[a]			
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
515	0.99 (0.83,1.19)	0.944	RACE (p=0.198)

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

[b] Relative risk for a twofold increase in initial dioxin.

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	879	1.00 (0.88,1.13)	0.994	

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).

[b] Relative risk for a twofold increase in current dioxin.