AIR FORCE HEALTH STUDY

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

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APPENDIX J-1.

Dependent Variable-Covariate Associations for the Dermatologic Assessment

This appendix contains results of tests of association between each dependent variable and candidate covariates for the adjusted analysis of each dependent variable. Pearson's chi-square test (continuity-adjusted for 2×2 tables) is used for significance testing of the associations between the dependent variable and the candidate covariate. When a candidate covariate is continuous in nature (for example, age), the covariate is discretized prior to the analysis of the discrete dependent variable.

Table J-1-1.
Dependent Variable-Covariate Associations for the Dermatologic Assessment

Dependent Variable	Level	Age			Occupation			
		Born ≥1942	Born <1942	p-Value	Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value
Occurrence of Acne (Lifetime)	Yes	(n=956) 81.7%	(n=1,277) 89.0%	<0.001	(n=869) 86.8%	(n=365) 86.8%	(n=999) 84.7%	0.365
Acne Relative to Time of Duty in SEA								
Pre- & Post-SEA and Post-SEA vs. Pre-SEA and None	Pre- & Post-SEA and Post-SEA	(n=956) 81.1%	(n=1,277) 88.8%	<0.001	(n=869) 86.4%	(n=365) 86.3%	(n=999) 84.4%	0.410
Location of Acne (Pre- & Post-SEA and Post-SEA)	Temples/ Eyes/ Ears	(n=773) 38.7%	(n=1,133) 51.1%	<0.001	(n=670) 48.3%	(n=283) 46.0%	(n=736) 44.0%	0.135
Other Abnormalities	Yes	(n=956) 74.0%	(n=1,275) 89.2%	<0.001	(n=868) 84.6%	(n=364) 85.7%	(n=999) 79.9%	0.007
Dermatology Index	Abnormal	(n=956) 46.1%	(n=1,276) 43.6%	0.246	(n=869) 39.1%	(n=364) 49.5%	(n=999) 47.7%	<0.001

Table J-1-1. (Continued)
Dependent Variable-Covariate Associations for the Dermatologic Assessment

Dependent Variable	Level	Race			Presence of Pre-SEA Acne		
		Black	Non-Black	p-Value	No	Yes	p-Value
Occurrence of Acne (Lifetime)	Yes	(n=131) 72.5%	(n=2,102) 86.0%	0.612	--	--	--
Acne Relative to Time of Duty in SEA							
Pre- & Post-SEA and Post-SEA vs. Pre-SEA and None	Pre- & Post- and Post-SEA	(n=131) 83.2%	(n=2,102) 85.6%	0.524	(n=2,008) 84.3%	(n=225) 96.4%	<0.001
Location of Acne (Pre- & Post-SEA and Post-SEA)	Temples/ Eyes/ Ears	(n=109) 25.7%	(n=1,797) 47.3%	<0.001	--	--	--
Other Abnormalities	Yes	(n=131) 72.5%	(n=2,100) 83.3%	0.002	(n=2,006) 83.5%	(n=225) 74.7%	0.001
Dermatology Index	Abnormal	(n=131) 64.1%	(n=2,101) 43.5%	<0.001	(n=2,007) 43.0%	(n=225) 59.1%	<0.001

--: Covariate not applicable for dependent variable.

Note: Temples/Eyes/Ears = Temples, eyes, ears, temples and eyes, temples and ears, eyes and ears, or temples, eyes, and ears.

APPENDIX J-2.

Interaction Tables for the Dermatologic Assessment

This appendix contains results of exposure analyses of interactions between covariates and group or dioxin. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The covariate involved in the interaction and a reference to the analysis table in Chapter 14 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix J-2 Table	Chapter 14 Table	Dependent Variable	Model	Covariate
J-2-1	14-6	Acne Relative to Time of Duty in SEA (Pre- & Post-SEA vs. Pre-SEA)	1	Age, Occupation
J-2-2	14-11	Other Abnormalities	2	Presence of Pre-SEA Acne
J-2-3	14-12	Dermatology Index	1 3	Age Age

Table J-2-1.
Interaction Table for Acne Relative to Time of Duty in SEA
(Pre- and Post-SEA vs. Pre-SEA)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Age: Table 14-6)						
Stratum	**Occupational Category**	**Group**	**n**	**Percent Pre- & Post-SEA**	**Adj. Relative Risk (95% C.I.)**	**p-Value**
Born ≥ 1942	***All***	***Ranch Hand***	***56***	***92.9***	--	--
		Comparison	***84***	***97.6***		
Born < 1942	***All***	***Ranch Hand***	***37***	***100.0***	--	--
		Comparison	***48***	***95.8***		
Born ≥ 1942	Officer	Ranch Hand	14	85.7	--	--
		Comparison	20	100.0		
	Enlisted Flyer	Ranch Hand	5	60.0	--	--
		Comparison	10	100.0		
	Enlisted Groundcrew	Ranch Hand	37	100.0	--	--
		Comparison	54	96.3		
Born < 1942	Officer	Ranch Hand	18	100.0	--	--
		Comparison	32	96.9		
	Enlisted Flyer	Ranch Hand	12	100.0	--	--
		Comparison	7	100.0		
	Enlisted Groundcrew	Ranch Hand	7	100.0	--	--
		Comparison	9	88.9		

--: Relative risk, confidence interval, and p-value not presented due to sparse number of participants with pre-SEA acne only.

Table J-2-2.
Interaction Table for Other Abnormalities

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Presence of Pre-SEA Acne: Table 14-11)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
No Pre-SEA Acne	Low	159	84.9	0.83 (0.65,1.05)	0.113
	Medium	154	85.7		
	High	157	80.3		
Pre-SEA Acne	Low	15	73.3	2.61 (1.23,5.52)	0.012
	Medium	19	57.9		
	High	16	87.5		

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

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

Table J-2-3.
Interaction Table for Dermatology Index

Stratum	Occupational Category	Group	n	Percent Abnormal	Adj. Relative Risk (95% C.I.)	p-Value
a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Age: Table 14-12)						
Born ≥ 1942	***All***	***Ranch Hand***	***396***	***48.2***	***1.16 (0.89,1.51)***	***0.269***
		Comparison	***560***	***44.6***		
Born < 1942	***All***	***Ranch Hand***	***556***	***40.6***	***0.80 (0.64,1.01)***	***0.058***
		Comparison	***720***	***45.8***		
Born ≥ 1942	Officer	Ranch Hand	79	43.0	1.22 (0.81,1.83)	0.339
		Comparison	121	38.8		
	Enlisted Flyer	Ranch Hand	38	42.1	0.89 (0.53,1.47)	0.637
		Comparison	59	52.5		
	Enlisted Groundcrew	Ranch Hand	279	50.5	1.19 (0.89,1.58)	0.234
		Comparison	380	45.3		
Born < 1942	Officer	Ranch Hand	288	36.8	0.87 (0.65,1.16)	0.327
		Comparison	381	40.2		
	Enlisted Flyer	Ranch Hand	124	45.2	0.63 (0.41,0.97)	0.034
		Comparison	143	53.8		
	Enlisted Groundcrew	Ranch Hand	144	44.4	0.84 (0.59,1.21)	0.350
		Comparison	196	51.0		

Table J-2-3. (Continued)
Interaction Table for Dermatology Index

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Age: Table 14-12)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)	p-Value
Born ≥ 1942	Comparison	454	43.0		
	Background RH	128	50.0	1.60 (1.06,2.41)	0.024
	Low RH	85	50.6	1.32 (0.82,2.11)	0.258
	High RH	154	44.2	0.97 (0.66,1.41)	0.856
	Low plus High RH	239	46.4	1.08 (0.78,1.49)	0.638
Born < 1942	Comparison	608	46.2		
	Background RH	246	45.1	1.08 (0.80,1.47)	0.605
	Low RH	175	35.4	0.61 (0.43,0.87)	0.006
	High RH	106	38.7	0.59 (0.38,0.91)	0.018
	Low plus High RH	281	36.7	0.60 (0.45,0.81)	0.001

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

APPENDIX J-3.

Dermatology 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 14 tables. A summary of the tables found in this appendix follows.

Appendix J-3 Table	Chapter 14 Table	Dependent Variable
J-3-1	14-3	Occurrence of Acne
J-3-2	14-4	Acne Relative to Time of Duty in SEA (Pre- & Post-SEA and Post-SEA vs. Pre-SEA and None)
J-3-3	14-5	Acne Relative to Time of Duty in SEA (Post-SEA vs. None)
J-3-4	14-8	Location of Acne (Post-SEA)
J-3-5	14-10	Location of Acne (Pre- & Post-SEA and Post-SEA)
J-3-6	14-11	Other Abnormalities
J-3-7	14-12	Dermatology Index

Table J-3-1.
Analysis of Occurrence of Acne
Occupation 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
520	1.03 (0.84,1.26)	0.780	AGE (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) 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	894	1.03 (0.90,1.18)	0.672	AGE (p<0.001)
5	894	0.98 (0.92,1.15)	0.649	AGE (p<0.001)
6[c]	894	1.02 (0.90,1.16)	0.750	AGE (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 J-3-2.
Analysis of Acne Relative to Time of Duty in SEA
(Pre- and Post-SEA and Post-SEA vs. Pre-SEA and None)
Occupation 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
520	1.05 (0.85,1.28)	0.665	AGE ($p<0.001$) PRESEA ($p=0.019$)

[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	1,063			AGE ($p<0.001$) PRESEA ($p<0.001$)
Background RH	374	1.20 (0.83,1.73)	0.324	
Low RH	260	1.06 (0.70,1.60)	0.773	
High RH	260	1.07 (0.73,1.59)	0.721	
Low plus High RH	520	1.07 (0.78,1.46)	0.674	

[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 J-3-2. (Continued)
Analysis of Acne Relative to Time of Duty in SEA
(Pre- and Post-SEA and Post-SEA vs. Pre-SEA and None)
Occupation 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	894	1.03 (0.90,1.18)	0.638	AGE ($p<0.001$) PRESEA ($p=0.001$)
5	894	1.03 (0.92,1.16)	0.635	AGE ($p<0.001$) PRESEA ($p=0.001$)
6[c]	894	1.03 (0.91,1.16)	0.693	AGE ($p<0.001$) PRESEA ($p=0.001$)

[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 J-3-3.
Analysis of Acne Relative to Time of Duty in SEA
(Post-SEA vs. None)
Occupation 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
470	1.03 (0.84,1.27)	0.761	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.

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	807	1.04 (0.90,1.19)	0.619	AGE ($p<0.001$)
5	807	1.03 (0.92,1.16)	0.602	AGE ($p<0.001$)
6[c]	807	1.03 (0.90,1.17)	0.686	AGE ($p<0.001$)

[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 J-3-4.
Analysis of Location of Acne (Post-SEA)
Occupation Removed from Final Model

a) MODELS 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
5	692	0.97 (0.88,1.06)	0.469	AGE (p=0.001) RACE (p=0.004)
6[c]	692	0.97 (0.88,1.07)	0.513	AGE (p=0.001) RACE (p=0.005)

[a] 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 J-3-5.
Analysis of Location of Acne
(Pre- and Post-SEA and Post-SEA)
Occupation 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	775	0.99 (0.89,1.09)	0.778	AGE (p=0.001) RACE (p=0.012)
5	775	0.98 (0.90,1.06)	0.596	AGE (p=0.001) RACE (p=0.011)
6[c]	774	0.98 (0.89,1.07)	0.641	AGE (p=0.001) RACE (p=0.013)

[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 J-3-6.
Analysis of Other Abnormalities
Occupation 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
520	1.02 (0.84,1.23)**	0.840**	INIT*PRESEA (p=0.041) RACE*PRESEA (p=0.106) AGE*PRESEA (p=0.640)

[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 model after deletion of this interaction; refer to Appendix Table J-4-1 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	1,061			AGE (p<0.001) RACE (p=0.008) PRESEA (p=0.030)
Background RH	374	1.27 (0.90,1.79)	0.168	
Low RH	260	1.14 (0.77,1.68)	0.515	
High RH	260	1.11 (0.78,1.59)	0.555	
Low plus High RH	520	1.12 (0.85,1.50)	0.420	

[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 J-3-6. (Continued)
Analysis of Other Abnormalities
Occupation 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	894	0.98 (0.87,1.11)	0.750	AGE ($p<0.001$) PRESEA ($p=0.050$) RACE ($p=0.562$)
5	894	1.00 (0.90,1.11)	0.991	AGE ($p<0.001$) PRESEA ($p=0.051$) RACE ($p=0.572$)
6[c]	894	0.97 (0.86,1.09)	0.580	AGE ($p<0.001$) PRESEA ($p=0.641$) RACE ($p=0.540$)

[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 J-3-7.
Analysis of Dermatology Index
Occupation 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
520	1.04 (0.91,1.19)	0.603	RACE (p=0.028) PRESEA (p=0.060)

[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	1,062			DXCAT*AGE (p=0.009) RACE (p<0.001) PRESEA (p<0.001)
Background RH	374	1.14 (0.90,1.45)**	0.280**	
Low RH	260	0.80 (0.61,1.07)**	0.129**	
High RH	260	0.87 (0.66,1.15)**	0.338**	
Low plus High RH	520	0.84 (0.67,1.04)**	0.107**	

[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 derived from model after deletion of this interaction; refer to Appendix Table J-4-2 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 J-3-7. (Continued)
Analysis of Dermatology Index
Occupation 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	894	0.94 (0.85,1.03)	0.158	RACE (p=0.005) PRESEA (p=0.006)
5	894	0.94 (0.87,1.01)	0.102	RACE (p=0.005) PRESEA (p=0.007)
6[c]	894	0.95 (0.87,1.03)	0.221	RACE (p=0.006) PRESEA (p=0.008)

[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.

APPENDIX J-4.

Interaction Tables for the Dermatologic Assessment Occupation Removed from Final Model

This appendix contains results of exposure analyses of interactions between covariates and dioxin after occupation has been removed from those final dioxin models (Models 2 through 6) that contained occupation. These tables are supplements to tables in Appendix J-3, which are main effects results with occupation removed from the model. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The analysis model, covariate involved in the interaction, and a reference to the analysis table in Chapter 14 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix J-4 Table	Chapter 14 Table	Appendix J-3 Table	Dependent Variable	Model	Covariate
J-4-1	14-11	J-3-6	Other Abnormalities	2	Presence of Pre-SEA Acne
J-4-2	14-12	J-3-7	Dermatology Index	3	Age

Table J-4-1.
Interaction Table for Other Abnormalities
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Presence of Pre-SEA Acne: Tables 14-11 and J-3-6)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
No Pre-SEA Acne	Low	159	84.9	0.94 (0.77,1.15)	0.556
	Medium	154	85.7		
	High	157	80.3		
Pre-SEA Acne	Low	15	73.3	1.67 (0.95,2.92)	0.072
	Medium	19	57.9		
	High	16	87.5		

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

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

Table J-4-2.
Interaction Table for Dermatology Index
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 14-12 and J-3-7)					
Stratum	**Dioxin Category**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)**	**p-Value**
Born ≥ 1942	Comparison	454	43.0		
	Background RH	128	50.0	1.44 (0.97,2.16)	0.073
	Low RH	85	50.6	1.31 (0.82,2.10)	0.260
	High RH	154	44.2	1.05 (0.72,1.52)	0.817
	Low plus High RH	239	46.4	1.13 (0.82,1.56)	0.442
Born < 1942	Comparison	608	46.2		
	Background RH	246	45.1	1.00 (0.74,1.35)	0.999
	Low RH	175	35.4	0.62 (0.43,0.87)	0.007
	High RH	106	38.7	0.70 (0.45,1.07)	0.098
	Low plus High RH	281	36.7	0.65 (0.48,0.87)	0.003

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.

APPENDIX K-1.

Dependent Variable-Covariate Associations for the Cardiovascular Assessment

Appendix K-1-1 contains results of tests of associations between each dependent variable and candidate covariates for the adjusted analysis of each dependent variable. Pearson's chi-square test (continuity-adjusted for 2×2 tables) is used for significance testing of the associations between each discrete dependent variable and the candidate covariate. When a candidate covariate is continuous in nature (e.g., age), the covariate is discretized prior to the analysis of the discrete dependent variable. Pearson's correlation coefficient is used for significance testing of the associations between each continuous dependent variable and a continuous candidate covariate. When a candidate covariate is discrete in nature and the dependent variable is continuous, means (transformed back to the original scale, if necessary) are presented and an analysis of variance is used to investigate the difference between the means.

Associations Between the Cardiovascular Physical Examination Findings and Verified Essential Hypertension, Verified Heart Disease, and Verified Myocardial Infarction

Appendix Table K-1-2 contains the results of associations between the central and peripheral physical examination findings and the verified cardiovascular disease endpoints. Pearson's continuity-adjusted chi-square test is used for significance testing of the associations between each discrete variable and the verified cardiovascular history endpoints. When a physical examination endpoint is continuous in nature (e.g., systolic blood pressure), the means are presented and an analysis of variance is used to investigate the difference between the means.

Table K-1-1.
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Age			Race		
		Born ≥1942	Born <1942	p-Value	Black	Non-Black	p-Value
Essential Hypertension	Yes	(n=942) 30.1%	(n=1,236) 44.7%	<0.001	(n=125) 44.0%	(n=2,053) 38.1%	0.221
Heart Disease (Excluding Essential Hypertension)	Yes	(n=948) 39.7%	(n=1,254) 55.5%	<0.001	(n=126) 49.2%	(n=2,076) 48.8%	0.999
Myocardial Infarction	Yes	(n=948) 2.5%	(n=1,254) 10.0%	<0.001	(n=126) 3.2%	(n=2,076) 7.0%	0.137
Systolic Blood Pressure (continuous)		(n=948) r=0.215	(n=1,253)	<0.001	(n=126) $\bar{x}$=123.93	(n=2,075) $\bar{x}$=121.84	0.217
(discrete)	Abnormal	9.8%	19.7%	<0.001	15.9%	15.4%	0.993
Heart Sounds	Abnormal	(n=945) 20.0%	(n=1,250) 20.6%	0.788	(n=126) 26.2%	(n=2,069) 20.0%	0.116
Overall Electro-cardiograph (ECG)	Abnormal	(n=947) 12.5%	(n=1,253) 29.7%	<0.001	(n=126) 28.6%	(n=2,074) 21.9%	0.101
ECG: Right Bundle Branch Block (RBBB)	Abnormal	(n=948) 0.7%	(n=1,252) 1.9%	0.032	(n=126) 3.2%	(n=2,074) 1.3%	0.179
ECG: Left Bundle Branch Block (LBBB)	Abnormal	(n=948) 0.3%	(n=1,252) 0.6%	0.449	(n=126) 0.0%	(n=2,074) 0.5%	0.866
ECG: Non-specific ST-and T-Wave Changes	Abnormal	(n=948) 7.7%	(n=1,252) 19.4%	<0.001	(n=126) 23.8%	(n=2,074) 13.8%	0.003
ECG: Bradycardia	Abnormal	(n=948) 3.0%	(n=1,254) 2.5%	0.576	(n=126) 2.4%	(n=2,076) 2.7%	0.999
ECG: Tachycardia	Abnormal	(n=948) 0.2%	(n=1,254) 0.2%	0.999	(n=126) 0.0%	(n=2,076) 0.2%	0.999
ECG: Arrhythmia	Abnormal	(n=948) 2.4%	(n=1,253) 6.2%	<0.001	(n=126) 3.2%	(n=2,075) 4.7%	.0.574
ECG: Evidence of Prior Myocardial Infarction	Abnormal	(n=946) 1.2%	(n=1,250) 5.1%	<0.001	(n=126) 0.8%	(n=2,070) 3.6%	0.157
ECG: Other Diagnoses	Abnormal	(n=948) 0.5%	(n=1,254) 0.8%	0.616	(n=126) 0.8%	(n=2,076) 0.7%	0.999

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Occupation			p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew	
Essential Hypertension	Yes	(n=843) 38.8%	(n=358) 41.3%	(n=977) 37.1%	0.348
Heart Disease (Excluding Essential Hypertension)	Yes	(n=853) 54.2%	(n=362) 49.7%	(n=987) 44.0%	<0.001
Myocardial Infarction	Yes	(n=853) 6.3%	(n=362) 9.1%	(n=987) 6.4%	0.163
Systolic Blood Pressure		(n=853)	(n=361)	(n=987)	
(continuous)		$\bar{x}$=123.46	$\bar{x}$=122.00	$\bar{x}$=120.65	0.005
(discrete)	Abnormal	17.5%	15.8%	13.6%	0.069
Heart Sounds	Abnormal	(n=852) 22.7%	(n=360) 18.1%	(n=983) 19.1%	0.088
Overall Electro-cardiograph (ECG)	Abnormal	(n=852) 24.9%	(n=362) 25.7%	(n=986) 18.8%	0.002
ECG: Right Bundle Branch Block (RBBB)	Abnormal	(n=852) 1.1%	(n=361) 1.9%	(n=987) 1.5%	0.454
ECG: Left Bundle Branch Block (LBBB)	Abnormal	(n=852) 0.9%	(n=361) 0.3%	(n=987) 0.2%	0.067
ECG: Non-specific ST-and T-Wave Changes	Abnormal	(n=852) 14.8%	(n=361) 19.1%	(n=987) 12.3%	0.006
ECG: Bradycardia	Abnormal	(n=853) 3.6%	(n=362) 2.2%	(n=987) 2.0%	0.086
ECG: Tachycardia	Abnormal	(n=853) 0.2%	(n=362) 0.0%	(n=987) 0.3%	0.582
ECG: Arrhythmia	Abnormal	(n=852) 5.2%	(n=362) 5.0%	(n=987) 4.0%	0.431
ECG: Evidence of Prior Myocardial Infarction	Abnormal	(n=849) 4.0%	(n=362) 4.1%	(n=985) 2.6%	0.195
ECG: Other Diagnoses	Abnormal	(n=853) 0.6%	(n=362) 0.8%	(n=987) 0.7%	0.886

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Lifetime Cigarette Smoking History (pack-years) 0	>0-10	>10	p-Value
Essential Hypertension	Yes	(n=600) 38.5%	(n=665) 35.2%	(n=910) 40.9%	0.072
Heart Disease (Excluding Essential Hypertension)	Yes	(n=604) 47.4%	(n=671) 46.3%	(n=924) 51.7%	0.071
Myocardial Infarction	Yes	(n=604) 3.3%	(n=671) 6.1%	(n=924) 9.6%	<0.001
Systolic Blood Pressure (continuous)		(n=604)	(n=671) r=0.001	(n=923)	0.999
(discrete)	Abnormal	16.9%	13.9%	15.7%	0.317
Heart Sounds	Abnormal	(n=604) 25.3%	(n=668) 19.2%	(n=920) 17.8%	0.001
Overall Electrocardiograph (ECG)	Abnormal	(n=603) 21.2%	(n=671) 18.0%	(n=923) 26.0%	0.001
ECG: Right Bundle Branch Block (RBBB)	Abnormal	(n=603) 1.2%	(n=671) 1.0%	(n=923) 1.8%	0.340
ECG: Left Bundle Branch Block (LBBB)	Abnormal	(n=603) 0.7%	(n=671) 0.6%	(n=923) 0.3%	0.602
ECG: Non-specific ST- and T-Wave Changes	Abnormal	(n=603) 13.3%	(n=671) 10.6%	(n=923) 17.9%	<0.001
ECG: Bradycardia	Abnormal	(n=604) 3.0%	(n=671) 2.8%	(n=924) 2.4%	0.747
ECG: Tachycardia	Abnormal	(n=604) 0.2%	(n=671) 0.3%	(n=924) 0.2%	0.881
ECG: Arrhythmia	Abnormal	(n=603) 4.6%	(n=671) 4.2%	(n=924) 4.9%	0.804
ECG: Evidence of Prior Myocardial Infarction	Abnormal	(n=601) 1.7%	(n=671) 2.7%	(n=921) 5.1%	0.001
ECG: Other Diagnoses	Abnormal	(n=604) 0.8%	(n=671) 0.0%	(n=924) 1.1%	0.030

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Current Cigarette Smoking (cigarettes/day) 0-Never Smoked	0-Former Smoker	>0-20	>20	p-Value
Essential Hypertension	Yes	--	--	--	--	--
Heart Disease (Excluding Essential Hypertension)	Yes	--	--	--	--	--
Myocardial Infarction	Yes	--	--	--	--	--
Systolic Blood Pressure (continuous)		(n=604)	(n=1,042)	(n=342)	(n=211)	
			r=-0.122			<0.001
(discrete)	Abnormal	16.9%	17.2%	11.4%	9.5%	0.004
Heart Sounds		(n=604)	(n=1,038)	(n=340)	(n=211)	
	Abnormal	25.3%	19.7%	17.4%	13.3%	<0.001
Overall Electro-cardiograph (ECG)	Abnormal	(n=603) 21.2%	(n=1,042) 23.1%	(n=342) 22.2%	(n=211) 20.9%	0.785
ECG: Right Bundle Branch Block (RBBB)	Abnormal	(n=603) 1.2%	(n=1,043) 1.7%	(n=341) 0.9%	(n=211) 1.4%	0.635
ECG: Left Bundle Branch Block (LBBB)	Abnormal	(n=603) 0.7%	(n=1,043) 0.7%	(n=341) 0.0%	(n=211) 0.0%	0.295
ECG: Non-specific ST-and T-Wave Changes	Abnormal	(n=603) 13.3%	(n=1,043) 15.6%	(n=341) 13.5%	(n=211) 12.8%	0.462
ECG: Bradycardia	Abnormal	(n=604) 3.0%	(n=1,043) 2.5%	(n=342) 3.2%	(n=211) 1.9%	0.748
ECG: Tachycardia	Abnormal	(n=604) 0.2%	(n=1,043) 0.3%	(n=342) 0.0%	(n=211) 0.5%	0.656
ECG: Arrhythmia	Abnormal	(n=603) 4.6%	(n=1,043) 4.4%	(n=342) 4.4%	(n=211) 5.7%	0.875
ECG: Evidence of Prior Myocardial Infarction	Abnormal	(n=601) 1.7%	(n=1,040) 3.7%	(n=342) 5.3%	(n=211) 4.3%	0.021
ECG: Other Diagnoses	Abnormal	(n=604) 0.8%	(n=1,043) 0.4%	(n=342) 1.5%	(n=211) 0.5%	0.189

--: Covariate not applicable for dependent variable.

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Lifetime Alcohol History (drink-years) 0	>0-40	>40	p-Value
Essential Hypertension	Yes	(n=134) 38.8%	(n=1,458) 34.5%	(n=544) 48.5%	<0.001
Heart Disease (Excluding Essential Hypertension)	Yes	(n=134) 47.0%	(n=1,473) 48.3%	(n=553) 50.3%	0.679
Myocardial Infarction	Yes	(n=134) 10.4%	(n=1,473) 6.1%	(n=553) 7.8%	0.093
Systolic Blood Pressure (continuous)		(n=134)	(n=1,472) r=0.048	(n=553)	0.027
(discrete)	Abnormal	17.2%	15.3%	15.6%	0.846
Heart Sounds	Abnormal	(n=134) 16.4%	(n=1,468) 20.5%	(n=552) 20.1%	0.529
Overall Electrocardiograph (ECG)	Abnormal	(n=134) 23.9%	(n=1,471) 21.7%	(n=553) 23.1%	0.694
ECG: Right Bundle Branch Block (RBBB)	Abnormal	(n=134) 0.7%	(n=1,471) 1.4%	(n=553) 1.6%	0.725
ECG: Left Bundle Branch Block (LBBB)	Abnormal	(n=134) 0.0%	(n=1,471) 0.7%	(n=553) 0.2%	0.259
ECG: Non-specific ST- and T-Wave Changes	Abnormal	(n=134) 16.4%	(n=1,471) 13.9%	(n=553) 15.0%	0.625
ECG: Bradycardia	Abnormal	(n=134) 2.2%	(n=1,473) 2.9%	(n=553) 2.2%	0.615
ECG: Tachycardia	Abnormal	(n=134) 0.7%	(n=1,473) 0.2%	(n=553) 0.2%	0.439
ECG: Arrhythmia	Abnormal	(n=134) 6.7%	(n=1,472) 4.6%	(n=553) 4.2%	0.444
ECG: Evidence of Prior Myocardial Infarction	Abnormal	(n=134) 4.5%	(n=1,470) 3.4%	(n=551) 3.3%	0.782
ECG: Other Diagnoses	Abnormal	(n=134) 1.5%	(n=1,473) 0.7%	(n=553) 0.5%	0.490

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Cholesterol (mg/dl) 0-200	>200-239	>239	p-Value
Essential Hypertension	Yes	(n=710) 34.8%	(n=868) 38.0%	(n=599) 43.4%	0.006
Heart Disease (Excluding Essential Hypertension)	Yes	(n=715) 50.2%	(n=880) 50.5%	(n=606) 45.1%	0.085
Myocardial Infarction	Yes	(n=715) 6.7%	(n=880) 7.0%	(n=606) 6.6%	0.937
Systolic Blood Pressure (continuous)		(n=715)	(n=879) r=0.076	(n=606)	<0.001
(discrete)	Abnormal	14.4%	14.4%	18.2%	0.097
Heart Sounds	Abnormal	(n=714) 21.7%	(n=875) 20.1%	(n=605) 19.0%	0.469
Overall Electrocardiograph (ECG)	Abnormal	(n=715) 21.7%	(n=880) 22.7%	(n=604) 22.4%	0.881
ECG: Right Bundle Branch Block (RBBB)	Abnormal	(n=715) 1.5%	(n=879) 1.1%	(n=605) 1.7%	0.667
ECG: Left Bundle Branch Block (LBBB)	Abnormal	(n=715) 0.4%	(n=879) 0.6%	(n=605) 0.5%	0.915
ECG: Non-specific ST-and T-Wave Changes	Abnormal	(n=715) 12.7%	(n=879) 15.0%	(n=605) 15.4%	0.307
ECG: Bradycardia	Abnormal	(n=715) 3.5%	(n=880) 2.7%	(n=606) 1.7%	0.117
ECG: Tachycardia	Abnormal	(n=715) 0.1%	(n=880) 0.3%	(n=606) 0.2%	0.655
ECG: Arrhythmia	Abnormal	(n=715) 4.9%	(n=880) 4.7%	(n=605) 4.1%	0.798
ECG: Evidence of Prior Myocardial Infarction	Abnormal	(n=714) 3.4%	(n=879) 3.4%	(n=602) 3.5%	0.992
ECG: Other Diagnoses	Abnormal	(n=715) 0.6%	(n=880) 0.7%	(n=606) 0.8%	0.843

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	HDL (mg/dl) Normal: >35	HDL (mg/dl) Low: 0-35	HDL (mg/dl) p-Value	Body Fat Obese: >25%	Body Fat Lean or Normal: ≤25%	Body Fat p-Value
Essential Hypertension	Yes	(n=1,598) 36.5%	(n=555) 43.1%	0.006	(n=549) 57.0%	(n=1,629) 32.2%	<0.001
Heart Disease (Excluding Essential Hypertension)	Yes	(n=1,615) 48.9%	(n=561) 49.0%	0.985	(n=561) 50.1%	(n=1,641) 48.4%	0.533
Myocardial Infarction	Yes	(n=1,615) 5.5%	(n=561) 10.5%	<0.001	(n=561) 8.0%	(n=1,641) 6.4%	0.222
Systolic Blood Pressure (continuous)		(n=1,614) r=-0.016	(n=561)	0.443	(n=561) r=0.273	(n=1,640)	<0.001
(discrete)	Abnormal	15.6%	14.4%	0.550	24.4%	12.4%	<0.001
Heart Sounds	Abnormal	(n=1,609) 20.1%	(n=560) 20.9%	0.724	(n=560) 24.6%	(n=1,635) 18.8%	0.004
Overall Electro-cardiograph (ECG)	Abnormal	(n=1,613) 21.5%	(n=561) 24.4%	0.172	(n=561) 25.0%	(n=1,639) 21.4%	0.087
ECG: Right Bundle Branch Block (RBBB)	Abnormal	(n=1,613) 1.4%	(n=561) 1.6%	0.836	(n=561) 1.4%	(n=1,639) 1.4%	0.999
ECG: Left Bundle Branch Block (LBBB)	Abnormal	(n=1,613) 0.7%	(n=561) 0.0%	0.106	(n=561) 0.7%	(n=1,639) 0.4%	0.630
ECG: Non-specific ST-and T-Wave Changes	Abnormal	(n=1,613) 13.6%	(n=561) 16.4%	0.115	(n=561) 18.4%	(n=1,639) 13.0%	0.002
ECG: Bradycardia	Abnormal	(n=1,615) 3.0%	(n=561) 1.8%	0.155	(n=561) 0.7%	(n=1,641) 3.4%	0.001
ECG: Tachycardia	Abnormal	(n=1,615) 0.2%	(n=561) 0.4%	0.829	(n=561) 0.2%	(n=1,641) 0.2%	0.999
ECG: Arrhythmia	Abnormal	(n=1,614) 4.2%	(n=561) 5.7%	0.161	(n=561) 4.1%	(n=1,640) 4.8%	0.600
ECG: Evidence of Prior Myocardial Infarction	Abnormal	(n=1,611) 2.5%	(n=559) 5.9%	<0.001	(n=559) 3.6%	(n=1,637) 3.4%	0.912
ECG: Other Diagnoses	Abnormal	(n=1,615) 0.6%	(n=561) 1.1%	0.333	(n=561) 0.2%	(n=1,641) 0.9%	0.167

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Diabetic Class			
		Normal	Impaired	Diabetic	p-Value
Essential Hypertension	Yes	(n=1,622) 32.2%	(n=242) 54.1%	(n=311) 58.8%	<0.001
Heart Disease (Excluding Essential Hypertension)	Yes	(n=1,632) 47.5%	(n=247) 53.0%	(n=320) 52.8%	0.084
Myocardial Infarction	Yes	(n=1,632) 5.3%	(n=247) 10.5%	(n=320) 11.9%	<0.001
Systolic Blood Pressure (continuous)		(n=1,631) $\bar{x}$=119.49	(n=247) $\bar{x}$=126.39	(n=320) $\bar{x}$=131.11	<0.001
(discrete)	Abnormal	11.8%	22.7%	28.4%	<0.001
Heart Sounds	Abnormal	(n=1,627) 19.7%	(n=246) 18.3%	(n=319) 24.5%	0.114
Overall Electrocardiograph (ECG)	Abnormal	(n=1,631) 19.1%	(n=247) 26.7%	(n=319) 35.1%	<0.001
ECG: Right Bundle Branch Block (RBBB)	Abnormal	(n=1,631) 1.1%	(n=247) 1.2%	(n=319) 3.1%	0.018
ECG: Left Bundle Branch Block (LBBB)	Abnormal	(n=1,631) 0.5%	(n=247) 0.4%	(n=319) 0.6%	0.927
ECG: Non-specific ST-and T-Wave Changes	Abnormal	(n=1,631) 12.0%	(n=247) 16.6%	(n=319) 24.5%	<0.001
ECG: Bradycardia	Abnormal	(n=1,632) 3.2%	(n=247) 1.2%	(n=320) 0.9%	0.021
ECG: Tachycardia	Abnormal	(n=1,632) 0.2%	(n=247) 0.4%	(n=320) 0.0%	0.578
ECG: Arrhythmia	Abnormal	(n=1,631) 3.7%	(n=247) 6.9%	(n=320) 7.2%	0.005
ECG: Evidence of Prior Myocardial Infarction	Abnormal	(n=1,628) 2.6%	(n=247) 4.5%	(n=318) 6.6%	0.001
ECG: Other Diagnoses	Abnormal	(n=1,632) 0.7%	(n=247) 0.4%	(n=320) 0.9%	0.745

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Personality Type			Family History of Heart Disease		
		A	B	p-Value	No	Yes	p-Value
Essential Hypertension	Yes	(n=932) 36.6%	(n=1,244) 39.8%	0.140	(n=918) 31.9%	(n=1,234) 43.4%	<0.001
Heart Disease (Excluding Essential Hypertension)	Yes	(n=942) 50.5%	(n=1,258) 47.6%	0.190	(n=926) 44.1%	(n=1,250) 52.6%	<0.001
Myocardial Infarction	Yes	(n=942) 6.6%	(n=1,258) 7.0%	0.768	(n=926) 4.4%	(n=1,250) 8.6%	<0.001
Systolic Blood Pressure (continuous)		(n=941) $\bar{x}$=121.21	(n=1,258) $\bar{x}$=122.53	0.097	(n=926) $\bar{x}$=120.94	(n=1,249) $\bar{x}$=122.61	0.037
(discrete)	Abnormal	13.5%	16.9%	0.032	14.9%	15.9%	0.585
Heart Sounds	Abnormal	(n=938) 21.0%	(n=1,255) 19.8%	0.508	(n=922) 20.0%	(n=1,247) 20.7%	0.715
Overall Electro-cardiograph (ECG)	Abnormal	(n=940) 21.9%	(n=1,258) 22.6%	0.752	(n=925) 20.4%	(n=1,249) 23.5%	0.104
ECG: Right Bundle Branch Block (RBBB)	Abnormal	(n=941) 1.4%	(n=1,257) 1.4%	0.999	(n=926) 1.4%	(n=1,248) 1.4%	0.999
ECG: Left Bundle Branch Block (LBBB)	Abnormal	(n=941) 0.4%	(n=1,257) 0.6%	0.898	(n=926) 0.5%	(n=1,248) 0.5%	0.999
ECG: Non-specific ST-and T-Wave Changes	Abnormal	(n=941) 13.7%	(n=1,257) 14.9%	0.477	(n=926) 13.9%	(n=1,248) 14.7%	0.675
ECG: Bradycardia	Abnormal	(n=942) 3.1%	(n=1,258) 2.4%	0.388	(n=926) 2.4%	(n=1,250) 3.0%	0.486
ECG: Tachycardia	Abnormal	(n=942) 0.1%	(n=1,258) 0.3%	0.562	(n=926) 0.1%	(n=1,250) 0.3%	0.570
ECG: Arrhythmia	Abnormal	(n=941) 4.9%	(n=1,258) 4.4%	0.639	(n=926) 4.2%	(n=1,249) 4.9%	0.524
ECG: Evidence of Prior Myocardial Infarction	Abnormal	(n=938) 2.5%	(n=1,256) 4.1%	0.042	(n=923) 2.5%	(n=1,247) 4.1%	0.056
ECG: Other Diagnoses	Abnormal	(n=942) 0.5%	(n=1,258) 0.8%	0.629	(n=926) 0.5%	(n=1,250) 0.8%	0.643

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Age			Race		
		Born ≥1942	Born <1942	p-Value	Black	Non-Black	p-Value
Diastolic Blood Pressure (continuous)		(n=948) r=0.025	(n=1,253)	0.239	(n=126) $\bar{x}$=73.94	(n=2,075) $\bar{x}$=72.20	0.051
(discrete)	Abnormal	3.7%	2.6%	0.157	4.0%	3.0%	0.723
Funduscopic Examination	Abnormal	(n=945) 4.1%	(n=1,245) 7.9%	<0.001	(n=126) 7.9%	(n=2,064) 6.2%	0.540
Carotid Bruits	Abnormal	(n=948) 0.4%	(n=1,253) 2.3%	0.001	(n=126) 0.0%	(n=2,075) 1.6%	0.294
Radial Pulses	Abnormal	(n=948) 0.2%	(n=1,254) 0.6%	0.354	(n=126) 0.8%	(n=2,076) 0.4%	0.999
Femoral Pulses	Abnormal	(n=948) 0.2%	(n=1,254) 1.3%	0.012	(n=126) 0.8%	(n=2,076) 0.8%	0.999
Popliteal Pulses	Abnormal	(n=948) 0.3%	(n=1,252) 2.2%	<0.001	(n=126) 1.6%	(n=2,074) 1.4%	0.999
Dorsalis Pedis Pulses	Abnormal	(n=946) 5.3%	(n=1,252) 9.5%	<0.001	(n=126) 7.1%	(n=2,072) 7.7%	0.948
Posterior Tibial Pulses	Abnormal	(n=948) 1.1%	(n=1,252) 4.4%	<0.001	(n=126) 4.8%	(n=2,074) 2.8%	0.336
Leg Pulses	Abnormal	(n=946) 5.8%	(n=1,253) 10.5%	<0.001	(n=126) 9.5%	(n=2,073) 8.4%	0.796
Peripheral Pulses	Abnormal	(n=946) 5.9%	(n=1,253) 10.9%	<0.001	(n=126) 10.3%	(n=2,073) 8.7%	0.640
Kidney, Urethra, and Bladder (KUB) X Ray Excluding Kidney Stones	Abnormal	(n=946) 19.6%	(n=1,253) 39.4%	<0.001	(n=126) 24.6%	(n=2,073) 31.2%	0.144
Intermittent Claudication and Vascular Insufficiency (ICVI) Index	Abnormal	(n=945) 1.1%	(n=1,254) 4.1%	<0.001	(n=126) 4.0%	(n=2,073) 2.7%	0.599

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Occupation			p-Value
		Officer	Enlisted Flyer	Enlisted Groundcrew	
Diastolic Blood Pressure		(n=852)	(n=362)	(n=987)	
(continuous)		$\bar{x}$=72.31	$\bar{x}$=72.68	$\bar{x}$=72.16	0.680
(discrete)	Abnormal	3.1%	3.0%	3.0%	0.999
Funduscopic Examination	Abnormal	(n=848) 5.1%	(n=359) 8.1%	(n=983) 6.6%	0.118
Carotid Bruits	Abnormal	(n=853) 1.6%	(n=362) 1.7%	(n=986) 1.3%	0.820
Radial Pulses	Abnormal	(n=853) 0.4%	(n=362) 0.0%	(n=987) 0.6%	0.284
Femoral Pulses	Abnormal	(n=853) 0.7%	(n=362) 1.4%	(n=987) 0.7%	0.428
Popliteal Pulses	Abnormal	(n=852) 1.3%	(n=361) 1.9%	(n=987) 1.2%	0.582
Dorsalis Pedis Pulses	Abnormal	(n=851) 7.3%	(n=361) 8.9%	(n=986) 7.6%	0.635
Posterior Tibial Pulses	Abnormal	(n=852) 2.7%	(n=361) 3.9%	(n=987) 2.8%	0.518
Leg Pulses	Abnormal	(n=851) 7.5%	(n=362) 9.9%	(n=986) 8.8%	0.341
Peripheral Pulses	Abnormal	(n=851) 7.8%	(n=362) 9.9%	(n=986) 9.2%	0.372
Kidney, Urethra, and Bladder (KUB) X Ray Excluding Kidney Stones	Abnormal	(n=853) 32.4%	(n=361) 33.2%	(n=985) 28.6%	0.125
Intermittent Claudication and Vascular Insufficiency (ICVI) Index	Abnormal	(n=852) 2.8%	(n=362) 3.6%	(n=985) 2.5%	0.585

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Lifetime Cigarette Smoking History (pack-years) 0	>0-10	>10	p-Value
Diastolic Blood Pressure		(n=604)	(n=671)	(n=923)	
(continuous)			r=-0.077		<0.001
(discrete)	Abnormal	3.8%	4.0%	1.8%	0.019
Funduscopic		(n=599)	(n=668)	(n=920)	
Examination	Abnormal	3.8%	6.0%	7.9%	0.005
Carotid Bruits		(n=604)	(n=671)	(n=923)	
	Abnormal	0.7%	1.6%	2.0%	0.121
Radial Pulses		(n=604)	(n=671)	(n=924)	
	Abnormal	0.3%	0.1%	0.6%	0.285
Femoral Pulses		(n=604)	(n=671)	(n=924)	
	Abnormal	0.0%	1.0%	1.2%	0.031
Popliteal Pulses		(n=604)	(n=669)	(n=924)	
	Abnormal	0.0%	1.3%	2.3%	0.001
Dorsalis Pedis Pulses		(n=604)	(n=667)	(n=924)	
	Abnormal	4.6%	5.8%	10.9%	<0.001
Posterior Tibial		(n=604)	(n=669)	(n=924)	
Pulses	Abnormal	0.7%	1.9%	5.2%	<0.001
Leg Pulses		(n=604)	(n=668)	(n=924)	
	Abnormal	4.8%	6.6%	12.2%	<0.001
Peripheral		(n=604)	(n=668)	(n=924)	
Pulses	Abnormal	5.1%	6.7%	12.6%	<0.001
Kidney, Urethra, and		(n=602)	(n=671)	(n=923)	
Bladder (KUB) X Ray Excluding Kidney Stones	Abnormal	28.4%	28.2%	34.3%	0.010
Intermittent		(n=603)	(n=671)	(n=924)	
Claudication and Vascular Insufficiency (ICVI) Index	Abnormal	1.3%	1.9%	4.4%	<0.001

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Current Cigarette Smoking (cigarettes/day) 0-Never Smoked	0-Former Smoker	>0-20	>20	p-Value
Diastolic Blood Pressure (continuous)		(n=604)	(n=1,043) r=-0.113	(n=342)	(n=210)	<0.001
(discrete)	Abnormal	3.8%	2.9%	2.6%	2.4%	0.615
Funduscopic Examination	Abnormal	(n=599) 3.8%	(n=1,038) 6.6%	(n=342) 6.1%	(n=209) 11.5%	0.001
Carotid Bruits	Abnormal	(n=604) 0.7%	(n=1,042) 2.1%	(n=342) 1.5%	(n=211) 0.9%	0.115
Radial Pulses	Abnormal	(n=604) 0.3%	(n=1,043) 0.4%	(n=342) 0.3%	(n=211) 0.9%	0.631
Femoral Pulses	Abnormal	(n=604) 0.0%	(n=1,043) 0.6%	(n=342) 2.0%	(n=211) 2.4%	<0.001
Popliteal Pulses	Abnormal	(n=604) 0.0%	(n=1,041) 0.8%	(n=342) 3.5%	(n=211) 4.7%	<0.001
Dorsalis Pedis Pulses	Abnormal	(n=604) 4.6%	(n=1,040) 7.3%	(n=342) 11.4%	(n=210) 11.9%	<0.001
Posterior Tibial Pulses	Abnormal	(n=604) 0.7%	(n=1,041) 2.5%	(n=342) 5.3%	(n=211) 8.1%	<0.001
Leg Pulses	Abnormal	(n=604) 4.8%	(n=1,041) 8.3%	(n=342) 12.6%	(n=210) 13.3%	<0.001
Peripheral Pulses	Abnormal	(n=604) 5.1%	(n=1,041) 8.5%	(n=342) 12.9%	(n=210) 13.3%	<0.001
Kidney, Urethra, and Bladder (KUB) X Ray Excluding Kidney Stones	Abnormal	(n=602) 28.4%	(n=1,042) 31.6%	(n=342) 33.6%	(n=211) 29.9%	0.351
Intermittent Claudication and Vascular Insufficiency (ICVI) Index	Abnormal	(n=603) 1.3%	(n=1,043) 2.5%	(n=342) 4.4%	(n=211) 6.2%	0.001

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Lifetime Alcohol History (drink-years) 0	>0-40	>40	p-Value
Diastolic Blood Pressure		(n=134)	(n=1,473)	(n=552)	
(continuous)			r=0.019		0.382
(discrete)	Abnormal	3.7%	3.2%	2.7%	0.784
Funduscopic Examination	Abnormal	(n=132) 9.8%	(n=1,466) 5.2%	(n=550) 8.4%	0.007
Carotid Bruits	Abnormal	(n=134) 0.0%	(n=1,472) 1.4%	(n=553) 2.0%	0.221
Radial Pulses	Abnormal	(n=134) 0.0%	(n=1,473) 0.4%	(n=553) 0.4%	0.758
Femoral Pulses	Abnormal	(n=134) 0.0%	(n=1,473) 0.5%	(n=553) 1.6%	0.027
Popliteal Pulses	Abnormal	(n=134) 1.5%	(n=1,471) 1.2%	(n=553) 1.8%	0.518
Dorsalis Pedis Pulses	Abnormal	(n=134) 6.7%	(n=1,469) 7.0%	(n=553) 9.8%	0.106
Posterior Tibial Pulses	Abnormal	(n=134) 2.2%	(n=1,471) 2.2%	(n=553) 4.9%	0.006
Leg Pulses	Abnormal	(n=134) 6.7%	(n=1,470) 7.6%	(n=553) 11.2%	0.027
Peripheral Pulses	Abnormal	(n=134) 6.7%	(n=1,470) 8.0%	(n=553) 11.2%	0.054
Kidney, Urethra, and Bladder (KUB) X Ray Excluding Kidney Stones	Abnormal	(n=134) 31.3%	(n=1,470) 28.9%	(n=553) 36.3%	0.006
Intermittent Claudication and Vascular Insufficiency (ICVI) Index	Abnormal	(n=134) 3.0%	(n=1,472) 2.2%	(n=553) 4.3%	0.040

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Cholesterol (mg/dl) 0-200	>200-239	>239	p-Value
Diastolic Blood Pressure		(n=714)	(n=880)	(n=606)	
(continuous)			r=0.090		<0.001
(discrete)	Abnormal	2.2%	3.0%	4.1%	0.136
Funduscopic Examination	Abnormal	(n=713) 5.2%	(n=876) 6.2%	(n=600) 7.7%	0.180
Carotid Bruits	Abnormal	(n=714) 1.7%	(n=880) 1.5%	(n=606) 1.3%	0.864
Radial Pulses	Abnormal	(n=715) 0.4%	(n=880) 0.3%	(n=606) 0.5%	0.899
Femoral Pulses	Abnormal	(n=715) 0.4%	(n=880) 1.0%	(n=606) 1.0%	0.354
Popliteal Pulses	Abnormal	(n=715) 0.8%	(n=878) 1.4%	(n=606) 2.0%	0.205
Dorsalis Pedis Pulses	Abnormal	(n=714) 7.4%	(n=878) 7.4%	(n=605) 8.4%	0.726
Posterior Tibial Pulses	Abnormal	(n=715) 2.8%	(n=878) 2.5%	(n=606) 3.8%	0.338
Leg Pulses	Abnormal	(n=714) 8.5%	(n=879) 8.2%	(n=605) 8.9%	0.882
Peripheral Pulses	Abnormal	(n=714) 8.8%	(n=879) 8.3%	(n=605) 9.4%	0.756
Kidney, Urethra, and Bladder (KUB) X Ray Excluding Kidney Stones	Abnormal	(n=713) 33.1%	(n=879) 28.3%	(n=606) 31.8%	0.100
Intermittent Claudication and Vascular Insufficiency (ICVI) Index	Abnormal	(n=712) 1.1%	(n=880) 3.2%	(n=606) 4.3%	0.002

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	HDL (mg/dl) Normal: >35	HDL (mg/dl) Low: 0-35	p-Value	Body Fat Obese: >25%	Body Fat Lean or Normal: ≤25%	p-Value
Diastolic Blood Pressure (continuous)		(n=1,614) r=-0.040	(n=561)	0.061	(n=561) r=0.218	(n=1,640)	<0.001
(discrete)	Abnormal	3.0%	3.0%	0.999	5.2%	2.3%	0.001
Funduscopic Examination	Abnormal	(n=1,606) 5.9%	(n=558) 7.5%	0.193	(n=556) 7.0%	(n=1,634) 6.0%	0.451
Carotid Bruits	Abnormal	(n=1,615) 1.7%	(n=560) 1.1%	0.423	(n=561) 1.8%	(n=1,640) 1.4%	0.661
Radial Pulses	Abnormal	(n=1,615) 0.4%	(n=561) 0.4%	0.999	(n=561) 0.5%	(n=1,641) 0.4%	0.874
Femoral Pulses	Abnormal	(n=1,615) 0.6%	(n=561) 1.4%	0.122	(n=561) 0.9%	(n=1,641) 0.8%	0.999
Popliteal Pulses	Abnormal	(n=1,614) 1.0%	(n=560) 2.3%	0.032	(n=561) 1.4%	(n=1,639) 1.3%	0.999
Dorsalis Pedis Pulses	Abnormal	(n=1,613) 7.6%	(n=559) 8.1%	0.817	(n=561) 6.6%	(n=1,637) 8.1%	0.301
Posterior Tibial Pulses	Abnormal	(n=1,614) 2.5%	(n=560) 4.1%	0.081	(n=561) 2.0%	(n=1,639) 3.3%	0.143
Leg Pulses	Abnormal	(n=1,613) 8.4%	(n=560) 8.9%	0.784	(n=561) 7.1%	(n=1,638) 9.0%	0.206
Peripheral Pulses	Abnormal	(n=1,613) 8.8%	(n=560) 8.9%	0.997	(n=561) 7.3%	(n=1,638) 9.3%	0.181
Kidney, Urethra, and Bladder (KUB) X Ray Excluding Kidney Stones	Abnormal	(n=1,613) 30.6%	(n=560) 31.6%	0.704	(n=560) 32.9%	(n=1,639) 30.1%	0.251
Intermittent Claudication and Vascular Insufficiency (ICVI) Index	Abnormal	(n=1,612) 2.4%	(n=561) 3.9%	0.088	(n=561) 3.4%	(n=1,638) 2.6%	0.428

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Diabetic Class			p-Value
		Normal	Impaired	Diabetic	
Diastolic Blood Pressure		(n=1,631)	(n=247)	(n=320)	
(continuous)		$\bar{x}$=71.63	$\bar{x}$=72.98	$\bar{x}$=75.15	<0.001
(discrete)	Abnormal	2.8%	3.2%	4.4%	0.301
Funduscopic		(n=1,625)	(n=244)	(n=318)	
Examination	Abnormal	5.2%	9.8%	9.1%	0.001
Carotid Bruits		(n=1,631)	(n=247)	(n=320)	
	Abnormal	1.2%	3.2%	1.9%	0.037
Radial Pulses		(n=1,632)	(n=247)	(n=320)	
	Abnormal	0.3%	0.4%	0.9%	0.271
Femoral Pulses		(n=1,632)	(n=247)	(n=320)	
	Abnormal	0.4%	1.2%	2.8%	<0.001
Popliteal Pulses		(n=1,631)	(n=246)	(n=320)	
	Abnormal	0.6%	3.3%	3.8%	<0.001
Dorsalis Pedis Pulses		(n=1,629)	(n=246)	(n=320)	
	Abnormal	6.0%	11.4%	13.8%	<0.001
Posterior Tibial		(n=1,631)	(n=246)	(n=320)	
Pulses	Abnormal	1.7%	5.3%	7.5%	<0.001
Leg Pulses		(n=1,629)	(n=247)	(n=320)	
	Abnormal	6.5%	13.0%	15.3%	<0.001
Peripheral		(n=1,629)	(n=247)	(n=320)	
Pulses	Abnormal	6.7%	13.4%	15.9%	<0.001
Kidney, Urethra, and		(n=1,629)	(n=247)	(n=320)	
Bladder (KUB) X Ray Excluding Kidney Stones	Abnormal	28.5%	30.8%	42.5%	<0.001
Intermittent		(n=1,630)	(n=246)	(n=320)	
Claudication and Vascular Insufficiency (ICVI) Index	Abnormal	1.8%	4.1%	6.9%	<0.001

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Personality Type			Family History of Heart Disease		
		A	B	p-Value	No	Yes	p-Value
Diastolic Blood Pressure		(n=942)	(n=1,257)		(n=925)	(n=1,250)	
(continuous)		$\bar{x}$=72.10	$\bar{x}$=72.46	0.389	$\bar{x}$=71.85	$\bar{x}$=72.57	0.089
(discrete)	Abnormal	2.3%	3.6%	0.120	3.6%	2.6%	0.263
Funduscopic Examination	Abnormal	(n=934) 6.0%	(n=1,254) 6.5%	0.724	(n=921) 4.5%	(n=1,243) 7.6%	0.004
Carotid Bruits	Abnormal	(n=942) 1.4%	(n=1,257) 1.6%	0.822	(n=926) 1.1%	(n=1,249) 1.8%	0.208
Radial Pulses	Abnormal	(n=942) 0.4%	(n=1,258) 0.4%	0.999	(n=926) 0.5%	(n=1,250) 0.3%	0.651
Femoral Pulses	Abnormal	(n=942) 1.1%	(n=1,258) 0.6%	0.391	(n=926) 0.8%	(n=1,250) 0.8%	0.999
Popliteal Pulses	Abnormal	(n=940) 1.6%	(n=1,258) 1.2%	0.535	(n=926) 1.2%	(n=1,248) 1.4%	0.747
Dorsalis Pedis Pulses	Abnormal	(n=938) 6.8%	(n=1,258) 8.3%	0.213	(n=925) 6.9%	(n=1,247) 8.3%	0.281
Posterior Tibial Pulses	Abnormal	(n=940) 3.2%	(n=1,258) 2.8%	0.665	(n=926) 2.9%	(n=1,248) 2.9%	0.999
Leg Pulses	Abnormal	(n=939) 8.0%	(n=1,258) 8.9%	0.494	(n=925) 7.8%	(n=1,248) 9.0%	0.364
Peripheral Pulses	Abnormal	(n=939) 8.1%	(n=1,258) 9.3%	0.362	(n=925) 8.1%	(n=1,248) 9.2%	0.409
Kidney, Urethra, and Bladder (KUB) X Ray Excluding Kidney Stones	Abnormal	(n=940) 28.1%	(n=1,257) 32.9%	0.017	(n=924) 28.9%	(n=1,249) 32.3%	0.102
Intermittent Claudication and Vascular Insufficiency (ICVI) Index	Abnormal	(n=941) 2.7%	(n=1,256) 2.9%	0.784	(n=926) 1.9%	(n=1,249) 3.4%	0.050

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

Table K-1-1. (Continued)
Dependent Variable-Covariate Associations for Cardiovascular Assessment

Dependent Variable	Level	Blood Pressure Medication		
		Yes	No	p-Value
Systolic Blood Pressure		(n=434)	(n=1,767)	
(continuous)		$\bar{x}$=131.68	$\bar{x}$=119.57	<0.001
(discrete)	Abnormal	28.8%	12.2%	<0.001
Diastolic Blood Pressure		(n=435)	(n=1,766)	
(continuous)		$\bar{x}$=75.81	$\bar{x}$=71.44	<0.001
(discrete)	Abnormal	4.8%	2.6%	0.024

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

Table K-1-2.
Association Between Cardiovascular Findings and Verified Essential Hypertension, Verified Heart Disease, and Verified Myocardial Infarction

Variable	Level	Essential Hypertension			Heart Disease*			Myocardial Infarction		
		Total	Percent Yes	p-Value	Total	Percent Yes	p-Value	Total	Percent Yes	p-Value
Central Cardiac Function										
Systolic Blood Pressure (D)	Normal	1,844	31.3		1,861	47.8		1,861	6.6	
	Abnormal	333	77.8	<0.001	340	54.4	0.030	340	8.2	0.311
Heart Sounds	Normal	1,730	36.8		1,749	46.7		1,749	6.8	
	Abnormal	441	44.7	0.003	446	57.2	<0.001	446	7.0	0.996
Overall Electrocardiograph (ECG)	Normal	1,693	34.0		1,710	41.6		1,710	2.3	
	Abnormal	483	54.0	<0.001	490	74.5	<0.001	490	22.4	<0.001
ECG: Right Bundle Branch Block (RBBB)	Normal	2,145	38.1		2,169	48.3		2,169	6.6	
	Abnormal	31	61.3	0.014	31	90.3	<0.001	31	22.6	0.002
ECG: Left Bundle Branch Block (LBBB)	Normal	2,165	38.5		2,189	48.6		2,189	6.8	
	Abnormal	11	27.3	0.652	11	100.0	0.002	11	9.1	0.999
ECG: Non-specific ST- and T-Wave Changes	Normal	1,865	35.5		1,884	45.6		1,884	4.1	
	Abnormal	311	55.9	<0.001	316	68.0	<0.001	316	23.1	<0.001
ECG: Bradycardia	Normal	2,119	39.0		2,143	47.8		2,143	6.8	
	Abnormal	59	18.6	0.002	59	88.1	<0.001	59	8.5	0.801
ECG: Tachycardia	Normal	2,173	38.4		2,197	48.7		2,197	6.8	
	Abnormal	5	60.0	0.594	5	100.0	0.065	5	0.0	0.999
ECG: Arrhythmia	Normal	2,076	37.6		2,100	47.2		2,100	6.2	
	Abnormal	101	56.4	<0.001	101	83.2	<0.001	101	19.8	<0.001

* Excluding essential hypertension.

Table K-1-2. (Continued)
Association Between Cardiovascular Findings and Verified Essential Hypertension, Verified Heart Disease, and Verified Myocardial Infarction

Variable	Level	Essential Hypertension			Heart Disease*			Myocardial Infarction		
		Total	Percent Yes	p-Value	Total	Percent Yes	p-Value	Total	Percent Yes	p-Value
ECG: Evidence of Prior Myocardial Infarction	Normal	2,097	37.3		2,121	47.1		2,121	3.5	
	Abnormal	75	68.0	<0.001	75	100.0	<0.001	75	100.0	<0.001
ECG: Other Diagnoses	Normal	2,163	38.2		2,187	48.7		2,187	6.4	
	Abnormal	15	66.7	0.047	15	73.3	0.100	15	60.0	<0.001
Peripheral Vascular Function										
Diastolic Blood Pressure (D)	Normal	2,111	36.7		2,134	48.8		2,134	6.8	
	Abnormal	66	95.5	<0.001	67	50.7	0.847	67	6.0	0.974
Funduscopic Examination	Normal	2,031	36.8		2,053	48.1		2,053	6.4	
	Abnormal	135	63.7	<0.001	137	61.3	0.004	137	12.4	0.012
Carotid Bruits	Normal	2,144	38.1		2,168	48.2		2,168	6.5	
	Abnormal	33	60.6	0.014	33	87.9	<0.001	33	24.2	<0.001
Radial Pulses	Normal	2,169	38.4		2,193	48.8		2,193	6.7	
	Abnormal	9	55.6	0.475	9	66.7	0.461	9	22.2	0.240
Femoral Pulses	Normal	2,161	38.3		2,184	48.8		2,184	6.7	
	Abnormal	17	58.8	0.138	18	61.1	0.420	18	16.7	0.231
Popliteal Pulses	Normal	2,147	38.1		2,170	48.7		2,170	6.6	
	Abnormal	29	62.1	0.014	30	63.3	0.158	30	20.0	0.011
Dorsalis Pedis Pulses	Normal	2,008	37.8		2,029	47.9		2,029	6.2	
	Abnormal	166	45.2	0.074	169	60.4	0.002	169	13.6	<0.001
Posterior Tibial Pulses	Normal	2,113	37.8		2,135	48.5		2,135	6.4	
	Abnormal	63	58.7	0.001	65	61.5	0.051	65	18.5	<0.001
Leg Pulse Index	Normal	1,991	38.0		2,012	47.9		2,012	6.1	
	Abnormal	184	43.5	0.164	187	59.4	0.004	187	13.9	<0.001

* Excluding essential hypertension.

Table K-1-2. (Continued)
Association Between Cardiovascular Findings and Verified Essential Hypertension, Verified Heart Disease, and Verified Myocardial Infarction

Variable	Level	Essential Hypertension			Heart Disease*			Myocardial Infarction		
		Total	Percent Yes	p-Value	Total	Percent Yes	p-Value	Total	Percent Yes	p-Value
Peripheral Pulse Index	Normal	1,985	37.9		2,006	47.9		2,006	6.0	
	Abnormal	190	43.7	0.139	193	59.6	0.002	193	14.5	<0.001
Kidney, Urethra, and Bladder (KUB) X-Ray Excluding Kidney Stones	Normal	1,504	35.0		1,521	45.6		1,521	4.8	
	Abnormal	671	46.1	<0.001	678	56.2	<0.001	678	11.4	<0.001
Intermittent Claudication and Vascular Insufficiency (ICVI) Index	Normal	2,117	38.0		2,137	48.5		2,137	6.4	
	Abnormal	58	55.2	0.012	62	61.3	0.063	62	21.0	<0.001

Variable	Level	Systolic Blood Pressure (C)			Diastolic Blood Pressure (C)		
		Total	Mean (95% C.I.)	p-Value	Total	Mean (95% C.I.)	p-Value
Essential Hypertension	No	1,341	115.55 (114.78,116.32)		1,340	69.31 (68.87,69.75)	
	Yes	836	132.00 (130.67,133.33)	<0.001	837	76.95 (76.28,77.62)	<0.001
Heart Disease*	No	1,126	121.03 (120.00,122.06)		1,126	72.60 (72.04,73.16)	
	Yes	1,075	122.93 (121.79,124.08)	0.016	1,075	71.99 (71.41,72.58)	0.144
Myocardial Infarction	No	2,051	121.75 (120.96,122.54)		2,051	72.33 (71.91,72.75)	
	Yes	150	124.79 (121.61,127.98)	0.051	150	71.91 (70.44,73.38)	0.610

C: Continuous analysis.
D: Discrete analysis.

* Excluding essential hypertension.

APPENDIX K-2.

Interaction Tables for the Cardiovascular Assessment

This appendix contains results of exposure analyses of interactions between covariates and group or dioxin. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The covariate involved in the interaction and a reference to the analysis table in Chapter 15, Cardiovascular Assessment, are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix K-2 Table	Chapter 15 Table	Dependent Variable	Model	Covariate
K-2-1	15-4	Verified Heart Disease (Excluding Essential Hypertension)	1 2	Lifetime Alcohol History Personality Type
K-2-2	15-5	Verified Myocardial Infarction	1 3 4 5 6	Body Fat Body Fat Race Race Race
K-2-3	15-6	Systolic Blood Pressure (Continuous)	2 4	Diabetic Class Diabetic Class
K-2-4	15-7	Systolic Blood Pressure (Discrete)	1	Total Cholesterol
K-2-5	15-8	Heart Sounds	1 2 3	Age Age Age
K-2-6	15-9	Overall Electrocardiograph (ECG)	2 5 6	Total Cholesterol Total Cholesterol Total Cholesterol
K-2-7	15-10	ECG: Right Bundle Branch Block (RBBB)	1 2 3	Diabetic Class, Current Cigarette Smoking Lifetime Cigarette Smoking History Diabetic Class
K-2-8	15-12	ECG: Non-specific ST- and T-Wave Changes	3	Lifetime Cigarette Smoking History
K-2-9	15-13	ECG: Bradycardia	3 4 5 6	Personality Type Personality Type, Diabetic Class Personality Type Personality Type

Appendix K-2 Table	Chapter 15 Table	Dependent Variable	Model	Covariate
K-2-10	15-15	ECG: Arrhythmia	2	HDL Cholesterol, Current Cigarette Smoking
			3	HDL Cholesterol
			5	Current Cigarette Smoking
			6	Current Cigarette Smoking
K-2-11	15-16	ECG: Evidence of Prior Myocardial Infarction	1	Body Fat
			2	Diabetic Class
K-2-12	15-17	ECG: Other Diagnoses	4	Occupation
			5	Race, Occupation
			6	Race, Occupation
K-2-13	15-18	Diastolic Blood Pressure (Continuous)	1	Age
			2	Occupation
			3	Family History of Heart Disease
K-2-14	15-19	Diastolic Blood Pressure (Discrete)	3	Family History of Heart Disease
K-2-15	15-20	Funduscopic Examination	2	Race
K-2-16	15-21	Carotid Bruits	2	Lifetime Cigarette Smoking History, Family History of Heart Disease
			3	Lifetime Alcohol History
			4	Total Cholesterol
			5	Family History of Heart Disease
			6	Family History of Heart Disease
K-2-17	15-24	Popliteal Pulses	5	Occupation
			6	Occupation
K-2-18	15-25	Dorsalis Pedis Pulses	2	Lifetime Cigarette Smoking History
			3	Age
K-2-19	15-26	Posterior Tibial Pulses	2	Occupation, Lifetime Cigarette Smoking History, Family History of Heart Disease
			3	Current Cigarette Smoking
K-2-20	15-27	Leg Pulses	2	Lifetime Cigarette Smoking History, Personality Type
K-2-21	15-28	Peripheral Pulses	2	Lifetime Cigarette Smoking History, Personality Type
K-2-22	15-29	Kidney, Urethra, & Bladder (KUB) X Ray (Excluding Kidney Stones)	4	Race
			5	Race
			6	Race
K-2-23	15-30	Intermittent Claudication and Vascular Insufficiency (ICVI) Index	3	Lifetime Cigarette Smoking History

Table K-2-1.
Interaction Table for Verified Heart Disease
(Excluding Essential Hypertension)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED
(Group-by-Lifetime Alcohol History: Table 15-4)

Stratum	Occupational Category	Group	n	Percent Yes	Adj. Relative Risk (95% C.I.)	p-Value
0 Drink-years	*All*	*Ranch Hand*	*61*	*50.8*	*1.54 (0.76,3.12)*	*0.234*
		Comparison	*70*	*41.4*		
>0-40 Drink-years	*All*	*Ranch Hand*	*614*	*50.0*	*1.09 (0.88,1.35)*	*0.449*
		Comparison	*841*	*47.4*		
>40 Drink-years	*All*	*Ranch Hand*	*230*	*50.0*	*0.96 (0.68,1.36)*	*0.828*
		Comparison	*319*	*50.8*		
0 Drink-years	Officer	Ranch Hand	12	58.3	1.44 (0.68,3.07)	0.345
		Comparison	24	37.5		
	Enlisted Flyer	Ranch Hand	14	64.3	2.16 (0.97,4.87)	0.058
		Comparison	11	45.5		
	Enlisted Groundcrew	Ranch Hand	35	42.9	1.42 (0.68,2.94)	0.348
		Comparison	35	42.9		
>0-40 Drink-years	Officer	Ranch Hand	245	55.1	1.03 (0.76,1.40)	0.851
		Comparison	335	54.3		
	Enlisted Flyer	Ranch Hand	93	57.0	1.56 (0.99,2.45)	0.057
		Comparison	122	44.3		
	Enlisted Groundcrew	Ranch Hand	276	43.1	1.01 (0.76,1.36)	0.928
		Comparison	384	42.4		
>40 Drink-years	Officer	Ranch Hand	93	52.7	0.89 (0.59,1.34)	0.565
		Comparison	123	56.1		
	Enlisted Flyer	Ranch Hand	46	50.0	1.34 (0.80,2.23)	0.263
		Comparison	65	46.2		
	Enlisted Groundcrew	Ranch Hand	91	47.3	0.87 (0.58,1.31)	0.513
		Comparison	131	48.1		

Table K-2-1. (Continued)
Interaction Table for Verified Heart Disease
(Excluding Essential Hypertension)

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Personality Type: Table 15-4)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Type A	Low	74	44.6	1.11 (0.88,1.41)	0.363
	Medium	67	52.2		
	High	61	44.3		
Type B	Low	89	57.3	0.82 (0.69,0.99)	0.039
	Medium	96	53.1		
	High	104	35.6		

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

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

Table K-2-2.
Interaction Table for Verified Myocardial Infarction

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED
(Group-by-Body Fat: Table 15-5)

Stratum	Occupational Category	Group	n	Percent Yes	Adj. Relative Risk (95% C.I.)	p-Value
Obese: >25%	*All*	*Ranch Hand*	*228*	*5.3*	*0.46 (0.23,0.95)*	*0.035*
		Comparison	*316*	*9.5*		
Normal: ≤25%	*All*	*Ranch Hand*	*684*	*7.5*	*1.26 (0.83,1.90)*	*0.283*
		Comparison	*922*	*5.7*		
Obese: >25%	Officer	Ranch Hand	73	4.1	0.33 (0.14,0.80)	0.014
		Comparison	112	8.9		
	Enlisted Flyer	Ranch Hand	35	8.6	0.56 (0.18,1.77)	0.322
		Comparison	45	15.6		
	Enlisted Groundcrew	Ranch Hand	120	5.0	0.53 (0.24,1.19)	0.126
		Comparison	159	8.2		
Normal: ≤25%	Officer	Ranch Hand	272	5.9	0.92 (0.49,1.73)	0.791
		Comparison	374	6.1		
	Enlisted Flyer	Ranch Hand	120	10.8	1.55 (0.72,3.36)	0.266
		Comparison	152	5.9		
	Enlisted Groundcrew	Ranch Hand	292	7.5	1.48 (0.81,2.70)	0.201
		Comparison	396	5.3		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Body Fat: Table 15-5)

Stratum	Dioxin Category	n	Percent Yes	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Obese: >25%	Comparison	268	10.1		
	Background RH	50	4.0	0.28 (0.06,1.26)	0.097
	Low RH	73	4.1	0.29 (0.08,1.02)	0.054
	High RH	89	5.6	0.51 (0.18,1.43)	0.198
	Low plus High RH	162	4.9	0.39 (0.17,0.92)	0.031
Normal: ≤25%	Comparison	758	5.0		
	Background RH	311	6.4	1.43 (0.79,2.60)	0.236
	Low RH	172	7.0	1.21 (0.60,2.45)	0.592
	High RH	162	9.9	2.02 (1.05,3.91)	0.036
	Low plus High RH	334	8.4	1.56 (0.92,2.66)	0.101

Table K-2-2. (Continued)
Interaction Table for Verified Myocardial Infarction

c) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 15-5)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Non-Black	Low	275	5.8	1.05 (0.84,1.31)	0.670
	Medium	262	6.1		
	High	271	9.2		
Black	Low	12	8.3	0.05 (0.00,6.21)	0.227
	Medium	21	0.0		
	High	16	0.0		

d) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 15-5)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Non-Black	Low	280	5.4	1.05 (0.87,1.27)	0.619
	Medium	262	6.1		
	High	266	9.8		
Black	Low	13	7.7	0.10 (0.00,2.79)	0.173
	Medium	22	0.0		
	High	14	0.0		

Table K-2-2. (Continued)
Interaction Table for Verified Myocardial Infarction

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 15-5)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Yes**	**Adjusted Relative Risk (95% C.I.)[b]**	**p-Value**
Non-Black	Low	279	5.0	1.15 (0.95,1.38)	0.160
	Medium	262	6.1		
	High	266	9.8		
Black	Low	13	7.7	0.09 (0.00,2.81)	0.170
	Medium	22	0.0		
	High	14	0.0		

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 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 K-2-3.
Interaction Table for Systolic Blood Pressure (mm Hg)
(Continuous)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Diabetic Class: Table 15-6)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean	Adj. Slope (Std. Error)	p-Value
Normal	Low	118	121.35	0.271 (0.732)	0.711
	Medium	116	123.75		
	High	108	123.79		
Impaired	Low	21	121.63	2.580 (1.918)	0.181
	Medium	22	120.80		
	High	26	132.04		
Diabetic	Low	29	132.52	-1.224 (1.262)	0.335
	Medium	30	131.91		
	High	34	122.49		

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Diabetic Class: Table 15-6)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean	Adjusted Slope (Std. Error)	p-Value
Normal	Low	235	123.16	0.330 (0.482)	0.494
	Medium	207	121.31		
	High	192	124.18		
Impaired	Low	27	123.86	0.964 (1.440)	0.505
	Medium	30	124.52		
	High	45	125.51		
Diabetic	Low	27	136.37	-2.026 (1.064)	0.059
	Medium	52	129.36		
	High	54	125.86		

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.
Model 4: Low = ≤8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.

Table K-2-4.
Interaction Table for Systolic Blood Pressure
(Discrete)

Stratum	Occupational Category	Group	n	Percent Abnormal	Adj. Relative Risk (95% C.I.)	p-Value
a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Total Cholesterol: Table 15-7)						
≤200 mg/dl	*All*	*Ranch Hand*	*309*	*16.8*	*1.37 (0.88,2.14)*	*0.159*
		Comparison	*404*	*12.4*		
>200-239 mg/dl	*All*	*Ranch Hand*	*352*	*13.6*	*0.89 (0.60,1.34)*	*0.590*
		Comparison	*517*	*14.9*		
>239 mg/dl	*All*	*Ranch Hand*	*263*	*14.4*	*0.63 (0.40,0.99)*	*0.046*
		Comparison	*328*	*20.4*		
≤200 mg/dl	Officer	Ranch Hand	124	16.9	1.16 (0.68,1.96)	0.591
		Comparison	167	14.4		
	Enlisted Flyer	Ranch Hand	46	15.2	1.76 (0.86,3.61)	0.121
		Comparison	44	15.9		
	Enlisted Groundcrew	Ranch Hand	139	17.3	1.52 (0.89,2.59)	0.128
		Comparison	193	9.8		
>200-239 mg/dl	Officer	Ranch Hand	127	13.4	0.74 (0.45,1.23)	0.250
		Comparison	212	17.9		
	Enlisted Flyer	Ranch Hand	61	14.8	1.13 (0.58,2.21)	0.712
		Comparison	93	11.8		
	Enlisted Groundcrew	Ranch Hand	164	13.4	0.98 (0.58,1.64)	0.927
		Comparison	212	13.2		
>239 mg/dl	Officer	Ranch Hand	102	17.6	0.52 (0.30,0.90)	0.019
		Comparison	110	23.6		
	Enlisted Flyer	Ranch Hand	48	20.8	0.79 (0.39,1.60)	0.510
		Comparison	61	19.7		
	Enlisted Groundcrew	Ranch Hand	113	8.8	0.68 (0.39,1.17)	0.165
		Comparison	157	18.5		

Table K-2-5.
Interaction Table for Heart Sounds

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Age: Table 15-8)						
Stratum	**Occupational Category**	**Group**	**n**	**Percent Abnormal**	**Adj. Relative Risk (95% C.I.)**	**p-Value**
Born ≥1942	***All***	***Ranch Hand***	***393***	***18.6***	***0.87 (0.63,1.21)***	***0.421***
		Comparison	***552***	***21.0***		
Born <1942	***All***	***Ranch Hand***	***543***	***21.9***	***1.18 (0.89,1.55)***	***0.249***
		Comparison	***707***	***19.5***		
Born ≥1942	Officer	Ranch Hand	77	22.1	0.93 (0.57,1.52)	0.767
		Comparison	119	29.4		
	Enlisted Flyer	Ranch Hand	38	18.4	1.13 (0.59,2.17)	0.701
		Comparison	58	15.5		
	Enlisted Groundcrew	Ranch Hand	278	17.6	0.83 (0.57,1.19)	0.311
		Comparison	375	19.2		
Born <1942	Officer	Ranch Hand	283	24.0	1.16 (0.83,1.64)	0.383
		Comparison	373	19.6		
	Enlisted Flyer	Ranch Hand	120	20.8	1.42 (0.82,2.48)	0.212
		Comparison	144	16.7		
	Enlisted Groundcrew	Ranch Hand	140	18.6	1.04 (0.66,1.63)	0.870
		Comparison	190	21.6		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Age: Table 15-8)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Born ≥1942	Low	54	22.2	0.80 (0.62,1.03)	0.082
	Medium	71	26.8		
	High	111	13.5		
Born <1942	Low	113	21.2	1.17 (0.92,1.47)	0.198
	Medium	96	22.9		
	High	59	27.1		

Table K-2-5. (Continued)
Interaction Table for Heart Sounds

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 15-8)					
Born ≥ 1942	Comparison	445	20.0		
	Background RH	127	17.3	0.87 (0.52,1.47)	0.609
	Low RH	84	23.8	1.25 (0.72,2.19)	0.425
	High RH	154	17.5	0.84 (0.52,1.36)	0.478
	Low plus High RH	238	19.7	0.98 (0.66,1.46)	0.916
Born < 1942	Comparison	596	19.5		
	Background RH	240	20.4	1.10 (0.76,1.60)	0.610
	Low RH	169	20.7	1.06 (0.69,1.62)	0.793
	High RH	105	25.7	1.50 (0.92,2.45)	0.105
	Low plus High RH	274	22.6	1.22 (0.85,1.73)	0.278

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

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

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-2-6.
Interaction Table for Overall Electrocardiograph (ECG)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Total Cholesterol: Table 15-9)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0-200 mg/dl	Low	50	24.0	1.46 (1.06,2.00)	0.019
	Medium	65	16.9		
	High	52	28.8		
>200-239 mg/dl	Low	65	24.6	0.86 (0.64,1.16)	0.319
	Medium	60	28.3		
	High	68	11.8		
>239 mg/dl	Low	54	25.9	0.84 (0.61,1.15)	0.266
	Medium	47	23.4		
	High	52	13.5		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Total Cholesterol: Table 15-9)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
0-200 mg/dl	Low	113	13.3	1.41 (1.14,1.74)	0.001
	Medium	91	22.0		
	High	87	24.1		
>200-239 mg/dl	Low	112	20.5	0.99 (0.83,1.17)	0.886
	Medium	113	16.8		
	High	111	20.7		
>239 mg/dl	Low	72	13.9	0.99 (0.81,1.22)	0.941
	Medium	87	26.4		
	High	97	19.6		

Table K-2-6. (Continued)
Interaction Table for Overall Electrocardiograph (ECG)

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Total Cholesterol: Table 15-9)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[b]**	**p-Value**
0-200 mg/dl	Low	113	13.3	1.41 (1.14,1.75)	0.002
	Medium	91	22.0		
	High	87	24.1		
>200-239 mg/dl	Low	111	20.7	0.98 (0.82,1.17)	0.800
	Medium	113	16.8		
	High	111	20.7		
>239 mg/dl	Low	72	13.9	0.99 (0.81,1.22)	0.948
	Medium	87	26.4		
	High	97	19.6		

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

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

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table K-2-7.
Interaction Table for ECG: Right Bundle Branch Block (RBBB)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Diabetic Class: Table 15-10)						
Stratum	**Occupational Category**	**Group**	**n**	**Percent Abnormal**	**Adj. Relative Risk (95% C.I.)**	**p-Value**
Normal	***All***	***Ranch Hand***	***680***	***0.7***	***0.53 (0.19,1.50)***	***0.233***
		Comparison	***950***	***1.4***		
Impaired	***All***	***Ranch Hand***	***117***	***2.6***	--	--
		Comparison	***129***	***0.0***		
Diabetic	***All***	***Ranch Hand***	***142***	***2.8***	***0.79 (0.21,2.87)***	***0.715***
		Comparison	***177***	***3.4***		
Normal	Officer	Ranch Hand	267	0.4	0.24 (0.04,1.36)	0.107
		Comparison	390	1.5		
	Enlisted Flyer	Ranch Hand	115	2.6	2.20 (0.36,13.67)	0.396
		Comparison	138	0.7		
	Enlisted Groundcrew	Ranch Hand	298	0.3	0.39 (0.10,1.55)	0.183
		Comparison	422	1.7		
Impaired	Officer	Ranch Hand	38	0.0	--	--
		Comparison	44	0.0		
	Enlisted Flyer	Ranch Hand	21	4.8	--	--
		Comparison	27	0.0		
	Enlisted Groundcrew	Ranch Hand	58	3.4	--	--
		Comparison	58	0.0		
Diabetic	Officer	Ranch Hand	56	1.8	0.37 (0.05,2.55)	0.314
		Comparison	57	3.5		
	Enlisted Flyer	Ranch Hand	24	4.2	3.43 (0.47,25.10)	0.225
		Comparison	35	2.9		
	Enlisted Groundcrew	Ranch Hand	62	3.2	0.61 (0.14,2.77)	0.526
		Comparison	85	3.5		

Table K-2-7. (Continued)
Interaction Table for ECG: Right Bundle Branch Block (RBBB)

b) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED
(Group-by-Current Cigarette Smoking: Table 15-10)

Stratum	Occupational Category	Group	n	Percent Abnormal	Adj. Relative Risk (95% C.I.)	p-Value
0-Never Smoked	*All*	*Ranch Hand*	*254*	*0.4*	*0.21 (0.02,1.76)*	*0.149*
		Comparison	*348*	*1.7*		
0-Former Smoker	*All*	*Ranch Hand*	*432*	*1.6*	*0.91 (0.35,2.41)*	*0.857*
		Comparison	*609*	*1.8*		
>0-20 Cigarettes/Day	*All*	*Ranch Hand*	*155*	*0.6*	*0.53 (0.05,5.93)*	*0.606*
		Comparison	*186*	*1.1*		
>20 Cigarettes/Day	*All*	*Ranch Hand*	*98*	*3.1*	--	--
		Comparison	*113*	*0.0*		
0-Never Smoked	Officer	Ranch Hand	131	0.0	0.13 (0.01,1.46)	0.097
		Comparison	190	1.1		
	Enlisted Flyer	Ranch Hand	25	0.0	0.86 (0.06,12.72)	0.913
		Comparison	26	3.8		
	Enlisted Groundcrew	Ranch Hand	98	1.0	0.19 (0.02,1.92)	0.160
		Comparison	132	2.3		
0-Former Smoker	Officer	Ranch Hand	178	1.1	0.48 (0.09,2.64)	0.397
		Comparison	239	2.1		
	Enlisted Flyer	Ranch Hand	82	2.4	3.26 (0.56,19.16)	0.190
		Comparison	107	0.0		
	Enlisted Groundcrew	Ranch Hand	172	1.7	0.72 (0.20,2.55)	0.613
		Comparison	263	2.3		
>0-20 Cigarettes/Day	Officer	Ranch Hand	33	0.0	0.26 (0.01,4.65)	0.357
		Comparison	32	0.0		
	Enlisted Flyer	Ranch Hand	28	0.0	1.75 (0.10,29.56)	0.699
		Comparison	46	2.2		
	Enlisted Groundcrew	Ranch Hand	94	1.1	0.39 (0.03,4.70)	0.456
		Comparison	108	0.9		
>20 Cigarettes/Day	Officer	Ranch Hand	19	0.0	--	--
		Comparison	30	0.0		
	Enlisted Flyer	Ranch Hand	25	12.0	--	--
		Comparison	21	0.0		
	Enlisted Groundcrew	Ranch Hand	54	0.0	--	--
		Comparison	62	0.0		

Table K-2-7. (Continued)
Interaction Table for ECG: Right Bundle Branch Block (RBBB)

c) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Lifetime Cigarette Smoking History: Table 15-10)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	45	0.0	1.16 (0.23,5.80)	0.853
	Medium	38	2.6		
	High	53	0.0		
>0-10 Pack-years	Low	52	0.0	4.74 (1.29,17.41)	0.019
	Medium	44	0.0		
	High	65	3.1		
>10 Pack-years	Low	72	4.2	0.71 (0.30,1.70)	0.447
	Medium	90	3.3		
	High	54	0.0		

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Diabetic Class: Table 15-10)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Normal	Comparison	788	1.5		
	Background RH	294	1.0	0.64 (0.18,2.32)	0.494
	Low RH	173	0.0	--	--
	High RH	171	1.2	0.84 (0.18,3.89)	0.828
	Low plus High RH	344	0.6	0.36 (0.08,1.65)	0.187
Impaired	Comparison	107	0.0		
	Background RH	33	0.0	--	--
	Low RH	32	3.1	--	--
	High RH	41	4.9	--	--
	Low plus High RH	73	4.1	--	--
Diabetic	Comparison	147	2.0		
	Background RH	42	0.0	--	--
	Low RH	49	6.1	2.09 (0.34,12.80)	0.421
	High RH	47	2.1	1.23 (0.11,13.70)	0.867
	Low plus High RH	96	4.2	1.73 (0.35,8.70)	0.501

[a] Relative risk for a twofold increase in initial dioxin.
[b] Relative risk and confidence interval relative to Comparisons.

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

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-2-8.
Interaction Table for ECG: Non-Specific ST- and T-Wave Changes

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Cigarette Smoking History: Table 15-12)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Comparison	276	14.9		
	Background RH	109	8.3	0.48 (0.22,1.05)	0.066
	Low RH	69	13.0	0.65 (0.29,1.44)	0.288
	High RH	67	13.4	0.85 (0.37,1.94)	0.704
	Low plus High RH	136	13.2	0.73 (0.39,1.37)	0.334
>0-10 Pack-years	Comparison	319	11.6		
	Background RH	108	5.6	0.48 (0.19,1.20)	0.117
	Low RH	69	20.3	1.57 (0.77,3.22)	0.216
	High RH	92	7.6	0.68 (0.28,1.63)	0.386
	Low plus High RH	161	13.0	1.08 (0.59,1.98)	0.793
>10 Pack-years	Comparison	447	17.0		
	Background RH	152	15.1	0.93 (0.55,1.58)	0.779
	Low RH	116	17.2	0.87 (0.49,1.53)	0.628
	High RH	100	20.0	1.45 (0.82,2.58)	0.201
	Low plus High RH	216	18.5	1.10 (0.71,1.72)	0.671

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

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 K-2-9.
Interaction Table for ECG: Bradycardia

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Personality Type: Table 15-13)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Type A	Comparison	435	3.0		
	Background RH	171	2.9	1.03 (0.35,3.00)	0.962
	Low RH	108	5.6	1.78 (0.64,4.98)	0.269
	High RH	97	3.1	0.89 (0.24,3.29)	0.860
	Low plus High RH	205	4.4	1.35 (0.55,3.29)	0.508
Type B	Comparison	601	1.7		
	Background RH	196	6.6	3.70 (1.56,8.79)	0.003
	Low RH	141	1.4	0.89 (0.19,4.22)	0.887
	High RH	157	0.0	--	--
	Low plus High RH	298	0.7	0.38 (0.08,1.78)	0.218

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Personality Type: Table 15-13)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Type A	Low	133	3.8	1.12 (0.77,1.61)	0.561
	Medium	126	4.0		
	High	110	3.6		
Type B	Low	154	7.1	0.43 (0.25,0.74)	0.002
	Medium	154	2.6		
	High	172	0.0		

Table K-2-9. (Continued)
Interaction Table for ECG: Bradycardia

c) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Diabetic Class: Table 15-13)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Normal	Low	233	6.0	0.81 (0.60,1.10)	0.171
	Medium	201	4.0		
	High	186	2.2		
Impaired	Low	27	3.7	--	--
	Medium	28	0.0		
	High	44	0.0		
Diabetic	Low	27	3.7	0.76 (0.21,2.67)	0.645
	Medium	51	2.0		
	High	52	0.0		

d) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Personality Type: Table 15-13)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Type A	Low	128	3.1	0.99 (0.72,1.36)	0.938
	Medium	133	4.5		
	High	109	3.7		
Type B	Low	166	6.0	0.54 (0.37,0.78)	0.001
	Medium	147	3.4		
	High	167	0.0		

Table K-2-9. (Continued)
Interaction Table for ECG: Bradycardia

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Personality Type: Table 15-13)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[b]**	**p-Value**
Type A	Low	127	3.1	1.01 (0.72,1.42)	0.940
	Medium	133	4.5		
	High	109	3.7		
Type B	Low	166	6.0	0.56 (0.38,0.82)	0.003
	Medium	147	3.4		
	High	167	0.0		

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

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 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 K-2-10.
Interaction Table for ECG: Arrhythmia

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-HDL Cholesterol: Table 15-15)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
>35 mg/dl	Low	122	5.7	0.75 (0.47,1.20)	0.229
	Medium	108	6.5		
	High	117	1.7		
0-35 mg/dl	Low	46	8.7	1.46 (0.95,2.25)	0.088
	Medium	60	5.0		
	High	51	11.8		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Current Cigarette Smoking: Table 15-15)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0-Never Smoked	Low	45	2.2	1.68 (1.04,2.72)	0.035
	Medium	38	2.6		
	High	53	11.3		
0-Former Smoker	Low	88	6.8	1.01 (0.62,1.66)	0.955
	Medium	77	3.9		
	High	65	3.1		
>0-20 Cigarettes/Day	Low	24	12.5	0.51 (0.21,1.22)	0.129
	Medium	30	13.0		
	High	32	0.0		
>20 Cigarettes/Day	Low	11	9.1	0.35 (0.05,2.24)	0.267
	Medium	23	8.7		
	High	18	0.0		

Table K-2-10. (Continued)
Interaction Table for ECG: Arrhythmia

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-HDL Cholesterol: Table 15-15)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
>35 mg/dl	Comparison	783	4.2		
	Background RH	279	3.2	0.75 (0.35,1.59)	0.448
	Low RH	176	5.7	1.24 (0.59,2.58)	0.572
	High RH	171	3.5	0.97 (0.39,2.39)	0.946
	Low plus High RH	347	4.6	1.12 (0.60,2.09)	0.714
0-35 mg/dl	Comparison	253	4.7		
	Background RH	88	2.3	0.39 (0.08,1.80)	0.228
	Low RH	74	6.8	1.18 (0.39,3.57)	0.768
	High RH	83	9.6	2.65 (1.02,6.88)	0.045
	Low plus High RH	157	8.3	1.82 (0.80,4.16)	0.155

d) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Current Cigarette Smoking: Table 15-15)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[c]	p-Value
0-Never Smoked	Low	88	2.3	1.56 (1.11,2.19)	0.010
	Medium	81	3.7		
	High	76	9.2		
0-Former Smoker	Low	137	1.5	1.26 (0.91,1.75)	0.171
	Medium	142	7.0		
	High	126	3.2		
>0-20 Cigarettes/Day	Low	47	2.1	1.06 (0.69,1.63)	0.799
	Medium	42	9.5		
	High	55	5.5		
>20 Cigarettes/Day	Low	26	3.8	0.83 (0.57,1.21)	0.333
	Medium	26	11.5		
	High	38	2.6		

Table K-2-10. (Continued)
Interaction Table for ECG: Arrhythmia

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Current Cigarette Smoking: Table 15-15)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[c]**	**p-Value**
0-Never Smoked	Low	88	2.3	1.56 (1.11,2.20)	0.011
	Medium	81	3.7		
	High	76	9.2		
0-Former Smoker	Low	137	1.5	1.25 (0.89,1.76)	0.188
	Medium	142	7.0		
	High	126	3.2		
>0-20 Cigarettes/Day	Low	46	2.2	1.04 (0.65,1.65)	0.879
	Medium	42	9.5		
	High	55	5.5		
>20 Cigarettes/Day	Low	26	3.8	0.83 (0.56,1.22)	0.338
	Medium	26	11.5		
	High	38	2.6		

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table K-2-11.
Interaction Table for ECG: Evidence of Prior Myocardial Infarction

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED
(Group-by-Body Fat: Table 15-16)

Stratum	Occupational Category	Group	n	Percent Abnormal	Adj. Relative Risk (95% C.I.)	p-Value
Normal: ≤25%	*All*	*Ranch Hand*	*681*	*4.0*	*0.31 (0.10,0.97)*	*0.044*
		Comparison	*920*	*2.9*		
Obese: >25%	*All*	*Ranch Hand*	*228*	*1.8*	*1.28 (0.73,2.23)*	*0.386*
		Comparison	*313*	*4.8*		
Normal: ≤25%	Officer	Ranch Hand	271	4.1	0.24 (0.07,0.87)	0.030
		Comparison	372	3.5		
	Enlisted Flyer	Ranch Hand	120	4.2	0.36 (0.08,1.64)	0.187
		Comparison	152	3.3		
	Enlisted Groundcrew	Ranch Hand	290	3.8	0.37 (0.10,1.32)	0.126
		Comparison	396	2.3		
Obese: >25%	Officer	Ranch Hand	73	1.4	1.01 (0.46,2.22)	0.976
		Comparison	111	7.2		
	Enlisted Flyer	Ranch Hand	35	5.7	1.51 (0.50,4.59)	0.466
		Comparison	45	4.4		
	Enlisted Groundcrew	Ranch Hand	120	0.8	1.56 (0.66,3.67)	0.313
		Comparison	157	3.2		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Diabetic Class: Table 15-16)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Normal	Low	118	0.0	1.74 (1.07,2.84)	0.026
	Medium	115	3.5		
	High	110	4.5		
Impaired	Low	20	5.0	0.94 (0.39,2.31)	0.901
	Medium	24	8.3		
	High	28	3.6		
Diabetic	Low	30	6.7	0.54 (0.26,1.15)	0.111
	Medium	32	9.4		
	High	34	0.0		

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

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

Table K-2-12.
Interaction Table for ECG: Other Diagnoses

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 15-17)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	192	0.5	2.08 (0.37,11.65)	0.403
	Medium	138	1.4		
	High	13	0.0		
Enlisted Flyer	Low	31	0.0	5.74 (1.17,28.30)	0.032
	Medium	54	0.0		
	High	62	3.2		
Enlisted Groundcrew	Low	69	2.9	0.87 (0.49,1.54)	0.630
	Medium	101	0.0		
	High	222	1.4		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 15-17)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	284	1.1	1.17 (0.76,1.80)	0.480
	Medium	268	0.7		
	High	281	1.4		
Black	Low	13	0.0	10.80 (0.53,218.91)	0.121
	Medium	22	0.0		
	High	14	7.1		

Table K-2-12. (Continued)
Interaction Table for ECG: Other Diagnoses

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 15-17)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	191	0.5	2.90 (0.71,11.95)	0.140
	Medium	133	1.5		
	High	19	0.0		
Enlisted Flyer	Low	33	0.0	4.37 (0.99,19.32)	0.052
	Medium	53	0.0		
	High	61	3.3		
Enlisted Groundcrew	Low	73	2.7	0.98 (0.62,1.55)	0.938
	Medium	104	0.0		
	High	215	1.4		

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 15-17)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	283	1.1	1.14 (0.71,1.83)	0.578
	Medium	268	0.7		
	High	281	1.4		
Black	Low	13	0.0	10.45 (0.52,210.28)	0.125
	Medium	22	0.0		
	High	14	7.1		

Table K-2-12. (Continued)
Interaction Table for ECG: Other Diagnoses

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 15-17)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Officer	Low	191	0.5	3.17 (0.68,14.78)	0.141
	Medium	133	1.5		
	High	19	0.0		
Enlisted Flyer	Low	32	0.0	4.76 (0.96,23.59)	0.056
	Medium	53	0.0		
	High	61	3.3		
Enlisted Groundcrew	Low	73	2.7	1.01 (0.62,1.63)	0.981
	Medium	104	0.0		
	High	215	1.4		

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

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 K-2-13.
Interaction Table for Diastolic Blood Pressure (mm Hg)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Age: Table 15-18)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean**	**Difference of Adjusted Means (95% C.I.)**	**p-Value**
Born ≥ 1942	***All***	***Ranch Hand***	***393***	***74.21***	***0.03 (-1.17,1.23)***	***0.963***
		Comparison	***552***	***74.18***		
Born < 1942	***All***	***Ranch Hand***	***544***	***73.83***	***-0.82 (-1.86,0.22)***	***0.122***
		Comparison	***706***	***74.65***		
Born ≥ 1942	Officer	Ranch Hand	77	75.02	0.50 (-2.17,3.17)	0.713
		Comparison	119	74.52		
	Enlisted Flyer	Ranch Hand	38	73.11	-1.61 (-5.43,2.21)	0.408
		Comparison	57	74.72		
	Enlisted Groundcrew	Ranch Hand	278	74.17	0.14 (-1.30,1.59)	0.846
		Comparison	376	74.03		
Born < 1942	Officer	Ranch Hand	282	73.86	0.53 (-1.97,0.91)	0.472
		Comparison	373	74.39		
	Enlisted Flyer	Ranch Hand	122	75.12	0.10 (-2.15,2.34)	0.932
		Comparison	144	75.02		
	Enlisted Groundcrew	Ranch Hand	140	72.74	-2.24 (-4.28,-0.21)	0.031
		Comparison	189	74.99		

Table K-2-13. (Continued)
Interaction Table for Diastolic Blood Pressure (mm Hg)
(Continuous)

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 15-18)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean	Adjusted Slope (Std. Error)	p-Value
Officer	Low	74	73.70	5.690 (1.696)	0.001
	Medium	33	81.50		
	High	1	68.88		
Enlisted Flyer	Low	34	75.22	1.639 (1.007)	0.107
	Medium	43	73.63		
	High	31	80.41		
Enlisted Groundcrew	Low	61	73.29	0.222 (0.380)	0.560
	Medium	96	75.56		
	High	140	74.82		

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Family History of Heart Disease: Table 15-18)

Stratum	Dioxin Category	n	Adjusted Mean	Difference of Adjusted Mean vs. Comparisons (95% C.I.)	p-Value
No	Comparison	450	73.35		
	Background RH	139	74.05	0.70 (-1.08,2.47)	0.442
	Low RH	113	74.08	0.74 (-1.18,2.66)	0.452
	High RH	108	72.85	-0.50 (-2.47,1.47)	0.618
	Low plus High RH	221	73.46	0.14 (-1.36,1.65)	0.852
Yes	Comparison	584	74.47		
	Background RH	224	72.96	-1.51 (-2.94,-0.07)	0.040
	Low RH	136	72.56	-1.91 (-3.64,-0.17)	0.032
	High RH	148	74.95	0.49 (-1.20,2.17)	0.570
	Low plus High RH	284	73.78	-0.66 (-1.98,0.67)	0.330

Note: RH = Ranch Hand.
Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: 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 K-2-14.
Interaction Table for Diastolic Blood Pressure (mm Hg)
(Discrete)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Family History of Heart Disease: Table 15-19)					
Stratum	**Dioxin Category**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
No	Comparison	450	3.3		
	Background RH	139	3.6	1.29 (0.45,3.66)	0.637
	Low RH	112	4.5	1.46 (0.51,4.18)	0.476
	High RH	108	2.8	0.69 (0.19,2.47)	0.566
	Low plus High RH	220	3.6	1.04 (0.43,2.51)	0.936
Yes	Comparison	584	2.9		
	Background RH	225	1.3	0.50 (0.14,1.72)	0.270
	Low RH	136	0.0	--	--
	High RH	148	5.4	1.80 (0.75,4.33)	0.188
	Low plus High RH	284	2.8	0.90 (0.38,2.12)	0.802

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-2-15.
Interaction Table for Funduscopic Examination

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Race: Table 15-20)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Non-Black	Low	151	4.6	1.13 (0.84,1.50)	0.423
	Medium	162	8.0		
	High	162	9.9		
Black	Low	16	12.5	0.04 (0.00,1.98)	0.106
	Medium	9	0.0		
	High	9	0.0		

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

Table K-2-16.
Interaction Table for Carotid Bruits

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Lifetime Cigarette Smoking History: Table 15-21)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	43	4.6	0.19 (0.01,2.57)	0.214
	Medium	35	0.0		
	High	49	0.0		
>0-10 Pack-years	Low	51	5.9	0.40 (0.16,1.04)	0.061
	Medium	42	2.4		
	High	63	1.6		
>10 Pack-years	Low	70	0.0	2.31 (0.75,7.12)	0.144
	Medium	86	1.2		
	High	53	1.9		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Family History of Heart Disease: Table 15-21)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
No	Low	69	2.9	0.17 (0.01,1.96)	0.154
	Medium	74	0.0		
	High	73	0.0		
Yes	Low	95	3.2	0.81 (0.40,1.62)	0.552
	Medium	89	2.2		
	High	92	2.2		

Table K-2-16. (Continued)
Interaction Table for Carotid Bruits

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Lifetime Alcohol History: Table 15-21)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
0-40 Drink-years	Comparison	754	1.6		
	Background RH	279	0.7	0.40 (0.09,1.79)	0.212
	Low RH	181	2.8	1.57 (0.54,4.58)	0.412
	High RH	188	0.0	--	--
	Low plus High RH	369	1.4	0.89 (0.31,2.60)	0.943
>40 Drink-years	Comparison	274	0.7		
	Background RH	85	5.9	7.55 (1.41,40.54)	0.018
	Low RH	67	1.5	1.85 (0.16,21.32)	0.623
	High RH	64	4.7	9.52 (1.51,59.83)	0.016
	Low plus High RH	131	3.1	4.78 (0.86,26.71)	0.074

d) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Cholesterol: Table 15-21)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[c]	p-Value
0-200 mg/dl	Low	98	4.1	0.55 (0.29,1.06)	0.073
	Medium	96	3.1		
	High	97	1.0		
>200-239 mg/dl	Low	114	1.8	0.86 (0.45,1.67)	0.660
	Medium	111	0.9		
	High	112	1.8		
>239 mg/dl	Low	81	0.0	1.58 (0.80,3.10)	0.189
	Medium	87	2.3		
	High	88	1.1		

Table K-2-16. (Continued)
Interaction Table for Carotid Bruits

e) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Family History of Heart Disease: Table 15-21)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[c]	p-Value
No	Low	110	1.8	0.48 (0.30,0.77)	0.002
	Medium	119	1.7		
	High	125	0.0		
Yes	Low	180	2.2	1.19 (0.82,1.73)	0.371
	Medium	161	2.5		
	High	156	2.6		

f) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Family History of Heart Disease: Table 15-21)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[c]	p-Value
No	Low	110	1.8	0.41 (0.24,0.70)	0.001
	Medium	119	1.7		
	High	125	0.0		
Yes	Low	179	2.2	1.10 (0.71,1.70)	0.660
	Medium	161	2.5		
	High	156	2.6		

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

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = > 8.1-20.5 ppt; High = > 20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table K-2-17.
Interaction Table for Popliteal Pulses

a) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 15-24)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	191	0.5	5.53 (1.79,17.08)	0.003
	Medium	133	1.5		
	High	19	15.8		
Enlisted Flyer	Low	33	0.0	1.92 (0.74,5.01)	0.182
	Medium	54	1.9		
	High	61	4.9		
Enlisted Groundcrew	Low	73	0.0	1.05 (0.72,1.54)	0.806
	Medium	104	4.8		
	High	215	0.9		

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 15-24)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	191	0.5	4.86 (1.46,16.16)	0.010
	Medium	133	1.5		
	High	19	15.8		
Enlisted Flyer	Low	32	0.0	1.78 (0.66,4.80)	0.254
	Medium	54	1.9		
	High	61	4.9		
Enlisted Groundcrew	Low	73	0.0	1.01 (0.68,1.51)	0.945
	Medium	104	4.8		
	High	215	0.9		

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

Note: Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table K-2-18.
Interaction Table for Dorsalis Pedis Pulses

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Lifetime Cigarette Smoking History: Table 15-25)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	45	0.0	1.46 (0.81,2.63)	0.208
	Medium	38	5.3		
	High	53	5.7		
>0-10 Pack-years	Low	52	9.6	0.89 (0.58,1.36)	0.583
	Medium	44	11.4		
	High	64	7.8		
>10 Pack-years	Low	72	11.1	0.84 (0.57,1.23)	0.360
	Medium	90	13.3		
	High	54	9.3		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Age: Table 15-25)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Born ≥ 1942	Comparison	447	6.7		
	Background RH	126	4.8	0.64 (0.26,1.59)	0.334
	Low RH	84	4.8	0.71 (0.24,2.07)	0.527
	High RH	153	5.2	0.73 (0.32,1.65)	0.447
	Low plus High RH	237	5.1	0.72 (0.36,1.45)	0.358
Born < 1942	Comparison	595	8.2		
	Background RH	242	11.2	1.46 (0.87,2.43)	0.149
	Low RH	170	9.4	1.06 (0.58,1.94)	0.857
	High RH	105	16.2	1.93 (1.04,3.59)	0.037
	Low plus High RH	275	12.0	1.38 (0.85,2.23)	0.192

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

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

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-2-19.
Interaction Table for Posterior Tibial Pulses

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 15-26)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	73	2.7	3.04 (0.55,16.78)	0.203
	Medium	31	6.5		
	High	1	100.0		
Enlisted Flyer	Low	34	5.9	1.19 (0.37,3.83)	0.773
	Medium	42	2.4		
	High	31	6.5		
Enlisted Groundcrew	Low	60	6.7	0.57 (0.29,1.10)	0.095
	Medium	95	6.3		
	High	138	0.7		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Lifetime Cigarette Smoking History: Table 15-26)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0-10 Pack-years	Low	96	1.0	1.25 (0.55,2.84)	0.593
	Medium	80	1.3		
	High	116	1.7		
>10 Pack-years	Low	71	9.9	0.59 (0.31,1.12)	0.109
	Medium	88	9.1		
	High	54	3.7		

c) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Family History of Heart Disease: Table 15-26)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
No	Low	71	8.5	0.46 (0.19,1.15)	0.098
	Medium	76	3.9		
	High	74	1.4		
Yes	Low	96	2.1	1.01 (0.55,1.86)	0.972
	Medium	92	6.5		
	High	96	3.1		

Table K-2-19. (Continued)
Interaction Table for Posterior Tibial Pulses

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Current Cigarette Smoking: Table 15-26)					
Stratum	**Dioxin Category**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.L)[b]**	**p-Value**
0-Never Smoked	Comparison	275	0.7		
	Background RH	107	1.9	2.27 (0.97,5.35)	0.059
	Low RH	69	0.0	--	--
	High RH	67	0.0	--	--
	Low plus High RH	136	0.0	--	--
0-Former Smoker	Comparison	513	1.9		
	Background RH	167	2.4	1.28 (0.54,3.00)	0.573
	Low RH	120	3.3	1.16 (0.34,3.97)	0.808
	High RH	110	2.7	1.85 (0.79,4.33)	0.157
	Low plus High RH	230	3.0	1.41 (0.84,2.37)	0.188
>0-20 Cigarettes/Day	Comparison	149	2.0		
	Background RH	56	7.1	3.75 (1.60,8.81)	0.002
	Low RH	39	7.7	5.86 (1.27,27.09)	0.024
	High RH	47	12.8	12.54 (5.36,29.36)	<0.001
	Low plus High RH	86	10.5	8.95 (3.72,21.54)	<0.001
>20 Cigarettes/Day	Comparison	96	9.4		
	Background RH	36	0.0	--	--
	Low RH	22	13.6	1.84 (0.41,8.22)	0.423
	High RH	30	10.0	1.05 (0.45,2.46)	0.906
	Low plus High RH	52	11.5	1.36 (0.42,4.43)	0.615

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-2-20.
Interaction Table for Leg Pulses

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Lifetime Cigarette Smoking History: Table 15-27)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	45	0.0	1.57 (0.86,2.86)	0.138
	Medium	38	5.3		
	High	53	5.7		
>0-10 Pack-years	Low	52	9.6	0.95 (0.63,1.45)	0.823
	Medium	44	11.4		
	High	64	9.4		
>10 Pack-years	Low	71	12.7	0.80 (0.55,1.17)	0.256
	Medium	90	16.7		
	High	54	9.3		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Personality Type: Table 15-27)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Type A	Low	78	14.1	0.61 (0.39,0.96)	0.032
	Medium	70	12.9		
	High	62	3.2		
Type B	Low	90	3.3	1.15 (0.84,1.58)	0.376
	Medium	102	12.7		
	High	109	11.0		

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

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

Table K-2-21.
Interaction Table for Peripheral Pulses

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Lifetime Cigarette Smoking History: Table 15-28)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	45	0.0	1.57 (0.86,2.86)	0.138
	Medium	38	5.3		
	High	53	5.7		
>0-10 Pack-years	Low	52	9.6	0.95 (0.63,1.45)	0.823
	Medium	44	11.4		
	High	64	9.4		
>10 Pack-years	Low	71	12.7	0.80 (0.55,1.17)	0.256
	Medium	90	16.7		
	High	54	9.3		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Personality Type: Table 15-28)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Type A	Low	78	14.1	0.61 (0.39,0.96)	0.032
	Medium	70	12.9		
	High	62	3.2		
Type B	Low	90	3.3	1.15 (0.84,1.58)	0.376
	Medium	102	12.7		
	High	109	11.0		

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

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

Table K-2-22.
Interaction Table for Kidney, Urethra, and Bladder (KUB) X Ray (Excluding Kidney Stones)

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 15-29)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	277	29.6	1.14 (1.02,1.27)	0.022
	Medium	266	33.8		
	High	271	30.6		
Black	Low	12	41.7	0.49 (0.25,0.96)	0.039
	Medium	20	15.0		
	High	16	12.5		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 15-29)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	280	29.6	1.10 (1.00,1.21)	0.041
	Medium	263	32.7		
	High	271	31.7		
Black	Low	13	38.5	0.52 (0.28,0.96)	0.035
	Medium	21	14.3		
	High	14	14.3		

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 15-29)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	279	29.7	1.12 (1.01,1.24)	0.037
	Medium	263	32.7		
	High	271	31.7		
Black	Low	13	38.5	0.52 (0.28,0.97)	0.039
	Medium	21	14.3		
	High	14	14.3		

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

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 K-2-23.
Interaction Table for Intermittent Claudication and Vascular Insufficiency (ICVI) Index

a) MODEL 3: RANCH HANDS AND COMPARISON BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Cigarette Smoking History: Table 15-30)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Comparison	267	0.7		
	Background RH	102	3.9	4.50 (0.78,25.93)	0.093
	Low RH	65	0.0	--	--
	High RH	62	1.6	2.36 (0.20,27.93)	0.495
	Low plus High RH	127	0.8	0.89 (0.08,10.31)	0.926
>0-10 Pack-years	Comparison	311	1.0		
	Background RH	106	2.8	2.87 (0.56,14.74)	0.207
	Low RH	66	1.5	1.29 (0.13,13.27)	0.829
	High RH	88	4.5	4.60 (0.97,21.95)	0.055
	Low plus High RH	154	3.2	3.01 (0.67,13.48)	0.150
>10 Pack-years	Comparison	432	4.4		
	Background RH	146	3.4	0.59 (0.20,1.73)	0.337
	Low RH	108	6.5	1.51 (0.59,3.86)	0.394
	High RH	94	4.3	0.78 (0.25,2.48)	0.678
	Low plus High RH	202	5.4	1.14 (0.51,2.53)	0.754

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

APPENDIX K-3.

Cardiovascular Analysis Tables
Occupation, Body Fat, Total Cholesterol, HDL, and Diabetic Class
Removed from Final Model

This appendix contains results of exposure analyses after occupation, percent body fat, total cholesterol, HDL cholesterol, and diabetic class have been removed from those final statistical models that used dioxin as a measure of exposure (Models 2 through 6) and contained any of these covariates. These analyses were performed to investigate the relationship of the dependent variable to dioxin without removing any effects due to these covariates. The format of these tables closely parallels the adjusted panels of Chapter 15, Cardiovascular Assessment, tables. A summary of the tables found in this appendix follows.

Appendix K-3 Table	Chapter 15 Table	Dependent Variable
K-3-1	15-3	Verified Essential Hypertension
K-3-2	15-4	Verified Heart Disease (Excluding Essential Hypertension)
K-3-3	15-5	Verified Myocardial Infarction
K-3-4	15-6	Systolic Blood Pressure (mm Hg) (Continuous)
K-3-5	15-7	Systolic Blood Pressure (Discrete)
K-3-6	15-8	Heart Sounds
K-3-7	15-9	Overall Electrocardiograph (ECG)
K-3-8	15-10	ECG: Right Bundle Branch Block (RBBB)
K-3-9	15-12	ECG: Non-Specific ST- and T-Wave Changes
K-3-10	15-13	ECG: Bradycardia
K-3-11	15-15	ECG: Arrhythmia
K-3-12	15-16	ECG: Evidence of Prior Myocardial Infarction
K-3-13	15-17	ECG: Other Diagnoses
K-3-14	15-18	Diastolic Blood Pressure (mm Hg) (Continuous)
K-3-15	15-19	Diastolic Blood Pressure (Discrete)
K-3-16	15-20	Funduscopic Examination
K-3-17	15-21	Carotid Bruits
K-3-18	15-23	Femoral Pulses
K-3-19	15-24	Popliteal Pulses
K-3-20	15-25	Dorsalis Pedis Pulses
K-3-21	15-26	Posterior Tibial Pulses

Appendix K-3 Table	Chapter 15 Table	Dependent Variable
K-3-22	15-27	Leg Pulses
K-3-23	15-28	Peripheral Pulses
K-3-24	15-29	Kidney, Urethra, and Bladder (KUB) X Ray (Excluding Kidney Stones)
K-3-25	15-30	Intermittent Claudication and Vascular Insufficiency (ICVI) Index

Table K-3-1.
Analysis of Verified Essential Hypertension
Total Cholesterol, Body Fat, and Diabetic Class 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
486	1.15 (0.98,1.34)	0.079	AGE (p=0.013) RACE (p=0.100) DRKYR (p=0.001) HRTDIS (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	1,007			AGE (p<0.001) RACE (p=0.021) DRKYR (p<0.001) HRTDIS (p<0.001)
Background RH	356	0.93 (0.71,1.23)	0.623	
Low RH	238	0.85 (0.62,1.16)	0.312	
High RH	248	1.28 (0.94,1.74)	0.112	
Low plus High RH	486	1.05 (0.83,1.33)	0.705	

[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 K-3-1. (Continued)
Analysis of Verified Essential Hypertension
Total Cholesterol, Body Fat, and Diabetic Class 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	842	1.28 (1.15,1.42)	<0.001	AGE (p<0.001) RACE (p=0.219) DRKYR (p<0.001) HRTDIS (p<0.001)
5	842	1.27 (1.16,1.40)	<0.001	AGE (p<0.001) RACE (p=0.191) DRKYR (p<0.001) HRTDIS (p<0.001)
6[c]	841	1.22 (1.11,1.35)	<0.001	AGE (p<0.001) RACE (p=0.143) DRKYR (p<0.001) HRTDIS (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 K-3-2.
Analysis of Verified Heart Disease (Excluding Essential Hypertension)
Total Cholesterol 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
491	0.91 (0.79,1.05)	0.205	AGE (p=0.007) DRKYR (p=0.054) HRTDIS (p=0.014) PERS (p=0.939)

[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	1,034			AGE (p<0.001) PERS (p=0.086) HRTDIS (p=0.004)
Background RH	366	1.09 (0.85,1.39)	0.505	
Low RH	248	1.09 (0.82,1.46)	0.534	
High RH	256	0.79 (0.59,1.05)	0.110	
Low plus High RH	504	0.93 (0.75,1.16)	0.527	

[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 K-3-3.
Analysis of Verified Myocardial Infarction
Occupation, HDL, 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
505	1.17 (0.90,1.53)	0.239	AGE (p=0.002) RACE (p=0.054) HRTDIS (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.

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. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,035			AGE (p<0.001) PACKYR (p=0.002) HRTDIS (p<0.001)
Background RH	365	0.94 (0.57,1.56)	0.810	
Low RH	249	0.78 (0.43,1.42)	0.408	
High RH	256	1.58 (0.93,2.71)	0.093	
Low plus High RH	505	1.11 (0.72,1.72)	0.633	

[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 K-3-3. (Continued)
Analysis of Verified Myocardial Infarction
Occupation, HDL, 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	870	1.16 (0.96,1.41)**	0.134**	CURR*RACE (p=0.049) AGE (p<0.001) PACKYR (p=0.029) HRTDIS (p=0.013)
5	870	1.15 (0.97,1.37)**	0.102**	CURR*RACE (p=0.045) AGE (p<0.001) PACKYR (p=0.030) HRTDIS (p=0.012)
6[c]	869	1.13 (0.94,1.36)**	0.200**	CURR*RACE (p=0.043) AGE (p<0.001) PACKYR (p=0.053) HRTDIS (p=0.014)

[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 from a model after deletion of this interaction; refer to Appendix Table K-4-1 for further analysis of this interaction.

Table K-3-4.
Analysis of Systolic Blood Pressure (mm Hg) (Continuous)
Total Cholesterol, HDL, Body Fat, and Diabetic Class 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[a]	R^2	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
Low	169	123.82	0.125	-0.057 (0.609)	0.926	AGE (p=0.001) BPMED (p=0.001)
Medium	172	125.26				
High	172	124.49				

[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: 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[a]	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,044	124.83			AGE (p<0.001) CSMOK (p<0.001) BPMED (p<0.001)
Background RH	370	123.86	-0.97 (-3.02,1.07)	0.350	
Low RH	254	124.45	-0.38 (-2.72,1.97)	0.752	
High RH	259	124.56	-0.27 (-2.62,2.08)	0.822	
Low plus High RH	513	124.51	-0.32 (-2.13,1.49)	0.726	

[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.

Table K-3-4. (Continued)
Analysis of Systolic Blood Pressure (mm Hg) (Continuous)
Total Cholesterol, HDL, Body Fat, and Diabetic Class Removed from Final Model

c) 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	123.72 (292)	124.37 (294)	126.70 (297)	0.112	1.055 (0.412)	0.011	AGE ($p<0.001$) CSMOK ($p<0.001$) BPMED ($p<0.001$)
5	123.23 (297)	124.54 (291)	126.95 (295)	0.114	1.020 (0.353)	0.004	AGE ($p<0.001$) CSMOK ($p<0.001$) BPMED ($p<0.001$)
6[b]	123.45 (296)	124.52 (291)	126.69 (295)	0.113	0.901 (0.383)	0.019	AGE ($p<0.001$) CSMOK ($p<0.001$) BPMED ($p<0.001$)

[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 K-3-5.
Analysis of Systolic Blood Pressure (Discrete)
HDL, Body Fat, and Diabetic Class 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
513	1.03 (0.85,1.23)	0.788	AGE (p=0.032)

[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	1,046			AGE (p<0.001) BPMED (p<0.001) CSMOK (p=0.033)
Background RH	370	0.87 (0.61,1.24)	0.434	
Low RH	254	0.93 (0.64,1.37)	0.728	
High RH	259	1.11 (0.76,1.64)	0.580	
Low plus High RH	513	1.02 (0.76,1.37)	0.904	

[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 K-3-5. (Continued)
Analysis of Systolic Blood Pressure (Discrete)
HDL, Body Fat, and Diabetic Class 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	883	1.16 (1.02,1.33)	0.027	AGE (p=0.002) BPMED (p<0.001)
5	883	1.14 (1.02,1.28)	0.025	AGE (p=0.002) BPMED (p<0.001)
6[c]	882	1.16 (1.02,1.31)	0.025	AGE (p=0.002) BPMED (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 K-3-6.
Analysis of Heart Sounds
Diabetic Class 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
504	0.98 (0.83,1.17)**	0.847**	INIT*AGE (p=0.023) HRTDIS (p=0.055)

[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 K-4-2 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	1,042			DXCAT*AGE (p=0.037) PACKYR (p=0.119) CSMOK (p=0.004)
Background RH	368	1.01 (0.74,1.37)**	0.963**	
Low RH	253	1.10 (0.78,1.54)**	0.592**	
High RH	259	1.10 (0.78,1.56)**	0.578**	
Low plus High RH	512	1.10 (0.84,1.43)**	0.481**	

[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 K-4-2 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 K-3-6. (Continued)
Analysis of Heart Sounds
Diabetic Class 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	868	1.07 (0.95,1.21)	0.249	AGE (p=0.007) CSMOK (p=0.020) HRTDIS (p=0.051)
5	868	1.07 (0.96,1.18)	0.225	AGE (p=0.007) CSMOK (p=0.019) HRTDIS (p=0.051)
6[c]	866	1.08 (0.96,1.20)	0.186	AGE (p=0.001) PACKYR (p=0.048) HRTDIS (p=0.057)

[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 K-3-7.
Analysis of Overall Electrocardiograph (ECG)
Total Cholesterol and Diabetic Class 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
513	1.02 (0.85,1.21)	0.840	AGE ($p<0.001$) RACE ($p=0.036$)

[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	1,044			AGE ($p<0.001$) RACE ($p=0.003$)
Background RH	371	0.63 (0.46,0.86)	0.004	
Low RH	254	0.90 (0.64,1.25)	0.524	
High RH	259	0.81 (0.56,1.17)	0.263	
Low plus High RH	513	0.86 (0.66,1.12)	0.263	

[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 K-3-7. (Continued)
Analysis of Electrocardiograph (ECG)
Total Cholesterol and Diabetic Class 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	884	1.15 (1.02,1.31)	0.024	AGE ($p<0.001$) RACE ($p=0.089$) CSMOK ($p=0.139$)
5	884	1.14 (1.02,1.27)	0.018	AGE ($p<0.001$) RACE ($p=0.083$) CSMOK ($p=0.142$)
6[c]	883	1.12 (1.00,1.26)	0.054	AGE ($p<0.001$) RACE ($p=0.077$) CSMOK ($p=0.154$)

[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 K-3-8.
Analysis of ECG: Right Bundle Branch Block (RBBB)
Diabetic Class 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
513	1.35 (0.79,2.29)**	0.287**	INIT*PACKYR (p=0.041) AGE (p=0.008) CSMOK (p=0.111)

[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 K-4-3 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	1,043			AGE (p=0.028) RACE (p=0.125) PACKYR (p=0.095)
Background RH	370	0.54 (0.15,1.89)	0.332	
Low RH	254	0.92 (0.30,2.85)	0.886	
High RH	259	1.58 (0.56,4.49)	0.388	
Low plus High RH	513	1.20 (0.51,2.81)	0.671	

[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 K-3-9.
Analysis of ECG: Non-Specific ST- and T- Wave Changes
Body Fat, Total Cholesterol, and Diabetic Class 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
512	1.04 (0.85,1.27)	0.676	AGE ($p<0.001$) RACE ($p=0.006$) PERS ($p=0.080$)

[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	1,043			DXCAT*PACKYR ($p=0.031$) AGE ($p<0.001$) RACE ($p<0.001$)
Background RH	370	0.70 (0.47,1.03)**	0.067**	
Low RH	254	0.97 (0.66,1.43)**	0.892**	
High RH	259	1.04 (0.69,1.57)**	0.849**	
Low plus High RH	513	1.00 (0.74,1.37)**	0.981**	

[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 ($0.01<p\leq0.05$); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table K-4-4 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 K-3-9. (Continued)
Analysis of ECG: Non-Specific ST- and T- Wave Changes
Body Fat, Total Cholesterol, and Diabetic Class 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	883	1.25 (1.08,1.44)	0.003	AGE (p<0.001) RACE (p=0.016) PACKYR (p=0.008)
5	883	1.22 (1.07,1.39)	0.012	AGE (p<0.001) RACE (p=0.014) PACKYR (p=0.008)
6[c]	882	1.20 (1.05,1.39)	0.009	AGE (p<0.001) RACE (p=0.012) PACKYR (p=0.009)

[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 K-3-10.
Analysis of ECG: Bradycardia
Total Cholesterol, HDL, Body Fat, and Diabetic Class 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
499	0.51 (0.27,0.94)	0.018	AGE (p=0.014) PERS (p=0.009) DRKYR (p=0.115)

[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			DXCAT*PERS (p=0.014) AGE (p=0.013)
Background RH	371	2.25 (1.18,4.28)**	0.013**	
Low RH	253	1.49 (0.65,3.39)**	0.346**	
High RH	259	0.48 (0.14,1.64)**	0.242**	
Low plus High RH	512	0.96 (0.46,2.00)**	0.905**	

[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 K-4-5 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 K-3-10. (Continued)
Analysis of ECG: Bradycardia
Total Cholesterol, HDL, Body Fat, and Diabetic Class 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	863	0.71 (0.53,0.94)**	0.014**	CURR*PERS (p=0.002) DRKYR (p=0.042)
5	863	0.73 (0.59,0.91)**	0.005**	CURR*PERS (p=0.016) AGE (p=0.083) DRKYR (p=0.047)
6[c]	862	0.76 (0.60,0.96)**	0.023**	CURR*PERS (p=0.019) AGE (p=0.114) DRKYR (p=0.061)

[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 K-4-5 for further analysis of this interaction.

Table K-3-11.
Analysis of ECG: Arrhythmia
Diabetic Class and HDL 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
513	1.06 (0.79,1.42)**	0.719**	INIT*CSMOK (p=0.006) AGE (p=0.017)

[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 ($p \leq 0.05$); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table K-4-6 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	1,045			AGE (p<0.001)
Background RH	371	0.69 (0.36,1.33)	0.271	
Low RH	254	1.20 (0.65,2.20)	0.565	
High RH	259	1.49 (0.79,2.80)	0.215	
Low plus High RH	513	1.32 (0.81,2.15)	0.263	

[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 K-3-12.
Analysis of ECG: Evidence of Prior Myocardial Infarction
Diabetic Class, HDL, 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
511	1.10 (0.78,1.55)	0.586	RACE (p=0.124) CSMOK (p=0.194) PERS (p=0.029)

[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.)[b]	p-Value	Covariate Remarks
Comparison	1,030			AGE (p<0.001) CSMOK (p=0.054) PERS (p=0.186) HRTDIS (p=0.029)
Background RH	365	0.92 (0.45,1.88)	0.825	
Low RH	248	0.77 (0.33,1.80)	0.547	
High RH	255	1.58 (0.77,3.26)	0.215	
Low plus High RH	513	1.12 (0.61,2.05)	0.706	

[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 K-3-12. (Continued)
Analysis of ECG: Evidence of Prior Myocardial Infarction
Diabetic Class, HDL, and Body Fat Removed from Final Model

c) MODELS 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
5	882	1.27 (1.01,1.60)	0.043	AGE (p=0.001) RACE (p=0.131) CSMOK (p=0.008)
6[c]	880	1.13 (0.88,1.47)	0.345	AGE (p=0.002) RACE (p=0.147) CSMOK (p=0.015) PERS (p=0.153)

[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 K-3-13.
Analysis of ECG: Other Diagnoses
Occupation, Diabetic Class, and 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	883	1.12 (0.74,1.69)	0.593	CSMOK (p=0.026) PERS (p=0.144)
5	883	1.12 (0.78,1.61)	0.545	RACE (p=0.501) CSMOK (p=0.024) PERS (p=0.146)
6[c]	882	1.11 (0.74,1.66)	0.609	CSMOK (p=0.025) PERS (p=0.147)

[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 K-3-14.
Analysis of Diastolic Blood Pressure (mm Hg) (Continuous)
Occupation, Cholesterol, Body Fat, and Diabetic Class 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[a]	R^2	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
Low	169	73.93	0.063	0.363 (0.319)	0.255	RACE (p=0.018) BPMED (p=0.006)
Medium	172	76.10				
High	172	75.59				

[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: 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[a]	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,035	73.51**			DXCAT*HRTDIS (p=0.029) CSMOK (p<0.001) PACKYR (p=0.105) BPMED (p<0.001)
Background RH	364	72.82**	-0.70 (-1.83,0.44)**	0.228**	
Low RH	249	72.88**	-0.63 (-1.93,0.67)**	0.343**	
High RH	256	73.68**	0.16 (-1.13,1.45)**	0.805**	
Low plus High RH	505	73.28**	-0.23 (-1.23,0.77)**	0.653**	

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

** Categorized dioxin-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table K-4-7 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 K-3-14. (Continued)
Analysis of Diastolic Blood Pressure (mm Hg) (Continuous)
Occupation, Cholesterol, Body Fat, and Diabetic Class Removed from Final Model

c) 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	74.28 (292)	73.84 (294)	75.63 (297)	0.072	0.529 (0.227)	0.020	AGE (p=0.142) RACE (p=0.109) CSMOK (p<0.001) BPMED (p<0.001)
5	73.96 (297)	73.89 (291)	75.94 (295)	0.074	0.543 (0.195)	0.005	AGE (p=0.142) RACE (p=0.109) CSMOK (p<0.001) BPMED (p<0.001)
6[b]	74.33 (296)	73.97 (291)	75.66 (295)	0.078	0.383 (0.211)	0.070	AGE (p=0.101) RACE (p=0.081) CSMOK (p<0.001) BPMED (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 K-3-15.
Analysis of Diastolic Blood Pressure (Discrete)
Occupation, HDL, and 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	1,034			DXCAT*HRTDIS (p=0.009) PACKYR (p=0.013) PERS (p=0.049) BPMED (p=0.034)
Background RH	364	****	****	
Low RH	248	****	****	
High RH	256	****	****	
Low plus High RH	504	****	****	

[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 K-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.

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	882	1.13 (0.87,1.49)	0.363	AGE (p=0.155) PACKYR (p=0.123) BPMED (p=0.012)
5	882	1.11 (0.88,1.42)	0.380	AGE (p=0.145) PACKYR (p=0.118) BPMED (p=0.012)
6[c]	881	1.15 (0.89,1.49)	0.297	AGE (p=0.166) PACKYR (p=0.143) BPMED (p=0.011)

[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)

[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 K-3-16.
Analysis of Funduscopic Examination
Occupation, Body Fat, and Diabetic Class 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
509	1.16 (0.91,1.47)**	0.236**	INIT*RACE (p=0.014) CSMOK (p=0.070)

[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 K-4-9 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	1,032			AGE (p=0.001) RACE (p=0.024) PACKYR (p=0.013) HRTDIS (p=0.002)
Background RH	363	1.26 (0.75,2.11)	0.382	
Low RH	246	0.99 (0.54,1.80)	0.961	
High RH	255	1.87 (1.10,3.20)	0.021	
Low plus High RH	501	1.38 (0.88,2.15)	0.159	

[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 K-3-16. (Continued)
Analysis of Funduscopic Examination
Occupation, Body Fat, and Diabetic Class Removed from Final Model

c) 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	864	1.25 (1.04,1.50)	0.021	AGE (p=0.011) PACKYR (p=0.039) HRTDIS (p=0.032)
5	864	1.23 (1.04,1.45)	0.014	AGE (p=0.011) PACKYR (p=0.043) HRTDIS (p=0.032)

[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 K-3-17.
Analysis of Carotid Bruits
Occupation and Total Cholesterol 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
492	0.86 (0.48,1.52)**	0.586**	INIT*PACKYR (p=0.002) INIT*HRTDIS (p=0.041) AGE (p=0.029) DRKYR (p=0.039)

[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 interactions ($p \leq 0.05$); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of these interactions; refer to Appendix Table K-4-10 for further analysis of these interactions.

b) MODELS 4 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	884	0.83 (0.55,1.23)	0.342	AGE (p=0.009)
6[c]	850	****	****	CURR*HRTDIS (p=0.003) AGE (p=0.003) PACKYR (p=0.137) DRKYR (p=0.032)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for 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)-by-covariate interaction ($p \leq 0.01$); adjusted relative risk, confidence interval, and p-value not presented, refer to Appendix Table K-4-10 for further analysis of this interaction.

Table K-3-18.
Analysis of Femoral Pulses
Body Fat and Diabetic Class 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
512	0.54 (0.27,1.07)	0.045	CSMOK (p=0.003) PERS (p=0.022)

[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	1,044			CSMOK (p=0.001)
Background RH	371	0.61 (0.07,5.39)	0.657	
Low RH	254	6.41 (1.91,21.60)	0.003	
High RH	259	1.63 (0.30,8.83)	0.571	
Low plus High RH	513	3.89 (1.23,12.30)	0.020	

[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 K-3-18. (Continued)
Analysis of Femoral Pulses
Body Fat and Diabetic Class 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	883	1.09 (0.72,1.66)	0.681	CSMOK (p=0.016) PERS (p=0.066)
5	883	1.12 (0.78,1.60)	0.545	CSMOK (p=0.016) PERS (p=0.065)
6[c]	883	1.04 (0.70,1.55)	0.834	CSMOK (p=0.024)

[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 K-3-19.
Analysis of Popliteal Pulses
Occupation, Body Fat, and Diabetic Class 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
513	0.92 (0.56,1.51)	0.740	AGE ($p<0.001$) CSMOK ($p<0.001$)

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

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

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	1,043			AGE ($p<0.001$) CSMOK ($p<0.001$)
Background RH	371	0.40 (0.08,2.03)	0.267	
Low RH	254	2.78 (1.01,7.68)	0.049	
High RH	259	4.14 (1.55,11.10)	0.005	
Low plus High RH	513	3.38 (1.45,7.84)	0.005	

[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 K-3-19. (Continued)
Analysis of Popliteal Pulses
Occupation, Body Fat, and Diabetic Class 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	884	1.42 (1.01,2.01)	0.049	AGE ($p<0.001$) CSMOK ($p<0.001$)
5	884	1.48 (1.08,2.01)	0.013	AGE ($p<0.001$) CSMOK ($p<0.001$)
6[c]	883	1.32 (0.94,1.85)	0.112	AGE ($p<0.001$) CSMOK ($p=0.001$)

[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 K-3-20.
Analysis of Dorsalis Pedis Pulses
Occupation, Total Cholesterol, HDL, Body Fat, and Diabetic Class 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
512	1.12 (0.88,1.43)	0.359	AGE (p=0.042) PACKYR (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.

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	1,043			DXCAT*AGE (p=0.048) PACKYR (p=0.005) CSMOK (p=0.043)
Background RH	369	1.11 (0.71,1.71)**	0.651**	
Low RH	254	0.95 (0.56,1.61)**	0.853**	
High RH	258	1.48 (0.91,2.41)**	0.116**	
Low plus High RH	512	1.19 (0.80,1.76)**	0.389**	

[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 K-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 K-3-20. (Continued)
Analysis of Dorsalis Pedis Pulses
Occupation, Total Cholesterol, HDL, Body Fat, and Diabetic Class 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	881	1.11 (0.94,1.31)	0.235	AGE ($p<0.001$) PACKYR ($p<0.001$)
5	881	1.08 (0.94,1.25)	0.279	AGE ($p<0.001$) PACKYR ($p<0.001$)
6[c]	880	1.10 (0.94,1.29)	0.224	AGE ($p<0.001$) PACKYR ($p<0.001$)

[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 K-3-21.
Analysis of Posterior Tibial Pulses
Occupation, HDL, Body Fat, and Diabetic Class 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
505	0.89 (0.57,1.38)**	0.595**	INIT*PACKYR (p=0.019) AGE (p<0.001) CSMOK (p<0.001) HRTDIS (p=0.806)

[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 K-4-12 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	1,043			DXCAT*CSMOK (p=0.030) AGE (p<0.001) RACE (p=0.011)
Background RH	371	0.97 (0.44,2.15)**	0.949**	
Low RH	254	1.69 (0.77,3.70)**	0.187**	
High RH	259	3.14 (1.51,6.55)**	0.002**	
Low plus High RH	513	2.29 (1.24,4.23)**	0.008**	

[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 K-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 K-3-21. (Continued)
Analysis of Posterior Tibial Pulses
Occupation, HDL, Body Fat, and Diabetic Class 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	884	1.19 (0.91,1.55)	0.204	AGE (p<0.001) RACE (p=0.102) CSMOK (p<0.001)
5	884	1.22 (0.97,1.53)	0.093	AGE (p<0.001) RACE (p=0.093) CSMOK (p<0.001)
6[c]	883	1.14 (0.89,1.47)	0.303	AGE (p<0.001) RACE (p=0.075) CSMOK (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 K-3-22.
Analysis of Leg Pulses
Occupation, HDL, Body Fat, Total Cholesterol, and Diabetic Class 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
511	1.14 (0.90,1.45)**	0.278**	INIT*PERS (p=0.021) AGE (p=0.010) PACKYR (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.

** 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 K-4-13 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	1,028			AGE (p=0.002) RACE (p=0.075) PACKYR (p<0.001) DRKYR (p=0.110)
Background RH	363	1.13 (0.74,1.73)	0.566	
Low RH	248	0.83 (0.49,1.41)	0.480	
High RH	251	1.59 (0.99,2.53)	0.054	
Low plus High RH	499	1.16 (0.79,1.70)	0.450	

[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 K-3-22. (Continued)
Analysis of Leg Pulses
Occupation, HDL, Body Fat, Total Cholesterol, and Diabetic Class 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	881	1.09 (0.93,1.29)	0.289	AGE ($p<0.001$) PACKYR ($p<0.001$)
5	881	1.07 (0.93,1.23)	0.329	AGE ($p<0.001$) PACKYR ($p<0.001$)
6[c]	880	1.09 (0.94,1.27)	0.271	AGE ($p<0.001$) PACKYR ($p<0.001$)

[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 K-3-23.
Analysis of Peripheral Pulses
Occupation, HDL, Body Fat, Total Cholesterol, and Diabetic Class 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
511	1.14 (0.90,1.45)**	0.278**	INIT*PERS (p=0.021) AGE (p=0.010) PACKYR (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.

** 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 K-4-14 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	1,043			AGE (p<0.001) RACE (p=0.068) PACKYR (p=0.004) CSMOK (p=0.045)
Background RH	369	1.08 (0.71,1.64)	0.717	
Low RH	254	0.85 (0.51,1.42)	0.537	
High RH	258	1.55 (0.98,2.46)	0.061	
Low plus High RH	512	1.16 (0.80,1.68)	0.448	

[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 K-3-23. (Continued)
Analysis of Peripheral Pulses
Occupation, HDL, Body Fat, Total Cholesterol, and Diabetic Class 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	881	1.08 (0.92,1.28)	0.328	AGE ($p<0.001$) PACKYR ($p<0.001$)
5	881	1.07 (0.93,1.22)	0.369	AGE ($p<0.001$) PACKYR ($p<0.001$)
6[c]	880	1.08 (0.93,1.26)	0.310	AGE ($p<0.001$) PACKYR ($p<0.001$)

[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 K-3-24.
Analysis of Kidney, Urethra, and Bladder (KUB) X Ray (Excluding Kidney Stones)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,028			AGE ($p<0.001$) DRKYR ($p=0.075$) CSMOK ($p=0.014$)
Background RH	363	0.90 (0.68,1.18)	0.425	
Low RH	248	0.81 (0.59,1.11)	0.190	
High RH	251	1.00 (0.73,1.39)	0.979	
Low plus High RH	499	0.90 (0.70,1.15)	0.388	

[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 K-3-25.
Analysis of Intermittent Claudication and Vascular Insufficiency (ICVI) Index Total Cholesterol, HDL, Body Fat, and Diabetic Class 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
513	1.09 (0.74,1.62)	0.663	AGE (p=0.012) CSMOK (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	1,019			AGE (p<0.001) PACKYR (p=0.487) DRKYR (p=0.336) HRTDIS (p=0.128) CSMOK (p=0.004)
Background RH	359	1.20 (0.58,2.48)	0.696	
Low RH	243	1.44 (0.63,3.28)	0.459	
High RH	249	2.05 (0.94,4.45)	0.082	
Low plus High RH	492	1.65 (0.88,3.09)	0.121	

[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 K-3-25. (Continued)
Analysis of Intermittent Claudication and Vascular Insufficiency (ICVI) Index
Total Cholesterol, HDL, Body Fat, and Diabetic Class 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	884	1.11 (0.86,1.44)	0.439	AGE (p=0.003) CSMOK (p=0.008)
5	884	1.20 (0.96,1.50)	0.108	AGE (p=0.002) CSMOK (p=0.008)
6[c]	883	1.02 (0.79,1.30)	0.905	AGE (p=0.003) CSMOK (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.

APPENDIX K-4.

Interaction Tables for the Cardiovascular Assessment Occupation, Body Fat, Total Cholesterol, HDL, and Diabetic Class Removed from Final Model

This appendix contains results of exposure analyses of interactions between covariates and dioxin, after occupation, percent body fat, total cholesterol, HDL, and diabetic class have been removed from those final statistical models that used dioxin as a measure of exposure (Models 2 through 6) and contained any of these covariates. These tables are supplements to tables in Appendix K-3, which are main effects results with these covariates removed from the model. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The analysis model, the covariate involved in the interaction, and a reference to the analysis table in Chapter 15, Cardiovascular Assessment, are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix K-4 Table	Chapter 15 Table	Appendix K-3 Table	Dependent Variable	Model	Covariate
K-4-1	15-5	K-3-3	Verified Myocardial Infarction	4 5 6	Race Race Race
K-4-2	15-8	K-3-6	Heart Sounds	2 3	Age Age
K-4-3	15-10	K-3-8	ECG: Right Bundle Branch Block (RBBB)	2	Lifetime Cigarette Smoking History
K-4-4	15-12	K-3-9	ECG: Non-Specific ST- and T-Wave Changes	3	Lifetime Cigarette Smoking History
K-4-5	15-13	K-3-10	ECG: Bradycardia	3 4 5 6	Personality Type Personality Type Personality Type Personality Type
K-4-6	15-15	K-3-11	ECG: Arrhythmia	2	Current Cigarette Smoking
K-4-7	15-18	K-3-14	Diastolic Blood Pressure (Continuous)	3	History of Heart Disease
K-4-8	15-19	K-3-15	Diastolic Blood Pressure (Discrete)	3	History of Heart Disease

Appendix K-4 Table	Chapter 15 Table	Appendix K-3 Table	Dependent Variable	Model	Covariate
K-4-9	15-20	K-3-16	Funduscopic Examination	2	Race
K-4-10	15-21	K-3-17	Carotid Bruits	2 6	Lifetime Cigarette Smoking History, History of Heart Disease History of Heart Disease
K-4-11	15-25	K-3-20	Dorsalis Pedis Pulses	3	Age
K-4-12	15-26	K-3-21	Posterior Tibial Pulses	2 3	Lifetime Cigarette Smoking History Current Cigarette Smoking
K-4-13	15-27	K-3-22	Leg Pulses	2	Personality Type
K-4-14	15-28	K-3-23	Peripheral Pulses	2	Personality Type

Table K-4-1.
Interaction Table for Verified Myocardial Infarction
Occupation and HDL Removed from Final Model

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 15-5 and K-3-3)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	277	5.8	1.19 (0.98,1.44)	0.086
	Medium	267	6.4		
	High	277	9.0		
Black	Low	12	8.3	0.09 (0.00,5.71)	0.252
	Medium	21	0.0		
	High	16	0.0		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 15-5 and K-3-3)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Yes	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	280	5.4	1.17 (0.99,1.39)	0.068
	Medium	265	6.0		
	High	276	9.8		
Black	Low	13	7.7	0.13 (0.01,2.94)	0.200
	Medium	22	0.0		
	High	14	0.0		

Table K-4-1. (Continued)
Interaction Table for Verified Myocardial Infarction
Occupation and HDL Removed from Final Model

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Tables 15-5 and K-3-3)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Yes**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Non-Black	Low	279	5.0	1.15 (0.96,1.39)	0.138
	Medium	265	6.0		
	High	276	9.8		
Black	Low	13	7.7	0.12 (0.01,3.00)	0.199
	Medium	22	0.0		
	High	14	0.0		

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

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 K-4-2.
Interaction Table for Heart Sounds
Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Age: Tables 15-8 and K-3-6)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Born ≥ 1942	Low	54	22.2	0.79 (0.62,1.02)	0.069
	Medium	71	26.8		
	High	111	13.5		
Born < 1942	Low	113	21.2	1.16 (0.92,1.47)	0.199
	Medium	96	22.9		
	High	59	27.1		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Age: Tables 15-8 and K-3-6)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Born ≥ 1942	Comparison	445	20.0		
	Background RH	127	17.3	0.89 (0.53,1.49)	0.648
	Low RH	84	23.8	1.26 (0.72,2.19)	0.422
	High RH	154	17.5	0.83 (0.51,1.34)	0.440
	Low plus High RH	238	19.7	0.97 (0.65,1.44)	0.878
Born < 1942	Comparison	597	19.6		
	Background RH	241	20.7	1.11 (0.76,1.61)	0.591
	Low RH	169	20.7	1.05 (0.69,1.61)	0.820
	High RH	105	25.7	1.45 (0.68,3.13)	0.338
	Low plus High RH	274	22.6	1.20 (0.84,1.70)	0.319

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-4-3.
Interaction Table for Right Bundle Branch Block (RBBB)
Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Lifetime Cigarette Smoking History: Tables 15-10 and K-3-8)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
0 Pack-years	Low	45	0.0	1.17 (0.24,5.68)	0.845
	Medium	38	2.6		
	High	53	0.0		
>0-10 Pack-years	Low	52	0.0	3.97 (1.08,14.61)	0.038
	Medium	44	0.0		
	High	65	3.1		
>10 Pack-years	Low	72	4.2	0.71 (0.30,1.70)	0.447
	Medium	90	3.3		
	High	54	0.0		

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

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

Table K-4-4.
Interaction Table for ECG: Non-Specific ST- and T-Wave Changes
Body Fat, Total Cholesterol, and Diabetic Class Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Lifetime Cigarette Smoking History: Tables 15-12 and K-3-9)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Comparison	276	14.9		
	Background RH	109	8.3	0.48 (0.22,1.05)	0.068
	Low RH	69	13.0	0.67 (0.30,1.48)	0.320
	High RH	67	13.4	0.86 (0.38,1.94)	0.714
	Low plus High RH	136	13.2	0.75 (0.40,1.39)	0.363
>0-10 Pack-years	Comparison	319	11.6		
	Background RH	108	5.6	0.48 (0.19,1.20)	0.117
	Low RH	69	20.3	1.71 (0.84,3.45)	0.137
	High RH	92	7.6	0.72 (0.30,1.72)	0.454
	Low plus High RH	161	13.0	1.17 (0.64,2.11)	0.613
>10 Pack-years	Comparison	448	17.0		
	Background RH	153	15.7	0.95 (0.56,1.59)	0.833
	Low RH	116	17.2	0.87 (0.50,1.53)	0.630
	High RH	100	20.0	1.43 (0.81,2.52)	0.223
	Low plus High RH	216	18.5	1.09 (0.70,1.70)	0.692

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-4-5.
Interaction Table for ECG: Bradycardia
Total Cholesterol, HDL Cholesterol, Body Fat, and Diabetic Class Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Personality Type: Tables 15-13 and K-3-10)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Type A	Comparison	438	3.0		
	Background RH	175	2.9	1.08 (0.38,3.13)	0.883
	Low RH	111	5.4	1.97 (0.72,5.35)	0.184
	High RH	100	3.0	0.93 (0.26,3.38)	0.912
	Low plus High RH	211	4.3	1.45 (0.60,3.47)	0.406
Type B	Comparison	607	1.6		
	Background RH	196	6.6	3.80 (1.62,8.93)	0.002
	Low RH	142	1.4	0.86 (0.18,3.98)	0.843
	High RH	159	0.0	--	--
	Low plus High RH	301	0.7	0.38 (0.08,1.78)	0.221

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Personality Type: Tables 15-13 and K-3-10)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Type A	Low	136	3.7	1.06 (0.73,1.54)	0.759
	Medium	130	3.8		
	High	114	3.5		
Type B	Low	154	7.1	0.40 (0.24,0.68)	0.001
	Medium	155	2.6		
	High	174	0.0		

Table K-4-5. (Continued)
Interaction Table for ECG: Bradycardia
Total Cholesterol, HDL Cholesterol, Body Fat, and Diabetic Class Removed from Final Model

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Personality Type: Tables 15-13 and K-3-10)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Type A	Low	128	3.1	0.94 (0.69,1.29)	0.704
	Medium	136	4.4		
	High	116	3.4		
Type B	Low	166	6.0	0.54 (0.38,0.76)	<0.001
	Medium	147	3.4		
	High	170	0.0		

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Personality Type: Tables 15-13 and K-3-10)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Type A	Low	127	3.1	0.99 (0.70,1.38)	0.932
	Medium	136	4.4		
	High	116	3.4		
Type B	Low	166	6.0	0.57 (0.40,0.81)	0.002
	Medium	147	3.4		
	High	170	0.0		

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

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 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 K-4-6.
Interaction Table for ECG: Arrhythmia
Diabetic Class and HDL Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Current Cigarette Smoking: Tables 15-15 and K-3-11)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
0-Never Smoked	Low	45	2.2	1.71 (1.06,2.77)	0.029
	Medium	38	2.6		
	High	53	11.3		
0-Former Smoker	Low	88	6.8	1.06 (0.66,1.71)	0.810
	Medium	80	3.8		
	High	67	3.0		
>0-20 Cigarettes/Day	Low	24	12.5	0.52 (0.23,1.16)	0.111
	Medium	30	13.3		
	High	34	0.0		
>20 Cigarettes/Day	Low	12	8.3	0.36 (0.06,2.00)	0.242
	Medium	24	8.3		
	High	18	0.0		

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

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

Table K-4-7.
Interaction Table for Diastolic Blood Pressure (mm Hg) (Continuous) Cholesterol, Body Fat, and Diabetic Class Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Family History of Heart Disease: Tables 15-18 and K-3-14)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)**	**p-Value**
No	Comparison	451	72.90		
	Background RH	139	73.64	0.74 (-1.05,2.53)	0.419
	Low RH	113	73.76	0.86 (-1.07,2.80)	0.384
	High RH	108	72.45	-0.45 (-2.42,1.53)	0.658
	Low plus High RH	221	73.11	0.23 (-1.29,1.74)	0.770
Yes	Comparison	584	74.07		
	Background RH	225	72.45	-1.62 (-3.07,-0.18)	0.028
	Low RH	136	72.22	-1.85 (-3.61,-0.10)	0.039
	High RH	148	74.65	0.58 (-1.12,2.28)	0.506
	Low plus High RH	284	73.48	-0.59 (-1.92,0.75)	0.390

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-4-8.
Interaction Table for Diastolic Blood Pressure (Discrete)
Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Family History of Heart Disease: Tables 15-19 and K-3-15)					
Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
No	Comparison	450	3.3		
	Background RH	139	3.6	1.27 (0.45,3.59)	0.657
	Low RH	112	4.5	1.50 (0.53,4.28)	0.444
	High RH	108	2.8	0.68 (0.19,2.44)	0.555
	Low plus High RH	220	3.6	1.04 (0.43,2.52)	0.925
Yes	Comparison	584	2.9		
	Background RH	225	1.3	0.48 (0.14,1.67)	0.248
	Low RH	136	0.0	--	--
	High RH	148	5.4	1.79 (0.75,4,28)	0.192
	Low plus High RH	284	2.8	0.91 (0.38,2.15)	0.822

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-4-9.
Interaction Table for Funduscopic Examination
Occupation, Body Fat, and Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Race: Tables 15-20 and K-3-16)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	151	4.6	1.20 (0.94,1.52)	0.144
	Medium	162	8.0		
	High	162	9.9		
Black	Low	16	12.5	0.04 (0.00,2.30)	0.121
	Medium	9	0.0		
	High	9	0.0		

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

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

Table K-4-10.
Interaction Table for Carotid Bruits
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Lifetime Cigarette Smoking History: Tables 15-21 and K-3-17)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	43	4.6	0.47 (0.06,3.39)	0.453
	Medium	35	0.0		
	High	49	0.0		
>0-10 Pack-years	Low	51	5.9	0.47 (0.18,1.24)	0.125
	Medium	42	2.4		
	High	63	1.6		
>10 Pack-years	Low	70	0.0	2.50 (0.89,7.00)	0.082
	Medium	86	1.2		
	High	53	1.9		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Family History of Heart Disease: Tables 15-21 and K-3-17)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
No	Low	69	2.9	0.27 (0.03,2.65)	0.263
	Medium	74	0.0		
	High	73	0.0		
Yes	Low	95	3.2	1.06 (0.59,1.93)	0.841
	Medium	89	2.2		
	High	92	2.2		

Table K-4-10. (Continued)
Interaction Table for Carotid Bruits
Cholesterol Removed from Final Model

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Family History of Heart Disease: Tables 15-21 and K-3-17)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
No	Low	110	1.8	0.39 (0.23,0.67)	0.001
	Medium	119	1.7		
	High	125	0.0		
Yes	Low	179	2.2	1.07 (0.70,1.62)	0.761
	Medium	161	2.5		
	High	156	2.6		

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table K-4-11.
Interaction Table for Dorsalis Pedis Pulses
Diabetic Class Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 15-25 and K-3-20)					
Stratum	**Dioxin Category**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Born ≥ 1942	Comparison	447	6.7		
	Background RH	126	4.8	0.65 (0.26,1.62)	0.355
	Low RH	84	4.8	0.68 (0.23,1.98)	0.478
	High RH	153	5.2	0.78 (0.34,1.75)	0.544
	Low plus High RH	237	5.1	0.74 (0.37,1.49)	0.399
Born < 1942	Comparison	596	8.2		
	Background RH	243	11.1	1.41 (0.83,2.35)	0.183
	Low RH	170	9.4	1.13 (0.62,2.07)	0.687
	High RH	105	16.2	2.07 (1.13,3.82)	0.019
	Low plus High RH	275	12.0	1.48 (0.92,2.38)	0.110

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-4-12.
Interaction Table for Posterior Tibial Pulses
Occupation, HDL, Body Fat, and Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Lifetime Cigarette Smoking History: Tables 15-26 and K-3-21)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
0-10 Pack-years	Low	96	1.0	1.22 (0.58,2.60)	0.600
	Medium	80	1.3		
	High	116	1.7		
>10 Pack-years	Low	71	9.9	0.78 (0.46,1.34)	0.372
	Medium	88	9.1		
	High	54	3.7		

Table K-4-12. (Continued)
Interaction Table for Posterior Tibial Pulses
Occupation, HDL, Body Fat, and Diabetic Class Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY -- ADJUSTED (Dioxin Category-by-Current Cigarette Smoking: Tables 15-26 and K-3-21)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[b]	p-Value
0-Never Smoked	Comparison	277	0.7		
	Background RH	109	1.8	2.24 (0.97,5.19)	0.060
	Low RH	69	0.0	--	--
	High RH	67	0.0	--	--
	Low plus High RH	136	0.0	--	--
0-Former Smoker	Comparison	520	1.9		
	Background RH	170	2.4	1.20 (0.52,2.78)	0.670
	Low RH	123	3.3	1.47 (0.45,4.77)	0.519
	High RH	112	2.7	2.04 (0.92,4.50)	0.079
	Low plus High RH	235	3.0	1.70 (0.64,4.55)	0.290
>0-20 Cigarettes/Day	Comparison	149	2.0		
	Background RH	56	7.1	3.11 (1.34,7.21)	0.008
	Low RH	39	7.7	3.87 (0.89,16.76)	0.070
	High RH	49	12.2	11.83 (5.35,26.17)	<0.001
	Low plus High RH	88	10.2	6.98 (2.12,22.98)	0.001
>20 Cigarettes/Day	Comparison	97	9.3		
	Background RH	36	0.0	--	--
	Low RH	23	13.0	1.81 (0.40,8.27)	0.443
	High RH	31	12.9	1.97 (0.89,4.35)	0.095
	Low plus High RH	54	13.0	1.88 (0.51,6.94)	0.345

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table K-4-13.
Interaction Table for Leg Pulses
Occupation and Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Personality Type: Tables 15-27 and K-3-22)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Type A	Low	78	14.1	0.80 (0.53,1.21)	0.282
	Medium	70	12.9		
	High	62	3.2		
Type B	Low	90	3.3	1.40 (1.05,1.87)	0.023
	Medium	102	12.7		
	High	109	11.0		

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

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

Table K-4-14.
Interaction Table for Peripheral Pulses
Occupation and Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Personality Type: Tables 15-28 and K-3-23)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Type A	Low	78	14.1	0.80 (0.53,1.21)	0.282
	Medium	70	12.9		
	High	62	3.2		
Type B	Low	90	3.3	1.40 (1.05,1.87)	0.023
	Medium	102	12.7		
	High	109	11.0		

[a] Relative risk for a twofo!d increase in initial dioxin.

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

APPENDIX L-1.

Dependent Variable-Covariate Associations for the Hematology Assessment

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

Table L-1-1.
Dependent Variable-Covariate Associations for the Hematology Assessment

Dependent Variable	Level	Age: Born ≥1942	Age: Born <1942	Age: p-Value	Race: Black	Race: Non-Black	Race: p-Value
Red Blood Cell (RBC) Count (million/mm^3)		(n=2,224)			(n=131)	(n=2,093)	
(continuous)		r=-0.143		<0.001	$\bar{x}$=5.11	$\bar{x}$=5.01	0.021
(discrete)		(n=950)	(n=1,274)				
	Abnormal Low	1.8%	3.5%	0.047	3.1%	2.8%	<0.001
	Abnormal High	1.3%	1.3%		5.3%	1.1%	
White Blood Cell (WBC) Count (thousand/mm^3)		(n=2,224)			(n=131)	(n=2,093)	
(continuous)[a]		r=-0.002		0.908	$\bar{x}$=6.58	$\bar{x}$=7.43	<0.001
(discrete)		(n=950)	(n=1,274)				
	Abnormal Low	4.6%	3.0%	0.124	13.0%	3.1%	<0.001
	Abnormal High	5.5%	5.7%		3.1%	5.7%	
Hemoglobin (gm/dl)		(n=2,224)			(n=131)	(n=2,093)	
(continuous)		r=-0.089		<0.001	$\bar{x}$=15.41	$\bar{x}$=15.89	<0.001
(discrete)		(n=950)	(n=1,274)				
	Abnormal Low	2.2%	3.0%	0.469	7.6%	2.3%	0.001
	Abnormal High	1.7%	2.0%		0.8%	1.9%	
Hematocrit (percent)		(n=2,224)			(n=131)	(n=2,093)	
(continuous)		r=-0.067		0.002	$\bar{x}$=45.48	$\bar{x}$=46.33	0.003
(discrete)		(n=950)	(n=1,274)				
	Abnormal Low	1.1%	1.7%	0.254	3.8%	1.3%	0.048
Platelet Count (thousand/mm^3)		(n=2,223)			(n=131)	(n=2,092)	
(continuous)[b]		r=-0.114		<0.001	$\bar{x}$=247.2	$\bar{x}$=251.6	0.378
(discrete)		(n=950)	(n=1,273)				
	Abnormal High	1.3%	1.0%	0.740	0.8%	1.2%	0.999
Prothrombin Time (seconds)		(n=2,045)			(n=123)	(n=1,922)	
(continuous)[a]		r=0.031		0.155	$\bar{x}$=12.09	$\bar{x}$=11.93	0.018
(discrete)		(n=899)	(n=1,146)				
	High	0.2%	1.1%	0.033	0.8%	0.7%	0.999
RBC Morphology		(n=950)	(n=1,274)		(n=131)	(n=2,093)	
	Abnormal	38.8%	50.5%	<0.001	56.5%	44.8%	0.012
Absolute Neutrophils (segs) (thousand/mm^3)[a]		(n=2,224)			(n=131)	(n=2,093)	
		r=0.006		0.765	$\bar{x}$=3.54	$\bar{x}$=4.28	<0.001

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

[b]Means transformed from square root scale; correlations based on square root versus covariate.

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

Table L-1-1. (Continued)
Dependent Variable-Covariate Associations for the Hematology Assessment

Dependent Variable	Level	Occupation			
		Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value
Red Blood Cell (RBC) Count (million/mm^3)		(n=865)	(n=363)	(n=996)	
(continuous)		$\bar{x}$=4.96	$\bar{x}$=5.02	$\bar{x}$=5.07	<0.001
(discrete)	Abnormal Low	3.9%	1.9%	2.1%	0.029
	Abnormal High	0.7%	1.7%	1.7%	
White Blood Cell (WBC) Count (thousand/mm^3)		(n=865)	(n=363)	(n=996)	
(continuous)[a]		$\bar{x}$=6.95	$\bar{x}$=7.77	$\bar{x}$=7.62	<0.001
(discrete)	Abnormal Low	4.1%	4.1%	3.2%	0.002
	Abnormal High	3.4%	8.8%	6.3%	
Hemoglobin (gm/dl)		(n=865)	(n=363)	(n=996)	
(continuous)		$\bar{x}$=15.78	$\bar{x}$=15.90	$\bar{x}$=15.93	0.007
(discrete)	Abnormal Low	3.1%	2.5%	2.3%	0.617
	Abnormal High	2.1%	1.1%	1.9%	
Hematocrit (percent)		(n=865)	(n=363)	(n=996)	
(continuous)		$\bar{x}$=45.98	$\bar{x}$=46.42	$\bar{x}$=46.49	0.001
(discrete)	Abnormal Low	2.0%	1.4%	1.0%	0.220
Platelet Count (thousand/mm^3)		(n=864)	(n=363)	(n=996)	
(continuous)[b]		$\bar{x}$=243.9	$\bar{x}$=251.9	$\bar{x}$=257.6	<0.001
(discrete)	Abnormal High	0.5%	1.1%	1.7%	0.040
Prothrombin Time (seconds)		(n=793)	(n=327)	(n=925)	
(continuous)[a]		$\bar{x}$=11.92	$\bar{x}$=11.97	$\bar{x}$=11.95	0.519
(discrete)	High	1.0%	1.2%	0.3%	0.133
RBC Morphology		(n=865)	(n=363)	(n=996)	
	Abnormal	47.3%	49.0%	42.7%	0.046
Absolute Neutrophils (segs) (thousand/mm^3)[a]		(n=865)	(n=363)	(n=996)	
		$\bar{x}$=3.96	$\bar{x}$=4.45	$\bar{x}$=4.40	<0.001

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

[b]Means transformed from square root scale; correlations based on square root versus covariate.

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

Table L-1-1. (Continued)
Dependent Variable-Covariate Associations for the Hematology Assessment

Dependent Variable	Level	Current Cigarette Smoking (cigarettes/day) 0-Never	0-Former	>0-20	>20	p-Value
Red Blood Cell (RBC) Count (million/mm^3) (continuous)			(n=2,222) r=0.083			<0.001
(discrete)		(n=608)	(n=1,054)	(n=349)	(n=211)	
	Abnormal Low	2.6%	3.5%	1.4%	1.9%	0.423
	Abnormal High	1.0%	1.3%	1.7%	1.4%	
White Blood Cell (WBC) Count (thousand/mm^3) (continuous)[a]			(n=2,222) r=0.438			<0.001
(discrete)		(n=608)	(n=1,054)	(n=349)	(n=211)	
	Abnormal Low	6.3%	3.8%	0.9%	0.0%	<0.001
	Abnormal High	0.7%	2.0%	13.5%	24.6%	
Hemoglobin (gm/dl) (continuous)			(n=2,222) r=0.227			<0.001
(discrete)		(n=608)	(n=1,054)	(n=349)	(n=211)	
	Abnormal Low	3.0%	3.2%	2.0%	0.0%	<0.001
	Abnormal High	0.7%	1.0%	4.0%	5.7%	
Hematocrit (percent) (continuous)			(n=2,222) r=0.239			<0.001
(discrete)		(n=608)	(n=1,054)	(n=349)	(n=211)	
	Abnormal Low	1.6%	2.0%	0.3%	0.0%	0.032
Platelet Count (thousand/mm^3) (continuous)[b]			(n=2,221) r=0.109			<0.001
(discrete)		(n=607)	(n=1,054)	(n=349)	(n=211)	
	Abnormal High	0.8%	0.8%	1.4%	3.3%	0.011
Prothrombin Time (seconds) (continuous)[a]			(n=2,043) r=-0.140			<0.001
(discrete)		(n=558)	(n=966)	(n=319)	(n=200)	
	High	0.5%	1.1%	0.3%	0.0%	0.194
RBC Morphology		(n=608)	(n=1,054)	(n=349)	(n=211)	
	Abnormal	45.2%	47.4%	42.4%	41.7%	0.242
Absolute Neutrophils (segs) (thousand/mm^3)[a]			(n=2,222) r=0.426			<0.001

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

[b]Means transformed from square root scale; correlations based on square root versus covariate.

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

Table L-1-1. (Continued)
Dependent Variable-Covariate Associations for the Hematology Assessment

Dependent Variable	Level	Lifetime Cigarette Smoking History (pack-years) 0	>0-10	>10	p-Value
Red Blood Cell (RBC) Count (million/mm^3)			(n=2,221)		
(continuous)			r=-0.029		0.169
(discrete)		(n=608)	(n=679)	(n=934)	
	Abnormal Low	2.6%	2.1%	3.4%	0.293
	Abnormal High	1.0%	1.0%	1.7%	
White Blood Cell (WBC) Count (thousand/mm^3)			(n=2,221)		
(continuous)[a]			r=0.245		<0.001
(discrete)		(n=608)	(n=679)	(n=934)	
	Abnormal Low	6.3%	3.2%	2.3%	<0.001
	Abnormal High	0.7%	5.2%	9.1%	
Hemoglobin (gm/dl)			(n=2,221)		
(continuous)			r=0.057		0.007
(discrete)		(n=608)	(n=679)	(n=934)	
	Abnormal Low	3.0%	2.5%	2.6%	0.103
	Abnormal High	0.7%	1.9%	2.6%	
Hematocrit (percent)			(n=2,221)		
(continuous)			r=0.072		<0.001
(discrete)		(n=608)	(n=679)	(n=934)	
	Abnormal Low	1.6%	2.1%	0.9%	0.118
Platelet Count (thousand/mm^3)			(n=2,220)		
(continuous)[b]			r=0.091		<0.001
(discrete)		(n=607)	(n=679)	(n=934)	
	Abnormal High	0.8%	1.3%	1.2%	0.683
Prothrombin Time (seconds)			(n=2,042)		
(continuous)[a]			r=-0.060		0.007
(discrete)		(n=558)	(n=641)	(n=843)	
	High	0.5%	0.9%	0.7%	0.719
RBC Morphology		(n=608)	(n=679)	(n=934)	
	Abnormal	45.2%	45.8%	45.5%	0.979
Absolute Neutrophils (segs) (thousand/mm^3)[a]			(n=2,221)		
			r=0.242		<0.001

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

[b]Means transformed from square root scale; correlations based on square root versus covariate.

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

Table L-1-1. (Continued)
Dependent Variable-Covariate Associations for the Hematology Assessment

Dependent Variable	Level	Age: Born ≥1942	Age: Born <1942	Age: p-Value	Race: Black	Race: Non-Black	Race: p-Value
Absolute Neutrophils (bands) (thousand/mm^3) (continuous)[a] (discrete)	Nonzero	(n=1,852) r=0.035		0.133	(n=88) $\bar{x}$=0.185	(n=1,764) $\bar{x}$=0.261	0.003
	Zero	(n=950) 17.4%	(n=1,274) 16.3%	0.520	(n=131) 32.8%	(n=2,093) 15.7%	<0.001
Absolute Lymphocytes (thousand/mm^3)[a]		(n=2,224) r=-0.019		0.375	(n=131) $\bar{x}$=2.15	(n=2,093) $\bar{x}$=2.08	0.332
Absolute Monocytes (thousand/mm^3)[b]		(n=2,224) r=0.013		0.530	(n=131) $\bar{x}$=0.459	(n=2,093) $\bar{x}$=0.491	0.151
Absolute Eosinophils (thousand/mm^3) (continuous)[a] (discrete)	Nonzero	(n=1,965) r=-0.001		0.978	(n=118) $\bar{x}$=0.189	(n=1,847) $\bar{x}$=0.220	0.021
	Zero	(n=950) 11.3%	(n=1,274) 11.9%	0.675	(n=131) 9.9%	(n=2,093) 11.8%	0.622
Absolute Basophils (thousand/mm^3) (continuous)[a] (discrete)	Nonzero	(n=1,219) r=-0.009		0.768	(n=65) $\bar{x}$=0.091	(n=1,154) $\bar{x}$=0.101	0.178
	Zero	(n=950) 43.6%	(n=1,274) 46.4%	0.203	(n=131) 50.4%	(n=2,093) 44.9%	0.254

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

[b]Means transformed from square root scale; correlations based on square root versus covariate.

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

Table L-1-1. (Continued)
Dependent Variable-Covariate Associations for the Hematology Assessment

Dependent Variable	Level	Occupation: Officer	Occupation: Enlisted Flyer	Occupation: Enlisted Groundcrew	p-Value
Absolute Neutrophils (bands) (thousand/mm^3) (continuous)[a] (discrete)	Nonzero	(n=732) $\bar{x}$=0.255	(n=301) $\bar{x}$=0.267	(n=819) $\bar{x}$=0.255	0.730
	Zero	(n=865) 15.4%	(n=363) 17.1%	(n=996) 17.8%	0.378
Absolute Lymphocytes (thousand/mm^3)[a]		(n=865) $\bar{x}$=1.94	(n=363) $\bar{x}$=2.24	(n=996) $\bar{x}$=2.16	<0.001
Absolute Monocytes (thousand/mm^3)[b]		(n=865) $\bar{x}$=0.485	(n=363) $\bar{x}$=0.490	(n=996) $\bar{x}$=0.493	0.775
Absolute Eosinophils (thousand/mm^3) (continuous)[a] (discrete)	Nonzero	(n=756) $\bar{x}$=0.215	(n=326) $\bar{x}$=0.229	(n=883) $\bar{x}$=0.217	0.484
	Zero	(n=865) 12.6%	(n=363) 10.2%	(n=996) 11.4%	0.449
Absolute Basophils (thousand/mm^3) (continuous)[a] (discrete)	Nonzero	(n=478) $\bar{x}$=0.097	(n=202) $\bar{x}$=0.106	(n=539) $\bar{x}$=0.101	0.126
	Zero	(n=865) 44.7%	(n=363) 44.4%	(n=996) 45.9%	0.832

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

[b]Means transformed from square root scale; correlations based on square root versus covariate.

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

Table L-1-1. (Continued)
Dependent Variable-Covariate Associations for the Hematology Assessment

Dependent Variable	Level	Current Cigarette Smoking (cigarettes/day) 0-Never	0-Former	>0-20	>20	p-Value
Absolute Neutrophils (bands) (thousand/mm^3) (continuous)[a] (discrete)			(n=1,850) r=0.229			<0.001
	Nonzero	(n=608)	(n=1,054)	(n=349)	(n=211)	
	Zero	17.8%	17.9%	13.5%	13.3%	0.110
Absolute Lymphocytes (thousand/mm^3)[a]			(n=2,222) r=0.164			<0.001
Absolute Monocytes (thousand/mm^3)[b]			(n=2,222) r=0.184			<0.001
Absolute Eosinophils (thousand/mm^3) (continuous)[a] (discrete)			(n=1,963) r=0.147			<0.001
	Nonzero	(n=608)	(n=1,054)	(n=349)	(n=211)	
	Zero	13.2%	11.0%	10.6%	12.3%	0.526
Absolute Basophils (thousand/mm^3) (continuous)[a] (discrete)			(n=1,218) r=0.199			<0.001
	Nonzero	(n=608)	(n=1,054)	(n=349)	(n=211)	
	Zero	44.7%	43.3%	47.3%	52.6%	0.074

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

[b]Means transformed from square root scale; correlations based on square root versus covariate.

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

Table L-1-1. (Continued)
Dependent Variable-Covariate Associations for the Hematology Assessment

Dependent Variable	Level	Lifetime Cigarette Smoking History (pack-years) 0	>0-10	>10	p-Value
Absolute Neutrophils (bands) (thousand/mm^3) (continuous)[a] (discrete)	Nonzero		(n=1,849) r=0.129		<0.001
	Zero	(n=608) 17.8%	(n=679) 18.9%	(n=934) 14.6%	0.055
Absolute Lymphocytes (thousand/mm^3)[a]			(n=2,221) r=0.087		<0.001
Absolute Monocytes (thousand/mm^3)[b]			(n=2,221) r=0.109		<0.001
Absolute Eosinophils (thousand/mm^3) (continuous)[a] (discrete)	Nonzero		(n=1,962) r=0.080		<0.001
	Zero	(n=608) 13.2%	(n=679) 10.3%	(n=934) 11.7%	0.283
Absolute Basophils (thousand/mm^3) (continuous)[a] (discrete)	Nonzero		(n=1,217) r=0.105		<0.001
	Zero	(n=608) 44.7%	(n=679) 44.5%	(n=934) 46.0%	0.794

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

[b]Means transformed from square root scale; correlations based on square root versus covariate.

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

APPENDIX L-2.

Interaction Tables for the Hematology Assessment

This appendix contains exposure analyses results of interactions between covariates and group or dioxin. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Means are transformed back to the original scale, if necessary. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The covariate involved in the interaction and a reference to the analysis table in Chapter 16 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix L-2 Table	Chapter 16 Table	Dependent Variable	Model	Covariate
L-2-1	16-3	Red Blood Cell (RBC) Count (Continuous)	1 3	Current Cigarette Smoking Current Cigarette Smoking
L-2-2	16-5	White Blood Cell (WBC) Count (Continuous)	1 2 4 5 6	Race Race, Occupation Race Race Race
L-2-3	16-6	White Blood Cell (WBC) Count (Discrete)	4 5 6	Race Race Race
L-2-4	16-7	Hemoglobin (Continuous)	1 3	Current Cigarette Smoking, Lifetime Cigarette Smoking History Current Cigarette Smoking, Lifetime Cigarette Smoking History
L-2-5	16-9	Hematocrit (Continuous)	1 3	Current Cigarette Smoking, Lifetime Cigarette Smoking History Current Cigarette Smoking, Lifetime Cigarette Smoking History
L-2-6	16-13	Prothrombin Time (Continuous)	3	Age
L-2-7	16-14	Prothrombin Time (Discrete)	4	Lifetime Cigarette Smoking History
L-2-8	16-16	Absolute Neutrophils (segs)	2 4 5 6	Race Race Race Race

Appendix L-2 Table	Chapter 16 Table	Dependent Variable	Model	Covariate
L-2-9	16-17	Absolute Neutrophils (bands)	2	Lifetime Cigarette Smoking History, Occupation
			3	Lifetime Cigarette Smoking History
			4	Lifetime Cigarette Smoking History
			5	Lifetime Cigarette Smoking History
			6	Lifetime Cigarette Smoking History
L-2-10	16-19	Absolute Monocytes	1	Race
L-2-11	16-20	Absolute Eosinophils	2	Age, Occupation
			6	Occupation
L-2-12	16-21	Absolute Basophils	5	Race
			6	Race

Table L-2-1.
Interaction Table for Red Blood Cell (RBC) Count (million/mm^3)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Current Cigarette Smoking: Table 16-3)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean**	**Difference of Adjusted Means (95% C.I.)**	**p-Value**
0-Never Smoked	***All***	***Ranch Hand***	***254***	***5.036***	***-0.028 (-0.089,0.033)***	***0.373***
		Comparison	***354***	***5.064***		
0-Former Smoker	***All***	***Ranch Hand***	***436***	***5.000***	***-0.043 (-0.090,0.004)***	***0.070***
		Comparison	***617***	***5.044***		
>0-20 Cigarettes/Day	***All***	***Ranch Hand***	***158***	***5.067***	***-0.006 (-0.087,0.074)***	***0.879***
		Comparison	***191***	***5.074***		
>20 Cigarettes/Day	***All***	***Ranch Hand***	***97***	***5.163***	***0.094 (-0.010,0.197)***	***0.076***
		Comparison	***114***	***5.070***		
0-Never Smoked	Officer	Ranch Hand	134	4.986	-0.003 (-0.087,0.081)	0.940
		Comparison	194	4.989		
	Enlisted Flyer	Ranch Hand	25	5.058	-0.048 (-0.256,0.159)	0.647
		Comparison	27	5.107		
	Enlisted Groundcrew	Ranch Hand	95	5.064	-0.061 (-0.162,0.039)	0.231
		Comparison	133	5.125		
0-Former Smoker	Officer	Ranch Hand	178	4.972	-0.036 (-0.110,0.038)	0.339
		Comparison	242	5.008		
	Enlisted Flyer	Ranch Hand	84	4.967	-0.104 (-0.213,0.005)	0.062
		Comparison	106	5.071		
	Enlisted Groundcrew	Ranch Hand	174	5.031	-0.023 (-0.096,0.049)	0.527
		Comparison	269	5.054		
>0-20 Cigarettes/Day	Officer	Ranch Hand	33	5.060	0.011 (-0.170,0.192)	0.906
		Comparison	35	5.049		
	Enlisted Flyer	Ranch Hand	28	4.948	-0.150 (-0.328,0.028)	0.099
		Comparison	47	5.098		
	Enlisted Groundcrew	Ranch Hand	97	5.117	0.032 (-0.073,0.136)	0.552
		Comparison	109	5.085		
>20 Cigarettes/Day	Officer	Ranch Hand	18	5.241	0.229 (0.007,0.452)	0.044
		Comparison	30	5.012		
	Enlisted Flyer	Ranch Hand	25	5.259	0.167 (-0.054,0.389)	0.138
		Comparison	21	5.092		
	Enlisted Groundcrew	Ranch Hand	54	5.109	0.009 (-0.129,0.148)	0.896
		Comparison	63	5.099		

Table L-2-1. (Continued)
Interaction Table for Red Blood Cell (RBC) Count (million/mm^3)
(Continuous)

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Current Cigarette Smoking: Table 16-3)

Stratum	Dioxin Category	n	Adjusted Mean	Difference of Adjusted Mean vs. Comparisons (95% C.I.)	p-Value
0-Never Smoked	Comparison	282	5.068		
	Background RH	108	5.036	-0.032 (-0.116,0.052)	0.459
	Low RH	72	5.051	-0.017 (-0.114,0.080)	0.732
	High RH	65	4.992	-0.075 (-0.179,0.028)	0.154
	Low plus High RH	137	5.023	-0.045 (-0.122,0.033)	0.258
0-Former Smoker	Comparison	528	5.044		
	Background RH	168	4.996	-0.048 (-0.114,0.018)	0.156
	Low RH	126	5.004	-0.040 (-0.113,0.033)	0.282
	High RH	113	5.001	-0.043 (-0.121,0.034)	0.277
	Low plus High RH	239	5.003	-0.042 (-0.099,0.016)	0.159
>0-20 Cigarettes/Day	Comparison	152	5.086		
	Background RH	59	5.169	0.083 (-0.031,0.196)	0.154
	Low RH	38	4.978	-0.109 (-0.242,0.025)	0.112
	High RH	49	5.055	-0.031 (-0.153,0.090)	0.613
	Low plus High RH	87	5.021	-0.065 (-0.164,0.034)	0.198
>20 Cigarettes/Day	Comparison	97	5.095		
	Background RH	35	5.263	0.168 (0.022,0.313)	0.024
	Low RH	23	5.181	0.086 (-0.085,0.257)	0.325
	High RH	31	5.093	-0.002 (-0.154,0.150)	0.981
	Low plus High RH	54	5.131	0.035 (-0.090,0.161)	0.579

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-2-2.
Interaction Table for White Blood Cell (WBC) Count (thousand/mm^3) (Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Race: Table 16-5)

Stratum	Occupational Category	Group	n	Adjusted Mean[a]	Difference of Adjusted Means (95% C.I.)[b]	p-Value[c]
Black	***All***	***Ranch Hand***	***56***	***5.87***	***-0.55 --***	***0.035***
		Comparison	***75***	***6.42***		
Non-Black	***All***	***Ranch Hand***	***889***	***7.19***	***0.07 --***	***0.346***
		Comparison	***1,201***	***7.12***		
Black	Officer	Ranch Hand	7	5.41	-2.27 --	0.008
		Comparison	6	7.68		
	Enlisted Flyer	Ranch Hand	10	5.70	-0.62 --	0.292
		Comparison	15	6.32		
	Enlisted Groundcrew	Ranch Hand	39	6.19	-0.35 --	0.277
		Comparison	54	6.54		
Non-Black	Officer	Ranch Hand	356	6.86	0.07 --	0.556
		Comparison	495	6.79		
	Enlisted Flyer	Ranch Hand	152	7.20	-0.04 --	0.847
		Comparison	186	7.24		
	Enlisted Groundcrew	Ranch Hand	381	7.48	0.12 --	0.329
		Comparison	520	7.37		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Race: Table 16-5)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Black	Low	17	5.10	0.1066 (0.0411)	0.010
	Medium	10	6.84		
	High	9	6.91		
Non-Black	Low	157	7.25	-0.0033 (0.0411)	0.742
	Medium	162	7.25		
	High	162	7.15		

Table L-2-2. (Continued)
Interaction Table for White Blood Cell (WBC) Count (thousand/mm^3)
(Continuous)

c) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 16-5)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Officer	Low	77	6.27	0.0926 (0.0418)	0.027
	Medium	33	6.80		
	High	1	9.33		
Enlisted Flyer	Low	36	6.53	-0.0317 (0.0226)	0.160
	Medium	43	6.59		
	High	31	6.30		
Enlisted Groundcrew	Low	61	6.74	0.0032 (0.0110)	0.775
	Medium	96	6.75		
	High	139	6.78		

d) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 16-5)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Black	Low	12	5.79	0.0615 (0.0302)	0.042
	Medium	22	5.48		
	High	17	6.78		
Non-Black	Low	279	7.15	-0.0014 (0.0068)	0.837
	Medium	277	7.18		
	High	280	7.11		

Table L-2-2. (Continued)
Interaction Table for White Blood Cell (WBC) Count (thousand/mm^3)
(Continuous)

e) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 16-5)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Black	Low	13	5.65	0.0634 (0.0269)	0.019
	Medium	23	5.54		
	High	15	7.04		
Non-Black	Low	283	7.12	-0.0011 (0.0057)	0.850
	Medium	274	7.17		
	High	279	7.15		

f) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 16-5)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Black	Low	13	5.69	0.0607 (0.0270)	0.025
	Medium	23	5.56		
	High	15	7.04		
Non-Black	Low	282	7.15	-0.0036 (0.0062)	0.568
	Medium	274	7.17		
	High	279	7.11		

[a] Transformed from natural logarithm scale.

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

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

[d] Slope and standard error based on natural logarithm of WBC count versus log_2 dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = > 8.1-20.5 ppt; High = > 20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table L-2-3.
Interaction Table for White Blood Cell (WBC) Count
(Discrete)

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 16-6)

			Analysis Results for Log_2 (Current Dioxin + 1)						
			Percent			Abnormal Low vs. Normal		Abnormal High vs. Normal	
Stratum	Current Dioxin	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	279	2.9	91.4	5.7	1.17 (0.85,1.61)	0.340	0.80 (0.65,0.99)	0.037
	Medium	277	2.9	89.9	7.2				
	High	280	3.9	90.4	5.7				
Black	Low	12	25.0	66.7	8.3	0.50 (0.23,1.09)	0.080	--	--
	Medium	22	22.7	77.3	0.0				
	High	17	0.0	100.0	0.0				

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 16-6)

			Analysis Results for Log_2 (Current Dioxin + 1)						
			Percent			Abnormal Low vs. Normal		Abnormal High vs. Normal	
Stratum	Current Dioxin	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	283	2.8	91.9	5.3	1.19 (0.90,1.57)	0.232	0.87 (0.74,1.03)	0.098
	Medium	274	3.3	89.1	7.7				
	High	279	3.6	90.7	5.7				
Black	Low	13	23.1	69.2	7.7	0.54 (0.27,1.08)	0.081	--	--
	Medium	23	21.7	78.3	0.0				
	High	15	0.0	100.0	0.0				

L-2-8

Table L-2-3. (Continued)
Interaction Table for White Blood Cell (WBC) Count
(Discrete)

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 16-6)									
Analysis Results for Log_2 (Current Dioxin + 1)									
			Percent			Abnormal Low vs. Normal		Abnormal High vs. Normal	
Stratum	Current Dioxin	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	282	2.8	91.8	5.3	1.17 (0.87,1.57)	0.301	0.84 (0.71,1.00)	0.047
	Medium	274	3.3	89.1	7.7				
	High	279	3.6	90.7	5.7				
Black	Low	13	23.1	69.2	7.7	0.54 (0.27,1.08)	0.081	--	--
	Medium	23	21.7	78.3	0.0				
	High	15	0.0	100.0	0.0				

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

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

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.

L-2-9

Table L-2-4.
Interaction Table for Hemoglobin (gm/dl)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Current Cigarette Smoking: Table 16-7)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean**	**Difference of Adjusted Means (95% C.I.)**	**p-Value**
0-Never Smoked	***All***	***Ranch Hand***	***254***	***15.49***	***-0.02 (-0.18,0.14)***	***0.775***
		Comparison	***354***	***15.51***		
0-Former Smoker	***All***	***Ranch Hand***	***436***	***15.47***	***-0.05 (-0.17,0.07)***	***0.437***
		Comparison	***617***	***15.51***		
>0-20 Cigarettes/Day	***All***	***Ranch Hand***	***158***	***15.90***	***0.04 (-0.17,0.25)***	***0.732***
		Comparison	***191***	***15.86***		
>20 Cigarettes/Day	***All***	***Ranch Hand***	***97***	***16.30***	***0.17 (-0.10,0.44)***	***0.221***
		Comparison	***114***	***16.14***		
0-Never Smoked	Officer	Ranch Hand	134	15.44	-0.01 (-0.23,0.21)	0.910
		Comparison	194	15.45		
	Enlisted Flyer	Ranch Hand	25	15.63	0.22 (-0.32,0.77)	0.421
		Comparison	27	15.41		
	Enlisted Groundcrew	Ranch Hand	95	15.47	-0.10 (-0.36,0.16)	0.456
		Comparison	133	15.57		
0-Former Smoker	Officer	Ranch Hand	178	15.46	-0.02 (-0.21,0.17)	0.831
		Comparison	242	15.48		
	Enlisted Flyer	Ranch Hand	84	15.36	-0.23 (-0.51,0.06)	0.119
		Comparison	106	15.59		
	Enlisted Groundcrew	Ranch Hand	174	15.50	0.00 (-0.19,0.19)	0.974
		Comparison	269	15.50		
>0-20 Cigarettes/Day	Officer	Ranch Hand	33	16.15	0.40 (-0.08,0.87)	0.102
		Comparison	35	15.76		
	Enlisted Flyer	Ranch Hand	28	15.68	-0.20 (-0.67,0.26)	0.390
		Comparison	47	15.88		
	Enlisted Groundcrew	Ranch Hand	97	15.87	-0.01 (-0.29,0.26)	0.928
		Comparison	109	15.88		
>20 Cigarettes/Day	Officer	Ranch Hand	18	16.36	0.46 (-0.13,1.04)	0.124
		Comparison	30	15.90		
	Enlisted Flyer	Ranch Hand	25	16.59	0.19 (-0.39,0.77)	0.520
		Comparison	21	16.39		
	Enlisted Groundcrew	Ranch Hand	54	16.17	0.02 (-0.35,0.38)	0.928
		Comparison	63	16.16		

Table L-2-4. (Continued)
Interaction Table for Hemoglobin (gm/dl)
(Continuous)

b) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Lifetime Cigarette Smoking History: Table 16-7)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean**	**Difference of Adjusted Means (95% C.I.)**	**p-Value**
0 Pack-years	***All***	***Ranch Hand***	***254***	***15.63***	***-0.02 (-0.19,0.14)***	***0.776***
		Comparison	***354***	***15.65***		
>0-10 Pack-years	***All***	***Ranch Hand***	***297***	***15.71***	***0.08 (-0.07,0.24)***	***0.282***
		Comparison	***382***	***15.63***		
>10 Pack-years	***All***	***Ranch Hand***	***394***	***15.59***	***-0.05 (-0.18,0.08)***	***0.454***
		Comparison	***540***	***15.64***		
0 Pack-years	Officer	Ranch Hand	134	15.42	-0.00 (-0.23,0.22)	0.967
		Comparison	194	15.43		
	Enlisted Flyer	Ranch Hand	25	15.71	0.21 (-0.34,0.77)	0.451
		Comparison	27	15.49		
	Enlisted Groundcrew	Ranch Hand	95	15.53	-0.10 (-0.37,0.17)	0.486
		Comparison	133	15.62		
>0-10 Pack-years	Officer	Ranch Hand	95	15.69	0.16 (-0.10,0.43)	0.226
		Comparison	141	15.53		
	Enlisted Flyer	Ranch Hand	53	15.51	-0.30 (-0.68,0.08)	0.118
		Comparison	60	15.81		
	Enlisted Groundcrew	Ranch Hand	149	15.72	0.17 (-0.06,0.39)	0.140
		Comparison	181	15.56		
>10 Pack-years	Officer	Ranch Hand	134	15.69	0.01 (-0.22,0.24)	0.936
		Comparison	166	15.68		
	Enlisted Flyer	Ranch Hand	84	15.73	-0.01 (-0.29,0.28)	0.969
		Comparison	114	15.74		
	Enlisted Groundcrew	Ranch Hand	176	15.70	-0.05 (-0.25,0.14)	0.588
		Comparison	260	15.75		

Table L-2-4. (Continued)
Interaction Table for Hemoglobin (gm/dl)
(Continuous)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Current Cigarette Smoking: Table 16-7)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)**	**p-Value**
0-Never Smoked	Comparison	282	15.51		
	Background RH	108	15.46	-0.05 (-0.27,0.17)	0.639
	Low RH	72	15.50	-0.01 (-0.27,0.24)	0.918
	High RH	65	15.48	-0.03 (-0.30,0.24)	0.828
	Low plus High RH	137	15.49	-0.02 (-0.22,0.18)	0.837
0-Former Smoker	Comparison	528	15.54		
	Background RH	168	15.47	-0.07 (-0.24,0.10)	0.433
	Low RH	126	15.39	-0.15 (-0.34,0.04)	0.111
	High RH	113	15.62	0.08 (-0.12,0.28)	0.437
	Low plus High RH	239	15.50	-0.04 (-0.19,0.11)	0.568
>0-20 Cigarettes/Day	Comparison	152	15.86		
	Background RH	59	16.14	0.28 (-0.02,0.57)	0.065
	Low RH	38	15.74	-0.11 (-0.46,0.23)	0.519
	High RH	49	15.83	-0.03 (-0.34,0.29)	0.858
	Low plus High RH	87	15.79	-0.07 (-0.32,0.19)	0.614
>20 Cigarettes/Day	Comparison	97	16.19		
	Background RH	35	16.56	0.37 (0.00,0.75)	0.053
	Low RH	23	16.32	0.13 (-0.32,0.58)	0.566
	High RH	31	16.10	-0.08 (-0.48,0.32)	0.684
	Low plus High RH	54	16.20	0.01 (-0.32,0.34)	0.961

Table L-2-4. (Continued)
Interaction Table for Hemoglobin (gm/dl)
(Continuous)

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Lifetime Cigarette Smoking History: Table 16-7)

Stratum	Dioxin Category	n	Adjusted Mean	Difference of Adjusted Mean vs. Comparisons (95% C.I.)	p-Value
0 Pack-years	Comparison	282	15.68		
	Background RH	108	15.64	-0.04 (-0.27,0.18)	0.720
	Low RH	72	15.67	-0.02 (-0.27,0.24)	0.900
	High RH	65	15.64	-0.05 (-0.33,0.23)	0.743
	Low plus High RH	137	15.65	-0.03 (-0.24,0.18)	0.768
>0-10 Pack-years	Comparison	322	15.66		
	Background RH	108	15.83	0.17 (-0.05,0.39)	0.128
	Low RH	69	15.62	-0.05 (-0.31,0.21)	0.709
	High RH	93	15.69	0.02 (-0.21,0.26)	0.855
	Low plus High RH	162	15.66	-0.01 (-0.20,0.18)	0.933
>10 Pack-years	Comparison	455	15.65		
	Background RH	154	15.63	-0.02 (-0.20,0.16)	0.823
	Low RH	118	15.52	-0.13 (-0.33,0.07)	0.192
	High RH	100	15.71	0.06 (-0.16,0.27)	0.601
	Low plus High RH	218	15.61	-0.05 (-0.20,0.11)	0.575

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-2-5.
Interaction Table for Hematocrit (percent)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Current Cigarette Smoking: Table 16-9)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean**	**Difference of Adjusted Means (95% C.I.)**	**p-Value**
0-Never Smoked	***All***	***Ranch Hand***	***254***	***45.38***	***-0.06 (-0.56,0.43)***	***0.810***
		Comparison	***354***	***45.44***		
0-Former Smoker	***All***	***Ranch Hand***	***436***	***45.29***	***-0.15 (-0.53,0.23)***	***0.441***
		Comparison	***617***	***45.44***		
>0-20 Cigarettes/Day	***All***	***Ranch Hand***	***158***	***46.73***	***0.02 (-0.63,0.67)***	***0.957***
		Comparison	***191***	***46.72***		
>20 Cigarettes/Day	***All***	***Ranch Hand***	***97***	***47.92***	***0.51 (-0.33,1.34)***	***0.235***
		Comparison	***114***	***47.41***		
0-Never Smoked	Officer	Ranch Hand	134	45.12	-0.05 (-0.73,0.62)	0.878
		Comparison	194	45.17		
	Enlisted Flyer	Ranch Hand	25	45.89	0.77 (-0.90,2.44)	0.367
		Comparison	27	45.12		
	Enlisted Groundcrew	Ranch Hand	95	45.46	-0.28 (-1.09,0.53)	0.501
		Comparison	133	45.73		
0-Former Smoker	Officer	Ranch Hand	178	45.26	-0.03 (-0.63,0.56)	0.909
		Comparison	242	45.29		
	Enlisted Flyer	Ranch Hand	84	44.97	-0.63 (-1.51,0.25)	0.161
		Comparison	106	45.60		
	Enlisted Groundcrew	Ranch Hand	174	45.42	-0.05 (-0.63,0.54)	0.875
		Comparison	269	45.47		
>0-20 Cigarettes/Day	Officer	Ranch Hand	33	47.43	1.21 (-0.25,2.68)	0.103
		Comparison	35	46.21		
	Enlisted Flyer	Ranch Hand	28	46.14	-0.64 (-2.08,0.80)	0.382
		Comparison	47	46.79		
	Enlisted Groundcrew	Ranch Hand	97	46.72	-0.18 (-1.02,0.66)	0.670
		Comparison	109	46.90		
>20 Cigarettes/Day	Officer	Ranch Hand	18	48.12	1.57 (-0.22,3.37)	0.086
		Comparison	30	46.54		
	Enlisted Flyer	Ranch Hand	25	48.72	0.50 (-1.30,2.29)	0.586
		Comparison	21	48.23		
	Enlisted Groundcrew	Ranch Hand	54	47.58	-0.01 (-1.13,1.11)	0.989
		Comparison	63	47.59		

Table L-2-5. (Continued)
Interaction Table for Hematocrit (percent)
(Continuous)

b) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Lifetime Cigarette Smoking History: Table 16-9)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean**	**Difference of Adjusted Means (95% C.I.)**	**p-Value**
0 Pack-years	***All***	***Ranch Hand***	***254***	***15.63***	***-0.03 (-0.20,0.13)***	***0.687***
		Comparison	***354***	***15.67***		
>0-10 Pack-years	***All***	***Ranch Hand***	***297***	***15.72***	***0.09 (-0.06,0.24)***	***0.251***
		Comparison	***382***	***15.63***		
>10 Pack-years	***All***	***Ranch Hand***	***394***	***15.57***	***-0.05 (-0.18,0.08)***	***0.431***
		Comparison	***540***	***15.62***		
0 Pack-years	Officer	Ranch Hand	134	15.38	-0.03 (-0.25,0.20)	0.812
		Comparison	194	15.41		
	Enlisted Flyer	Ranch Hand	25	15.70	0.23 (-0.33,0.79)	0.420
		Comparison	27	15.47		
	Enlisted Groundcrew	Ranch Hand	95	15.58	-0.10 (-0.37,0.17)	0.455
		Comparison	133	15.69		
>0-10 Pack-years	Officer	Ranch Hand	95	15.68	0.19 (-0.07,0.46)	0.152
		Comparison	141	15.49		
	Enlisted Flyer	Ranch Hand	53	15.49	-0.31 (-0.69,0.07)	0.105
		Comparison	60	15.80		
	Enlisted Groundcrew	Ranch Hand	149	15.78	0.17 (-0.06,0.39)	0.142
		Comparison	181	15.62		
>10 Pack-years	Officer	Ranch Hand	134	15.62	0.00 (-0.23,0.24)	0.989
		Comparison	166	15.62		
	Enlisted Flyer	Ranch Hand	84	15.71	-0.01 (-0.30,0.28)	0.947
		Comparison	114	15.72		
	Enlisted Groundcrew	Ranch Hand	176	15.72	-0.05 (-0.25,0.14)	0.605
		Comparison	260	15.77		

Table L-2-5. (Continued)
Interaction Table for Hematocrit (percent)
(Continuous)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Current Cigarette Smoking: Table 16-9)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)**	**p-Value**
0-Never Smoked	Comparison	282	45.54		
	Background RH	108	45.45	-0.08 (-0.77,0.61)	0.817
	Low RH	72	45.46	-0.07 (-0.85,0.71)	0.858
	High RH	65	45.39	-0.15 (-1.01,0.72)	0.741
	Low plus High RH	137	45.43	-0.11 (-0.74,0.53)	0.741
0-Former Smoker	Comparison	528	45.47		
	Background RH	168	45.23	-0.23 (-0.77,0.31)	0.396
	Low RH	126	44.91	-0.55 (-1.14,0.04)	0.066
	High RH	113	45.82	0.36 (-0.27,0.99)	0.268
	Low plus High RH	239	45.34	-0.12 (-0.59,0.34)	0.605
>0-20 Cigarettes/Day	Comparison	152	46.68		
	Background RH	59	47.43	0.75 (-0.18,1.68)	0.114
	Low RH	38	46.07	-0.61 (-1.68,0.47)	0.268
	High RH	49	46.46	-0.21 (-1.21,0.78)	0.671
	Low plus High RH	87	46.29	-0.39 (-1.19,0.42)	0.346
>20 Cigarettes/Day	Comparison	97	47.62		
	Background RH	35	48.74	1.13 (-0.04,2.29)	0.059
	Low RH	23	47.96	0.34 (-1.03,1.72)	0.625
	High RH	31	46.92	-0.69 (-1.94,0.55)	0.276
	Low plus High RH	54	47.37	-0.25 (-1.27,0.77)	0.629

Table L-2-5. (Continued)
Interaction Table for Hematocrit (percent)
(Continuous)

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Lifetime Cigarette Smoking History: Table 16-9)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)**	**p-Value**
0 Pack-years	Comparison	282	46.01		
	Background RH	108	45.93	-0.07 (-0.76,0.62)	0.836
	Low RH	72	45.96	-0.04 (-0.83,0.74)	0.911
	High RH	65	45.86	-0.15 (-1.02,0.72)	0.733
	Low plus High RH	137	45.91	-0.10 (-0.73,0.54)	0.769
>0-10 Pack-years	Comparison	322	45.88		
	Background RH	108	46.48	0.60 (-0.08,1.28)	0.082
	Low RH	69	45.74	-0.14 (-0.93,0.65)	0.724
	High RH	93	46.08	0.19 (-0.53,0.92)	0.602
	Low plus High RH	162	45.93	0.05 (-0.54,0.64)	0.868
>10 Pack-years	Comparison	455	45.93		
	Background RH	154	45.79	-0.14 (-0.70,0.43)	0.635
	Low RH	118	45.36	-0.56 (-1.18,0.05)	0.072
	High RH	100	45.94	0.01 (-0.66,0.68)	0.973
	Low plus High RH	218	45.63	-0.30 (-0.79,0.19)	0.229

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-2-6.
Interaction Table for Prothrombin Time (seconds)
(Continuous)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 16-13)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)**	**p-Value**
Born ≥ 1942	Comparison	426	11.99		
	Background RH	121	12.07	0.07 --	0.132
	Low RH	75	11.83	-0.16 --	0.006
	High RH	146	11.94	-0.06 --	0.193
	Low plus High RH	221	11.90	-0.09 --	0.015
Born < 1942	Comparison	551	11.95		
	Background RH	220	11.98	0.03 --	0.448
	Low RH	159	11.96	0.01 --	0.820
	High RH	94	11.98	0.03 --	0.596
	Low plus High RH	253	11.97	0.02 --	0.645

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-2-7.
Interaction Table for Prothrombin Time
(Discrete)

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Lifetime Cigarette Smoking History: Table 16-14)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent High	Adjusted Relative Risk (95% C.I.)[c]	p-Value
0 Pack-years	Low	77	1.3	0.36 (0.06,2.01)	0.243
	Medium	76	1.3		
	High	76	0.0		
>0-10 Pack-years	Low	83	1.2	0.74 (0.26,2.11)	0.575
	Medium	74	1.4		
	High	97	0.0		
>10 Pack-years	Low	108	0.0	1.89 (0.59,6.01)	0.281
	Medium	120	1.7		
	High	104	1.0		

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

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

Table L-2-8.
Interaction Table for Absolute Neutrophils (segs) (thousand/mm^3)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Race: Table 16-16)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	17	2.680	0.1138 (0.0559)	0.042
	Medium	10	3.531		
	High	9	3.540		
Non-Black	Low	157	4.158	-0.0049 (0.0135)	0.714
	Medium	162	4.003		
	High	162	4.003		

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 16-16)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	12	2.698	0.0905 (0.0405)	0.026
	Medium	22	2.751		
	High	17	3.464		
Non-Black	Low	279	3.996	0.0030 (0.0092)	0.743
	Medium	277	3.998		
	High	280	4.051		

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 16-16)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	13	2.684	0.0944 (0.0362)	0.009
	Medium	23	2.776		
	High	15	3.544		
Non-Black	Low	283	3.985	0.0015 (0.0077)	0.846
	Medium	274	4.006		
	High	279	4.052		

Table L-2-8. (Continued)
Interaction Table for Absolute Neutrophils (segs) (thousand/mm^3)

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 16-16)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Adjusted Mean[a]**	**Adjusted Slope (Std. Error)[b]**	**p-Value**
Black	Low	13	2.695	0.0932 (0.0363)	0.010
	Medium	23	2.781		
	High	15	3.540		
Non-Black	Low	282	3.993	0.0003 (0.0084)	0.970
	Medium	274	4.006		
	High	279	4.035		

[a] Transformed from natural logarithm scale.

[b] Slope and standard error based on natural logarithm scale of absolute neutrophils (segs) versus log_2 dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = > 8.1-20.5 ppt; High = > 20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table L-2-9.
Interaction Table for Absolute Neutrophils (bands)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Lifetime Cigarette Smoking History: Table 16-17)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Zero	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	47	21.3	0.71 (0.49,1.03)	0.075
	Medium	39	20.5		
	High	51	9.8		
>0-10 Pack-years	Low	52	25.0	0.88 (0.64,1.21)	0.429
	Medium	44	9.1		
	High	66	16.7		
>10 Pack-years	Low	75	14.7	1.15 (0.87,1.52)	0.317
	Medium	89	18.0		
	High	54	20.4		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 16-17)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[b]	Adjusted Slope (Std. Error)[c]	p-Value
Officer	Low	63	0.195	0.3524 (0.1420)	0.014
	Medium	27	0.300		
	High	1	0.337		
Enlisted Flyer	Low	27	0.084	0.0002 (0.0754)	0.998
	Medium	39	0.091		
	High	27	0.092		
Enlisted Groundcrew	Low	50	0.163	-0.0532 (0.0371)	0.152
	Medium	78	0.150		
	High	116	0.143		

Table L-2-9. (Continued)
Interaction Table for Absolute Neutrophils (bands)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Lifetime Cigarette Smoking History: Table 16-17)

Stratum	Dioxin Category	n	Percent Zero	Adjusted Relative Risk (95% C.I.)[d]	p-Value
0 Pack-years	Comparison	282	18.1		
	Background RH	108	18.5	1.10 (0.62,1.96)	0.738
	Low RH	72	20.8	1.15 (0.60,2.21)	0.672
	High RH	65	12.3	0.59 (0.26,1.32)	0.199
	Low plus High RH	137	16.8	0.87 (0.50,1.50)	0.610
>0-10 Pack-years	Comparison	322	19.6		
	Background RH	108	21.3	1.14 (0.66,1.97)	0.638
	Low RH	69	21.7	1.04 (0.37,2.93)	0.947
	High RH	93	14.0	0.67 (0.19,2.34)	0.532
	Low plus High RH	162	17.3	0.83 (0.37,1.86)	0.645
>10 Pack-years	Comparison	455	13.4		
	Background RH	154	13.0	0.98 (0.57,1.69)	0.946
	Low RH	118	13.6	1.00 (0.36,2.74)	0.998
	High RH	100	22.0	1.82 (0.55,6.05)	0.325
	Low plus High RH	218	17.4	1.36 (0.62,2.97)	0.447

d) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Lifetime Cigarette Smoking History: Table 16-17)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Zero	Adjusted Relative Risk (95% C.I.)[e]	p-Value
0 Pack-years	Low	83	21.7	0.81 (0.63,1.04)	0.098
	Medium	84	15.5		
	High	78	15.4		
>0-10 Pack-years	Low	90	20.0	0.97 (0.79,1.19)	0.773
	Medium	79	26.6		
	High	101	11.9		
>10 Pack-years	Low	118	11.0	1.22 (1.00,1.49)	0.052
	Medium	136	16.2		
	High	118	19.5		

Table L-2-9. (Continued)
Interaction Table for Absolute Neutrophils (bands)

e) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Lifetime Cigarette Smoking History: Table 16-17)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Zero	Adjusted Relative Risk (95% C.I.)[e]	p-Value
0 Pack-years	Low	87	21.8	0.84 (0.67,1.04)	0.102
	Medium	83	16.9		
	High	75	13.3		
>0-10 Pack-years	Low	93	21.5	0.98 (0.82,1.17)	0.811
	Medium	77	23.4		
	High	100	13.0		
>10 Pack-years	Low	116	12.1	1.16 (0.98,1.38)	0.085
	Medium	137	16.1		
	High	119	18.5		

f) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Lifetime Cigarette Smoking History: Table 16-17)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Zero	Adjusted Relative Risk (95% C.I.)[e]	p-Value
0 Pack-years	Low	87	21.8	0.85 (0.69,1.06)	0.159
	Medium	83	16.9		
	High	75	13.3		
>0-10 Pack-years	Low	93	21.5	1.00 (0.83,1.20)	0.990
	Medium	77	23.4		
	High	100	13.0		
>10 Pack-years	Low	115	12.2	1.20 (1.00,1.44)	0.053
	Medium	137	16.1		
	High	119	18.5		

[a] Relative risk for a twofold increase in initial dioxin.
[b] Transformed from natural logarithm scale.
[c] Slope and standard error based on natural logarithm of absolute neutrophils vs. log_2 dioxin.
[d] Relative risk and confidence interval relative to Comparisons.
[e] Relative risk for a twofold increase in current dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = > 8.1-20.5 ppt; High = > 20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table L-2-10.
Interaction Table for Absolute Monocytes (thousand/mm^3)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Race: Table 16-19)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Black	***All***	***Ranch Hand***	***56***	***0.391***	***-0.077 --***	***0.058***
		Comparison	***75***	***0.469***		
Non-Black	***All***	***Ranch Hand***	***889***	***0.466***	***0.012 --***	***0.259***
		Comparison	***1,201***	***0.454***		
Black	Officer	Ranch Hand	7	0.319	-0.129 --	0.288
		Comparison	6	0.447		
	Enlisted Flyer	Ranch Hand	10	0.405	-0.062--	0.515
		Comparison	15	0.467		
	Enlisted Groundcrew	Ranch Hand	39	0.402	-0.070 --	0.152
		Comparison	54	0.472		
Non-Black	Officer	Ranch Hand	356	0.473	0.016 --	0.334
		Comparison	495	0.457		
	Enlisted Flyer	Ranch Hand	152	0.448	-0.003 --	0.916
		Comparison	186	0.451		
	Enlisted Groundcrew	Ranch Hand	381	0.466	0.014 --	0.384
		Comparison	520	0.452		

[a] Transformed from square root scale.

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

[c] P-value is based on difference of means on square root scale.

Table L-2-11.
Interaction Table for Absolute Eosinophils

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Age: Table 16-20)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Zero	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Born ≥ 1942	Low	55	12.7	0.88 (0.64,1.21)	0.434
	Medium	72	12.5		
	High	110	9.1		
Born < 1942	Low	119	10.9	1.23 (0.89,1.71)	0.203
	Medium	100	10.0		
	High	61	11.5		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 16-20)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Zero	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	77	15.6	0.19 (0.05,0.77)	0.020
	Medium	33	3.0		
	High	1	0.0		
Enlisted Flyer	Low	36	11.1	0.41 (0.18,0.93)	0.033
	Medium	43	9.3		
	High	31	3.2		
Enlisted Groundcrew	Low	61	6.6	1.30 (1.00,1.69)	0.054
	Medium	96	14.6		
	High	139	11.5		

Table L-2-11. (Continued)
Interaction Table for Absolute Eosinophils

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 16-20)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Zero	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Officer	Low	190	8.4	1.29 (0.87,1.91)	0.205
	Medium	136	10.3		
	High	19	10.5		
Enlisted Flyer	Low	32	12.5	0.68 (0.43,1.06)	0.088
	Medium	56	10.7		
	High	61	4.9		
Enlisted Groundcrew	Low	74	10.8	1.19 (0.98,1.43)	0.075
	Medium	105	10.5		
	High	214	12.2		

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table L-2-12.
Interaction Table for Absolute Basophils (thousand/mm^3)

a) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 16-21)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	8	0.058	0.1437 (0.0631)	0.023
	Medium	14	0.072		
	High	8	0.098		
Non-Black	Low	157	0.091	-0.0033 (0.0121)	0.783
	Medium	144	0.090		
	High	157	0.091		

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 16-21)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	8	0.060	0.1375 (0.0629)	0.029
	Medium	14	0.074		
	High	8	0.098		
Non-Black	Low	157	0.092	-0.0137 (0.0130)	0.292
	Medium	144	0.090		
	High	157	0.089		

[a] Transformed from natural logarithm scale.

[b] Slope and standard error based on natural logarithm of absolute basophils versus log_2 (current dioxin + 1).

Note: Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

APPENDIX L-3.

Hematology Analysis Tables
Occupation Removed from Final Model

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

Appendix L-3 Table	Chapter 16 Table	Dependent Variable
L-3-1	16-3	Red Blood Cell (RBC) Count (Continuous)
L-3-2	16-5	White Blood Cell (WBC) Count (Continuous)
L-3-3	16-6	White Blood Cell (WBC) Count (Discrete)
L-3-4	16-7	Hemoglobin (Continuous)
L-3-5	16-9	Hematocrit (Continuous)
L-3-6	16-11	Platelet Count (Continuous)
L-3-7	16-13	Prothrombin Time (Continuous)
L-3-8	16-14	Prothrombin Time (Discrete)
L-3-9	16-15	RBC Morphology (Discrete)
L-3-10	16-16	Absolute Neutrophils (segs)
L-3-11	16-17	Absolute Neutrophils (bands)
L-3-12	16-18	Absolute Lymphocytes
L-3-13	16-20	Absolute Eosinophils (Zero versus Nonzero)

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

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

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

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

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

Table L-3-2.
Analysis of White Blood Cell (WBC) Count (thousand/mm^3) (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)[b]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	174	6.53	0.268	0.0084 (0.0085)**	0.325**	INIT*RACE (p=0.011)
Medium	172	6.76				CSMOK (p<0.001)
High	171	6.74				PACKYR (p=0.018)

[a] Transformed from natural logarithm scale.

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

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

** Log_2 (initial dioxin)-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-2 for further analysis of this interaction.

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

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

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

[a] Transformed from natural logarithm scale.

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

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

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

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

Table L-3-2. (Continued)
Analysis of White Blood Cell (WBC) Count (thousand/mm^3) (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	6.51 (291)	6.59 (299)	6.80 (297)	0.243	0.0111 (0.0059)	0.061	CSMOK ($p<0.001$) PACKYR ($p=0.004$) AGE*RACE ($p=0.025$)
5	6.50 (296)	6.60 (297)	6.83 (294)	0.247	0.0096 (0.0051)**	0.058**	CURR*RACE ($p=0.035$) CSMOK ($p<0.001$) PACKYR ($p=0.004$) AGE*RACE ($p=0.031$)
6[d]	6.53 (295)	6.61 (297)	6.81 (294)	0.248	0.0077 (0.0055)**	0.161**	CURR*RACE ($p=0.036$) CSMOK ($p<0.001$) PACKYR ($p=0.006$) AGE*RACE ($p=0.027$)

[a] Transformed from natural logarithm scale.

[b] Model 4: 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 WBC count 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)-by-covariate interaction ($0.01<p\leq0.05$); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-2 for further analysis of this interaction.

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

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

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED					
Analysis Results for Log_2 (Initial Dioxin)[a]					
	Abnormal Low vs. Normal		Abnormal High vs. Normal		
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
517	0.87 (0.60,1.27)	0.476	0.74 (0.52,1.05)	0.096	AGE (p=0.030) RACE (p=0.020) CSMOK (p<0.001)

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

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

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

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

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED						
		Abnormal Low vs. Normal		Abnormal 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	1,059					AGE (p=0.047) RACE (p<0.001) CSMOK (p<0.001)
Background RH	371	1.11 (0.57,2.17)	0.754	1.03 (0.59,1.79)	0.925	
Low RH	259	1.32 (0.65,2.68)	0.445	1.56 (0.87,2.80)	0.133	
High RH	258	1.25 (0.59,2.65)	0.563	0.88 (0.46,1.68)	0.694	
Low plus High RH	517	1.28 (0.72,2.27)	0.393	1.18 (0.73,1.91)	0.489	

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

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

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

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

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED						
		Analysis Results for Log_2 (Current Dioxin + 1)				
		Abnormal Low vs. Normal		Abnormal 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	887	0.94 (0.74,1.20)	0.622	0.86 (0.71,1.05)	0.136	PACKYR ($p<0.001$) AGE*RACE ($p=0.009$)
5	887	0.97 (0.78,1.20)**	0.766**	0.92 (0.78,1.07)**	0.272**	CURR*RACE ($p=0.049$) PACKYR ($p<0.001$) AGE*RACE ($p=0.005$)
6[c]	886	0.95 (0.76,1.19)**	0.675**	0.87 (0.74,1.03)**	0.105**	CURR*RACE ($p=0.037$) PACKYR ($p<0.001$) AGE*RACE ($p=0.004$)

[a] Model 4: 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 ($0.01<p\leq0.05$); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-3 for further analysis of this interaction.

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

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

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

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

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

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

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

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

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

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

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

Table L-3-6.
Analysis of Platelet Count (thousand/mm^3) (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	248.4 (291)	247.2 (299)	255.1 (297)	0.044	0.0479 (0.0397)	0.228	AGE ($p<0.001$) PACKYR ($p<0.001$)
5	246.8 (296)	250.4 (297)	253.5 (294)	0.045	0.0524 (0.0338)	0.122	AGE ($p<0.001$) PACKYR ($p<0.001$)
6[d]	247.5 (295)	250.5 (297)	252.3 (294)	0.047	0.0428 (0.0367)	0.244	AGE ($p<0.001$) PACKYR ($p<0.001$)

[a] Transformed from square root scale.

[b] Model 4: 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 platelet count 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 L-3-7.
Analysis of Prothrombin Time (seconds) (Continuous)
Occupation Removed from Final Model

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

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	977	11.98**			DXCAT*AGE (p=0.004) RACE (p=0.006) CSMOK (p<0.001)
Background RH	341	12.01**	0.03 --**	0.298**	
Low RH	234	11.92**	-0.05 --**	0.121**	
High RH	240	11.97**	0.00 --**	0.931**	
Low plus High RH	474	11.95**	-0.03 --**	0.293**	

[a] Transformed from natural logarithm scale.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	888	1.06 (0.97,1.17)	0.207	AGE ($p<0.001$) RACE ($p=0.181$)
5	888	1.05 (0.97,1.14)	0.218	AGE ($p<0.001$) RACE ($p=0.178$)
6[c]	887	1.07 (0.98,1.17)	0.118	AGE ($p<0.001$) RACE ($p=0.193$)

[a] Model 4: 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.

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

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

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[b]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	174	3.606**	0.215	0.0093 (0.0116)**	0.426**	INIT*RACE (p=0.043)
Medium	172	3.616**				CSMOK (p<0.001)
High	171	3.681**				PACKYR (p=0.032)

[a] Transformed from natural logarithm scale.

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

[c] Slope and standard error based on natural logarithm of absolute neutrophils (segs) versus log_2 (initial dioxin).

** Log_2 (initial dioxin)-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-7 for further analysis of this interaction.

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

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

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

[a] Transformed from natural logarithm scale.

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

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

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

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

Table L-3-10. (Continued)
Analysis of Absolute Neutrophils (segs) (thousand/mm^3)
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	3.424 (291)	3.463 (299)	3.663 (297)	0.189	0.0174 (0.0080)	0.029	AGE (p=0.274) RACE (p<0.001) CSMOK (p<0.001) PACKYR (p=0.046)
5	3.421** (296)	3.476** (297)	3.662** (294)	0.194	0.0143 (0.0068)**	0.036**	CURR*RACE (p=0.021) AGE (p=0.351) CSMOK (p<0.001) PACKYR (p=0.045)
6[d]	3.430** (295)	3.480** (297)	3.653** (294)	0.194	0.0135 (0.0074)**	0.068**	CURR*RACE (p=0.022) AGE (p=0.386) CSMOK (p<0.001) PACKYR (p=0.051)

[a] Transformed from natural logarithm scale.

[b] Model 4: 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 absolute neutrophils (segs) 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)-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-7 for further analysis of this interaction.

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

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

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[b]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	140	0.142	0.101	-0.0167 (0.0291)	0.566	CSMOK ($p<0.001$) RACE ($p=0.001$)
Medium	144	0.159				
High	144	0.146				

[a] Transformed from natural logarithm scale.

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

[c] Slope and standard error based on natural logarithm of absolute neutrophils (bands) versus log_2 (initial dioxin).

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

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

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

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	884	0.157			AGE (p=0.008) CSMOK*RACE (p=0.041)
Background RH	308	0.153	-0.004 --	0.642	
Low RH	213	0.159	0.002 --	0.792	
High RH	215	0.158	0.001 --	0.917	
Low plus High RH	428	0.158	0.001 --	0.812	

[a] Transformed from natural logarithm scale.

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

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

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

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

Table L-3-11. (Continued)
Analysis of Absolute Neutrophils (bands) (thousand/mm^3)
(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	0.155 (243)	0.154 (243)	0.158 (250)	0.071	0.0028 (0.0200)	0.890	AGE (p=0.102) CSMOK (p<0.001) RACE (p=0.004)
5	0.157 (244)	0.147 (243)	0.168 (249)	0.071	0.0030 (0.0168)	0.857	AGE (p=0.098) CSMOK (p<0.001) RACE (p=0.004)
6[d]	0.160 (243)	0.147 (243)	0.166 (249)	0.074	-0.0090 (0.0185)	0.627	AGE (p=0.145) CSMOK (p<0.001) RACE (p=0.005)

[a] Transformed from natural logarithm scale.

[b] Model 4: 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 absolute neutrophils (bands) 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 L-3-12.
Analysis of Absolute Lymphocytes (thousand/mm^3)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[b]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	174	1.917	0.076	0.0057 (0.0131)	0.663	CSMOK ($p<0.001$) AGE*RACE ($p=0.263$)
Medium	172	1.940				
High	171	1.978				

[a] Transformed from natural logarithm scale.

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

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

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

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

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

[a] Transformed from natural logarithm scale.

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

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

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

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

Table L-3-12. (Continued)
Analysis of Absolute Lymphocytes (thousand/mm^3)
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	1.934 (291)	1.976 (299)	1.961 (297)	0.090	0.0039 (0.0084)	0.648	CSMOK (p<0.001) PACKYR (p=0.052) AGE*RACE (p=0.115)
5	1.927 (296)	1.979 (297)	1.963 (294)	0.090	0.0045 (0.0072)	0.536	CSMOK (p<0.001) PACKYR (p=0.052) AGE*RACE (p=0.116)
6[d]	1.947 (295)	1.988 (297)	1.951 (294)	0.092	0.0010 (0.0078)	0.899	CSMOK (p<0.001) PACKYR (p=0.067) AGE*RACE (p=0.102)

[a] Transformed from natural logarithm scale.

[b] Model 4: 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 absolute lymphocytes 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 L-3-13.
Analysis of Absolute Eosinophils
(Zero versus Nonzero)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED			
Analysis Results for Log_2 (Initial Dioxin)[a]			
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
517	1.04 (0.84,1.29)	0.722	AGE (p=0.973) RACE (p=0.079)

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

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

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

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
6[c]	887	1.13 (0.98,1.29)	0.095	RACE*CSMOK (p=0.015)

[a] Model 6: 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.

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

APPENDIX L-4.

Interaction Tables for the Hematology Assessment Occupation Removed from Final Model

This appendix contains exposure analyses results of interactions between covariates and dioxin after occupation has been removed from those final dioxin models (Models 2 through 6) that contained occupation. These tables are supplements to tables in Appendix L-3, which are main effects results with occupation removed from the model. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The analysis model, covariate involved in the interaction, and a reference to the analysis table in Chapter 16 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix L-4 Table	Chapter 16 Table	Appendix L-3 Table	Dependent Variable	Model	Covariate
L-4-1	16-3	L-3-1	Red Blood Cell (RBC) Count (Continuous)	3	Current Cigarette Smoking
L-4-2	16-5	L-3-2	White Blood Cell (WBC) Count (Continuous)	2 5 6	Race Race Race
L-4-3	16-6	L-3-3	White Blood Cell (WBC) Count (Discrete)	5 6	Race Race
L-4-4	16-7	L-3-4	Hemoglobin (Continuous)	3	Current Cigarette Smoking
L-4-5	16-9	L-3-5	Hematocrit (Continuous)	3	Current Cigarette Smoking
L-4-6	16-13	L-3-7	Prothrombin Time (Continuous)	3	Age
L-4-7	16-16	L-3-10	Absolute Neutrophils (segs)	2 5	Race Race

Table L-4-1.
Interaction Table for Red Blood Cell (RBC) Count (million/mm^3) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Current Cigarette Smoking: Tables 16-3 and L-3-1)

Stratum	Dioxin Category	n	Adjusted Mean	Difference of Adjusted Mean vs. Comparisons (95% C.I.)	p-Value
0-Never Smoked	Comparison	282	5.065		
	Background RH	108	5.019	-0.046 (-0.130,0.037)	0.280
	Low RH	72	5.051	-0.014 (-0.111,0.084)	0.785
	High RH	65	5.016	-0.049 (-0.151,0.053)	0.345
	Low plus High RH	137	5.034	-0.030 (-0.107,0.047)	0.438
0-Former Smoker	Comparison	528	5.051		
	Background RH	168	4.987	-0.063 (-0.129,0.002)	0.058
	Low RH	126	5.008	-0.043 (-0.116,0.030)	0.250
	High RH	113	5.023	-0.027 (-0.104,0.050)	0.486
	Low plus High RH	239	5.015	-0.036 (-0.093,0.022)	0.226
>0-20 Cigarettes/Day	Comparison	152	5.098		
	Background RH	59	5.172	0.073 (-0.040,0.187)	0.207
	Low RH	38	4.992	-0.106 (-0.240,0.028)	0.120
	High RH	49	5.079	-0.019 (-0.140,0.102)	0.761
	Low plus High RH	87	5.041	-0.057 (-0.156,0.042)	0.259
>20 Cigarettes/Day	Comparison	97	5.103		
	Background RH	35	5.270	0.167 (0.022,0.313)	0.024
	Low RH	23	5.192	0.089 (-0.082,0.261)	0.307
	High RH	31	5.113	0.010 (-0.142,0.162)	0.896
	Low plus High RH	54	5.146	0.044 (-0.081,0.169)	0.493

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

Table L-4-2.
Interaction Table for White Blood Cell (WBC) Count (thousand/mm^3) (Continuous)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Race: Tables 16-5 and L-3-2)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	17	5.18	0.1110 (0.0411)	0.007
	Medium	10	6.95		
	High	9	7.09		
Non-Black	Low	157	7.24	0.0040 (0.0087)	0.641
	Medium	162	7.32		
	High	162	7.31		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-5 and L-3-2)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	13	5.76	0.0659 (0.0271)	0.015
	Medium	23	5.66		
	High	15	7.25		
Non-Black	Low	283	7.05	0.0076 (0.0051)	0.140
	Medium	274	7.19		
	High	279	7.35		

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-5 and L-3-2)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	13	5.80	0.0635 (0.0272)	0.020
	Medium	23	5.68		
	High	15	7.25		
Non-Black	Low	282	7.08	0.0056 (0.0056)	0.312
	Medium	274	7.19		
	High	279	7.30		

[a] Transformed from natural logarithm scale.

[b] Slope and standard error based on natural logarithm of WBC count versus log_2 dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table L-4-3.
Interaction Table for White Blood Cell (WBC) Count (Discrete)
Occupation Removed from Final Model

a) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-6 and L-3-3)

Analysis Results for Log_2 (Current Dioxin + 1)

Stratum	Current Dioxin	n	Percent Abnormal Low	Percent Normal	Percent Abnormal High	Abnormal Low vs. Normal Adj. Relative Risk (95% C.I.)[a]	Abnormal Low vs. Normal p-Value	Abnormal High vs. Normal Adj. Relative Risk (95% C.I.)[a]	Abnormal High vs. Normal p-Value
Non-Black	Low	283	2.8	91.9	5.3	1.05 (0.84,1.32)	0.676	0.92 (0.79,1.08)	0.307
	Medium	274	3.3	89.1	7.7				
	High	279	3.6	90.7	5.7				
Black	Low	13	23.1	69.2	7.7	0.53 (0.27,1.02)	0.057	--	--
	Medium	23	21.7	78.3	0.0				
	High	15	0.0	100.0	0.0				

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-6 and L-3-3)

Analysis Results for Log_2 (Current Dioxin + 1)

Stratum	Current Dioxin	n	Percent Abnormal Low	Percent Normal	Percent Abnormal High	Abnormal Low vs. Normal Adj. Relative Risk (95% C.I.)[a]	Abnormal Low vs. Normal p-Value	Abnormal High vs. Normal Adj. Relative Risk (95% C.I.)[a]	Abnormal High vs. Normal p-Value
Non-Black	Low	282	2.8	91.8	5.3	1.03 (0.81,1.31)	0.792	0.88 (0.75,1.04)	0.133
	Medium	274	3.3	89.1	7.7				
	High	279	3.6	90.7	5.7				
Black	Low	13	23.1	69.2	7.7	0.53 (0.28,1.02)	0.059	--	--
	Medium	23	21.7	78.3	0.0				
	High	15	0.0	100.0	0.0				

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

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

Note: Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table L-4-4.
Interaction Table for Hemoglobin (gm/dl) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Current Cigarette Smoking: Tables 16-7 and L-3-4)

Stratum	Dioxin Category	n	Adjusted Mean	Difference of Adjusted Mean vs. Comparisons (95% C.I.)	p-Value
0-Never Smoked	Comparison	282	15.50		
	Background RH	108	15.40	-0.10 (-0.31,0.12)	0.389
	Low RH	72	15.49	-0.01 (-0.26,0.24)	0.937
	High RH	65	15.54	0.05 (-0.22,0.31)	0.735
	Low plus High RH	137	15.51	0.02 (-0.18,0.22)	0.873
0-Former Smoker	Comparison	528	15.55		
	Background RH	168	15.47	-0.08 (-0.25,0.09)	0.376
	Low RH	126	15.40	-0.15 (-0.34,0.04)	0.124
	High RH	113	15.64	0.09 (-0.11,0.29)	0.386
	Low plus High RH	239	15.51	-0.04 (-0.19,0.11)	0.629
>0-20 Cigarettes/Day	Comparison	152	15.87		
	Background RH	59	16.15	0.28 (-0.02,0.57)	0.064
	Low RH	38	15.76	-0.10 (-0.45,0.24)	0.556
	High RH	49	15.85	-0.02 (-0.33,0.30)	0.905
	Low plus High RH	87	15.81	-0.06 (-0.31,0.20)	0.667
>20 Cigarettes/Day	Comparison	97	16.17		
	Background RH	35	16.57	0.40 (0.02,0.78)	0.038
	Low RH	23	16.32	0.15 (-0.29,0.60)	0.508
	High RH	31	16.08	-0.10 (-0.49,0.30)	0.624
	Low plus High RH	54	16.18	0.01 (-0.32,0.33)	0.965

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-4-5.
Interaction Table for Hematocrit (percent) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Current Cigarette Smoking: Tables 16-9 and L-3-5)

Stratum	Dioxin Category	n	Adjusted Mean	Difference of Adjusted Mean vs. Comparisons (95% C.I.)	p-Value
0-Never Smoked	Comparison	282	45.39		
	Background RH	108	45.07	-0.32 (-0.99,0.35)	0.355
	Low RH	72	45.33	-0.06 (-0.84,0.73)	0.889
	High RH	65	45.65	0.26 (-0.56,1.08)	0.534
	Low plus High RH	137	45.48	0.09 (-0.52,0.71)	0.766
0-Former Smoker	Comparison	528	45.52		
	Background RH	168	45.30	-0.22 (-0.75,0.30)	0.403
	Low RH	126	44.98	-0.54 (-1.13,0.04)	0.069
	High RH	113	45.88	0.36 (-0.25,0.98)	0.247
	Low plus High RH	239	45.41	-0.12 (-0.58,0.35)	0.624
>0-20 Cigarettes/Day	Comparison	152	46.78		
	Background RH	59	47.54	0.75 (-0.16,1.67)	0.104
	Low RH	38	46.23	-0.55 (-1.63,0.52)	0.315
	High RH	49	46.66	-0.12 (-1.09,0.86)	0.814
	Low plus High RH	87	46.47	-0.31 (-1.10,0.49)	0.449
>20 Cigarettes/Day	Comparison	97	47.58		
	Background RH	35	48.79	1.20 (0.03,2.37)	0.044
	Low RH	23	48.02	0.44 (-0.93,1.81)	0.530
	High RH	31	46.99	-0.60 (-1.82,0.62)	0.336
	Low plus High RH	54	47.43	-0.16 (-1.16,0.85)	0.761

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-4-6.
Interaction Table for Prothrombin Time (seconds) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Age: Tables 16-13 and L-3-7)

Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]	p-Value[c]
Born ≥ 1942	Comparison	426	12.01		
	Background RH	121	12.07	0.06 --	0.203
	Low RH	75	11.85	-0.16 --	0.005
	High RH	146	11.96	-0.05 --	0.277
	Low plus High RH	221	11.92	-0.09 --	0.023
Born < 1942	Comparison	551	11.95		
	Background RH	220	11.97	0.02 --	0.548
	Low RH	159	11.96	0.01 --	0.822
	High RH	94	11.99	0.04 --	0.436
	Low plus High RH	253	11.97	0.02 --	0.554

[a] Transformed from natural logarithm scale.

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

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

[d] Slope and standard error based on natural logarithm of prothrombin time versus $\log_2$ dioxin.

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

Table L-4-7.
Interaction Table for Absolute Neutrophils (segs) (thousand/mm^3)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Race: Tables 16-16 and L-3-10)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	17	2.737	0.1202 (0.0560)	0.032
	Medium	10	3.636		
	High	9	3.697		
Non-Black	Low	157	4.161	0.0045 (0.0118)	0.701
	Medium	162	4.071		
	High	162	4.150		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-16 and L-3-10)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	13	2.764	0.0972 (0.0364)	0.008
	Medium	23	2.845		
	High	15	3.681		
Non-Black	Low	283	3.960	0.0113 (0.0069)	0.103
	Medium	274	4.030		
	High	279	4.189		

Table L-4-7. (Continued)
Interaction Table for Absolute Neutrophils (segs) (thousand/mm^3)
Occupation Removed from Final Model

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Tables 16-16 and L-3-10)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Adjusted Mean[a]**	**Adjusted Slope (Std. Error)[b]**	**p-Value**
Black	Low	12	2.775	0.0956 (0.0365)	0.009
	Medium	23	2.851		
	High	15	3.679		
Non-Black	Low	282	3.967	0.0104 (0.0075)	0.166
	Medium	274	4.030		
	High	279	4.172		

[a] Transformed from natural logarithm scale.

[b] Slope and standard error based on natural logarithm versus log_2 dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

APPENDIX M-1.

Dependent Variable-Covariate Associations for the Renal Assessment

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

Table M-1-1.
Dependent Variable-Covariate Associations for the Renal Assessment

Dependent Variable	Level	Age			Occupation			
		Born ≥1942	Born <1942	p-Value	Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value
Kidney Disease	Yes	(n=947) 13.2%	(n=1,235) 18.8%	0.001	(n=843) 15.4%	(n=358) 15.6%	(n=981) 17.4%	0.472
Kidney Stones from KUB X Ray	Present	(n=956) 1.9%	(n=1,277) 3.6%	0.023	(n=869) 3.5%	(n=365) 3.3%	(n=999) 2.2%	0.236
Urinary Protein	Present	(n=953) 3.8%	(n=1,276) 5.2%	0.145	(n=869) 3.6%	(n=363) 4.7%	(n=997) 5.4%	0.162
Urinary Red Blood Cell Count	Abnormal	(n=953) 2.6%	(n=1,276) 2.8%	0.879	(n=869) 1.7%	(n=363) 2.2%	(n=997) 3.8%	0.018
Urinary White Blood Cell Count	Abnormal	(n=953) 2.2%	(n=1,276) 3.5%	0.109	(n=869) 2.0%	(n=363) 4.7%	(n=997) 3.1%	0.031
Serum Creatinine[a]		n=2,232 r=0.061		n=2,232 0.004	(n=869) $\bar{x}$=0.9794	(n=364) $\bar{x}$=0.9591	(n=999) $\bar{x}$=0.9745	0.125
Urine Specific Gravity		n=2,229 r=-0.037		n=2,229 0.081	(n=869) $\bar{x}$=1.0182	(n=363) $\bar{x}$=1.0182	(n=997) $\bar{x}$=1.0196	<0.001

[a] Analysis performed on natural logarithm scale; means transformed from natural logarithm scale.

Table M-1-1. (Continued)
Dependent Variable-Covariate Associations for the Renal Assessment

Dependent Variable	Level	Race			Diabetic Class			
		Black	Non-Black	p-Value	Normal	Impaired	Diabetic	p-Value
Kidney Disease	Yes	(n=130) 12.3%	(n=2,052) 16.6%	0.244	(n=1,621) 14.7%	(n=241) 17.4%	(n=317) 24.0%	<0.001
Kidney Stones from KUB X Ray	Present	(n=131) 2.3%	(n=2,102) 2.9%	0.891	(n=1,653) 2.9%	(n=251) 2.8%	(n=326) 2.8%	0.987
Urinary Protein	Present	(n=131) 7.6%	(n=2,098) 4.4%	0.131	(n=1,651) 2.7%	(n=251) 4.8%	(n=325) 13.9%	<0.001
Urinary Red Blood Cell Count	Abnormal	(n=131) 6.9%	(n=2,098) 2.5%	0.007	(n=1,651) 2.6%	(n=251) 3.6%	(n=325) 2.8%	0.674
Urinary White Blood Cell Count	Abnormal	(n=131) 5.3%	(n=2,098) 2.8%	0.151	(n=1,651) 2.4%	(n=251) 2.8%	(n=325) 5.9%	0.003
Serum Creatinine[a]		(n=131) $\bar{x}$=1.0513	(n=2,101) $\bar{x}$=0.9692	<0.001	(n=1,653) $\bar{x}$=0.9750	(n=251) $\bar{x}$=0.9877	(n=326) $\bar{x}$=0.9584	0.081
Urine Specific Gravity		(n=131) $\bar{x}$=1.0198	(n=2,098) $\bar{x}$=1.0188	0.069	(n=1,651) $\bar{x}$=1.0186	(n=251) $\bar{x}$=1.0194	(n=325) $\bar{x}$=1.0198	0.002

[a] Analysis performed on natural logarithm scale; means transformed from natural logarithm scale.

APPENDIX M-2.

Interaction Tables for the Renal Assessment

This appendix contains exposure analyses results of interactions between covariates and group or dioxin. Results are presented for each separate stratum of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Means are transformed back to the original scale, if necessary. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The covariate involved in the interaction and a reference to the analysis table in Chapter 17 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix M-2 Table	Chapter 17 Table	Dependent Variable	Model	Covariate
M-2-1	17-4	Kidney Stones	2	Diabetic Class
M-2-2	17-5	Urinary Protein	4 5 6	Diabetic Class Diabetic Class Diabetic Class
M-2-3	17-6	Urinary Red Blood Cell Count	3 4 5 6	Occupation Occupation Occupation Occupation
M-2-4	17-8	Serum Creatinine	1 2 3	Diabetic Class Diabetic Class Diabetic Class
M-2-5	17-9	Urine Specific Gravity	2	Age

Table M-2-1.
Interaction Table for Kidney Stones

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Diabetic Class: Table 17-4)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Percent Present**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Normal	Low	120	4.2	0.83 (0.50,1.39)	0.486
	Medium	117	4.3		
	High	111	2.7		
Impaired	Low	22	4.6	0.57 (0.08,4.07)	0.571
	Medium	24	0.0		
	High	28	0.0		
Diabetic	Low	32	9.4	0.01 (0.00,0.96)	0.048
	Medium	32	0.0		
	High	34	0.0		

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

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

Table M-2-2.
Interaction Table for Urinary Protein

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Diabetic Class: Table 17-5)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Present	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Normal	Low	239	3.8	0.69 (0.46,1.04)	0.076
	Medium	210	2.4		
	High	195	1.0		
Impaired	Low	27	0.0	2.17 (1.19,3.94)	0.011
	Medium	32	6.3		
	High	48	8.3		
Diabetic	Low	28	10.7	1.20 (0.86,1.68)	0.289
	Medium	57	14.0		
	High	55	10.9		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Diabetic Class: Table 17-5)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Present	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Normal	Low	250	3.6	0.78 (0.58,1.06)	0.109
	Medium	206	2.4		
	High	188	1.1		
Impaired	Low	23	0.0	1.92 (1.09,3.37)	0.024
	Medium	35	2.9		
	High	49	10.2		
Diabetic	Low	26	11.5	1.18 (0.88,1.58)	0.279
	Medium	55	10.9		
	High	59	13.6		

Table M-2-2. (Continued)
Interaction Table for Urinary Protein

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Diabetic Class: Table 17-5)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Present	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Normal	Low	249	3.6	0.78 (0.57,1.06)	0.115
	Medium	206	2.4		
	High	188	1.1		
Impaired	Low	23	0.0	1.93 (1.10,3.40)	0.022
	Medium	35	2.9		
	High	49	10.2		
Diabetic	Low	26	11.5	1.20 (0.88,1.65)	0.248
	Medium	55	10.9		
	High	59	13.6		

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

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 M-2-3.
Interaction Table for Urinary Red Blood Cell Count

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 17-6)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)	p-Value
Officer	Comparison	409	1.0		
	Background RH	236	0.9	0.89 (0.16,4.89)	0.889
	Low RH	103	4.9	4.92 (1.28,18.83)	0.020
	High RH	9	22.2	28.11 (4.34,181.98)	<0.001
	Low plus High RH	112	6.3	6.43 (1.83,22.59)	0.004
Enlisted Flyer	Comparison	173	1.7		
	Background RH	40	5.0	3.18 (0.50,20.11)	0.219
	Low RH	55	0.0	--	--
	High RH	54	3.7	2.25 (0.36,13.99)	0.385
	Low plus High RH	109	1.8	1.03 (0.17,6.29)	0.971
Enlisted Groundcrew	Comparison	480	2.9		
	Background RH	98	4.1	1.30 (0.41,4.14)	0.658
	Low RH	101	1.0	0.29 (0.04,2.25)	0.236
	High RH	196	5.6	2.25 (0.99,5.13)	0.054
	Low plus High RH	297	4.0	1.44 (0.65,3.18)	0.364

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 17-6)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	193	0.5	4.31 (1.55,12.00)	0.005
	Medium	141	4.3		
	High	14	14.3		
Enlisted Flyer	Low	31	3.2	1.22 (0.53,2.83)	0.641
	Medium	57	1.8		
	High	61	3.3		
Enlisted Groundcrew	Low	71	4.2	0.96 (0.70,1.31)	0.781
	Medium	101	3.0		
	High	223	4.5		

Table M-2-3. (Continued)
Interaction Table for Urinary Red Blood Cell Count

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 17-6)					
	Current Dioxin Category Summary Statistics			Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	192	0.5	2.80 (1.34,5.83)	0.006
	Medium	136	4.4		
	High	20	10.0		
Enlisted Flyer	Low	33	3.0	1.12 (0.54,2.32)	0.754
	Medium	56	1.8		
	High	60	3.3		
Enlisted Groundcrew	Low	75	4.0	0.96 (0.73,1.26)	0.780
	Medium	104	2.9		
	High	216	4.6		

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 17-6)					
	Current Dioxin Category Summary Statistics			Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	192	0.5	3.13 (1.37,7.12)	0.007
	Medium	136	4.4		
	High	20	10.0		
Enlisted Flyer	Low	32	3.1	1.15 (0.53,2.49)	0.716
	Medium	56	1.8		
	High	60	3.3		
Enlisted Groundcrew	Low	75	4.0	0.99 (0.74,1.31)	0.923
	Medium	104	2.9		
	High	216	4.6		

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 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 M-2-4.
Interaction Table for Serum Creatinine (mg/dl)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Diabetic Class: Table 17-8)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Normal	***All***	***Ranch Hand***	***688***	***1.0068***	***-0.0131 --***	***0.111***
		Comparison	***965***	***1.0199***		
Impaired	***All***	***Ranch Hand***	***119***	***1.0390***	***0.0333 --***	***0.113***
		Comparison	***132***	***1.0057***		
Diabetic	***All***	***Ranch Hand***	***144***	***0.9982***	***0.0402 --***	***0.024***
		Comparison	***182***	***0.9579***		
Normal	Officer	Ranch Hand	271	1.0198	-0.0081 --	0.537
		Comparison	399	1.0279		
	Enlisted Flyer	Ranch Hand	116	1.0006	-0.0091 --	0.656
		Comparison	139	1.0097		
	Enlisted Groundcrew	Ranch Hand	301	1.0011	-0.0191 --	0.123
		Comparison	427	1.0201		
Impaired	Officer	Ranch Hand	39	1.0422	0.0120 --	0.746
		Comparison	45	1.0302		
	Enlisted Flyer	Ranch Hand	21	0.9849	0.0133 --	0.774
		Comparison	27	0.9716		
	Enlisted Groundcrew	Ranch Hand	59	1.0794	0.0575 --	0.066
		Comparison	60	1.0219		
Diabetic	Officer	Ranch Hand	57	0.9787	0.0413 --	0.155
		Comparison	58	0.9374		
	Enlisted Flyer	Ranch Hand	25	0.9860	0.0485 --	0.233
		Comparison	36	0.9376		
	Enlisted Groundcrew	Ranch Hand	62	1.0331	0.0363 --	0.184
		Comparison	88	0.9967		

Table M-2-4. (Continued)
Interaction Table for Serum Creatinine (mg/dl)

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Diabetic Class: Table 17-8)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Normal	Low	120	1.0323	-0.0184 (0.0086)	0.032
	Medium	117	0.9822		
	High	111	0.9749		
Impaired	Low	22	0.9863	0.0373 (0.0176)	0.035
	Medium	24	0.9970		
	High	28	1.1184		
Diabetic	Low	32	1.0488	-0.0113 (0.0145)	0.439
	Medium	32	0.9784		
	High	34	0.9632		

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Diabetic Class: Table 17-8)

Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]	p-Value[c]
Normal	Comparison	802	1.0163		
	Background RH	298	0.9963	-0.0200 --	0.080
	Low RH	176	1.0301	0.0137 --	0.326
	High RH	172	0.9866	-0.0297 --	0.037
	Low plus High RH	348	1.0111	-0.0053 --	0.502
Impaired	Comparison	109	0.9946		
	Background RH	33	1.0216	0.0271 --	0.423
	Low RH	33	0.9602	-0.0344 --	0.281
	High RH	41	1.0737	0.0791 --	0.014
	Low plus High RH	74	1.0231	0.0285 --	0.329
Diabetic	Comparison	151	0.9472		
	Background RH	42	0.9872	0.0400 --	0.158
	Low RH	51	1.0051	0.0579 --	0.028
	High RH	47	0.9642	0.0169 --	0.526
	Low plus High RH	98	0.9862	0.0390 --	0.065

[a] Transformed from natural logarithm scale.

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

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

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

Note: RH = Ranch Hand.
Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = > 232 ppt.
Model 3: 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 M-2-5.
Interaction Table for Urine Specific Gravity

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Age: Table 17-9)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Adjusted Mean**	**Adjusted Slope (Std. Error)**	**p-Value**
Born ≥ 1942	Low	54	1.0191	-0.0002 (0.0003)	0.535
	Medium	72	1.0194		
	High	111	1.0183		
Born < 1942	Low	119	1.0178	0.0009 (0.0004)	0.012
	Medium	101	1.0188		
	High	61	1.0203		

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

APPENDIX M-3.

Renal Analysis Tables
Occupation and Diabetic Class Removed from Final Model

This appendix contains results of exposure analyses after occupation or diabetic class has been removed from those final dioxin models (Models 2 through 6) that contained occupation or diabetic class. These analyses are performed to investigate the relationship of the dependent variable to dioxin without adjusting any effects due to occupation or diabetic class. The format of these tables closely parallels the adjusted panels of Chapter 17 tables. A summary of the tables found in this appendix follows.

Appendix M-3 Table	Chapter 17 Table	Dependent Variable
M-3-1	17-3	Kidney Disease
M-3-2	17-4	Kidney Stones
M-3-3	17-5	Urinary Protein
M-3-4	17-6	Urinary Red Blood Cell Count
M-3-5	17-7	Urinary White Blood Cell Count
M-3-6	17-8	Serum Creatinine
M-3-7	17-9	Urine Specific Gravity

Table M-3-1.
Analysis of Kidney Disease
Occupation and Diabetic Class Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,041			AGE ($p<0.001$)
Background RH	364	1.02 (0.73,1.42)	0.905	
Low RH	253	1.00 (0.69,1.45)	0.985	
High RH	256	1.17 (0.81,1.70)	0.393	
Low plus High RH	509	1.08 (0.81,1.44)	0.580	

[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 M-3-2.
Analysis of Kidney Stones
Diabetic Class 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
520	0.65 (0.39,1.06)	0.061	AGE ($p=0.057$)

[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 M-3-3.
Analysis of Urinary Protein
Occupation and Diabetic Class 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
518	1.18 (0.87,1.59)	0.287	

[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.

[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	1,062			AGE (p=0.012)
Background RH	374	1.28 (0.72,2.25)	0.401	
Low RH	259	0.64 (0.30,1.33)	0.230	
High RH	259	0.99 (0.50,1.92)	0.965	
Low plus High RH	518	0.80 (0.47,1.36)	0.407	

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

[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 M-3-3. (Continued)
Analysis of Urinary Protein
Occupation and Diabetic Class 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	892	1.18 (0.94,1.49)	0.157	AGE*RACE (p=0.039)
5	892	1.16 (0.95,1.43)	0.145	AGE*RACE (p=0.035)
6[c]	891	1.15 (0.93,1.44)	0.203	AGE*RACE (p=0.036)

[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 M-3-4.
Analysis of Urinary Red Blood Cell Count
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,062			AGE (p=0.054) RACE (p=0.004)
Background RH	374	1.07 (0.47,2.47)	0.869	
Low RH	259	1.08 (0.43,2.73)	0.873	
High RH	259	3.39 (1.69,6.79)	0.001	
Low plus High RH	518	2.10 (1.13,3.90)	0.020	

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

[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.

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	892	1.18 (0.92,1.50)	0.197	
5	892	1.16 (0.93,1.44)	0.194	
6[c]	891	1.16 (0.92,1.46)	0.224	

[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.

Table M-3-5.
Analysis of Urinary White Blood Cell Count
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,063			AGE (p=0.040) RACE (p=0.069)
Background RH	374	1.03 (0.47,2.24)	0.947	
Low RH	260	1.34 (0.61,2.92)	0.467	
High RH	260	1.81 (0.85,3.87)	0.124	
Low plus High RH	520	1.55 (0.84,2.86)	0.160	

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

[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.

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	892	1.13 (0.87,1.47)	0.370	AGE (p=0.174)
5	892	1.10 (0.87,1.38)	0.430	AGE (p=0.186)
6[c]	891	1.15 (0.89,1.48)	0.278	AGE (p=0.153)

[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 M-3-6.
Analysis of Serum Creatinine (mg/dl)
Occupation and Diabetic Class 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	174	1.0286	0.012	-0.0069 (0.0069)	0.320	AGE (p=0.471) RACE (p=0.072)
Medium	173	0.9819				
High	173	0.9952				

[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 creatinine 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	1,063	1.0051			AGE*RACE (p=0.033)
Background RH	374	0.9992	-0.0058 --	0.561	
Low RH	260	1.0178	0.0127 --	0.274	
High RH	260	0.9977	-0.0073 --	0.526	
Low plus High RH	520	1.0082	0.0031 --	0.761	

[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 M-3-6. (Continued)
Analysis of Serum Creatinine (mg/dl)
Occupation and Diabetic Class 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	1.0018 (295)	1.0158 (300)	1.0005 (299)	0.016	0.0033 (0.0043)	0.437	AGE (p=0.013) RACE (p=0.001)
5	0.9972 (300)	1.0144 (297)	1.0066 (297)	0.017	0.0039 (0.0037)	0.291	AGE (p=0.012) RACE (p=0.002)
6[d]	1.0001 (299)	1.0149 (297)	1.0054 (297)	0.016	0.0025 (0.0040)	0.525	AGE (p=0.014) RACE (p=0.002)

[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 creatinine 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 M-3-7.
Analysis of Urine Specific Gravity
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[a]	R^2	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
Low	173	1.0184	0.028	0.0003 (0.0002)	0.139	AGE (p=0.800)
Medium	173	1.0192				
High	172	1.0193				

[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: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 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
6	1.0180 (299)	1.0187 (296)	1.0194 (296)	0.008	0.0003 (0.0001)	0.027	

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

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

APPENDIX N-1.

Dependent Variable-Covariate Associations for the Endocrine Assessment

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

Table N-1-1.
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Age			Race		
		Born ≥1942	Born <1942	p-Value	Black	Non-Black	p-Value
Past Thyroid Disease		(n=953)	(n=1,267)		(n=131)	(n=2,089)	
	Yes	4.0%	6.6%	0.009	4.6%	5.6%	0.782
Composite Diabetes		(n=953)	(n=1,272)		(n=131)	(n=2,094)	
Indicator	Yes	8.2%	19.1%	<0.001	19.9%	14.1%	0.091
Diabetic Severity		(n=954)	(n=1,274)		(n=131)	(n=2,097)	
	No Treatment	5.1%	11.0%	<0.001	13.0%	8.2%	0.021
	Diet Only	1.8%	3.5%		0.8%	2.9%	
	Oral Hypoglycemic	0.9%	2.5%		4.6%	1.7%	
	Insulin Dependent	0.3%	2.0%		1.5%	1.3%	
Time to Diabetes		(n=2,227)			(n=131)	(n=2,096)	
Onset (years)[a]		β=-0.024		<0.001	β=-0.160[b]		0.069
Thyroid Gland		(n=946)	(n=1,227)		(n=130)	(n=2,043)	
	Abnormal	0.6%	0.7%	0.987	0.8%	0.7%	0.999
Testicular Volume:		(n=2,207)			(n=130)	(n=2,077)	
Minimum (cm^3)		r=-0.153		<0.001	$\bar{x}$=14.30	$\bar{x}$=16.02	<0.001
Testicular Volume:		(n=2,207)			(n=130)	(n=2,077)	
Total (cm^3)		r=-0.140		<0.001	$\bar{x}$=30.55	$\bar{x}$=34.20	<0.001
Retinopathy		(n=78)	(n=241)		(n=26)	(n=293)	
Results (Diabetics)	Abnormal	1.3%	4.6%	0.326	3.9%	3.8%	0.999
Neuropathy Results		(n=78)	(n=243)		(n=26)	(n=295)	
(Diabetics)	Abnormal	3.9%	10.7%	0.107	19.2%	8.1%	0.125
Radial Pulses		(n=78)	(n=243)		(n=26)	(n=295)	
(Diabetics)	Abnormal	0.0%	1.2%	0.757	0.0%	1.0%	0.999
Femoral Pulses		(n=78)	(n=243)		(n=26)	(n=295)	
(Diabetics)	Abnormal	1.3%	3.7%	0.486	3.9%	3.1%	0.999
Popliteal Pulses		(n=78)	(n=243)		(n=26)	(n=295)	
(Diabetics)	Abnormal	1.3%	4.9%	0.273	3.9%	4.1%	0.999
Dorsalis Pedis Pulses		(n=78)	(n=243)		(n=26)	(n=295)	
(Diabetics)	Abnormal	7.7%	16.5%	0.082	19.2%	13.9%	0.651
Posterior Tibial		(n=78)	(n=243)		(n=26)	(n=295)	
Pulses (Diabetics)	Abnormal	1.3%	9.5%	0.032	11.5%	7.1%	0.665
Leg Pulses		(n=78)	(n=243)		(n=26)	(n=295)	
(Diabetics)	Abnormal	7.7%	18.1%	0.043	23.1%	14.9%	0.413
Peripheral Pulses		(n=78)	(n=243)		(n=26)	(n=295)	
(Diabetics)	Abnormal	7.7%	18.9%	0.030	23.1%	15.6%	0.474

[a]Estimated from a failure time analysis model, using the censored Weibull distribution.

[b]Estimated coefficient relative to non-Blacks.

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Age			Race		
		Born ≥1942	Born <1942	p-Value	Black	Non-Black	p-Value
Thyroid Stimulating Hormone (TSH) (μIU/ml)		(n=944)	(n=1,225)		(n=131)	(n=2,038)	
(continuous)		r=0.088		<0.001	$\bar{x}$=1.19	$\bar{x}$=1.62	<0.001
(discrete)	Abnormal High	1.7%	2.9%	0.077	0.0%	2.5%	0.125
Thyroxine (T_4) (μg/dl)		(n=944)	(n=1,225)		(n=131)	(n=2,038)	
(continuous)		r=0.013		0.545	$\bar{x}$=7.77	$\bar{x}$=7.82	0.711
(discrete)	Abnormal Low	0.5%	0.7%	0.748	0.8%	0.6%	0.999
Anti-Thyroid Antibodies	Abnormal	(n=944) 3.1%	(n=1,225) 3.0%	0.999	(n=131) 2.3%	(n=2,038) 3.1%	0.799
Fasting Glucose (mg/dl) (All Participants)		(n=953)	(n=1,274)		(n=131)	(n=2,096)	
(continuous)		r=0.191		<0.001	$\bar{x}$=109.06	$\bar{x}$=104.03	0.008
(discrete)	Abnormal High	7.0%	17.8%	<0.001	21.4%	12.7%	0.007
Fasting Glucose (mg/dl) (Diabetics)		(n=78)	(n=243)		(n=26)	(n=295)	
(continuous)		r=0.050		0.367	$\bar{x}$=160.58	$\bar{x}$=140.48	0.058
(discrete)	Abnormal High	59.0%	72.4%	0.036	84.6%	67.8%	0.119
Fasting Glucose (mg/dl) (Nondiabetics)		(n=875)	(n=1,031)		(n=105)	(n=1,801)	
(continuous)		r=0.169		<0.001	$\bar{x}$=99.10	$\bar{x}$=99.04	0.946
(discrete)	Abnormal High	2.4%	5.0%	0.005	5.7%	3.7%	0.419
2-Hour Postprandial Glucose (Nondiabetics) (mg/dl)		(n=875)	(n=1,029)		(n=105)	(n=1,799)	
(continuous)		r=0.188		<0.001	$\bar{x}$=103.09	$\bar{x}$=103.56	0.867
(discrete)	Impaired	8.9%	16.8%	<0.001	9.5%	13.4%	0.321
Fasting Urinary Glucose (All Participants)	Present	(n=951) 1.6%	(n=1,273) 4.2%	0.001	(n=131) 6.1%	(n=2,093) 2.9%	0.068
Fasting Urinary Glucose (Diabetics)	Present	(n=78) 19.2%	(n=242) 21.5%	0.790	(n=26) 30.8%	(n=294) 20.1%	0.301
2-Hour Postprandial Urinary Glucose (Nondiabetics)	Present	(n=873) 15.9%	(n=1,028) 20.5%	0.012	(n=104) 16.4%	(n=1,797) 18.5%	0.668

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Age			Race		
		Born ≥1942	Born <1942	p-Value	Black	Non-Black	p-Value
Serum Insulin (mIU/ml) (All Participants)		(n=2,227)			(n=131)	(n=2,096)	
(continuous)		r=0.103		<0.001	$\bar{x}$=56.9	$\bar{x}$=67.0	0.048
(discrete)		(n=953)	(n=1,274)				
	Abnormal Low	6.0%	3.5%	<0.001	6.1%	4.4%	0.502
	Abnormal High	51.1%	60.9%		52.7%	57.0%	
Serum Insulin (mIU/ml) (Diabetics)		(n=321)			(n=26)	(n=295)	
(continuous)		r=-0.004		0.939	$\bar{x}$=27.5	$\bar{x}$=61.0	0.001
(discrete)		(n=78)	(n=243)				
	Abnormal Low	0.0%	0.8%	0.186	7.7%	0.0%	<0.001
	Abnormal High	50.0%	60.1%		38.5%	59.3%	
Serum Insulin (mIU/ml) (Nondiabetics)		(n=1,906)			(n=105)	(n=1,801)	
(continuous)		r=0.147		<0.001	$\bar{x}$=68.2	$\bar{x}$=68.1	0.987
(discrete)		(n=875)	(n=1,031)				
	Abnormal Low	6.5%	4.1%	<0.001	5.7%	5.2%	0.970
	Abnormal High	51.2%	61.1%		56.2%	56.6%	
Serum Glucagon (pg/ml) (All Participants)		(n=1,931)			(n=114)	(n=1,817)	
(continuous)		r=0.105		<0.001	$\bar{x}$=54.7	$\bar{x}$=56.5	0.213
(discrete)		(n=787)	(n=1,144)				
	Abnormal	0.0%	0.4%	0.250	0.9%	0.2%	0.575
Serum Glucagon (pg/ml) (Diabetics)		(n=285)			(n=22)	(n=263)	
(continuous)		r=0.048		0.417	$\bar{x}$=67.8	$\bar{x}$=65.4	0.620
(discrete)		(n=64)	(n=221)				
	Abnormal	0.0%	1.8%	0.631	4.6%	1.1%	0.718
Serum Glucagon (pg/ml) (Nondiabetics)		(n=1,646)			(n=92)	(n=1,554)	
(continuous)		r=0.066		0.007	$\bar{x}$=52.0	$\bar{x}$=55.1	0.024
α-1-C Hemoglobin (percent) (All Participants)		(n=2,227)			(n=131)	(n=2,096)	
(continuous)		r=0.165		<0.001	$\bar{x}$=7.80	$\bar{x}$=7.12	<0.001
(discrete)		(n=953)	(n=1,274)				
	Abnormal	21.3%	30.5%	<0.001	48.1%	25.2%	<0.001

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Age			Race		
		Born ≥1942	Born <1942	p-Value	Black	Non-Black	p-Value
α-1-C Hemoglobin (percent)							
(Diabetics)		(n=321)			(n=26)	(n=295)	
(continuous)		r=0.068		0.225	$\bar{x}$=10.65	$\bar{x}$=8.89	0.001
(discrete)		(n=78)	(n=243)				
	Abnormal	71.8%	79.8%	0.183	88.5%	77.0%	0.267
α-1-C Hemoglobin (percent)							
(Nondiabetics)		(n=1,906)			(n=105)	(n=1,801)	
(continuous)		r=0.091		<0.001	$\bar{x}$=7.22	$\bar{x}$=6.87	<0.001
(discrete)		(n=875)	(n=1,031)				
	Abnormal	16.8%	18.9%	0.255	38.1%	16.8%	<0.001
Urinary Protein		(n=78)	(n=242)		(n=26)	(n=294)	
(Diabetics)	Abnormal	12.8%	14.5%	0.861	15.4%	14.0%	0.999
Serum Proinsulin (ng/ml)							
(Diabetics)		(n=307)			(n=25)	(n=282)	
(continuous)		r=0.002		0.978	$\bar{x}$=0.426	$\bar{x}$=0.803	0.019
(discrete)		(n=73)	(n=234)				
	Abnormal	41.1%	42.3%	0.962	28.0%	43.3%	0.204
Serum C Peptide (ng/ml)							
(Diabetics)		(n=307)			(n=25)	(n=282)	
(continuous)		r=0.024		0.673	$\bar{x}$=4.83	$\bar{x}$=8.93	0.003
(discrete)		(n=73)	(n=234)				
	Abnormal	56.2%	62.8%	0.378	44.0%	62.8%	0.103
Total Testosterone (ng/ml)		(n=2,207)			(n=130)	(n=2,077)	
(continuous)		r=-0.104		<0.001	$\bar{x}$=528.4	$\bar{x}$=501.8	0.112
(discrete)		(n=950)	(n=1,257)				
	Abnormal	4.5%	5.4%	0.400	3.9%	5.1%	0.668
Free Testosterone (pg/ml)		(n=2,207)			(n=130)	(n=2,077)	
(continuous)		r=-0.292		<0.001	$\bar{x}$=19.45	$\bar{x}$=18.42	0.062
(discrete)		(n=950)	(n=1,257)				
	Abnormal	21.9%	14.6%	<0.001	20.8%	17.6%	0.420
Sex Hormone		(n=950)	(n=1,257)		(n=130)	(n=2,077)	
Binding Globulin	Abnormal	17.1%	17.8%	0.679	26.2%	17.0%	0.010
Total Testosterone to Sex Hormone Binding Globulin		(n=950)	(n=1,257)		(n=130)	(n=2,077)	
Ratio	Abnormal	5.7%	13.1%	<0.001	7.7%	10.0%	0.478

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Age			Race		
		Born ≥1942	Born <1942	p-Value	Black	Non-Black	p-Value
Estradiol (pg/ml)		(n=2,232)			(n=131)	(n=2,101)	
(continuous)		r=-0.081		<0.001	$\bar{x}$=37.04	$\bar{x}$=31.87	<0.001
(discrete)		(n=955)	(n=1,277)				
	Abnormal	4.3%	3.6%	0.469	6.9%	3.7%	0.114
Luteinizing Hormone (LH) (mIU/ml)		(n=2,232)			(n=131)	(n=2,101)	
(continuous)		r=0.165		<0.001	$\bar{x}$=4.11	$\bar{x}$=3.93	0.352
(discrete)		(n=955)	(n=1,277)				
	Abnormal	0.3%	3.1%	<0.001	1.5%	1.9%	0.999
Follicle Stimulating Hormone (FSH) (mIU/ml)		(n=2,232)			(n=131)	(n=2,101)	
(continuous)		r=0.257		<0.001	$\bar{x}$=3.93	$\bar{x}$=4.39	0.070
(discrete)		(n=955)	(n=1,277)				
	Abnormal	1.7%	6.3%	<0.001	2.3%	4.4%	0.343

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Occupation				Personality Type		
		Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value	Type A	Type B	p-Value
Past Thyroid Disease		(n=863)	(n=364)	(n=993)		(n=948)	(n=1,270)	
	Yes	6.0%	4.1%	5.5%	0.408	5.4%	5.6%	0.903
Composite Diabetes Indicator		(n=867)	(n=364)	(n=994)		(n=949)	(n=1,274)	
	Yes	13.0%	16.8%	14.8%	0.215	12.2%	16.1%	0.012
Diabetic Severity		(n=867)	(n=365)	(n=996)		(n=950)	(n=1,276)	
	No Treatment	7.0%	10.1%	9.1%	0.422	7.0%	9.6%	0.098
	Diet Only	2.5%	3.0%	2.9%		2.7%	2.8%	
	Oral Hypoglycemic	1.7%	1.9%	1.9%		1.6%	2.0%	
	Insulin Dependent	1.7%	1.6%	0.8%		1.0%	1.6%	
Time to Diabetes Onset (years)[a]		(n=867)	(n=365)	(n=995)		(n=950)	(n=1,275)	
			β=-0.111[b]	β=-0.049[b]	0.261	β=0.111[c]		0.027
Thyroid Gland		(n=839)	(n=355)	(n=979)		(n=932)	(n=1,239)	
	Abnormal	0.6%	0.6%	0.8%	0.810	0.8%	0.7%	0.975
Testicular Volume: Minimum (cm^3)		(n=857)	(n=363)	(n=987)		(n=940)	(n=1,265)	
		$\bar{x}$=15.67	$\bar{x}$=15.85	$\bar{x}$=16.16	0.157	$\bar{x}$=16.01	$\bar{x}$=15.86	0.540
Testicular Volume: Total (cm^3)		(n=857)	(n=363)	(n=987)		(n=940)	(n=1,265)	
		$\bar{x}$=33.61	$\bar{x}$=34.18	$\bar{x}$=34.22	0.435	$\bar{x}$=34.31	$\bar{x}$=33.77	0.251
Retinopathy Results (Diabetics)		(n=111)	(n=61)	(n=147)		(n=114)	(n=205)	
	Abnormal	3.6%	4.9%	3.4%	0.867	2.6%	4.4%	0.628
Neuropathy Results (Diabetics)		(n=113)	(n=61)	(n=147)		(n=116)	(n=205)	
	Abnormal	7.1%	13.1%	8.8%	0.413	6.9%	10.2%	0.422
Radial Pulses (Diabetics)		(n=113)	(n=61)	(n=147)		(n=116)	(n=205)	
	Abnormal	1.8%	0.0%	0.7%	0.465	0.9%	1.0%	0.999
Femoral Pulses (Diabetics)		(n=113)	(n=61)	(n=147)		(n=116)	(n=205)	
	Abnormal	3.5%	4.9%	2.0%	0.526	3.5%	2.9%	0.999
Popliteal Pulses (Diabetics)		(n=113)	(n=61)	(n=147)		(n=116)	(n=205)	
	Abnormal	5.3%	4.9%	2.7%	0.536	3.5%	4.4%	0.907

[a]Estimated from a failure time analysis model, using the censored Weibull distribution.

[b]Estimated coefficient relative to officers.

[c]Estimated coefficient relative to Type B.

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Occupation				Personality Type		
		Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value	Type A	Type B	p-Value
Dorsalis Pedis Pulses (Diabetics)	Abnormal	(n=113) 15.0%	(n=61) 14.8%	(n=147) 13.6%	0.942	(n=116) 12.1%	(n=205) 15.6%	0.481
Posterior Tibial Pulses (Diabetics)	Abnormal	(n=113) 8.9%	(n=61) 8.2%	(n=147) 6.1%	0.690	(n=116) 6.9%	(n=205) 7.8%	0.939
Leg Pulses (Diabetics)	Abnormal	(n=113) 15.0%	(n=61) 16.4%	(n=147) 15.7%	0.972	(n=116) 14.7%	(n=205) 16.1%	0.855
Peripheral Pulses (Diabetics)	Abnormal	(n=113) 16.8%	(n=61) 16.4%	(n=147) 15.7%	0.967	(n=116) 14.7%	(n=205) 17.1%	0.684
Thyroid Stimulating Hormone (TSH) (μIU/ml)		(n=837)	(n=356)	(n=976)		(n=931)	(n=1,236)	
(continuous)		$\bar{x}$=1.68	$\bar{x}$=1.49	$\bar{x}$=1.56	0.003	$\bar{x}$=1.57	$\bar{x}$=1.61	0.406
(discrete)	Abnormal High	3.0%	1.7%	2.1%	0.280	2.8%	2.0%	0.304
Thyroxine (T_4) (μg/dl)		(n=837)	(n=356)	(n=976)		(n=931)	(n=1,236)	
(continuous)		$\bar{x}$=7.57	$\bar{x}$=7.96	$\bar{x}$=7.98	<0.001	$\bar{x}$=7.79	$\bar{x}$=7.83	0.427
(discrete)	Abnormal Low	1.2%	0.3%	0.3%	0.040	0.6%	0.7%	0.999
Anti-Thyroid Antibodies	Abnormal	(n=837) 3.4%	(n=356) 2.8%	(n=976) 2.9%	0.808	(n=931) 3.4%	(n=1,236) 2.8%	0.427
Fasting Glucose (mg/dl) (All Participants)		(n=867)	(n=364)	(n=996)		(n=950)	(n=1,275)	
(continuous)		$\bar{x}$=104.48	$\bar{x}$=105.87	$\bar{x}$=103.62	0.203	$\bar{x}$=103.43	$\bar{x}$=105.00	0.078
(discrete)	Abnormal High	12.8%	14.6%	13.1%	0.695	11.4%	14.6%	0.031
Fasting Glucose (mg/dl) (Diabetics)		(n=113)	(n=61)	(n=147)		(n=116)	(n=205)	
(continuous)		$\bar{x}$=144.68	$\bar{x}$=143.41	$\bar{x}$=139.43	0.674	$\bar{x}$=145.53	$\bar{x}$=140.06	0.340
(discrete)	Abnormal High	71.7%	70.5%	66.7%	0.665	69.8%	68.8%	0.945
Fasting Glucose (mg/dl) (Nondiabetics)		(n=754)	(n=303)	(n=849)		(n=834)	(n=1,070)	
(continuous)		$\bar{x}$=99.51	$\bar{x}$=99.60	$\bar{x}$=98.43	0.021	$\bar{x}$=98.64	$\bar{x}$=99.36	0.068
(discrete)	Abnormal High	4.0%	3.3%	3.8%	0.872	3.2%	4.2%	0.328
2-Hour Postprandial Glucose (Nondiabetics) (mg/dl)		(n=754)	(n=303)	(n=847)		(n=833)	(n=1,069)	
(continuous)		$\bar{x}$=102.17	$\bar{x}$=107.66	$\bar{x}$=103.31	0.018	$\bar{x}$=100.89	$\bar{x}$=105.61	<0.001
(discrete)	Impaired	11.1%	15.8%	14.1%	0.075	10.4%	15.3%	0.003

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Occupation				Personality Type		
		Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value	Type A	Type B	p-Value
Fasting Urinary Glucose (All Participants)		(n=867)	(n=363)	(n=994)		(n=949)	(n=1,273)	
	Present	2.7%	3.9%	3.1%	0.529	2.9%	3.2%	0.701
Fasting Urinary Glucose (Diabetics)		(n=113)	(n=61)	(n=146)		(n=116)	(n=204)	
	Present	20.4%	21.3%	21.2%	0.982	23.3%	19.6%	0.527
2-Hour Postprandial Urinary Glucose (Nondiabetics)		(n=751)	(n=303)	(n=847)		(n=833)	(n=1,066)	
	Present	14.3%	21.8%	20.9%	0.001	17.7%	19.0%	0.505
Serum Insulin (mIU/ml) (All Participants)		(n=867)	(n=364)	(n=996)		(n=950)	(n=1,275)	
(continuous)		$\bar{x}$=63.8	$\bar{x}$=70.2	$\bar{x}$=67.4	0.190	$\bar{x}$=59.9	$\bar{x}$=71.6	<0.001
(discrete)	Abnormal Low	5.0%	3.9%	4.4%	0.241	5.4%	3.9%	<0.001
	Abnormal High	54.7%	61.8%	56.6%		51.9%	60.3%	
Serum Insulin (mIU/ml) (Diabetics)		(n=113)	(n=61)	(n=147)		(n=116)	(n=205)	
(continuous)		$\bar{x}$=68.4	$\bar{x}$=49.5	$\bar{x}$=52.9	0.133	$\bar{x}$=50.9	$\bar{x}$=61.1	0.190
(discrete)	Abnormal Low	0.0%	3.3%	0.0%	0.003	0.0%	1.0%	0.030
	Abnormal High	68.1%	50.8%	52.4%		49.1%	62.4%	
Serum Insulin (mIU/ml) (Nondiabetics)		(n=754)	(n=303)	(n=849)		(n=834)	(n=1,070)	
(continuous)		$\bar{x}$=63.1	$\bar{x}$=75.4	$\bar{x}$=70.2	0.003	$\bar{x}$=61.3	$\bar{x}$=73.8	<0.001
(discrete)	Abnormal Low	5.7%	4.0%	5.2%	0.018	6.1%	4.5%	0.003
	Abnormal High	52.7%	64.0%	57.4%		52.3%	59.9%	
Serum Glucagon (pg/ml) (All Participants)		(n=745)	(n=331)	(n=855)		(n=816)	(n=1,113)	
(continuous)		$\bar{x}$=56.0	$\bar{x}$=55.7	$\bar{x}$=57.0	0.273	$\bar{x}$=56.0	$\bar{x}$=56.7	0.288
(discrete)	Abnormal	0.0%	0.0%	0.5%	0.080	0.1%	0.3%	0.846
Serum Glucagon (pg/ml) (Diabetics)		(n=104)	(n=53)	(n=128)		(n=100)	(n=185)	
(continuous)		$\bar{x}$=64.6	$\bar{x}$=63.4	$\bar{x}$=67.4	0.430	$\bar{x}$=64.9	$\bar{x}$=66.0	0.665
(discrete)	Abnormal	0.0%	0.0%	3.1%	0.083	1.0%	1.6%	0.999
Serum Glucagon (pg/ml) (Nondiabetics)		(n=641)	(n=278)	(n=727)		(n=716)	(n=928)	
(continuous)		$\bar{x}$=54.7	$\bar{x}$=54.4	$\bar{x}$=55.3	0.514	$\bar{x}$=54.8	$\bar{x}$=55.0	0.800

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Occupation				Personality Type		
		Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value	Type A	Type B	p-Value
α-1-C Hemoglobin (percent)								
(All Participants)		(n=867)	(n=364)	(n=996)		(n=950)	(n=1,275)	
(continuous)		$\bar{x}$=7.07	$\bar{x}$=7.32	$\bar{x}$=7.18	0.003	$\bar{x}$=7.12	$\bar{x}$=7.19	0.128
(discrete)	Abnormal	23.2%	33.2%	27.1%	0.001	24.6%	28.0%	0.083
α-1-C Hemoglobin (percent)								
(Diabetics)		(n=113)	(n=61)	(n=147)		(n=116)	(n=205)	
(continuous)		$\bar{x}$=8.90	$\bar{x}$=9.19	$\bar{x}$=9.03	0.758	$\bar{x}$=9.12	$\bar{x}$=8.96	0.565
(discrete)	Abnormal	77.0%	80.3%	77.6%	0.872	80.2%	76.6%	0.546
α-1-C Hemoglobin (percent)								
(Nondiabetics)		(n=754)	(n=303)	(n=849)		(n=834)	(n=1,070)	
(continuous)		$\bar{x}$=6.83	$\bar{x}$=6.99	$\bar{x}$=6.90	0.001	$\bar{x}$=6.88	$\bar{x}$=6.90	0.445
(discrete)	Abnormal	15.1%	23.8%	18.4%	0.004	16.9%	18.7%	0.343
Urinary Protein		(n=113)	(n=61)	(n=146)		(n=116)	(n=204)	
(Diabetics)	Abnormal	12.4%	11.5%	16.4%	0.527	14.7%	13.7%	0.950
Serum Proinsulin (ng/ml)								
(Diabetics)		(n=109)	(n=58)	(n=140)		(n=110)	(n=197)	
(continuous)		$\bar{x}$=0.87	$\bar{x}$=0.65	$\bar{x}$=0.74	0.247	$\bar{x}$=0.62	$\bar{x}$=0.86	0.021
(discrete)	Abnormal	40.4%	41.4%	43.6%	0.874	45.5%	40.1%	0.429
Serum C Peptide (ng/ml)								
(Diabetics)		(n=109)	(n=58)	(n=140)		(n=110)	(n=197)	
(continuous)		$\bar{x}$=9.20	$\bar{x}$=8.03	$\bar{x}$=8.35	0.469	$\bar{x}$=8.23	$\bar{x}$=8.79	0.483
(discrete)	Abnormal	64.2%	55.2%	61.4%	0.520	62.7%	60.4%	0.781
Total Testosterone (ng/ml)		(n=857)	(n=361)	(n=989)		(n=939)	(n=1,266)	
(continuous)		$\bar{x}$=489.8	$\bar{x}$=505.5	$\bar{x}$=514.5	0.014	$\bar{x}$=511.2	$\bar{x}$=497.6	0.085
(discrete)	Abnormal	4.7%	4.7%	5.5%	0.706	4.5%	5.5%	0.347
Free Testosterone (pg/ml)		(n=857)	(n=361)	(n=989)		(n=939)	(n=1,266)	
(continuous)		$\bar{x}$=17.37	$\bar{x}$=18.68	$\bar{x}$=19.39	<0.001	$\bar{x}$=18.97	$\bar{x}$=18.12	0.001
(discrete)	Abnormal	17.4%	14.1%	19.4%	0.074	15.4%	19.5%	0.016
Sex Hormone Binding Globulin	Abnormal	(n=857) 18.8%	(n=361) 15.2%	(n=989) 17.2%	0.312	(n=939) 15.4%	(n=1,266) 19.0%	0.036

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Occupation				Personality Type		
		Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value	Type A	Type B	p-Value
Total Testosterone to Sex Hormone Binding Globulin Ratio	Abnormal	(n=857) 10.7%	(n=361) 11.1%	(n=989) 8.7%	0.241	(n=939) 10.3%	(n=1,266) 9.5%	0.554
Estradiol (pg/ml)		(n=869)	(n=364)	(n=999)				
(continuous)		$\bar{x}$=31.45	$\bar{x}$=32.13	$\bar{x}$=32.81	0.085	--	--	--
(discrete)		3.5%	5.0%	3.9%	0.466	--	--	--
Luteinizing Hormone (LH) (mIU/ml)		(n=869)	(n=364)	(n=999)				
(continuous)		$\bar{x}$=3.99	$\bar{x}$=3.98	$\bar{x}$=3.88	0.476	--	--	--
(discrete)	Abnormal	2.2%	2.2%	1.5%	0.493	--	--	--
Follicle Stimulating Hormone (FSH) (mIU/ml)		(n=869)	(n=364)	(n=999)				
(continuous)		$\bar{x}$=4.59	$\bar{x}$=4.44	$\bar{x}$=4.15	0.005	--	--	--
(discrete)	Abnormal	5.3%	5.5%	3.0%	0.024	--	--	--

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Body Fat: Obese >25%	Body Fat: Lean or Normal ≤25%	Body Fat: p-Value	Family History of Diabetes: Yes	Family History of Diabetes: No	Family History of Diabetes: p-Value
Composite Diabetes Indicator	Yes	(n=567) 26.1%	(n=1,658) 10.4%	<0.001	(n=521) 21.9%	(n=1,668) 12.0%	<0.001
Diabetic Severity		(n=568)	(n=1,660)		(n=521)	(n=1,671)	
	No Treatment	15.9%	6.0%	<0.001	10.9%	7.5%	<0.001
	Diet Only	4.8%	2.1%		4.8%	2.2%	
	Oral Hypoglycemic	3.9%	1.1%		3.8%	1.3%	
	Insulin Dependent	1.6%	1.2%		2.3%	1.0%	
Time to Diabetes Onset (years)[a]		(n=2,227) β=-0.035		<0.001	(n=521) β=-0.283[b]	(n=1,670)	<0.001
Testicular Volume: Minimum (cm^3)		(n=2,207) r=0.034		0.105	--	--	--
Testicular Volume: Total (cm^3)		(n=2,207) r=0.037		0.080	--	--	--
Retinopathy Results (Diabetics)	Abnormal	(n=148) 2.0%	(n=171) 5.3%	0.223	(n=113) 7.1%	(n=199) 1.5%	0.025
Neuropathy Results (Diabetics)	Abnormal	(n=148) 6.8%	(n=173) 11.0%	0.262	(n=114) 7.9%	(n=200) 9.5%	0.784
Radial Pulses (Diabetics)	Abnormal	(n=148) 0.7%	(n=173) 1.2%	0.999	(n=114) 0.9%	(n=200) 1.0%	0.999
Femoral Pulses (Diabetics)	Abnormal	(n=148) 3.4%	(n=173) 2.9%	0.999	(n=114) 2.6%	(n=200) 3.5%	0.930
Popliteal Pulses (Diabetics)	Abnormal	(n=148) 4.1%	(n=173) 4.1%	0.999	(n=114) 3.5%	(n=200) 4.5%	0.897
Dorsalis Pedis Pulses (Diabetics)	Abnormal	(n=148) 11.5%	(n=173) 16.8%	0.236	(n=114) 14.0%	(n=200) 14.0%	0.999
Posterior Tibial Pulses (Diabetics)	Abnormal	(n=148) 4.7%	(n=173) 9.8%	0.129	(n=114) 7.9%	(n=200) 7.5%	0.999
Leg Pulses (Diabetics)	Abnormal	(n=148) 12.2%	(n=173) 18.5%	0.160	(n=114) 16.7%	(n=200) 14.5%	0.726
Peripheral Pulses (Diabetics)	Abnormal	(n=148) 12.2%	(n=173) 19.7%	0.096	(n=114) 16.7%	(n=200) 15.5%	0.911
Fasting Glucose (mg/dl) (All Participants)		(n=568)	(n=1,659)		(n=521)	(n=1,670)	
(continuous)		r=0.209		<0.001	$\bar{x}$=108.12	$\bar{x}$=103.21	<0.001
(discrete)	Abnormal High	23.1%	9.8%	<0.001	18.2%	11.6%	<0.001

[a]Estimated from a failure time analysis model, using the censored Weibull distribution.

[b]Estimated coefficient relative to no family history of diabetes.

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Body Fat: Obese >25%	Body Fat: Lean or Normal ≤25%	Body Fat: p-Value	Family History of Diabetes: Yes	Family History of Diabetes: No	Family History of Diabetes: p-Value
Fasting Glucose (mg/dl) (Diabetics)		(n=148)	(n=173)		(n=114)	(n=200)	
(continuous)		r=0.048		0.395	$\bar{x}$=145.48	$\bar{x}$=140.37	0.377
(discrete)	Abnormal High	73.7%	65.3%	0.136	66.7%	70.5%	0.562
Fasting Glucose (mg/dl) (Nondiabetics)		(n=420)	(n=1,486)		(n=407)	(n=1,470)	
(continuous)		r=0.165		<0.001	$\bar{x}$=99.49	$\bar{x}$=98.98	0.287
(discrete)	Abnormal High	5.2%	3.4%	0.102	4.7%	3.5%	0.367
2-Hour Postprandial Glucose (Nondiabetics) (mg/dl)		(n=419)	(n=1,485)		(n=407)	(n=1,468)	
(continuous)		r=0.265		<0.001	$\bar{x}$=108.53	$\bar{x}$=102.46	<0.001
(discrete)	Impaired	23.2%	10.4%	<0.001	17.0%	12.1%	0.014
Fasting Urinary Glucose (All Participants)	Present	(n=566) 6.0%	(n=1,658) 2.1%	<0.001	(n=520) 4.8%	(n=1,668) 2.5%	0.010
Fasting Urinary Glucose (Diabetics)	Present	(n=147) 22.5%	(n=173) 19.7%	0.635	(n=114) 21.9%	(n=199) 20.1%	0.811
2-Hour Postprandial Urinary Glucose (Nondiabetics)	Present	(n=418) 20.3%	(n=1,483) 17.9%	0.281	(n=407) 19.4%	(n=1,466) 18.1%	0.587
Serum Insulin (mIU/ml) (All Participants)		(n=2,227)			(n=521)	(n=1,670)	
(continuous)		r=0.347		<0.001	$\bar{x}$=69.0	$\bar{x}$=65.8	0.310
(discrete)		(n=568)	(n=1,659)				
	Abnormal Low	1.2%	5.7%	<0.001	3.1%	5.0%	0.065
	Abnormal High	74.3%	50.7%		60.5%	55.8%	
Serum Insulin (mIU/ml) (Diabetics)		(n=321)			(n=114)	(n=200)	
(continuous)		r=0.223		<0.001	$\bar{x}$=47.1	$\bar{x}$=64.1	0.030
(discrete)		(n=148)	(n=173)				
	Abnormal Low	0.0%	1.2%	0.017	0.9%	0.5%	0.236
	Abnormal High	65.5%	50.9%		51.8%	61.5%	

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Body Fat: Obese >25%	Body Fat: Lean or Normal ≤25%	Body Fat: p-Value	Family History of Diabetes: Yes	Family History of Diabetes: No	Family History of Diabetes: p-Value
Serum Insulin (mIU/ml)							
(Nondiabetics)		(n=1,906)			(n=407)	(n=1,470)	
(continuous)		r=0.415		<0.001	$\bar{x}$=76.8	$\bar{x}$=66.1	0.002
(discrete)		(n=420)	(n=1,486)				
	Abnormal Low	1.7%	6.2%	<0.001	3.7%	5.6%	0.013
	Abnormal High	77.4%	50.7%		62.9%	55.0%	
Serum Glucagon (pg/ml)							
(All Participants)		(n=1,931)			(n=458)	(n=1,442)	
(continuous)		r=0.095		<0.001	$\bar{x}$=57.1	$\bar{x}$=56.1	0.227
(discrete)		(n=500)	(n=1,431)				
	Abnormal	0.6%	0.1%	0.094	0.4%	0.1%	0.531
Serum Glucagon (pg/ml)							
(Diabetics)		(n=285)			(n=103)	(n=175)	
(continuous)		r=0.104		0.080	$\bar{x}$=68.5	$\bar{x}$=64.2	0.105
(discrete)		(n=131)	(n=154)				
	Abnormal	2.3%	0.7%	0.504	1.9%	1.1%	0.985
Serum Glucagon (pg/ml)							
(Nondiabetics)		(n=1,646)			(n=355)	(n=1,267)	
(continuous)		r=0.027		0.267	$\bar{x}$=54.1	$\bar{x}$=55.1	0.212
α-1-C Hemoglobin (percent)							
(All Participants)		(n=2,227)			(n=521)	(n=1,670)	
(continuous)		r=0.163		<0.001	$\bar{x}$=7.46	$\bar{x}$=7.07	<0.001
(discrete)		(n=568)	(n=1,659)				
	Abnormal	38.9%	22.4%	<0.001	35.1%	24.2%	<0.001
α-1-C Hemoglobin (percent)							
(Diabetics)		(n=321)			(n=114)	(n=200)	
(continuous)		r=0.011		0.846	$\bar{x}$=9.44	$\bar{x}$=8.79	0.025
(discrete)		(n=148)	(n=173)				
	Abnormal	84.5%	72.3%	0.013	81.6%	76.5%	0.364
α-1-C Hemoglobin (percent)							
(Nondiabetics)		(n=1,906)			(n=407)	(n=1,470)	
(continuous)		r=0.078		0.001	$\bar{x}$=6.98	$\bar{x}$=6.87	0.001
(discrete)		(n=420)	(n=1,486)				
	Abnormal	22.9%	16.6%	0.004	22.1%	17.1%	0.024
Urinary Protein							
(Diabetics)		(n=147)	(n=173)		(n=114)	(n=199)	
(discrete)	Abnormal	15.0%	13.3%	0.789	15.8%	13.1%	0.618

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Body Fat: Obese >25%	Body Fat: Lean or Normal ≤25%	Body Fat: p-Value	Family History of Diabetes: Yes	Family History of Diabetes: No	Family History of Diabetes: p-Value
Serum Proinsulin (ng/ml)							
(Diabetics)		(n=307)			(n=112)	(n=189)	
(continuous)		r=0.249		<0.001	$\bar{x}$=0.760	$\bar{x}$=0.776	0.885
(discrete)		(n=140)	(n=167)				
	Abnormal	49.3%	35.9%	0.025	45.5%	40.7%	0.488
Serum C Peptide (ng/ml)							
(Diabetics)		(n=307)			(n=112)	(n=189)	
(continuous)		r=0.195		0.001	$\bar{x}$=7.31	$\bar{x}$=9.35	0.010
(discrete)		(n=140)	(n=167)				
	Abnormal	67.1%	56.3%	0.068	54.5%	65.6%	0.072
Total Testosterone (ng/ml)		(n=2,207)					
(continuous)		r=-0.347		<0.001	--	--	--
(discrete)		(n=565)	(n=1,642)				
	Abnormal	12.0%	2.6%	<0.001	--	--	--
Free Testosterone (pg/ml)		(n=2,207)					
(continuous)		r=-0.236		<0.001	--	--	--
(discrete)		(n=565)	(n=1,642)				
	Abnormal	27.1%	14.6%	<0.001	--	--	--
Sex Hormone		(n=565)	(n=1,642)				
Binding Globulin	Abnormal	19.3%	16.9%	0.214	--	--	--
Total Testosterone to Sex Hormone Binding Globulin		(n=565)	(n=1,642)				
Ratio	Abnormal	10.8%	9.6%	0.443	--	--	--

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Diabetic Severity: No Treatment	Diet Only	Oral Hypoglycemic	Insulin Dependent	p-Value
Retinopathy Results (Diabetics)	Abnormal	(n=189) 0.5%	(n=61) 3.3%	(n=41) 7.3%	(n=28) 21.4%	<0.001
Neuropathy Results (Diabetics)	Abnormal	(n=189) 3.7%	(n=62) 3.2%	(n=41) 17.1%	(n=29) 44.8%	<0.001
Radial Pulses (Diabetics)	Abnormal	(n=189) 0.5%	(n=62) 1.6%	(n=41) 2.4%	(n=29) 0.0%	0.589
Femoral Pulses (Diabetics)	Abnormal	(n=189) 2.7%	(n=62) 3.2%	(n=41) 0.0%	(n=29) 10.3%	0.090
Popliteal Pulses (Diabetics)	Abnormal	(n=189) 2.7%	(n=62) 3.2%	(n=41) 2.4%	(n=29) 17.2%	0.002
Dorsalis Pedis Pulses (Diabetics)	Abnormal	(n=189) 11.6%	(n=62) 12.9%	(n=41) 17.1%	(n=29) 31.0%	0.045
Posterior Tibial Pulses (Diabetics)	Abnormal	(n=189) 6.9%	(n=62) 3.2%	(n=41) 7.3%	(n=29) 20.7%	0.029
Leg Pulses (Diabetics)	Abnormal	(n=189) 13.2%	(n=62) 12.9%	(n=41) 19.5%	(n=29) 31.0%	0.076
Peripheral Pulses (Diabetics)	Abnormal	(n=189) 13.8%	(n=62) 12.9%	(n=41) 22.0%	(n=29) 31.0%	0.071
Fasting Glucose (mg/dl) (Diabetics)		(n=189)	(n=62)	(n=41)	(n=29)	
(continuous)		$\bar{x}$=130.64	$\bar{x}$=141.57	$\bar{x}$=187.22	$\bar{x}$=166.60	<0.001
(discrete)	Abnormal High	64.6%	61.3%	92.7%	82.8%	0.001
Fasting Urinary Glucose (Diabetics)	Present	(n=188) 11.7%	(n=62) 21.0%	(n=41) 43.9%	(n=29) 48.3%	<0.001
Serum Insulin (mIU/ml) (Diabetics)		(n=189)	(n=62)	(n=41)	(n=29)	
(continuous)		$\bar{x}$=81.70	$\bar{x}$=38.83	$\bar{x}$=23.38	$\bar{x}$=45.30	<0.001
(discrete)	Abnormal Low	1.1%	0.0%	0.0%	0.0%	<0.001
	Abnormal High	68.3%	45.2%	26.8%	58.6%	

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Diabetic Severity				
		No Treatment	Diet Only	Oral Hypoglycemic	Insulin Dependent	p-Value
Serum Glucagon (pg/ml)						
(Diabetics)		(n=165)	(n=54)	(n=41)	(n=25)	
(continuous)		$\bar{x}$=61.6	$\bar{x}$=67.0	$\bar{x}$=75.4	$\bar{x}$=75.3	<0.001
(discrete)	Abnormal	1.2%	0.0%	2.4%	4.0%	0.503
α-1-C Hemoglobin (percent)						
(Diabetics)		(n=189)	(n=62)	(n=41)	(n=29)	
(continuous)		$\bar{x}$=8.41	$\bar{x}$=8.79	$\bar{x}$=11.00	$\bar{x}$=11.37	<0.001
(discrete)	Abnormal	72.0%	71.0%	100.0%	100.0%	<0.001
Urinary Protein		(n=188)	(n=62)	(n=41)	(n=29)	
(Diabetics)	Abnormal	10.1%	11.3%	24.4%	31.0%	0.004
Serum Proinsulin (ng/ml)						
(Diabetics)		(n=175)	(n=62)	(n=41)	(n=29)	
(continuous)		$\bar{x}$=0.930	$\bar{x}$=0.531	$\bar{x}$=0.651	$\bar{x}$=0.579	0.004
(discrete)	Abnormal	24.0%	58.1%	82.9%	58.6%	<0.001
Serum C Peptide (ng/ml)						
(Diabetics)		(n=175)	(n=62)	(n=41)	(n=29)	
(continuous)		$\bar{x}$=11.41	$\bar{x}$=6.70	$\bar{x}$=4.03	$\bar{x}$=2.10	<0.001
(discrete)	Abnormal	78.3%	48.4%	41.5%	13.8%	<0.001

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Family History of Heart Disease			Current Cigarette Smoking (cigarettes/day)				
		No	Yes	p-Value	0-Never	0-Former	>0-20	>20	p-Value
Radial Pulses (Diabetics)	Abnormal	(n=139) 0.7%	(n=179) 1.1%	0.999	(n=73) 1.4%	(n=169) 1.2%	(n=47) 0.0%	(n=32) 0.0%	0.799
Femoral Pulses (Diabetics)	Abnormal	(n=139) 3.6%	(n=179) 2.8%	0.933	(n=73) 0.0%	(n=169) 1.2%	(n=47) 12.8%	(n=32) 6.3%	<0.001
Popliteal Pulses (Diabetics)	Abnormal	(n=139) 5.0%	(n=179) 3.4%	0.641	(n=73) 0.0%	(n=169) 1.2%	(n=47) 17.0%	(n=32) 9.4%	<0.001
Dorsalis Pedis Pulses (Diabetics)	Abnormal	(n=139) 18.7%	(n=179) 11.2%	0.083	(n=73) 6.9%	(n=169) 13.0%	(n=47) 27.7%	(n=32) 18.8%	0.012
Posterior Tibial Pulses (Diabetics)	Abnormal	(n=139) 10.1%	(n=179) 5.6%	0.198	(n=73) 0.0%	(n=169) 6.5%	(n=47) 19.2%	(n=32) 12.5%	0.001
Leg Pulses (Diabetics)	Abnormal	(n=139) 20.9%	(n=179) 11.7%	0.039	(n=73) 6.9%	(n=169) 14.2%	(n=47) 29.8%	(n=32) 21.9%	0.005
Peripheral Pulses (Diabetics)	Abnormal	(n=139) 20.9%	(n=179) 12.9%	0.078	(n=73) 8.2%	(n=169) 14.8%	(n=47) 29.8%	(n=32) 21.9%	0.013

Dependent Variable	Level	Lifetime Cigarette Smoking History (pack-years)				Cholesterol (mg/dl)			
		0	>0-10	>10	p-Value	0-200	200-239	>239	p-Value
Radial Pulses (Diabetics)	Abnormal	(n=73) 1.4%	(n=82) 0.0%	(n=166) 1.2%	0.590	(n=104) 1.9%	(n=113) 0.0%	(n=104) 1.0%	0.339
Femoral Pulses (Diabetics)	Abnormal	(n=73) 0.0%	(n=82) 3.7%	(n=166) 4.2%	0.213	(n=104) 2.9%	(n=113) 3.5%	(n=104) 2.9%	0.949
Popliteal Pulses (Diabetics)	Abnormal	(n=73) 0.0%	(n=82) 4.9%	(n=166) 5.4%	0.133	(n=104) 2.9%	(n=113) 5.3%	(n=104) 3.9%	0.658
Dorsalis Pedis Pulses (Diabetics)	Abnormal	(n=73) 6.9%	(n=82) 9.8%	(n=166) 19.9%	0.012	(n=104) 16.4%	(n=113) 10.6%	(n=104) 16.4%	0.376

Table N-1-1. (Continued)
Dependent Variable-Covariate Associations for the Endocrine Assessment

Dependent Variable	Level	Lifetime Cigarette Smoking History (pack-years) 0	>0-10	>10	p-Value	Cholesterol (mg/dl) 0-200	200-239	>239	p-Value
Posterior Tibial Pulses (Diabetics)	Abnormal	(n=73) 0.0%	(n=82) 6.1%	(n=166) 11.5%	0.007	(n=104) 6.7%	(n=113) 8.0%	(n=104) 7.7%	0.937
Leg Pulses (Diabetics)	Abnormal	(n=73) 6.9%	(n=82) 11.0%	(n=166) 21.7%	0.006	(n=104) 17.3%	(n=113) 11.5%	(n=104) 18.3%	0.327
Peripheral Pulses (Diabetics)	Abnormal	(n=73) 8.2%	(n=82) 11.0%	(n=166) 22.3%	0.008	(n=104) 18.3%	(n=113) 11.5%	(n=104) 19.2%	0.238

Dependent Variable	Level	HDL Cholesterol (mg/dl) >35	0-35	p-Value	Lifetime Alcohol History (drink-years) 0	>0-40	>40	p-Value
Radial Pulses (Diabetics)	Abnormal	(n=187) 1.1%	(n=121) 0.8%	0.999	(n=24) 0.0%	(n=190) 1.1%	(n=101) 0.0%	0.516
Femoral Pulses (Diabetics)	Abnormal	(n=187) 2.7%	(n=121) 4.1%	0.707	(n=24) 0.0%	(n=190) 2.1%	(n=101) 5.0%	0.261
Popliteal Pulses (Diabetics)	Abnormal	(n=187) 2.7%	(n=121) 6.6%	0.165	(n=24) 0.0%	(n=190) 4.2%	(n=101) 4.0%	0.594
Dorsalis Pedis Pulses (Diabetics)	Abnormal	(n=187) 13.4%	(n=121) 16.5%	0.547	(n=24) 4.2%	(n=190) 12.1%	(n=101) 20.8%	0.044
Posterior Tibial Pulses (Diabetics)	Abnormal	(n=187) 7.0%	(n=121) 9.1%	0.641	(n=24) 4.2%	(n=190) 5.8%	(n=101) 9.9%	0.362
Leg Pulses (Diabetics)	Abnormal	(n=187) 15.5%	(n=121) 16.5%	0.936	(n=24) 4.2%	(n=190) 12.6%	(n=101) 22.8%	0.021
Peripheral Pulses (Diabetics)	Abnormal	(n=187) 16.6%	(n=121) 16.5%	0.999	(n=24) 4.2%	(n=190) 13.7%	(n=101) 22.8%	0.034

APPENDIX N-2.

Interaction Tables for the Endocrine Assessment

This appendix contains exposure analyses results of interactions between covariates and group or dioxin. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Means are transformed back to the original scale, if necessary. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The covariate involved in the interaction and a reference to the analysis table in Chapter 18 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix N-2 Table	Chapter 18 Table	Dependent Variable	Model	Covariate
N-2-1	18-3	Past Thyroid Disease	1 3 4	Personality Type Personality Type Personality Type
N-2-2	18-4	Composite Diabetes Indicator	2 3	Occupation Occupation
N-2-3	18-5	Diabetic Severity	4 5 6	Occupation Occupation Age
N-2-4	18-8	Testicular Volume: Minimum	2 6	Occupation Occupation
N-2-5	18-9	Testicular Volume: Total	2	Occupation
N-2-6	18-10	Retinopathy Results (Diabetics)	1	Personality Type
N-2-7	18-15	Dorsalis Pedis Pulses (Doppler) (Diabetics)	5 6	Lifetime Cigarette Smoking History Lifetime Cigarette Smoking History
N-2-8	18-17	Leg Pulses (Doppler) (Diabetics)	5	Lifetime Cigarette Smoking History
N-2-9	18-18	Peripheral Pulses (Doppler) (Diabetics)	4 6	Family History of Heart Disease Family History of Heart Disease
N-2-10	18-24	Fasting Glucose (All Participants) (Continuous)	2 3 5	Occupation Occupation Body Fat
N-2-11	18-26	Fasting Glucose (Diabetics) (Continuous)	1	Age

Appendix N-2 Table	Chapter 18 Table	Dependent Variable	Model	Covariate
N-2-12	18-27	Fasting Glucose (Diabetics) (Discrete)	3 4 5 6	Body Fat Body Fat Body Fat Body Fat
N-2-13	18-28	Fasting Glucose (Nondiabetics) (Continuous)	2 3	Occupation Occupation
N-2-14	18-30	2-Hour Postprandial Glucose (Nondiabetics) (Continuous)	1 3	Body Fat, Family History of Diabetes Body Fat, Family History of Diabetes
N-2-15	18-31	2-Hour Postprandial Glucose (Nondiabetics) (Discrete)	1 2 4 5 6	Body Fat Race Race Race Race
N-2-16	18-32	Fasting Urinary Glucose (All Participants)	3 5 6	Personality Type, Body Fat Personality Type Personality Type
N-2-17	18-33	Fasting Urinary Glucose (Diabetics)	3	Body Fat
N-2-18	18-35	2-Hour Postprandial Urinary Glucose (Nondiabetics)	6	Occupation
N-2-19	18-36	Serum Insulin (All Participants) (Continuous)	1 3 6	Age, Body Fat Age Body Fat
N-2-20	18-37	Serum Insulin (All Participants) (Discrete)	1 3 4 5	Age, Body Fat Age, Occupation, Personality Type, Body Fat Body Fat Body Fat
N-2-21	18-39	Serum Insulin (Diabetics) (Discrete)	2 3 4 5 6	Age, Occupation, Body Fat Age Body Fat Body Fat Body Fat
N-2-22	18-40	Serum Insulin (Nondiabetics) (Continuous)	1 3	Body Fat Age
N-2-23	18-41	Serum Insulin (Nondiabetics) (Discrete)	1 2 3 6	Age, Body Fat Occupation Occupation Age

Appendix N-2 Table	Chapter 18 Table	Dependent Variable	Model	Covariate
N-2-24	18-42	Serum Glucagon (All Participants) (Continuous)	2 3 4	Occupation Family History of Diabetes Family History of Diabetes
N-2-25	18-44	Serum Glucagon (Diabetics) (Continuous)	1 3	Body Fat, Diabetic Severity Body Fat, Diabetic Severity
N-2-26	18-48	α-1-C Hemoglobin (All Participants) (Continuous)	2 3 4 5 6	Occupation Body Fat Body Fat Age, Body Fat Age, Body Fat
N-2-27	18-49	α-1-C Hemoglobin (All Participants) (Discrete)	2 5 6	Occupation Body Fat Body Fat
N-2-28	18-50	α-1-C Hemoglobin (Diabetics) (Continuous)	1	Age
N-2-29	18-52	α-1-C Hemoglobin (Nondiabetics) (Continuous)	1 4	Body Fat Race
N-2-30	18-54	Urinary Protein (Diabetics)	1	Race
N-2-31	18-56	Serum Proinsulin (Diabetics) (Discrete)	4 5 6	Occupation Occupation Occupation, Diabetic Severity
N-2-32	18-57	Serum C Peptide (Diabetics) (Continuous)	3	Occupation
N-2-33	18-58	Serum C Peptide (Diabetics) (Discrete)	3 5 6	Age Age, Diabetic Severity Age, Diabetic Severity
N-2-34	18-59	Total Testosterone (Continuous)	1 2 4 5 6	Age Personality Type Occupation Occupation Occupation
N-2-35	18-60	Total Testosterone (Discrete)	1 2 3 4	Race, Personality Type Occupation Personality Type Occupation
N-2-36	18-66	Estradiol	4 5 6	Occupation Occupation Occupation

Table N-2-1.
Interaction Table for Past Thyroid Disease

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Personality Type: Table 18-3)						
Stratum	**Occupational Category**	**Group**	**n**	**Percent Yes**	**Adj. Relative Risk (95% C.I.)**	**p-Value**
Type A	***All***	***Ranch Hand***	***415***	***6.5***	***1.44 (0.82,2.54)***	***0.206***
		Comparison	***533***	***4.5***		
Type B	***All***	***Ranch Hand***	***529***	***4.4***	***0.65 (0.39,1.08)***	***0.097***
		Comparison	***741***	***6.5***		
Type A	Officer	Ranch Hand	183	7.7	1.63 (0.81,3.29)	0.171
		Comparison	223	4.0		
	Enlisted Flyer	Ranch Hand	60	3.3	2.36 (0.76,7.35)	0.139
		Comparison	88	2.3		
	Enlisted Groundcrew	Ranch Hand	172	6.4	1.07 (0.52,2.22)	0.846
		Comparison	222	5.9		
Type B	Officer	Ranch Hand	181	5.0	0.75 (0.38,1.48)	0.409
		Comparison	276	7.3		
	Enlisted Flyer	Ranch Hand	100	6.0	1.08 (0.37,3.22)	0.884
		Comparison	115	4.4		
	Enlisted Groundcrew	Ranch Hand	248	3.2	0.49 (0.25,0.96)	0.038
		Comparison	350	6.6		

Table N-2-1. (Continued)
Interaction Table for Past Thyroid Disease

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Personality Type: Table 18-3)					
Stratum	**Dioxin Category**	**n**	**Percent Yes**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Type A	Comparison	443	5.0		
	Background RH	172	10.5	2.26 (1.16,4.37)	0.016
	Low RH	115	4.3	0.68 (0.14,3.23)	0.627
	High RH	99	4.0	0.85 (0.20,3.68)	0.833
	Low plus High RH	214	4.2	0.75 (0.25,2.27)	0.612
Type B	Comparison	613	6.5		
	Background RH	199	3.5	0.53 (0.23,1.22)	0.136
	Low RH	142	4.2	0.63 (0.26,1.51)	0.298
	High RH	159	5.7	0.87 (0.41,1.84)	0.707
	Low plus High RH	301	5.0	0.75 (0.41,1.39)	0.358

c) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Personality Type: Table 18-3)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Yes**	**Adjusted Relative Risk (95% C.I.)[b]**	**p-Value**
Type A	Low	158	3.2	1.22 (0.93,1.61)	0.157
	Medium	162	4.9		
	High	180	5.0		
Type B	Low	136	9.6	0.79 (0.58,1.07)	0.133
	Medium	134	7.5		
	High	116	3.5		

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.

Table N-2-2.
Interaction Table for Composite Diabetes Indicator

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 18-4)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Diabetic	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	76	18.4	2.79 (1.18,6.59)	0.020
	Medium	31	38.7		
	High	1	100.0		
Enlisted Flyer	Low	35	25.7	0.81 (0.52,1.27)	0.360
	Medium	42	14.3		
	High	30	26.7		
Enlisted Groundcrew	Low	60	13.3	1.27 (0.99,1.63)	0.065
	Medium	94	12.8		
	High	137	17.5		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Occupation: Table 18-4)

Stratum	Dioxin Category	n	Percent Diabetic	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Officer	Comparison	406	12.8		
	Background RH	232	10.3	0.97 (0.56,1.66)	0.900
	Low RH	99	24.2	1.65 (0.93,2.95)	0.090
	High RH	9	33.3	3.04 (0.67,13.79)	0.150
	Low plus High RH	108	25.0	1.75 (1.00,3.06)	0.050
Enlisted Flyer	Comparison	169	15.4		
	Background RH	40	2.5	0.19 (0.02,1.54)	0.121
	Low RH	54	22.2	1.80 (0.80,4.04)	0.157
	High RH	53	20.8	1.01 (0.43,2.36)	0.989
	Low plus High RH	107	21.5	1.35 (0.69,2.62)	0.380
Enlisted Groundcrew	Comparison	469	14.7		
	Background RH	95	14.7	1.44 (0.73,2.85)	0.297
	Low RH	99	12.1	0.59 (0.28,1.22)	0.155
	High RH	192	16.7	1.22 (0.75,1.99)	0.422
	Low plus High RH	291	15.1	0.97 (0.62,1.52)	0.910

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-2-3.
Interaction Table for Diabetic Severity

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 18-5)

Stratum	Current Dioxin Category	n	Current Dioxin Category Summary Statistics: Percent Non-Diabetic	No Treatment	Diet Only	Oral Hypoglycemic	Insulin Dependent	Analysis Results for Log_2 (Current Dioxin + 1): Contrast vs. Non-Diabetic	Est. Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	189	92.1	4.2	1.6	0.0	2.1	No Treatment	1.46 (0.80, 2.66)	0.217
	Medium	138	77.5	10.9	7.3	1.5	2.9	Diet Only	3.03 (1.25, 7.38)	0.015
	High	13	61.5	15.4	0.0	7.7	15.4	Oral Hypoglycemic	--	--
								Insulin Dependent	1.08 (0.44, 2.61)	0.870
Enlisted Flyer	Low	31	96.8	3.2	0.0	0.0	0.0	No Treatment	0.84 (0.51, 1.39)	0.501
	Medium	56	80.4	16.1	0.0	1.8	1.8	Diet Only	4.55 (1.28, 16.15)	0.019
	High	60	80.0	5.0	6.7	6.7	1.7	Oral Hypoglycemic	3.52 (1.33, 9.33)	0.011
								Insulin Dependent	1.60 (0.41, 6.30)	0.501
Enlisted Groundcrew	Low	70	85.7	8.6	1.4	0.0	4.3	No Treatment	1.03 (0.79, 1.35)	0.823
	Medium	100	87.0	7.0	5.0	1.0	0.0	Diet Only	1.26 (0.85, 1.87)	0.241
	High	217	83.9	8.8	3.2	3.7	0.5	Oral Hypoglycemic	3.66 (1.72, 7.76)	0.001
								Insulin Dependent	0.38 (0.16, 0.89)	0.025

Table N-2-3. (Continued)
Interaction Table for Diabetic Severity

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 18-5)

Stratum	Current Dioxin Category	n	Current Dioxin Category Summary Statistics: Percent Non-Diabetic	No Treatment	Diet Only	Oral Hypoglycemic	Insulin Dependent	Analysis Results for Log_2 (Current Dioxin + 1): Contrast vs. Non-Diabetic	Est. Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	189	93.1	4.2	0.5	0.0	2.1	No Treatment	1.40 (0.86, 2.28)	0.176
	Medium	133	79.7	10.5	6.8	0.8	2.3	Diet Only	3.77 (1.82, 7.80)	<0.001
	High	18	38.9	16.7	16.7	11.1	16.7	Oral Hypoglycemic	--	--
								Insulin Dependent	1.03 (0.53, 1.97)	0.938
Enlisted Flyer	Low	33	97.0	3.0	0.0	0.0	0.0	No Treatment	0.89 (0.58, 1.37)	0.609
	Medium	55	80.0	14.6	1.8	1.8	1.8	Diet Only	3.18 (1.15, 8.84)	0.026
	High	59	79.7	6.8	5.1	6.8	1.7	Oral Hypoglycemic	3.19 (1.36, 7.49)	0.008
								Insulin Dependent	1.91 (0.53, 6.86)	0.323
Enlisted Groundcrew	Low	74	86.5	6.8	2.7	0.0	4.1	No Treatment	1.06 (0.83, 1.35)	0.624
	Medium	102	85.3	8.8	3.9	2.0	0.0	Diet Only	1.33 (0.93, 1.91)	0.124
	High	211	84.4	8.5	3.3	3.3	0.5	Oral Hypoglycemic	3.59 (1.82, 7.08)	<0.001
								Insulin Dependent	0.53 (0.32, 0.89)	0.015

Table N-2-3. (Continued)
Interaction Table for Diabetic Severity

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Age: Table 18-5)

Stratum	Current Dioxin Category	n	Current Dioxin Category Summary Statistics: Percent Non-Diabetic	No Treatment	Diet Only	Oral Hypoglycemic	Insulin Dependent	Analysis Results for Log_2 (Current Dioxin + 1): Contrast vs. Non-Diabetic	Est. Relative Risk (95% C.I.)[a]	p-Value
Born ≥1942	Low	102	95.1	2.9	1.0	0.0	1.0	No Treatment	1.04 (0.78, 1.38)	0.810
	Medium	96	93.8	6.3	0.0	0.0	0.0	Diet Only	1.41 (0.95, 2.10)	0.092
	High	163	88.3	4.9	4.3	2.5	0.0	Oral Hypoglycemic	2.52 (1.21, 5.26)	0.014
								Insulin Dependent	--	--
Born <1942	Low	194	90.2	5.7	1.0	0.0	3.1	No Treatment	1.23 (0.99, 1.52)	0.066
	Medium	194	75.8	12.9	7.2	2.1	2.1	Diet Only	1.47 (1.09, 1.99)	0.012
	High	125	70.4	13.6	4.8	7.2	4.0	Oral Hypoglycemic	2.71 (1.85, 3.96)	<0.001
								Insulin Dependent	0.95 (0.62, 1.45)	0.802

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

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

[c] Adjusted for log_2 total lipids.

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-2-4.
Interaction Table for Testicular Volume: Minimum (cm^3)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 18-8)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adj. Mean	Adj. Slope (Std. Error)	p-Value
Officer	Low	76	14.83	1.9524 (0.9483)	0.040
	Medium	33	16.39		
	High	1	22.88		
Enlisted Flyer	Low	36	15.17	-0.9115 (0.5086)	0.074
	Medium	42	15.25		
	High	31	13.90		
Enlisted Groundcrew	Low	60	14.11	-0.4353 (0.2507)	0.083
	Medium	95	15.62		
	High	139	14.01		

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 18-8)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adj. Mean	Adj. Slope (Std. Error)	p-Value
Officer	Low	190	14.6	0.2570 (0.2799)	0.359
	Medium	133	15.4		
	High	19	16.2		
Enlisted Flyer	Low	32	15.5	-0.8563 (0.3426)	0.013
	Medium	56	15.7		
	High	60	14.2		
Enlisted Groundcrew	Low	74	15.3	-0.2721 (0.1625)	0.094
	Medium	103	14.5		
	High	213	14.6		

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-5.
Interaction Table for Testicular Volume: Total (cm^3)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 18-9)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adj. Mean[a]	Adj. Slope (Std. Error)[b]	p-Value
Officer	Low	76	33.33	0.3189 (0.1597)	0.046
	Medium	33	35.74		
	High	1	51.42		
Enlisted Flyer	Low	36	33.65	-0.1763 (0.0857)	0.040
	Medium	42	31.74		
	High	31	30.42		
Enlisted Groundcrew	Low	60	30.70	-0.0741 (0.0421)	0.079
	Medium	95	33.19		
	High	139	30.26		

[a] Transformed from square root scale.

[b] Slope and standard error based on square root of total testicular volume versus log_2 (initial dioxin).

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

Table N-2-6.
Interaction Table for Retinopathy Results (Diabetics)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Personality Type: Table 18-10)						
Stratum	**Occupational Category**	**Group**	**n**	**Percent Abnormal**	**Adj. Relative Risk (95% C.I.)**	**p-Value**
Type A	***All***	***Ranch Hand***	***48***	***0.0***	--	--
		Comparison	***64***	***3.1***		
Type B	***All***	***Ranch Hand***	***88***	***6.8***	***3.21 (0.61,16.90)***	***0.168***
		Comparison	***112***	***2.7***		
Type A	Officer	Ranch Hand	22	0.0	--	--
		Comparison	20	5.0		
	Enlisted Flyer	Ranch Hand	7	0.0	--	--
		Comparison	11	0.0		
	Enlisted Groundcrew	Ranch Hand	19	0.0	--	--
		Comparison	33	3.0		
Type B	Officer	Ranch Hand	30	6.7	1.39 (0.12,16.74)	0.796
		Comparison	37	2.7		
	Enlisted Flyer	Ranch Hand	17	11.8	--	--
		Comparison	23	0.0		
	Enlisted Groundcrew	Ranch Hand	41	4.9	2.00 (0.17,23.74)	0.583
		Comparison	52	3.9		

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

Table N-2-7.
Interaction Table for Dorsalis Pedis Pulses (Doppler) (Diabetics)

a) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Lifetime Cigarette Smoking History: Table 18-15)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	8	0.0	2.33 (0.90,5.99)	0.081
	Medium	10	0.0		
	High	12	33.3		
>0-10 Pack-years	Low	6	16.7	1.54 (0.89,2.66)	0.121
	Medium	13	0.0		
	High	18	22.2		
>10 Pack-years	Low	11	36.4	1.03 (0.71,1.49)	0.869
	Medium	29	10.3		
	High	26	23.1		

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Lifetime Cigarette Smoking History: Table 18-15)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	8	0.0	2.25 (0.86,5.86)	0.098
	Medium	10	0.0		
	High	12	33.3		
>0-10 Pack-years	Low	6	16.7	1.47 (0.83,2.58)	0.183
	Medium	13	0.0		
	High	18	22.2		
>10 Pack-years	Low	11	36.4	1.00 (0.67,1.48)	0.981
	Medium	29	10.3		
	High	26	23.1		

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

Note: Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-8.
Interaction Table for Leg Pulses (Doppler) (Diabetics)

a) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Lifetime Cigarette Smoking History: Table 18-17)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
0 Pack-years	Low	8	0.0	1.92 (0.79,4.66)	0.150
	Medium	10	0.0		
	High	12	33.3		
>0-10 Pack-years	Low	6	16.7	1.37 (0.81,2.29)	0.238
	Medium	13	0.0		
	High	18	22.2		
>10 Pack-years	Low	11	36.4	0.97 (0.69,1.37)	0.862
	Medium	29	13.8		
	High	26	23.1		

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

Note: Model 5: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-9.
Interaction Table for Peripheral Pulses (Doppler) (Diabetics)

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Family History of Heart Disease: Table 18-18)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
No	Low	9	22.2	1.65 (1.06,2.59)	0.028
	Medium	24	4.2		
	High	28	42.9		
Yes	Low	18	22.2	0.65 (0.35,1.19)	0.159
	Medium	30	10.0		
	High	24	8.3		

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Family History of Heart Disease: Table 18-18)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
No	Low	10	20.0	1.47 (0.98,2.20)	0.063
	Medium	21	9.5		
	High	30	36.7		
Yes	Low	15	26.7	0.76 (0.48,1.22)	0.261
	Medium	31	6.5		
	High	26	11.5		

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

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

Table N-2-10.
Interaction Table for Fasting Glucose (mg/dl) (All Participants)
(Continuous)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 18-24)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Officer	Low	76	113.14	0.0721 (0.0350)	0.040
	Medium	31	119.98		
	High	1	279.08		
Enlisted Flyer	Low	34	115.65	-0.0232 (0.0193)	0.229
	Medium	42	108.96		
	High	30	110.73		
Enlisted Groundcrew	Low	60	104.63	0.0322 (0.0093)	<0.001
	Medium	94	107.96		
	High	137	112.59		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Occupation: Table 18-24)

Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]
Officer	Comparison	406	100.14		
	Background RH	232	100.05	-0.09 --	0.952
	Low RH	99	103.01	2.86 --	0.184
	High RH	9	112.77	12.63 --	0.061
	Low plus High RH	108	103.79	3.65 --	0.082
Enlisted Flyer	Comparison	169	116.16		
	Background RH	40	109.37	-6.80 --	0.069
	Low RH	54	115.64	-0.52 --	0.879
	High RH	53	114.35	-1.81 --	0.597
	Low plus High RH	107	115.00	-1.16 --	0.664
Enlisted Groundcrew	Comparison	470	107.13		
	Background RH	96	109.97	2.83 --	0.221
	Low RH	99	102.36	-4.78 --	0.029
	High RH	192	110.17	3.03 --	0.084
	Low plus High RH	291	107.44	0.31 --	0.843

Table N-2-10. (Continued)
Interaction Table for Fasting Glucose (mg/dl) (All Participants)
(Continuous)

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Body Fat: Table 18-24)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Obese: >25%	Low	37	102.94	0.0495 (0.0090)	<0.001
	Medium	80	106.30		
	High	104	117.32		
Lean or Normal: ≤25%	Low	259	101.36	0.0163 (0.0049)	<0.001
	Medium	210	103.16		
	High	184	108.64		

[a] Transformed from natural logarithm scale.

[b] Slope and standard error based on natural logarithm of fasting glucose versus log_2 dioxin.

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

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

Note: RH = Ranch Hand.
Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 5: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-11.
Interaction Table for Fasting Glucose (mg/dl) (Diabetics)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Age: Table 18-26)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Born ≥ 1942	***All***	***Ranch Hand***	***31***	***163.72***	***18.85 --***	***0.099***
		Comparison	***45***	***144.87***		
Born < 1942	***All***	***Ranch Hand***	***106***	***155.08***	***-10.80 --***	***0.105***
		Comparison	***132***	***165.88***		
Born ≥ 1942	Officer	Ranch Hand	3	196.57	56.94 --	0.168
		Comparison	4	139.63		
	Enlisted Flyer	Ranch Hand	4	156.43	25.13 --	0.395
		Comparison	6	131.30		
	Enlisted Groundcrew	Ranch Hand	24	162.78	13.73 --	0.297
		Comparison	35	149.05		
Born < 1942	Officer	Ranch Hand	50	167.04	-10.31 --	0.349
		Comparison	54	177.35		
	Enlisted Flyer	Ranch Hand	20	153.00	-11.91 --	0.425
		Comparison	28	164.91		
	Enlisted Groundcrew	Ranch Hand	36	145.32	-11.06 --	0.283
		Comparison	50	156.38		

[a] Transformed from natural logarithm scale.

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

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

Table N-2-12.
Interaction Table for Fasting Glucose (Diabetics)
(Discrete)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Body Fat: Table 18-27)

Stratum	Dioxin Category	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Obese: >25%	Comparison	72	73.6		
	Background RH	9	77.8	1.30 (0.22,7.63)	0.769
	Low RH	22	72.7	0.80 (0.14,4.39)	0.793
	High RH	27	66.7	0.66 (0.08,5.15)	0.691
	Low plus High RH	49	69.4	0.73 (0.19,2.79)	0.645
Lean or Normal: ≤25%	Comparison	75	64.0		
	Background RH	30	60.0	1.08 (0.42,2.78)	0.878
	Low RH	26	65.4	0.85 (0.30,2.37)	0.752
	High RH	19	79.0	2.37 (0.62,9.05)	0.206
	Low plus High RH	45	71.1	1.25 (0.52,3.01)	0.623

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Body Fat: Table 18-27)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Obese: >25%	Low	6	83.3	0.73 (0.46,1.16)	0.182
	Medium	22	77.3		
	High	32	65.6		
Lean or Normal: ≤25%	Low	22	59.1	1.31 (0.88,1.94)	0.185
	Medium	34	64.7		
	High	22	77.3		

Table N-2-12. (Continued)
Interaction Table for Fasting Glucose (Diabetics)
(Discrete)

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Body Fat: Table 18-27)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Obese: >25%	Low	6	66.7	0.79 (0.54,1.16)	0.234
	Medium	23	82.6		
	High	31	64.5		
Lean or Normal: ≤25%	Low	20	55.0	1.37 (0.99,1.89)	0.060
	Medium	31	58.1		
	High	27	85.2		

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Body Fat: Table 18-27)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Obese: >25%	Low	6	66.7	0.66 (0.42,1.02)	0.063
	Medium	23	82.6		
	High	31	64.5		
Lean or Normal: ≤25%	Low	20	55.0	1.22 (0.86,1.72)	0.267
	Medium	31	58.1		
	High	27	85.2		

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 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-2-13.
Interaction Table for Fasting Glucose (mg/dl) (Nondiabetics)
(Continuous)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 18-28)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Officer	Low	62	103.05	-0.0436 (0.0171)	0.011
	Medium	19	98.78		
	High	0	--		
Enlisted Flyer	Low	25	99.94	-0.0099 (0.0089)	0.269
	Medium	36	98.44		
	High	22	99.02		
Enlisted Groundcrew	Low	52	97.79	0.0055 (0.0042)	0.188
	Medium	82	99.89		
	High	113	99.36		

Table N-2-13. (Continued)
Interaction Table for Fasting Glucose (mg/dl) (Nondiabetics)
(Continuous)

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 18-28)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)[c]**	**p-Value[d]**
Officer	Comparison	354	99.09		
	Background RH	208	99.49	0.39 --	0.590
	Low RH	75	100.47	1.38 --	0.200
	High RH	6	96.72	-2.38 --	0.485
	Low plus High RH	81	100.19	1.10 --	0.289
Enlisted Flyer	Comparison	143	100.55		
	Background RH	39	96.40	-4.15 --	0.006
	Low RH	41	99.25	-1.30 --	0.386
	High RH	42	97.43	-3.12 --	0.034
	Low plus High RH	83	98.33	-2.22 --	0.056
Enlisted Groundcrew	Comparison	400	98.96		
	Background RH	82	101.78	2.82 --	0.007
	Low RH	87	98.70	-0.26 --	0.791
	High RH	160	99.35	0.39 --	0.618
	Low plus High RH	247	99.13	0.16 --	0.812

[a] Transformed from natural logarithm scale.

[b] Slope and standard error based on natural logarithm of fasting glucose versus $\log_2$ dioxin.

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-2-14.
Interaction Table for 2-Hour Postprandial Glucose (mg/dl) (Nondiabetics) (Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Body Fat: Table 18-30)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Obese: >25%	***All***	***Ranch Hand***	***175***	***119.79***	***6.20 --***	***0.038***
		Comparison	***242***	***113.59***		
Lean or Normal: ≤25%	***All***	***Ranch Hand***	***618***	***102.10***	***-0.77 --***	***0.581***
		Comparison	***838***	***102.88***		
Obese: >25%	Officer	Ranch Hand	59	115.84	6.87 --	0.159
		Comparison	89	108.79		
	Enlisted Flyer	Ranch Hand	28	120.56	6.96 --	0.358
		Comparison	37	113.60		
	Enlisted Groundcrew	Ranch Hand	88	121.77	5.39 --	0.215
		Comparison	116	116.38		
Lean or Normal: ≤25%	Officer	Ranch Hand	247	99.59	1.27 --	0.549
		Comparison	352	98.32		
	Enlisted Flyer	Ranch Hand	106	102.67	-5.22 --	0.146
		Comparison	126	107.89		
	Enlisted Groundcrew	Ranch Hand	265	103.06	-1.19 --	0.582
		Comparison	360	104.25		

Table N-2-14. (Continued)
Interaction Table for 2-Hour Postprandial Glucose (mg/dl) (Nondiabetics)
(Continuous)

b) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Family History of Diabetes: Table 18-30)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
No	*All*	*Ranch Hand*	*626*	*104.19*	*2.29 --*	*0.097*
		Comparison	*840*	*101.90*		
Yes	*All*	*Ranch Hand*	*167*	*104.77*	*-5.10 --*	*0.063*
		Comparison	*240*	*109.86*		
No	Officer	Ranch Hand	251	99.85	1.47 --	0.477
		Comparison	363	98.39		
	Enlisted Flyer	Ranch Hand	105	105.64	-1.48 --	0.683
		Comparison	118	107.12		
	Enlisted Groundcrew	Ranch Hand	270	106.57	4.35 --	0.041
		Comparison	359	102.21		
Yes	Officer	Ranch Hand	55	107.72	4.15 --	0.378
		Comparison	78	103.57		
	Enlisted Flyer	Ranch Hand	29	102.65	-7.37 --	0.250
		Comparison	45	110.02		
	Enlisted Groundcrew	Ranch Hand	83	103.30	-10.66 --	0.007
		Comparison	117	113.95		

Table N-2-14. (Continued)
Interaction Table for 2-Hour Postprandial Glucose (mg/dl) (Nondiabetics) (Continuous)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Body Fat: Table 18-30)					
Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]	p-Value[c]
Obese: >25%	Comparison	205	105.51		
	Background RH	43	112.68	7.17 --	0.125
	Low RH	55	105.60	0.09 --	0.984
	High RH	65	118.94	13.43 --	0.001
	Low plus High RH	120	112.62	7.11 --	0.026
Lean or Normal: ≤25%	Comparison	691	104.45		
	Background RH	285	102.10	-2.35 --	0.210
	Low RH	148	105.47	1.02 --	0.673
	High RH	143	103.53	-0.92 --	0.710
	Low plus High RH	291	104.51	0.06 --	0.975

Table N-2-14. (Continued)
Interaction Table for 2-Hour Postprandial Glucose (mg/dl) (Nondiabetics)
(Continuous)

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Family History of Diabetes: Table 18-30)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]**	**p-Value[c]**
No	Comparison	695	101.50		
	Background RH	264	101.58	0.08 --	0.964
	Low RH	162	103.04	1.54 --	0.491
	High RH	161	107.98	6.48 --	0.006
	Low plus High RH	323	105.48	3.98 --	0.026
Yes	Comparison	201	109.78		
	Background RH	64	106.14	-3.64 --	0.352
	Low RH	41	105.83	-3.95 --	0.394
	High RH	47	102.03	-7.75 --	0.074
	Low plus High RH	88	103.78	-6.00 --	0.081

[a] Transformed from natural logarithm scale.

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin $\leq$ 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-2-15.
Interaction Table for 2-Hour Postprandial Glucose (Nondiabetics) (Discrete)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Body Fat: Table 18-31)						
Stratum	**Occupational Category**	**Group**	**n**	**Percent Impaired**	**Adj. Relative Risk (95% C.I.)**	**p-Value**
Obese: >25%	***All***	***Ranch Hand***	***175***	***27.4***	***1.56 (0.97,2.50)***	***0.064***
		Comparison	***242***	***20.4***		
Lean or Normal: ≤25%	***All***	***Ranch Hand***	***618***	***10.8***	***1.12 (0.79,1.58)***	***0.536***
		Comparison	***838***	***9.5***		
Obese: >25%	Officer	Ranch Hand	59	25.4	1.63 (0.88,3.01)	0.119
		Comparison	89	15.7		
	Enlisted Flyer	Ranch Hand	28	25.0	1.06 (0.49,2.27)	0.885
		Comparison	37	24.3		
	Enlisted Groundcrew	Ranch Hand	88	29.6	1.74 (1.00,3.02)	0.050
		Comparison	116	22.4		
Lean or Normal: ≤25%	Officer	Ranch Hand	247	9.3	1.18 (0.71,1.97)	0.527
		Comparison	352	8.8		
	Enlisted Flyer	Ranch Hand	106	12.3	0.77 (0.39,1.51)	0.441
		Comparison	126	14.3		
	Enlisted Groundcrew	Ranch Hand	265	11.7	1.26 (0.79,2.00)	0.334
		Comparison	360	9.2		

Table N-2-15. (Continued)
Interaction Table for 2-Hour Postprandial Glucose (Nondiabetics)
(Discrete)

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Race: Table 18-31)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Impaired	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	128	16.4	1.17 (0.95,1.45)	0.146
	Medium	133	18.1		
	High	133	20.3		
Black	Low	13	0.0	--	--
	Medium	8	0.0		
	High	6	16.7		

c) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 18-31)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Impaired	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Non-Black	Low	255	10.6	1.26 (1.07,1.48)	0.006
	Medium	226	14.2		
	High	232	20.3		
Black	Low	11	0.0	--	--
	Medium	17	0.0		
	High	12	8.3		

Table N-2-15. (Continued)
Interaction Table for 2-Hour Postprandial Glucose (Nondiabetics)
(Discrete)

d) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 18-31)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Impaired	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Non-Black	Low	259	8.9	1.26 (1.08,1.47)	0.008
	Medium	220	15.0		
	High	221	21.3		
Black	Low	12	0.0	--	--
	Medium	17	0.0		
	High	11	9.1		

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Table 18-31)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Impaired	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Non-Black	Low	258	8.9	1.22 (1.04,1.43)	0.016
	Medium	220	15.0		
	High	221	21.3		
Black	Low	12	0.0	--	--
	Medium	17	0.0		
	High	11	9.1		

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.
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-2-16.
Interaction Table for Fasting Urinary Glucose (All Participants)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Personality Type: Table 18-32)					
Stratum	**Dioxin Category**	**n**	**Percent Present**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Type A	Comparison	443	3.4		
	Background RH	175	0.0	--	--
	Low RH	113	3.5	0.59 (0.90,3.78)	0.581
	High RH	99	6.1	1.92 (0.45,8.12)	0.374
	Low plus High RH	212	4.7	1.06 (0.32,3.52)	0.921
Type B	Comparison	615	2.9		
	Background RH	199	3.0	1.49 (0.57,3.91)	0.418
	Low RH	143	2.8	0.82 (0.27,2.51)	0.726
	High RH	160	5.6	1.55 (0.64,3.75)	0.327
	Low plus High RH	303	4.3	1.19 (0.56,2.54)	0.655

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Body Fat: Table 18-32)					
Stratum	**Dioxin Category**	**n**	**Percent Present**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Obese: >25%	Comparison	277	6.9		
	Background RH	53	3.8	0.45 (0.10,2.05)	0.302
	Low RH	79	1.3	0.11 (0.01,1.11)	0.062
	High RH	92	10.9	1.86 (0.39,8.79)	0.433
	Low plus High RH	171	6.4	0.80 (0.25,2.54)	0.709
Lean or Normal: ≤25%	Comparison	781	1.8		
	Background RH	321	1.2	0.81 (0.26,2.51)	0.715
	Low RH	177	4.0	1.93 (0.76,4.90)	0.170
	High RH	167	3.0	1.64 (0.56,4.75)	0.364
	Low plus High RH	344	3.5	1.79 (0.81,3.96)	0.151

Table N-2-16. (Continued)
Interaction Table for Fasting Urinary Glucose (All Participants)

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Personality Type: Table 18-32)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Present	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Type A	Low	127	0.0	2.56 (1.59,4.12)	<0.001
	Medium	139	0.7		
	High	113	7.1		
Type B	Low	169	2.4	1.48 (1.11,1.97)	0.007
	Medium	149	3.4		
	High	174	5.8		

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Personality Type: Table 18-32)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Present	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Type A	Low	128	0.0	2.51 (1.54,4.10)	<0.001
	Medium	141	0.7		
	High	117	7.7		
Type B	Low	171	2.3	1.39 (1.04,1.86)	0.027
	Medium	153	3.3		
	High	178	5.6		

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

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-17.
Interaction Table for Fasting Urinary Glucose (Diabetics)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Body Fat: Table 18-33)					
Stratum	**Dioxin Category**	**n**	**Percent Present**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Obese: >25%	Comparison	71	25.4		
	Background RH	9	22.2	1.20 (0.16,8.74)	0.861
	Low RH	22	4.5	0.02 (0.00,0.42)	0.014
	High RH	27	37.0	2.73 (0.73,10.24)	0.136
	Low plus High RH	49	22.4	0.92 (0.31,2.78)	0.888
Lean or Normal: ≤25%	Comparison	75	18.7		
	Background RH	30	13.3	0.97 (0.21,4.42)	0.967
	Low RH	26	26.9	2.77 (0.73,10.48)	0.133
	High RH	19	21.1	0.40 (0.07,2.28)	0.299
	Low plus High RH	45	24.4	1.22 (0.40,3.68)	0.729

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-2-18.
Interaction Table for 2-Hour Postprandial Urinary Glucose (Nondiabetics)

a) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 18-35)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Present	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	176	16.5	0.82 (0.62,1.09)	0.176
	Medium	107	13.1		
	High	8	25.0		
Enlisted Flyer	Low	31	22.6	0.80 (0.57,1.11)	0.179
	Medium	45	22.2		
	High	48	18.8		
Enlisted Groundcrew	Low	65	12.3	1.18 (0.99,1.40)	0.071
	Medium	89	19.1		
	High	182	26.4		

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

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

Table N-2-19.
Interaction Table for Serum Insulin (mIU/ml) (All Participants)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Age: Table 18-36)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Born ≥1942	***All***	***Ranch Hand***	***390***	***31.17***	***-0.83 --***	***0.614***
		Comparison	***548***	***32.00***		
Born <1942	***All***	***Ranch Hand***	***541***	***43.66***	***2.54 --***	***0.181***
		Comparison	***710***	***41.13***		
Born ≥1942	Officer	Ranch Hand	78	34.85	-1.30 --	0.748
		Comparison	121	36.15		
	Enlisted Flyer	Ranch Hand	38	26.60	-2.11 --	0.643
		Comparison	57	28.72		
	Enlisted Groundcrew	Ranch Hand	274	31.78	-0.50 --	0.801
		Comparison	370	32.23		
Born <1942	Officer	Ranch Hand	281	51.20	5.62 --	0.060
		Comparison	378	45.58		
	Enlisted Flyer	Ranch Hand	120	33.43	-5.80 --	0.101
		Comparison	140	39.23		
	Enlisted Groundcrew	Ranch Hand	140	45.86	5.36 --	0.153
		Comparison	192	40.50		

Table N-2-19. (Continued)
Interaction Table for Serum Insulin (mIU/ml) (All Participants)
(Continuous)

b) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Body Fat: Table 18-36)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Obese: >25%	***All***	***Ranch Hand***	***237***	***66.06***	***10.17 --***	***0.017***
		Comparison	***326***	***55.89***		
Lean or Normal: ≤25%	***All***	***Ranch Hand***	***694***	***31.84***	***-1.17 --***	***0.380***
		Comparison	***932***	***33.01***		
Obese: >25%	Officer	Ranch Hand	80	87.56	26.00 --	0.003
		Comparison	115	61.56		
	Enlisted Flyer	Ranch Hand	38	54.36	5.55 --	0.546
		Comparison	47	48.81		
	Enlisted Groundcrew	Ranch Hand	119	60.79	3.47 --	0.549
		Comparison	164	57.31		
Lean or Normal: ≤25%	Officer	Ranch Hand	279	37.76	0.93 --	0.969
		Comparison	384	36.82		
	Enlisted Flyer	Ranch Hand	120	24.04	-5.66 --	0.034
		Comparison	150	29.70		
	Enlisted Groundcrew	Ranch Hand	295	33.30	0.85 --	0.688
		Comparison	398	34.15		

Table N-2-19. (Continued)
Interaction Table for Serum Insulin (mIU/ml) (All Participants)
(Continuous)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 18-36)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]**	**p-Value[c]**
Born ≥1942	Comparison	446	33.45		
	Background RH	127	28.91	-4.54 --	0.067
	Low RH	83	32.52	-0.93 --	0.762
	High RH	151	36.96	3.51 --	0.180
	Low plus High RH	234	35.32	1.87 --	0.391
Born <1942	Comparison	598	44.73		
	Background RH	241	45.99	1.26 --	0.644
	Low RH	168	48.60	3.87 --	0.224
	High RH	103	45.35	0.62 --	0.872
	Low plus High RH	271	47.34	2.61 --	0.328

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Body Fat: Table 18-36)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Adjusted Mean[a]**	**Adjusted Slope (Std. Error)[d]**	**p-Value**
Obese: >25%	Low	37	66.63	0.0113 (0.0391)	0.772
	Medium	81	57.96		
	High	107	62.80		
Lean or Normal: ≥25%	Low	262	28.22	0.0749 (0.0217)	<0.001
	Medium	215	32.65		
	High	189	35.83		

[a] Transformed from natural logarithm scale.

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

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤10 ppt.
Background (Ranch Hand): Current Dioxin ≤10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 6: Low = ≤ ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-20.
Interaction Table for Serum Insulin (All Participants)
(Discrete)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED
(Group-by-Age: Table 18-37)

Stratum	Occupational Category	Group	n	Percent Abnormal Low	Percent Normal	Percent Abnormal High	Low vs. Normal Adj. Relative Risk (95% C.I.)	Low vs. Normal p-Value	High vs. Normal Adj. Relative Risk (95% C.I.)	High vs. Normal p-Value
Born ≥1942	*All*	*Ranch Hand*	*396*	*6.6*	*46.5*	*47.0*	*1.03 (0.59,1.80)*	*0.927*	*0.77 (0.58,1.01)*	*0.063*
		Comparison	*557*	*5.6*	*40.4*	*54.0*				
Born <1942	*All*	*Ranch Hand*	*553*	*2.9*	*34.7*	*62.4*	*0.77 (0.40,1.46)*	*0.423*	*1.12 (0.88,1.43)*	*0.354*
		Comparison	*719*	*3.9*	*36.3*	*59.8*				
Born ≥1942	Officer	Ranch Hand	79	6.3	50.6	43.0	0.79 (0.33,1.92)	0.609	0.76 (0.50,1.18)	0.225
		Comparison	121	9.1	47.9	43.0				
	Enlisted Flyer	Ranch Hand	38	5.3	52.6	42.1	1.10 (0.31,3.88)	0.878	0.53 (0.30,0.92)	0.024
		Comparison	58	5.2	29.3	65.5				
	Enlisted Groundcrew	Ranch Hand	279	6.8	44.4	48.8	1.14 (0.59,2.19)	0.706	0.81 (0.60,1.10)	0.173
		Comparison	378	4.5	39.7	55.8				
Born <1942	Officer	Ranch Hand	286	3.2	36.7	60.1	0.66 (0.31,1.42)	0.290	1.20 (0.88,1.63)	0.254
		Comparison	381	4.7	38.6	56.7				
	Enlisted Flyer	Ranch Hand	123	4.1	33.3	62.6	0.92 (0.29,2.94)	0.886	0.82 (0.51,1.33)	0.425
		Comparison	144	2.8	32.6	64.6				
	Enlisted Groundcrew	Ranch Hand	144	1.4	31.9	66.7	0.94 (0.36,2.49)	0.908	1.26 (0.85,1.88)	0.243
		Comparison	194	3.1	34.5	62.4				

Table N-2-20. (Continued)
Interaction Table for Serum Insulin (All Participants)
(Discrete)

b) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED
(Group-by-Body Fat: Table 18-37)

Stratum	Occupational Category	Group	n	Percent Abnormal Low	Percent Normal	Percent Abnormal High	Low vs. Normal Adj. Relative Risk (95% C.I.)	Low vs. Normal p-Value	High vs. Normal Adj. Relative Risk (95% C.I.)	High vs. Normal p-Value
Obese: >25%	*All*	*Ranch Hand*	*241*	*1.2*	*20.8*	*78.0*	*1.32 (0.28,6.15)*	*0.724*	*1.42 (0.96,2.12)*	*0.082*
		Comparison	*327*	*1.2*	*26.9*	*71.9*				
Lean or Normal: ≤25%	*All*	*Ranch Hand*	*708*	*5.5*	*46.1*	*48.5*	*0.88 (0.57,1.36)*	*0.557*	*0.84 (0.69,1.03)*	*0.089*
		Comparison	*949*	*5.8*	*41.9*	*52.3*				
Obese: >25%	Officer	Ranch Hand	81	2.5	12.4	85.2	0.96 (0.19,4.98)	0.963	1.72 (1.08,2.74)	0.023
		Comparison	115	1.7	26.1	72.2				
	Enlisted Flyer	Ranch Hand	38	0.0	21.1	79.0	1.44 (0.23,9.23)	0.698	1.12 (0.62,2.00)	0.713
		Comparison	48	0.0	20.8	79.2				
	Enlisted Groundcrew	Ranch Hand	122	0.8	26.2	73.0	1.58 (0.32,7.74)	0.573	1.34 (0.87,2.07)	0.191
		Comparison	164	1.2	29.3	69.5				
Lean or Normal: ≤25%	Officer	Ranch Hand	284	4.2	47.5	48.2	0.66 (0.34,1.31)	0.241	1.01 (0.75,1.35)	0.973
		Comparison	387	7.0	45.2	47.8				
	Enlisted Flyer	Ranch Hand	123	5.7	43.1	51.2	1.00 (0.33,3.04)	0.997	0.65 (0.41,1.03)	0.067
		Comparison	154	4.6	35.1	60.4				
	Enlisted Groundcrew	Ranch Hand	301	6.6	45.9	47.5	1.09 (0.57,2.07)	0.789	0.78 (0.58,1.05)	0.097
		Comparison	408	5.2	41.4	53.4				

Table N-2-20. (Continued)
Interaction Table for Serum Insulin (All Participants)
(Discrete)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Age: Table 18-37)

Stratum	Dioxin Category	n	Percent			Low vs. Normal		High vs. Normal	
			Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Born ≥1942	Comparison	446	5.4	38.3	56.3				
	Background RH	127	7.9	55.9	36.2	0.86 (0.38,1.94)	0.719	0.59 (0.38,0.92)	0.019
	Low RH	83	8.4	42.2	49.4	1.27 (0.49,3.32)	0.619	0.82 (0.49,1.37)	0.444
	High RH	151	4.0	41.1	55.0	0.80 (0.30,2.18)	0.669	0.78 (0.52,1.17)	0.231
	Low plus High RH	234	5.6	41.5	53.0	1.00 (0.47,2.13)	0.999	0.79 (0.56,1.12)	0.187
Born <1942	Comparison	598	4.4	35.1	60.5				
	Background RH	241	3.3	39.8	56.9	0.61 (0.26,1.41)	0.244	0.98 (0.70,1.36)	0.886
	Low RH	168	1.8	33.9	64.3	0.44 (0.13,1.52)	0.194	1.06 (0.72,1.54)	0.778
	High RH	103	2.9	27.2	69.9	0.89 (0.24,3.30)	0.866	1.37 (0.82,2.28)	0.228
	Low plus High RH	271	2.2	31.4	66.4	0.59 (0.23,1.51)	0.269	1.15 (0.71,1.89)	0.568

Table N-2-20. (Continued)
Interaction Table for Serum Insulin (All Participants)
(Discrete)

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 18-37)									
			Percent			Low vs. Normal		High vs. Normal	
Stratum	Dioxin Category	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Officer	Comparison	406	6.2	39.9	53.9				
	Background RH	232	3.5	43.5	53.0	0.51 (0.22,1.18)	0.116	1.01 (0.72,1.44)	0.934
	Low RH	99	4.0	34.3	61.6	0.95 (0.30,2.98)	0.931	1.15 (0.71,1.88)	0.570
	High RH	9	11.1	11.1	77.8	9.37 (0.54,163.79)	0.125	3.80 (0.44,32.82)	0.225
	Low plus High RH	108	4.6	32.4	63.0	1.17 (0.41,3.33)	0.774	1.23 (0.76,1.98)	0.399
Enlisted Flyer	Comparison	169	4.1	28.4	67.5				
	Background RH	40	5.0	57.5	37.5	0.49 (0.09,2.66)	0.412	0.31 (0.14,0.66)	0.002
	Low RH	53	3.8	47.2	49.1	0.43 (0.08,2.31)	0.326	0.47 (0.24,0.92)	0.028
	High RH	53	3.8	17.0	79.3	1.49 (0.25,8.77)	0.656	1.70 (0.75,3.86)	0.206
	Low plus High RH	106	3.8	32.1	64.2	0.69 (0.18,2.60)	0.582	0.80 (0.46,1.41)	0.445
Enlisted Groundcrew	Comparison	469	3.8	36.5	59.7				
	Background RH	96	8.3	44.8	46.9	1.57 (0.62,4.00)	0.339	0.83 (0.51,1.35)	0.447
	Low RH	99	4.0	33.3	62.6	1.04 (0.32,3.44)	0.945	1.15 (0.70,1.88)	0.578
	High RH	192	3.1	41.7	55.2	0.64 (0.23,1.80)	0.393	0.81 (0.55,1.18)	0.267
	Low plus High RH	291	3.4	38.8	57.7	0.76 (0.33,1.75)	0.514	0.91 (0.66,1.25)	0.549

Table N-2-20. (Continued)
Interaction Table for Serum Insulin (All Participants)
(Discrete)

e) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Personality Type: Table 18-37)

			Percent			Low vs. Normal		High vs. Normal	
Stratum	Dioxin Category	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Type A	Comparison	437	6.4	42.6	51.0				
	Background RH	172	5.2	46.5	48.3	0.75 (0.33,1.70)	0.490	0.95 (0.65,1.41)	0.808
	Low RH	111	6.3	32.4	61.3	1.42 (0.56,3.57)	0.459	1.56 (0.98,2.51)	0.063
	High RH	97	1.0	41.2	57.7	0.17 (0.02,1.34)	0.093	1.14 (0.70,1.85)	0.602
	Low plus High RH	208	3.9	36.5	59.6	0.75 (0.32,1.77)	0.513	1.34 (0.93,1.93)	0.119
Type B	Comparison	607	3.6	32.1	64.3				
	Background RH	196	4.6	44.4	51.0	0.75 (0.32,1.72)	0.496	0.73 (0.51,1.04)	0.079
	Low RH	140	2.1	40.0	57.9	0.41 (0.11,1.50)	0.180	0.64 (0.43,0.96)	0.033
	High RH	157	5.1	31.9	63.1	1.42 (0.56,3.59)	0.463	0.90 (0.60,1.36)	0.610
	Low plus High RH	297	3.7	35.7	60.6	0.87 (0.39,1.95)	0.739	0.76 (0.56,1.05)	0.092

Table N-2-20. (Continued)
Interaction Table for Serum Insulin (All Participants)
(Discrete)

f) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Body Fat: Table 18-37)									
			Percent			Low vs. Normal		High vs. Normal	
Stratum	Dioxin Category	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Obese: >25%	Comparison	278	1.4	27.7	70.9				
	Background RH	52	1.9	13.5	84.6	2.53 (0.24,26.28)	0.438	2.68 (1.14,6.31)	0.024
	Low RH	77	2.6	20.8	76.6	2.57 (0.42,15.55)	0.305	1.55 (0.82,2.91)	0.175
	High RH	92	0.0	25.0	75.0	--	--	1.19 (0.68,2.08)	0.552
	Low plus High RH	169	1.2	23.1	75.7	0.92 (0.16,5.32)	0.925	1.33 (0.84,2.11)	0.219
Lean or Normal: ≤25%	Comparison	766	6.0	39.7	54.3				
	Background RH	316	5.4	50.6	44.0	0.69 (0.37,1.25)	0.220	0.68 (0.51,0.90)	0.007
	Low RH	174	4.6	43.7	51.7	0.66 (0.29,1.49)	0.315	0.84 (0.59,1.19)	0.321
	High RH	162	5.6	41.4	53.1	1.00 (0.44,2.24)	0.991	0.88 (0.61,1.27)	0.493
	Low plus High RH	336	5.1	42.6	52.4	0.81 (0.43,1.49)	0.494	0.86 (0.65,1.13)	0.273

Table N-2-20. (Continued)
Interaction Table for Serum Insulin (All Participants)
(Discrete)

g) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Body Fat: Table 18-37)

Analysis Results for Log_2 (Current Dioxin + 1)

Stratum	Current Dioxin	n	Percent Abnormal Low	Percent Normal	Percent Abnormal High	Low vs. Normal Adj. Relative Risk (95% C.I.)[b]	Low vs. Normal p-Value	High vs. Normal Adj. Relative Risk (95% C.I.)[b]	High vs. Normal p-Value
Obese: >25%	Low	35	2.9	14.3	82.9	0.49 (0.21,1.14)	0.098	0.85 (0.68,1.08)	0.183
	Medium	81	1.2	17.3	81.5				
	High	109	0.9	26.6	72.5				
Lean or Normal: ≤25%	Low	260	6.2	51.5	42.3	0.80 (0.62,1.03)	0.087	1.18 (1.05,1.32)	0.005
	Medium	217	5.1	45.2	49.8				
	High	189	4.8	39.7	55.6				

Table N-2-20. (Continued)
Interaction Table for Serum Insulin (All Participants)
(Discrete)

h) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Body Fat: Table 18-37)									
Analysis Results for Log_2 (Current Dioxin + 1)									
			Percent			Low vs. Normal		High vs. Normal	
Stratum	Current Dioxin	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[b]	p-Value	Adj. Relative Risk (95% C.I.)[b]	p-Value
Obese: >25%	Low	37	2.7	13.5	83.8	0.57 (0.31,1.02)	0.058	0.88 (0.71,1.08)	0.224
	Medium	81	2.5	19.8	77.8				
	High	107	0.0	25.2	74.8				
Lean or Normal: ≤25%	Low	263	6.5	51.3	42.2	0.83 (0.68,1.01)	0.062	1.19 (1.08,1.31)	0.001
	Medium	214	4.7	44.4	50.9				
	High	189	4.8	40.7	54.5				

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

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Model 5: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-21.
Interaction Table for Serum Insulin (Diabetics)
(Discrete)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Age: Table 18-39)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Born ≥ 1942	Low	2	50.0	0.75 (0.34,1.64)	0.470
	Medium	6	66.7		
	High	15	40.0		
Born < 1942	Low	29	62.1	0.61 (0.36,1.05)	0.073
	Medium	25	80.0		
	High	19	31.6		

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 18-39)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	14	64.3	5.43 (0.86,34.21)	0.072
	Medium	12	83.3		
	High	1	100.0		
Enlisted Flyer	Low	9	55.6	0.57 (0.25,1.33)	0.194
	Medium	6	66.7		
	High	9	44.4		
Enlisted Groundcrew	Low	8	62.5	0.55 (0.31,0.98)	0.043
	Medium	13	76.9		
	High	24	29.2		

Table N-2-21. (Continued)
Interaction Table for Serum Insulin (Diabetics)
(Discrete)

c) MODEL 2: RANCH HANDS – INITIAL DIOXIN – ADJUSTED (Initial Dioxin-by-Body Fat: Table 18-39)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Obese: >25%	Low	11	100.0	0.30 (0.13,0.67)	0.003
	Medium	19	79.0		
	High	20	40.0		
Lean or Normal: ≤25%	Low	20	40.0	0.95 (0.57,1.60)	0.856
	Medium	12	75.0		
	High	14	28.6		

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY – ADJUSTED (Dioxin Category-by-Age: Table 18-39)					
Stratum	Dioxin Category	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Born ≥1942	Comparison	36	52.8		
	Background RH	8	50.0	0.98 (0.17,5.76)	0.982
	Low RH	4	25.0	0.12 (0.01,2.04)	0.141
	High RH	19	52.6	1.76 (0.48,6.41)	0.393
	Low plus High RH	23	47.8	1.13 (0.34,3.68)	0.844
Born <1942	Comparison	112	59.8		
	Background RH	34	67.6	1.24 (0.50,3.07)	0.640
	Low RH	45	71.1	2.73 (1.14,6.50)	0.024
	High RH	28	42.9	0.44 (0.16,1.21)	0.112
	Low plus High RH	73	60.3	1.30 (0.64,2.64)	0.469

Table N-2-21. (Continued)
Interaction Table for Serum Insulin (Diabetics)
(Discrete)

e) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Body Fat: Table 18-39)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[c]	p-Value
Obese: >25%	Low	6	100.0	0.39 (0.21,0.72)	0.003
	Medium	22	86.4		
	High	32	56.3		
Lean or Normal: ≤25%	Low	22	54.6	0.91 (0.66,1.25)	0.564
	Medium	34	50.0		
	High	22	45.5		

f) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Body Fat: Table 18-39)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[c]	p-Value
Obese: >25%	Low	6	100.0	0.47 (0.28,0.79)	0.005
	Medium	23	82.6		
	High	31	58.1		
Lean or Normal: ≤25%	Low	20	55.0	0.92 (0.71,1.19)	0.536
	Medium	31	54.8		
	High	27	40.7		

Table N-2-21. (Continued)
Interaction Table for Serum Insulin (Diabetics)
(Discrete)

g) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Body Fat: Table 18-39)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[c]	p-Value
Obese: >25%	Low	6	100.0	0.47 (0.27,0.80)	0.006
	Medium	23	82.6		
	High	31	58.1		
Lean or Normal: ≤25%	Low	20	55.0	0.92 (0.69,1.22)	0.544
	Medium	31	54.8		
	High	27	40.7		

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-22.
Interaction Table for Serum Insulin (mIU/ml) (Nondiabetics)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Body Fat: Table 18-40)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Obese: >25%	***All***	***Ranch Hand***	***175***	***117.03***	***17.32 --***	***0.043***
		Comparison	***243***	***99.71***		
Lean or Normal: ≤25%	***All***	***Ranch Hand***	***619***	***55.96***	***-3.19 --***	***0.189***
		Comparison	***838***	***59.15***		
Obese: >25%	Officer	Ranch Hand	59	135.02	29.48 --	0.066
		Comparison	89	105.54		
	Enlisted Flyer	Ranch Hand	28	105.19	16.27 --	0.400
		Comparison	37	88.92		
	Enlisted Groundcrew	Ranch Hand	88	115.32	10.63 --	0.390
		Comparison	117	104.69		
Lean or Normal: ≤25%	Officer	Ranch Hand	247	63.64	0.67 --	0.874
		Comparison	352	62.98		
	Enlisted Flyer	Ranch Hand	106	43.22	-10.82 --	0.033
		Comparison	126	54.03		
	Enlisted Groundcrew	Ranch Hand	266	58.34	-3.24 --	0.400
		Comparison	360	61.58		

Table N-2-22. (Continued)
Interaction Table for Serum Insulin (mIU/ml) (Nondiabetics)
(Continuous)

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Table 18-40)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]**	**p-Value[c]**
Born ≥ 1942	Comparison	410	48.20		
	Background RH	119	41.90	-6.30 --	0.080
	Low RH	80	45.93	-2.27 --	0.603
	High RH	132	51.56	3.36 --	0.380
	Low plus High RH	212	49.36	1.16 --	0.712
Born < 1942	Comparison	487	64.49		
	Background RH	210	64.56	0.07 --	0.988
	Low RH	123	63.88	0.61 --	0.901
	High RH	76	72.50	8.01 --	0.221
	Low plus High RH	199	67.05	2.56 --	0.547

[a] Transformed from natural logarithm scale.

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-2-23.
Interaction Table for Serum Insulin (Nondiabetics)
(Discrete)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED
(Group-by-Age: Table 18-41)

Stratum	Occupational Category	Group	n	Percent Abnormal Low	Percent Normal	Percent Abnormal High	Low vs. Normal Adj. Relative Risk (95% C.I.)	Low vs. Normal p-Value	High vs. Normal Adj. Relative Risk (95% C.I.)	High vs. Normal p-Value
Born ≥1942	*All*	*Ranch Hand*	*359*	*7.2*	*46.2*	*46.5*	*0.97 (0.55,1.72)*	*0.926*	*0.72 (0.53,0.97)*	*0.028*
		Comparison	*503*	*6.2*	*39.4*	*54.5*				
Born <1942	*All*	*Ranch Hand*	*435*	*3.2*	*34.5*	*62.3*	*0.72 (0.36,1.42)*	*0.342*	*1.04 (0.78,1.37)*	*0.801*
		Comparison	*578*	*4.5*	*34.6*	*60.9*				
Born ≥1942	Officer	Ranch Hand	75	6.7	53.3	40.0	0.69 (0.28,1.71)	0.420	0.65 (0.41,1.04)	0.074
		Comparison	117	9.4	47.0	43.6				
	Enlisted Flyer	Ranch Hand	34	5.9	50.0	44.1	1.18 (0.29,4.74)	0.815	0.45 (0.27,0.84)	0.012
		Comparison	51	5.9	29.4	64.7				
	Enlisted Groundcrew	Ranch Hand	250	7.6	43.6	48.8	1.11 (0.57,2.15)	0.769	0.79 (0.57,1.10)	0.162
		Comparison	335	5.1	38.2	56.7				
Born <1942	Officer	Ranch Hand	231	3.5	39.0	57.6	0.59 (0.26,1.31)	0.194	1.07 (0.76,1.51)	0.697
		Comparison	324	5.6	38.6	55.9				
	Enlisted Flyer	Ranch Hand	100	4.0	32.0	64.0	1.01 (0.27,3.79)	0.987	0.74 (0.43,1.28)	0.283
		Comparison	112	1.8	27.7	70.5				
	Enlisted Groundcrew	Ranch Hand	104	1.9	26.9	71.2	0.95 (0.34,2.63)	0.916	1.30 (0.82,2.05)	0.261
		Comparison	142	4.2	31.0	64.8				

Table N-2-23. (Continued)
Interaction Table for Serum Insulin (Nondiabetics)
(Discrete)

b) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED
(Group-by-Body Fat: Table 18-41)

Stratum	Occupational Category	Group	n	Percent Abnormal Low	Percent Normal	Percent Abnormal High	Low vs. Normal Adj. Relative Risk (95% C.I.)	Low vs. Normal p-Value	High vs. Normal Adj. Relative Risk (95% C.I.)	High vs. Normal p-Value
Obese: >25%	***All***	***Ranch Hand***	***175***	***1.7***	***18.9***	***79.4***	***1.07 (0.20,5.69)***	***0.937***	***1.25 (0.76,2.05)***	***0.372***
		Comparison	***243***	***1.7***	***22.2***	***76.1***				
Lean/Normal: ≤25%	***All***	***Ranch Hand***	***619***	***6.0***	***45.7***	***48.3***	***0.85 (0.54,1.34)***	***0.483***	***0.81 (0.65,1.01)***	***0.061***
		Comparison	***838***	***6.3***	***41.1***	***52.6***				
Obese: >25%	Officer	Ranch Hand	59	3.4	15.3	81.4	0.74 (0.14,3.98)	0.728	1.42 (0.81,2.48)	0.219
		Comparison	89	2.3	21.4	76.4				
	Enlisted Flyer	Ranch Hand	28	0.0	14.3	85.7	--	--	0.93 (0.46,1.84)	0.827
		Comparison	37	0.0	13.5	86.5				
	Enlisted Groundcrew	Ranch Hand	88	1.1	22.7	76.1	1.34 (0.26,6.82)	0.726	1.24 (0.73,2.11)	0.430
		Comparison	117	1.7	25.6	72.7				
Lean/Normal: ≤25%	Officer	Ranch Hand	247	4.5	49.0	46.6	0.60 (0.30,1.22)	0.161	0.92 (0.67,1.27)	0.622
		Comparison	352	7.7	45.7	46.6				
	Enlisted Flyer	Ranch Hand	106	5.7	42.5	51.9	1.09 (0.31,3.85)	0.895	0.60 (0.36,1.01)	0.054
		Comparison	126	4.0	32.5	63.5				
	Enlisted Groundcrew	Ranch Hand	266	7.5	44.0	48.5	1.09 (0.57,2.09)	0.796	0.81 (0.59,1.11)	0.182
		Comparison	360	5.8	39.4	54.7				

Table N-2-23. (Continued)
Interaction Table for Serum Insulin (Nondiabetics)
(Discrete)

c) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Occupation: Table 18-41)									
			Analysis Results for Log_2 (Initial Dioxin)						
			Percent			Low vs. Normal		High vs. Normal	
Stratum	Initial Dioxin	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	62	3.2	40.3	56.5	3.71 (0.66,20.72)	0.136	1.97 (0.74,5.25)	0.177
	Medium	21	14.3	19.1	66.7				
	High	0	--	--	--				
Enlisted Flyer	Low	27	7.4	51.9	40.7	1.35 (0.38,4.82)	0.647	2.75 (1.39,5.44)	0.004
	Medium	37	8.1	18.9	73.0				
	High	22	0.0	9.1	90.9				
Enlisted Groundcrew	Low	53	3.8	30.2	66.0	0.75 (0.47,1.19)	0.224	1.08 (0.87,1.34)	0.507
	Medium	83	4.8	39.8	55.4				
	High	117	3.4	38.5	58.1				

Table N-2-23. (Continued)
Interaction Table for Serum Insulin (Nondiabetics)
(Discrete)

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 18-41)									
			Percent			Low vs. Normal		High vs. Normal	
Stratum	Dioxin Category	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[b]	p-Value	Adj. Relative Risk (95% C.I.)[b]	p-Value
Officer	Comparison	354	7.1	40.7	52.3				
	Background RH	208	3.9	45.2	51.0	0.49 (0.21,1.15)	0.101	0.98 (0.67,1.42)	0.899
	Low RH	75	5.3	36.0	58.7	1.03 (0.33,3.27)	0.955	1.02 (0.58,1.77)	0.954
	High RH	6	16.7	16.7	66.7	7.24 (0.41,126.67)	0.175	2.24 (0.23,21.75)	0.487
	Low plus High RH	81	6.2	34.6	59.3	1.25 (0.43,3.61)	0.684	1.06 (0.61,1.82)	0.839
Enlisted Flyer	Comparison	143	3.5	28.0	68.5				
	Background RH	39	5.1	56.4	38.5	0.73 (0.13,4.18)	0.720	0.32 (0.14,0.70)	0.005
	Low RH	41	4.9	48.8	46.3	0.70 (0.12,4.09)	0.690	0.40 (0.18,0.85)	0.018
	High RH	42	4.8	7.1	88.1	4.59 (0.58,36.14)	0.148	4.80 (1.37,16.74)	0.014
	Low plus High RH	83	4.8	27.7	67.5	1.18 (0.28,4.97)	0.820	0.97 (0.51,1.83)	0.917
Enlisted Groundcrew	Comparison	400	4.5	34.5	61.0				
	Background RH	82	9.8	45.1	45.1	1.60 (0.63,4.08)	0.322	0.73 (0.43,1.25)	0.255
	Low RH	87	4.6	34.5	60.9	1.01 (0.31,3.26)	0.984	0.93 (0.55,1.58)	0.798
	High RH	160	3.8	38.1	58.1	0.69 (0.25,1.89)	0.477	0.83 (0.59,1.16)	0.269
	Low plus High RH	247	4.1	36.8	59.1	0.80 (0.35,1.83)	0.595	0.86 (0.60,1.23)	0.417

Table N-2-23. (Continued)
Interaction Table for Serum Insulin (Nondiabetics)
(Discrete)

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Age: Table 18-41)

Analysis Results for Log_2 (Current Dioxin + 1)

Stratum	Current Dioxin	n	Percent Abnormal Low	Percent Normal	Percent Abnormal High	Low vs. Normal Adj. Relative Risk (95% C.I.)[c]	Low vs. Normal p-Value	High vs. Normal Adj. Relative Risk (95% C.I.)[c]	High vs. Normal p-Value
Born ≥ 1942	Low	98	9.2	60.2	30.6	0.96 (0.73,1.26)	0.770	1.09 (0.94,1.25)	0.256
	Medium	90	6.7	40.0	53.3				
	High	148	5.4	40.5	54.1				
Born < 1942	Low	175	5.1	40.6	54.3	0.85 (0.62,1.16)	0.314	1.34 (1.14,1.58)	0.001
	Medium	151	4.0	37.8	58.3				
	High	90	1.1	16.7	82.2				

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

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-24.
Interaction Table for Serum Glucagon (pg/ml) (All Participants)
(Continuous)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 18-42)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Officer	Low	63	57.64	0.0795 (0.0458)	0.083
	Medium	30	62.43		
	High	1	63.10		
Enlisted Flyer	Low	32	55.21	0.0434 (0.0240)	0.071
	Medium	38	55.66		
	High	28	62.88		
Enlisted Groundcrew	Low	55	61.01	-0.0146 (0.0118)	0.215
	Medium	81	63.85		
	High	124	59.73		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Family History of Diabetes: Table 18-42)

Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]
No	Comparison	709	60.72		
	Background RH	256	59.28	-1.44 --	0.202
	Low RH	175	59.44	-1.28 --	0.322
	High RH	162	63.07	2.35 --	0.094
	Low plus High RH	337	61.16	0.44 --	0.670
Yes	Comparison	235	61.51		
	Background RH	74	61.36	-0.15 --	0.941
	Low RH	48	61.21	-0.30 --	0.904
	High RH	56	55.87	-5.64 --	0.011
	Low plus High RH	104	58.28	-3.23 --	0.071

Table N-2-24. (Continued)
Interaction Table for Serum Glucagon (pg/ml) (All Participants)
(Continuous)

c) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Family History of Diabetes: Table 18-42)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
No	Low	204	57.09	0.0213 (0.0080)	0.008
	Medium	201	57.13		
	High	188	61.47		
Yes	Low	54	57.55	-0.0191 (0.0127)	0.132
	Medium	61	59.60		
	High	63	56.74		

[a] Transformed from natural logarithm scale.

[b] Slope and standard error based on natural logarithm of serum glucagon versus log_2 dioxin.

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.

Table N-2-25.
Interaction Table for Serum Glucagon (pg/ml) (Diabetics)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Body Fat: Table 18-44)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Obese: >25%	***All***	***Ranch Hand***	***59***	***67.74***	***-5.05 --***	***0.197***
		Comparison	***72***	***72.79***		
Lean or Normal: ≤25%	***All***	***Ranch Hand***	***66***	***71.55***	***4.94 --***	***0.174***
		Comparison	***88***	***66.61***		
Obese: >25%	Officer	Ranch Hand	21	68.65	-0.67 --	0.917
		Comparison	25	69.32		
	Enlisted Flyer	Ranch Hand	8	56.63	-19.54 --	0.053
		Comparison	9	76.17		
	Enlisted Groundcrew	Ranch Hand	30	74.46	-4.47 --	0.452
		Comparison	38	78.93		
Lean or Normal: ≤25%	Officer	Ranch Hand	29	70.89	3.49 --	0.546
		Comparison	29	67.40		
	Enlisted Flyer	Ranch Hand	13	66.20	-2.49 --	0.736
		Comparison	23	68.70		
	Enlisted Groundcrew	Ranch Hand	24	76.27	10.92 --	0.065
		Comparison	36	65.35		

Table N-2-25. (Continued)
Interaction Table for Serum Glucagon (pg/ml) (Diabetics)
(Continuous)

b) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Diabetic Severity: Table 18-44)						
Stratum	Occupational Category	Group	n	Adjusted Mean[a]	Difference of Adjusted Means (95% C.I.)[b]	p-Value[c]
No Treatment	*All*	*Ranch Hand*	*67*	*64.12*	*2.76 --*	*0.368*
		Comparison	*98*	*61.36*		
Diet Only	*All*	*Ranch Hand*	*25*	*74.51*	*13.55 --*	*0.018*
		Comparison	*29*	*60.96*		
Oral Hypo-glycemics	*All*	*Ranch Hand*	*17*	*60.95*	*-26.09 --*	*<0.001*
		Comparison	*24*	*87.04*		
Insulin Dependent	*All*	*Ranch Hand*	*16*	*76.44*	*-3.91 --*	*0.697*
		Comparison	*9*	*80.35*		
No Treatment	Officer	Ranch Hand	26	63.68	1.71 --	0.746
		Comparison	30	61.97		
	Enlisted Flyer	Ranch Hand	11	55.53	-6.87 --	0.302
		Comparison	21	62.40		
	Enlisted Groundcrew	Ranch Hand	30	68.81	7.04 --	0.133
		Comparison	47	61.77		
Diet Only	Officer	Ranch Hand	11	72.67	19.34 --	0.031
		Comparison	8	53.33		
	Enlisted Flyer	Ranch Hand	2	83.99	13.92 --	0.456
		Comparison	7	70.07		
	Enlisted Groundcrew	Ranch Hand	12	76.46	13.61 --	0.109
		Comparison	14	62.85		
Oral Hypo-glycemics	Officer	Ranch Hand	3	67.11	-15.60 --	0.288
		Comparison	12	82.71		
	Enlisted Flyer	Ranch Hand	5	56.99	-15.77 --	0.345
		Comparison	2	72.76		
	Enlisted Groundcrew	Ranch Hand	9	63.58	-34.14 --	0.002
		Comparison	10	97.72		
Insulin Dependent	Officer	Ranch Hand	10	69.85	-4.36 --	0.742
		Comparison	4	74.21		
	Enlisted Flyer	Ranch Hand	3	72.08	-4.76 --	0.817
		Comparison	2	76.84		
	Enlisted Groundcrew	Ranch Hand	3	105.53	13.16 --	0.591
		Comparison	3	92.37		

Table N-2-25. (Continued)
Interaction Table for Serum Glucagon (pg/ml) (Diabetics)
(Continuous)

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Body Fat: Table 18-44)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]**	**p-Value[c]**
Obese: >25%	Comparison	61	67.64		
	Background RH	10	65.61	-2.03 --	0.781
	Low RH	23	60.99	-6.65 --	0.195
	High RH	22	57.60	-10.04 --	0.050
	Low plus High RH	45	59.31	-8.33 --	0.038
Lean or Normal: ≤25%	Comparison	71	67.68		
	Background RH	28	74.76	7.08 --	0.190
	Low RH	22	76.81	9.13 --	0.108
	High RH	16	69.79	2.11 --	0.740
	Low plus High RH	38	73.78	6.10 --	0.191

Table N-2-25. (Continued)
Interaction Table for Serum Glucagon (pg/ml) (Diabetics)
(Continuous)

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Diabetic Severity: Table 18-44)

Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Means vs. Comparisons (95% C.I.)[b]	p-Value[c]
No Treatment/ Diet Only	Comparison	103	60.52		
	Background RH	30	67.19	6.67 --	0.112
	Low RH	35	64.36	3.84 --	0.311
	High RH	23	66.66	6.14 --	0.182
	Low plus High RH	58	65.27	4.75 --	0.137
Oral Hypo-glycemics/ Insulin Dependent	Comparison	29	86.09		
	Background RH	8	77.01	-9.08 --	0.386
	Low RH	10	71.04	-15.05 --	0.099
	High RH	15	56.58	-29.51 --	<0.001
	Low plus High RH	25	61.97	-24.12 --	<0.001

[a] Transformed from natural logarithm scale.

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-2-26.
Interaction Table for α-1-C Hemoglobin (percent) (All Participants) (Continuous)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 18-48)

	Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Officer	Low	76	7.06	0.0940 (0.0290)	0.001
	Medium	31	7.86		
	High	1	11.73		
Enlisted Flyer	Low	35	8.53	-0.0073 (0.0160)	0.647
	Medium	42	8.17		
	High	30	8.41		
Enlisted Groundcrew	Low	60	7.36	0.0231 (0.0077)	0.003
	Medium	94	7.61		
	High	137	7.76		

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Body Fat: Table 18-48)

Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]
Obese: >25%	Comparison	278	7.75		
	Background RH	52	7.31	-0.44 --	0.012
	Low RH	77	7.52	-0.23 --	0.123
	High RH	92	8.01	0.26 --	0.080
	Low plus High RH	169	7.78	0.03 --	0.795
Lean or Normal: ≤25%	Comparison	767	7.50		
	Background RH	316	7.58	0.08 --	0.310
	Low RH	175	7.54	0.04 --	0.704
	High RH	162	7.53	0.03 --	0.809
	Low plus High RH	337	7.53	0.04 --	0.684

Table N-2-26. (Continued)
Interaction Table for α-1-C Hemoglobin (percent) (All Participants)
(Continuous)

c) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Body Fat: Table 18-48)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Obese: >25%	Low	35	7.47	0.0377 (0.0081)	<0.001
	Medium	79	7.55		
	High	107	8.18		
Lean or Normal: ≤25%	Low	255	7.41	0.0041 (0.0048)	0.398
	Medium	215	7.51		
	High	183	7.48		

d) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Age and Body Fat: Table 18-48)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Born ≥1942, Obese: >25%	Low	9	7.77	0.0201 (0.0109)	0.065
	Medium	26	7.24		
	High	58	7.75		
Born ≥1942, Lean or Normal: ≤25%	Low	93	7.39	-0.0021 (0.0059)	0.720
	Medium	70	7.14		
	High	105	7.14		
Born <1942, Obese: >25%	Low	28	7.44	0.0492 (0.0102)	<0.001
	Medium	54	7.88		
	High	46	8.34		
Born <1942, Lean or Normal: ≤25%	Low	166	7.42	0.0139 (0.0057)	0.016
	Medium	140	7.49		
	High	79	8.17		

Table N-2-26. (Continued)
Interaction Table for α-1-C Hemoglobin (percent) (All Participants)
(Continuous)

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Age and Body Fat: Table 18-48)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Born ≥ 1942, Obese: >25%	Low	9	7.92	0.0137 (0.0109)	0.209
	Medium	26	7.25		
	High	58	7.70		
Born ≥ 1942, Lean or Normal: ≤25%	Low	93	7.50	-0.0061 (0.0060)	0.304
	Medium	70	7.16		
	High	105	7.12		
Born < 1942, Obese: >25%	Low	28	7.53	0.0431 (0.0103)	<0.001
	Medium	54	7.91		
	High	46	8.23		
Born < 1942, Lean or Normal: ≤25%	Low	165	7.51	0.0082 (0.0061)	0.177
	Medium	140	7.52		
	High	79	8.04		

[a] Transformed from natural logarithm scale.

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-27.
Interaction Table for α-1-C Hemoglobin (All Participants)
(Discrete)

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 18-49)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	76	27.6	2.53 (1.15,5.57)	0.021
	Medium	31	38.7		
	High	1	100.0		
Enlisted Flyer	Low	35	40.0	0.80 (0.54,1.19)	0.267
	Medium	42	28.6		
	High	30	40.0		
Enlisted Groundcrew	Low	60	21.7	1.12 (0.91,1.37)	0.280
	Medium	94	31.9		
	High	137	25.6		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Body Fat: Table 18-49)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Lean or Normal: ≤25%	Low	259	21.6	1.05 (0.93,1.17)	0.432
	Medium	209	23.4		
	High	184	24.5		
Obese: >25%	Low	37	24.3	1.32 (1.09,1.60)	0.005
	Medium	80	42.5		
	High	104	41.4		

Table N-2-27. (Continued)
Interaction Table for α-1-C Hemoglobin (All Participants)
(Discrete)

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Body Fat: Table 18-49)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Lean or Normal: ≤25%	Low	258	21.7	0.98 (0.87,1.11)	0.754
	Medium	209	23.4		
	High	184	24.5		
Obese: >25%	Low	37	24.3	1.22 (1.00,1.49)	0.050
	Medium	80	42.5		
	High	104	41.4		

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-28.
Interaction Table for α-1-C Hemoglobin (percent) (Diabetics)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Age: Table 18-50)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Born ≥ 1942	***All***	***Ranch Hand***	***31***	***10.60***	***1.00 --***	***0.087***
		Comparison	***45***	***9.60***		
Born < 1942	***All***	***Ranch Hand***	***106***	***10.28***	***-0.38 --***	***0.263***
		Comparison	***132***	***10.66***		
Born ≥ 1942	Officer	Ranch Hand	3	10.01	0.06 --	0.974
		Comparison	4	9.95		
	Enlisted Flyer	Ranch Hand	4	10.04	0.75 --	0.629
		Comparison	6	9.29		
	Enlisted Groundcrew	Ranch Hand	24	11.15	1.21 --	0.084
		Comparison	35	9.94		
Born < 1942	Officer	Ranch Hand	50	10.34	0.04 --	0.929
		Comparison	54	10.30		
	Enlisted Flyer	Ranch Hand	20	10.10	-0.99 --	0.195
		Comparison	28	11.09		
	Enlisted Groundcrew	Ranch Hand	36	10.15	-0.54 --	0.334
		Comparison	50	10.69		

[a] Transformed from natural logarithm scale.

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

[c] P-values based on difference of means on natural logarithm scale.

Table N-2-29.
Interaction Table for α-1-C Hemoglobin (percent) (Nondiabetics)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED
(Group-by-Body Fat: Table 18-52)

Stratum	Occupational Category	Group	n	Adjusted Mean[a]	Difference of Adjusted Means (95% C.I.)[b]	p-Value[c]
Obese: >25%	*All*	*Ranch Hand*	*175*	*7.11*	*-0.08 --*	*0.159*
		Comparison	*243*	*7.19*		
Lean or Normal: ≤25%	*All*	*Ranch Hand*	*620*	*7.05*	*-0.01 --*	*0.793*
		Comparison	*839*	*7.06*		
Obese: >25%	Officer	Ranch Hand	59	6.99	-0.17 --	0.092
		Comparison	89	7.16		
	Enlisted Flyer	Ranch Hand	28	7.24	0.00 --	0.978
		Comparison	37	7.24		
	Enlisted Groundcrew	Ranch Hand	88	7.12	-0.06 --	0.566
		Comparison	117	7.18		
Lean or Normal: ≤25%	Officer	Ranch Hand	247	6.95	-0.01 --	0.776
		Comparison	352	6.96		
	Enlisted Flyer	Ranch Hand	107	7.09	-0.06 --	0.505
		Comparison	126	7.15		
	Enlisted Groundcrew	Ranch Hand	266	7.10	0.02 --	0.775
		Comparison	361	7.08		

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Table 18-52)

Current Dioxin Category Summary Statistics				Analysis Results for $\log_2$ (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Non-Black	Low	253	6.96	-0.0026 (0.0028)	0.347
	Medium	222	6.89		
	High	226	6.89		
Black	Low	11	7.34	-0.0282 (0.0125)	0.024
	Medium	17	7.21		
	High	12	6.87		

[a] Transformed from natural logarithm scale.

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

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

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

Table N-2-30.
Interaction Table for Urinary Protein (Diabetics)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Race: Table 18-54)						
Stratum	**Occupational Category**	**Group**	**n**	**Percent Present**	**Adj. Relative Risk (95% C.I.)**	**p-Value**
Non-Black	***All***	***Ranch Hand***	***126***	***14.3***	***1.05 (0.51,2.19)***	***0.890***
		Comparison	***161***	***13.7***		
Black	***All***	***Ranch Hand***	***11***	***0.0***	--	--
		Comparison	***15***	***26.7***		
Non-Black	Officer	Ranch Hand	53	13.2	1.07 (0.32,3.57)	0.910
		Comparison	58	12.1		
	Enlisted Flyer	Ranch Hand	20	15.0	2.15 (0.35,13.04)	0.407
		Comparison	28	7.1		
	Enlisted Groundcrew	Ranch Hand	53	15.1	0.84 (0.30,2.37)	0.743
		Comparison	75	17.3		
Black	Officer	Ranch Hand	0	0.0	--	--
		Comparison	0	0.0		
	Enlisted Flyer	Ranch Hand	4	0.0	--	--
		Comparison	6	16.7		
	Enlisted Groundcrew	Ranch Hand	7	0.0	--	--
		Comparison	9	33.3		

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

Table N-2-31.
Interaction Table for Serum Proinsulin (Diabetics)
(Discrete)

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 18-56)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	13	15.4	7.29 (1.46,36.42)	0.016
	Medium	30	43.3		
	High	5	60.0		
Enlisted Flyer	Low	1	0.0	1.81 (0.55,5.95)	0.330
	Medium	9	11.1		
	High	12	66.7		
Enlisted Groundcrew	Low	10	50.0	0.70 (0.47,1.04)	0.081
	Medium	12	41.7		
	High	33	45.5		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 18-56)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	13	7.7	12.43 (2.45,62.98)	0.002
	Medium	26	38.5		
	High	11	63.6		
Enlisted Flyer	Low	1	0.0	2.01 (0.70,5.82)	0.196
	Medium	9	0.0		
	High	13	69.2		
Enlisted Groundcrew	Low	10	50.0	0.83 (0.62,1.11)	0.203
	Medium	15	40.0		
	High	32	46.9		

Table N-2-31. (Continued)
Interaction Table for Serum Proinsulin (Diabetics)
(Discrete)

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 18-56)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	13	7.7	10.52 (1.76,62.96)	0.010
	Medium	26	38.5		
	High	11	63.6		
Enlisted Flyer	Low	1	0.0	1.78 (0.59,5.43)	0.308
	Medium	9	0.0		
	High	13	69.2		
Enlisted Groundcrew	Low	10	50.0	0.62 (0.42,0.92)	0.019
	Medium	15	40.0		
	High	32	46.9		

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Diabetic Severity: Table 18-56)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
No Treatment	Low	14	7.1	1.20 (0.73,1.95)	0.472
	Medium	28	10.7		
	High	24	50.0		
Diet Only	Low	3	66.7	0.51 (0.25,1.01)	0.055
	Medium	14	50.0		
	High	13	53.9		
Oral Hypoglycemic	Low	0	0.0	0.45 (0.21,0.94)	0.035
	Medium	4	75.0		
	High	13	76.9		
Insulin Dependent	Low	7	42.9	0.78 (0.49,1.23)	0.286
	Medium	4	75.0		
	High	6	33.3		

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

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-2-32.
Interaction Table for Serum C Peptide (ng/ml) (Diabetics)
(Continuous)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 18-57)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)**	**p-Value**
Officer	Comparison	51	6.52		
	Background RH	22	6.12	-0.40 (-2.51,1.71)	0.707
	Low RH	23	7.14	0.62 (-1.42,2.66)	0.553
	High RH	3	7.31	0.79 (-4.02,5.59)	0.749
	Low plus High RH	26	7.16	0.64 (-1.32,2.59)	0.523
Enlisted Flyer	Comparison	26	6.78		
	Background RH	1	3.17	-3.61 (-11.97,4.74)	0.398
	Low RH	10	6.39	-0.39 (-3.42,2.63)	0.799
	High RH	11	7.86	1.08 (-1.86,4.02)	0.472
	Low plus High RH	21	7.16	0.38 (-2.00,2.76)	0.756
Enlisted Groundcrew	Comparison	66	5.86		
	Background RH	13	6.42	0.56 (-1.94,3.06)	0.660
	Low RH	12	11.68	5.82 (3.29,8.35)	<0.001
	High RH	30	6.24	0.39 (-1.41,2.19)	0.673
	Low plus High RH	42	7.80	1.94 (0.34,3.55)	0.019

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-2-33.
Interaction Table for Serum C Peptide (Diabetics)
(Discrete)

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Age: Table 18-58)

Stratum	Dioxin Category	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Born ≥ 1942	Comparison	34	58.8		
	Background RH	7	14.3	0.14 (0.01,1.69)	0.122
	Low RH	3	66.7	0.77 (0.04,14.06)	0.862
	High RH	19	68.4	4.19 (0.95,18.52)	0.059
	Low plus High RH	22	68.2	3.09 (0.79,12.00)	0.104
Born < 1942	Comparison	109	65.1		
	Background RH	32	65.6	1.17 (0.35,3.90)	0.804
	Low RH	43	69.8	2.81 (1.02,7.75)	0.046
	High RH	26	42.3	0.29 (0.08,1.07)	0.062
	Low plus High RH	69	59.4	1.25 (0.54,2.88)	0.601

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Age: Table 18-58)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Born ≥ 1942	Low	4	0.0	0.93 (0.58,1.51)	0.773
	Medium	5	60.0		
	High	19	68.4		
Born < 1942	Low	18	61.1	0.73 (0.51,1.04)	0.079
	Medium	44	65.9		
	High	35	54.3		

Table N-2-33. (Continued)
Interaction Table for Serum C Peptide (Diabetics)
(Discrete)

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Diabetic Severity: Table 18-58)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
No Treatment or Diet Only	Low	15	73.3	0.62 (0.42,0.92)	0.017
	Medium	41	75.6		
	High	36	66.7		
Oral Hypoglycemic or Insulin Dependent	Low	7	0.0	1.08 (0.67,1.75)	0.752
	Medium	8	12.5		
	High	18	44.4		

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Age: Table 18-58)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Born ≥ 1942	Low	4	0.0	0.98 (0.60,1.60)	0.925
	Medium	5	60.0		
	High	19	68.4		
Born < 1942	Low	18	61.1	0.78 (0.52,1.16)	0.216
	Medium	44	65.9		
	High	35	54.3		

Table N-2-33. (Continued)
Interaction Table for Serum C Peptide (Diabetics)
(Discrete)

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Diabetic Severity: Table 18-58)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
No Treatment or Diet Only	Low	15	73.3	0.65 (0.42,1.00)	0.052
	Medium	41	75.6		
	High	36	66.7		
Oral Hypoglycemic or Insulin Dependent	Low	7	0.0	1.12 (0.68,1.85)	0.658
	Medium	8	12.5		
	High	18	44.4		

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-2-34.
Interaction Table for Total Testosterone (ng/dl)
(Continuous)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Age: Table 18-59)						
Stratum	**Occupational Category**	**Group**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Means (95% C.I.)[b]**	**p-Value[c]**
Born ≥1942	***All***	***Ranch Hand***	***395***	***518.9***	***1.06 --***	***0.926***
		Comparison	***555***	***517.8***		
Born <1942	***All***	***Ranch Hand***	***541***	***503.2***	***18.59 --***	***0.054***
		Comparison	***716***	***484.6***		
Born ≥1942	Officer	Ranch Hand	78	500.8	19.97 --	0.414
		Comparison	121	480.8		
	Enlisted Flyer	Ranch Hand	38	535.2	17.18 --	0.638
		Comparison	57	518.0		
	Enlisted Groundcrew	Ranch Hand	279	528.3	-7.78 --	0.574
		Comparison	377	536.1		
Born <1942	Officer	Ranch Hand	279	493.1	14.48 --	0.273
		Comparison	379	478.6		
	Enlisted Flyer	Ranch Hand	123	520.0	45.52 --	0.029
		Comparison	143	474.5		
	Enlisted Groundcrew	Ranch Hand	139	495.7	4.55 --	0.808
		Comparison	194	491.1		

Table N-2-34. (Continued)
Interaction Table for Total Testosterone (ng/dl)
(Continuous)

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Personality Type: Table 18-59)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Type A	Low	80	539.0	-0.5988 (0.2433)	0.015
	Medium	70	492.6		
	High	63	461.8		
Type B	Low	91	534.8	0.0392 (0.1816)	0.829
	Medium	100	509.3		
	High	110	505.2		

c) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 18-59)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Officer	Low	188	531.2	-0.9913 (0.2791)	<0.001
	Medium	137	493.0		
	High	14	369.3		
Enlisted Flyer	Low	31	571.6	-0.6173 (0.2891)	0.035
	Medium	57	565.5		
	High	61	504.2		
Enlisted Groundcrew	Low	68	515.6	-0.1184 (0.1315)	0.369
	Medium	101	540.2		
	High	222	511.4		

Table N-2-34. (Continued)
Interaction Table for Total Testosterone (ng/dl)
(Continuous)

d) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 18-59)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Adjusted Mean[a]**	**Adjusted Slope (Std. Error)[d]**	**p-Value**
Officer	Low	187	534.9	-0.7894 (0.2008)	<0.001
	Medium	133	488.2		
	High	19	385.6		
Enlisted Flyer	Low	33	563.4	-0.6092 (0.2386)	0.012
	Medium	56	554.4		
	High	60	515.2		
Enlisted Groundcrew	Low	72	522.7	-0.1864 (0.1158)	0.108
	Medium	104	536.3		
	High	215	509.3		

e) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 18-59)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Adjusted Mean[a]**	**Adjusted Slope (Std. Error)[d]**	**p-Value**
Officer	Low	187	525.6	-0.7437 (0.2158)	0.001
	Medium	133	487.0		
	High	19	402.9		
Enlisted Flyer	Low	32	544.5	-0.3897 (0.2839)	0.172
	Medium	56	548.9		
	High	60	520.0		
Enlisted Groundcrew	Low	72	514.9	-0.0834 (0.1220)	0.495
	Medium	104	531.8		
	High	215	512.5		

[a] Transformed from square root scale.

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

[c] P-value is based on difference of means on square root scale.

[d] Slope and standard error based on square root of total testosterone versus log_2 dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
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-2-35.
Interaction Table for Total Testosterone
(Discrete)

a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Race: Table 18-60)						
Stratum	**Occupational Category**	**Group**	**n**	**Percent Abnormal Low**	**Adjusted Relative Risk (95% C.I.)**	**p-Value**
Non-Black	***All***	***Ranch Hand***	***877***	***4.8***	***0.89 (0.59,1.35)***	***0.597***
		Comparison	***1,193***	***5.2***		
Black	***All***	***Ranch Hand***	***56***	***0.0***	--	--
		Comparison	***74***	***6.8***		
Non-Black	Officer	Ranch Hand	348	4.6	1.03 (0.53,2.00)	0.414
		Comparison	494	4.7		
	Enlisted Flyer	Ranch Hand	150	4.0	0.55 (0.19,1.60)	0.638
		Comparison	186	5.9		
	Enlisted Groundcrew	Ranch Hand	379	5.3	0.94 (0.52,1.73)	0.574
		Comparison	513	5.7		
Black	Officer	Ranch Hand	7	0.0	--	--
		Comparison	6	0.0		
	Enlisted Flyer	Ranch Hand	10	0.0	--	--
		Comparison	14	0.0		
	Enlisted Groundcrew	Ranch Hand	39	0.0	--	--
		Comparison	54	0.0		

Table N-2-35. (Continued)
Interaction Table for Total Testosterone
(Discrete)

b) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Personality Type: Table 18-60)						
Stratum	**Occupational Category**	**Group**	**n**	**Percent Abnormal Low**	**Adjusted Relative Risk (95% C.I.)**	**p-Value**
Type A	***All***	***Ranch Hand***	***408***	***5.6***	***1.82 (0.95,3.49)***	***0.071***
		Comparison	***527***	***3.4***		
Type B	***All***	***Ranch Hand***	***525***	***3.6***	***0.48 (0.27,0.84)***	***0.011***
		Comparison	***740***	***6.8***		
Type A	Officer	Ranch Hand	175	6.3	2.01 (0.89,4.55)	0.092
		Comparison	223	2.2		
	Enlisted Flyer	Ranch Hand	60	3.3	1.24 (0.37,4.15)	0.730
		Comparison	86	4.7		
	Enlisted Groundcrew	Ranch Hand	173	5.8	1.86 (0.84,4.11)	0.125
		Comparison	218	4.1		
Type B	Officer	Ranch Hand	180	2.8	0.54 (0.24,1.22)	0.139
		Comparison	277	6.5		
	Enlisted Flyer	Ranch Hand	100	4.0	0.33 (0.11,1.01)	0.053
		Comparison	114	6.1		
	Enlisted Groundcrew	Ranch Hand	245	4.1	0.50 (0.25,1.02)	0.055
		Comparison	349	7.2		

Table N-2-35. (Continued)
Interaction Table for Total Testosterone
(Discrete)

c) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Occupation: Table 18-60)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Abnormal Low	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	76	5.3	5.48 (1.53,19.67)	0.009
	Medium	33	12.1		
	High	1	100.0		
Enlisted Flyer	Low	36	0.0	1.14 (0.51,2.55)	0.754
	Medium	42	4.8		
	High	31	9.7		
Enlisted Groundcrew	Low	60	6.7	1.01 (0.70,1.45)	0.974
	Medium	95	2.1		
	High	141	7.1		

d) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Personality Type: Table 18-60)

Stratum	Dioxin Category	n	Percent Abnormal Low	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Type A	Comparison	441	3.2		
	Background RH	168	4.2	1.58 (0.60,4.15)	0.040
	Low RH	113	6.2	1.83 (0.69,4.86)	0.024
	High RH	100	7.0	2.39 (0.90,6.34)	0.880
	Low plus High RH	213	6.6	2.08 (0.94,4.56)	0.116
Type B	Comparison	614	6.7		
	Background RH	196	1.5	0.28 (0.09,0.94)	0.350
	Low RH	142	2.8	0.29 (0.10,0.85)	0.227
	High RH	159	7.5	0.95 (0.46,1.94)	0.080
	Low plus High RH	301	5.3	0.60 (0.32,1.13)	0.069

Table N-2-35. (Continued)
Interaction Table for Total Testosterone
(Discrete)

e) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 18-60)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal Low	Adjusted Relative Risk (95% C.I.)[c]	p-Value
Officer	Low	188	2.7	2.83 (1.25,6.42)	0.012
	Medium	137	5.1		
	High	14	28.6		
Enlisted Flyer	Low	31	0.0	1.28 (0.61,2.69)	0.523
	Medium	56	0.0		
	High	61	8.2		
Enlisted Groundcrew	Low	68	2.9	0.94 (0.68,1.30)	0.691
	Medium	101	5.0		
	High	222	5.4		

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

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.

Table N-2-36.
Interaction Table for Estradiol
(Discrete)

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 18-66)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	193	3.1	0.56 (0.29,1.08)	0.082
	Medium	141	2.1		
	High	14	7.1		
Enlisted Flyer	Low	31	9.7	0.62 (0.32,1.20)	0.158
	Medium	57	3.5		
	High	62	1.6		
Enlisted Groundcrew	Low	71	1.4	1.55 (1.09,2.21)	0.015
	Medium	102	3.9		
	High	223	4.5		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 18-66)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	192	2.6	0.74 (0.48,1.12)	0.156
	Medium	136	2.2		
	High	20	10.0		
Enlisted Flyer	Low	33	9.1	0.71 (0.43,1.17)	0.184
	Medium	56	3.6		
	High	61	1.6		
Enlisted Groundcrew	Low	75	1.3	1.45 (1.04,2.01)	0.026
	Medium	105	4.8		
	High	216	4.2		

Table N-2-36. (Continued)
Interaction Table for Estradiol
(Discrete)

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 18-66)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	192	2.6	0.71 (0.47,1.07)	0.103
	Medium	136	2.2		
	High	20	10.0		
Enlisted Flyer	Low	32	9.4	0.59 (0.31,1.12)	0.108
	Medium	56	3.6		
	High	61	1.6		
Enlisted Groundcrew	Low	75	1.3	1.39 (1.00,1.94)	0.052
	Medium	105	4.8		
	High	216	4.2		

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

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.

APPENDIX N-3.

Endocrine Analysis Tables
Occupation, Body Fat, HDL Cholesterol, and Cholesterol Removed from Final Model

This appendix contains results of exposure analyses after occupation, body fat, high density lipoprotein, and cholesterol have been removed from those final dioxin models (Models 2 through 6) that contained these covariates. These analyses are performed to investigate the relationship of the dependent variable to dioxin without removing any effects due to these covariates. The format of these tables closely parallels the adjusted panels of Chapter 18 tables. A summary of the tables found in this appendix follows.

Appendix N-3 Table	Chapter 18 Table	Dependent Variable
N-3-1	18-4	Composite Diabetes Indicator
N-3-2	18-5	Diabetic Severity
N-3-3	18-6	Time to Diabetes Onset
N-3-4	18-8	Testicular Volume: Minimum
N-3-5	18-9	Testicular Volume: Total
N-3-6	18-10	Retinopathy Results (Diabetics)
N-3-7	18-11	Neuropathy Results (Diabetics)
N-3-8	18-15	Dorsalis Pedis Pulses (Doppler) (Diabetics)
N-3-9	18-19	Thyroid Stimulating Hormone (TSH) (Continuous)
N-3-10	18-21	Thyroxine (T_4) (Continuous)
N-3-11	18-24	Fasting Glucose (All Participants) (Continuous)
N-3-12	18-25	Fasting Glucose (All Participants) (Discrete)
N-3-13	18-26	Fasting Glucose (Diabetics) (Continuous)
N-3-14	18-27	Fasting Glucose (Diabetics) (Discrete)
N-3-15	18-28	Fasting Glucose (Nondiabetics) (Continuous)
N-3-16	18-29	Fasting Glucose (Nondiabetics) (Discrete)
N-3-17	18-30	2-Hour Postprandial Glucose (Nondiabetics) (Continuous)
N-3-18	18-31	2-Hour Postprandial Glucose (Nondiabetics) (Discrete)
N-3-19	18-32	Fasting Urinary Glucose (All Participants)
N-3-20	18-33	Fasting Urinary Glucose (Diabetics)
N-3-21	18-35	2-Hour Postprandial Urinary Glucose (Nondiabetics)
N-3-22	18-36	Serum Insulin (All Participants) (Continuous)

Appendix N-3 Table	Chapter 18 Table	Dependent Variable
N-3-23	18-37	Serum Insulin (All Participants) (Discrete)
N-3-24	18-38	Serum Insulin (Diabetics) (Continuous)
N-3-25	18-39	Serum Insulin (Diabetics) (Discrete)
N-3-26	18-40	Serum Insulin (Nondiabetics) (Continuous)
N-3-27	18-41	Serum Insulin (Nondiabetics) (Discrete)
N-3-28	18-42	Serum Glucagon (All Participants) (Continuous)
N-3-29	18-43	Serum Glucagon (All Participants) (Discrete)
N-3-30	18-44	Serum Glucagon (Diabetics) (Continuous)
N-3-31	18-45	Serum Glucagon (Diabetics) (Discrete)
N-3-32	18-46	Serum Glucagon (Nondiabetics) (Continuous)
N-3-33	18-48	α-1-C Hemoglobin (All Participants) (Continuous)
N-3-34	18-49	α-1-C Hemoglobin (All Participants) (Discrete)
N-3-35	18-50	α-1-C Hemoglobin (Diabetics) (Continuous)
N-3-36	18-51	α-1-C Hemoglobin (Diabetics) (Discrete)
N-3-37	18-52	α-1-C Hemoglobin (Nondiabetics) (Continuous)
N-3-38	18-53	α-1-C Hemoglobin (Nondiabetics) (Discrete)
N-3-39	18-55	Serum Proinsulin (Diabetics) (Continuous)
N-3-40	18-56	Serum Proinsulin (Diabetics) (Discrete)
N-3-41	18-57	Serum C Peptide (Diabetics) (Continuous)
N-3-42	18-58	Serum C Peptide (Diabetics) (Discrete)
N-3-43	18-59	Total Testosterone (Continuous)
N-3-44	18-60	Total Testosterone (Discrete)
N-3-45	18-61	Free Testosterone (Continuous)
N-3-46	18-62	Free Testosterone (Discrete)
N-3-47	18-63	Sex Hormone Binding Globulin
N-3-48	18-66	Estradiol (Discrete)
N-3-49	18-67	Luteinizing Hormone (LH) (Continuous)
N-3-50	18-68	Luteinizing Hormone (LH) (Discrete)

Table N-3-1.
Analysis of Composite Diabetes Indicator
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	1.16 (0.96,1.40)	0.121	AGE ($p<0.001$) RACE ($p=0.107$) FAMDIAB ($p=0.026$)

[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	1,044			AGE ($p<0.001$) RACE ($p=0.031$) FAMDIAB ($p<0.001$)
Background RH	367	0.87 (0.59,1.30)	0.497	
Low RH	252	1.19 (0.80,1.75)	0.388	
High RH	254	1.41 (0.95,2.10)	0.091	
Low plus High RH	506	1.29 (0.95,1.75)	0.105	

[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-3-1. (Continued)
Analysis of Composite Diabetes Indicator
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	1.34 (1.17,1.54)	<0.001	AGE (p<0.001) RACE (p=0.085) FAMDIAB (p=0.002)
5	873	1.34 (1.18,1.52)	<0.001	AGE (p<0.001) RACE (p=0.069) FAMDIAB (p=0.002)
6[c]	871	1.23 (1.08,1.41)	0.002	AGE (p<0.001) RACE (p=0.036) FAMDIAB (p=0.002) PERS (p=0.136)

[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.

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-3-2.
Analysis of Diabetic Severity
Occupation and Body Fat Removed From Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED				
		Analysis Results for Log_2 (Initial Dioxin)[b]		
n	Contrast vs. Nondiabetic	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
518	No Treatment	1.02 (0.79,1.31)	0.902	AGE ($p<0.001$) RACE ($p=0.126$) FAMDIAB ($p=0.183$)
	Diet Only	1.16 (0.83,1.63)	0.389	
	Oral Hypoglycemic	1.81 (1.24,2.65)	0.002	
	Insulin Dependent	0.85 (0.45,1.63)	0.630	

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

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

Table N-3-2. (Continued)
Analysis of Diabetic Severity
Occupation and Body Fat Removed From Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED						
		No Treatment vs. Nondiabetic		Diet Only vs. Nondiabetic		
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Adj. Relative Risk (95% C.I.)[b]	p-Value	
Comparison	1,045					
Background RH	368	0.87 (0.53,1.43)	0.580	0.84 (0.38,1.89)	0.679	
Low RH	252	1.17 (0.72,1.89)	0.529	1.40 (0.68,2.89)	0.366	
High RH	254	1.07 (0.63,1.82)	0.806	1.71 (0.82,3.56)	0.151	
Low plus High RH	506	1.13 (0.76, 1.66)	0.550	1.54 (0.86, 2.75)	0.143	

		Oral Hypoglycemic vs. Nondiabetic		Insulin Dependent vs. Nondiabetic		
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
Comparison	1,045					AGE ($p<0.001$) RACE ($p=0.029$) FAMDIAB ($p<0.001$)
Background RH	368	--	--	2.04 (0.81,5.17)	0.132	
Low RH	252	0.80 (0.28,2.25)	0.668	1.36 (0.46,4.03)	0.578	
High RH	254	2.63 (1.20,5.78)	0.016	1.08 (0.29,4.06)	0.907	
Low plus High RH	506	1.58 (0.79,3.15)	0.195	1.25 (0.49,3.17)	0.643	

[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.

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

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-3-2. (Continued)
Analysis of Diabetic Severity
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)		
Model[a]	n	Contrast	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	874	No Treatment	1.23 (1.02, 1.47)	0.030	AGE ($p<0.001$)
		Diet Only	1.46 (1.12, 1.90)	0.005	RACE ($p=0.048$)
		Oral Hypoglycemic	2.87 (1.97, 4.18)	<0.001	FAMDIAB ($p=0.020$)
		Insulin Dependent	0.71 (0.46, 1.10)	0.130	
5	874	No Treatment	1.23 (1.04, 1.45)	0.014	AGE ($p<0.001$)
		Diet Only	1.54 (1.21, 1.97)	<0.001	RACE ($p=0.032$)
		Oral Hypoglycemic	2.80 (1.95, 4.02)	<0.001	FAMDIAB ($p=0.022$)
		Insulin Dependent	0.78 (0.58, 1.07)	0.123	
6[c]	873	No Treatment	****	****	CURR*AGE ($p<0.001$)
		Diet Only	****	****	FAMDIAB ($p=0.015$)
		Oral Hypoglycemic	****	****	
		Insulin Dependent	****	****	

[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 ($p \leq 0.01$); adjusted relative risk, confidence interval, and p-value not presented; refer to Appendix Table N-4-1 for further analysis of this interaction.

Table N-3-3.
Analysis of Time to Diabetes Onset (years)
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. Slope (Std. Error)[b]**	**p-Value**	**Covariate Remarks**
Low	171	-0.0361 (0.0328)	0.271	AGE (p<0.001) RACE (p=0.098) FAMDIAB (p=0.038)
Medium	167			
High	168			

[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] Slope and standard error based on time to diabetes onset versus log_2 (initial dioxin) in a failure time analysis model, using a censored Weibull distribution.

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

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED			
	Analysis Results for Log_2 (Current Dioxin + 1)		
Model[a]	**Adj. Slope (Std. Error)[b]**	**p-Value**	**Covariate Remarks**
4	-0.1117 (0.0270)	<0.001	AGE (<0.001) RACE (p=0.066) FAMDIAB (p=0.002)
5	-0.1117 (0.0246)	<0.001	AGE (<0.001) RACE (p=0.051) FAMDIAB (p=0.002)
6[c]	-0.0890 (0.0256)	<0.001	AGE (<0.001) RACE (p=0.024) FAMDIAB (p=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] Slope and standard error based on time to diabetes onset versus log_2 (current dioxin + 1) in a failure time analysis model, using a censored Weibull distribution.

[c] 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-3-4.
Analysis of Testicular Volume: Minimum (cm^3)
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[a]	R^2	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
Low	172	14.60	0.049	-0.4098 (0.2003)	0.041	AGE ($p<0.001$) RACE ($p=0.004$)
Medium	170	15.65				
High	171	14.05				

[a] 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: 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[a]	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,057	15.11			AGE ($p<0.001$) RACE ($p=0.001$)
Background RH	368	15.28	0.16 (-0.48,0.81)	0.619	
Low RH	256	15.27	0.16 (-0.58,0.90)	0.674	
High RH	257	14.81	-0.30 (-1.04,0.44)	0.431	
Low plus High RH	513	15.04	-0.07 (-0.64,0.50)	0.809	

[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.

Table N-3-4. (Continued)
Analysis of Testicular Volume: Minimum (cm^3)
Occupation and Body Fat Removed from Final Model

c) MODEL 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
6[b]	14.88 (296)	15.15 (292)	14.63 (292)	0.042	-0.2234 (0.1215)	0.066	AGE ($p<0.001$) RACE ($p=0.005$)

[a] 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 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table N-3-5.
Analysis of Testicular Volume: Total (cm^3)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[b]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	172	31.63	0.053	-0.0725 (0.0337)	0.032	AGE ($p<0.001$) RACE ($p=0.007$)
Medium	170	32.99				
High	171	30.34				

[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 testicular volume versus log_2 (initial dioxin).

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

Table N-3-6.
Analysis of Retinopathy Results (Diabetics)
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	132	1.38 (0.84,2.28)	0.194	PERS (p=0.003) FAMDIAB (p=0.016) DIABSEV (p=0.001)
5	132	1.31 (0.83,2.06)	0.227	PERS (p=0.004) FAMDIAB (p=0.019) DIABSEV (p=0.001)
6[c]	132	1.39 (0.84,2.28)	0.186	PERS (p=0.003) FAMDIAB (p=0.016) DIABSEV (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.

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-3-7.
Analysis of Neuropathy Results (Diabetics)
Occupation and 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=0.028) RACE (p=0.013) PERS (p=0.670) DIABSEV (p<0.001)
Background RH	42	1.72 (0.44,6.78)	0.439	
Low RH	49	0.36 (0.07,1.84)	0.221	
High RH	47	2.53 (0.76,8.42)	0.131	
Low plus High RH	96	1.16 (0.41,3.31)	0.779	

[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-3-7. (Continued)
Analysis of Neuropathy Results (Diabetics)
Occupation and 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	133	1.02 (0.68,1.52)	0.924	FAMDIAB*DIABSEV (p=0.044) AGE*PERS (p=0.040) AGE*RACE (p=0.086)
5	133	0.98 (0.70,1.38)	0.923	FAMDIAB*DIABSEV (p=0.044) AGE*PERS (p=0.038) AGE*RACE (p=0.083)
6[c]	133	1.10 (0.75,1.59)	0.627	FAMDIAB*DIABSEV (p=0.032) AGE*PERS (p=0.036) AGE*RACE (p=0.075)

[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.

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-3-8.
Analysis of Dorsalis Pedis Pulses (Diabetics)
Cholesterol and High Density Lipoprotein 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	1.37 (0.88,2.12)	0.155	DIABSEV (p=0.219) FAMDIAB (p=0.568) DRKYR (p=0.294) HRTDIS (p=0.165)

[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
5	133	1.21 (0.92,1.59)**	0.164**	CURR*PACKYR (p=0.019) DIABSEV (p=0.044) DRKYR (p=0.046) HRTDIS (p=0.072)
6[c]	133	1.18 (0.86,1.61)**	0.298**	CURR*PACKYR (p=0.020) DIABSEV (p=0.048) DRKYR (p=0.050) HRTDIS (p=0.072)

[a] 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-4-2 for further analysis of this interaction.

Table N-3-9.
Analysis of Thyroid Stimulating Hormone (TSH) (μIU/ml)
(Continuous)
Occupation Removed From Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,027	1.37			AGE ($p<0.001$) RACE ($p<0.001$)
Background RH	365	1.40	0.04 --	0.485	
Low RH	254	1.39	0.02 --	0.705	
High RH	255	1.45	0.08 --	0.196	
Low plus High RH	509	1.42	0.05 --	0.278	

[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-3-9. (Continued)
Analysis of Thyroid Stimulating Hormone (TSH) (μIU/ml)
(Continuous)
Occupation Removed From Final Model

b) 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	1.35 (291)	1.40 (290)	1.38 (293)	0.020	0.0089 (0.0143)	0.534	RACE ($p<0.001$)
5	1.33 (296)	1.40 (288)	1.39 (290)	0.021	0.0116 (0.0123)	0.345	RACE ($p<0.001$)
6[d]	1.35 (295)	1.41 (288)	1.39 (290)	0.022	0.0072 (0.0133)	0.590	RACE ($p<0.001$)

[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 TSH 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-3-10.
Analysis of Thyroxine (T_4) (μg/dl)
(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[a]	R^2	Adj. Slope (Std. Error)	p-Value	Covariate Remarks
Low	170	7.70	0.013	0.0413 (0.0432)	0.340	RACE (p=0.110)
Medium	171	7.57				
High	168	7.80				

[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: 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[a]	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,026	7.79			AGE (p=0.400) RACE*PERS (p=0.029)
Background RH	365	7.70	-0.09 (-0.25,0.06)	0.245	
Low RH	253	7.83	0.04 (-0.14,0.23)	0.643	
High RH	255	7.80	0.01 (-0.18,0.19)	0.935	
Low plus High RH	508	7.81	0.03 (-0.12,0.17)	0.724	

[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.

Table N-3-10. (Continued)
Analysis of Thyroxine (T_4) (μg/dl)
(Continuous)
Occupation Removed from Final Model

c) 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	7.58 (291)	7.70 (289)	7.70 (293)	0.009	0.0499 (0.0308)	0.106	RACE (p=0.228) PERS (p=0.061)
5	7.63 (296)	7.63 (287)	7.73 (290)	0.008	0.0356 (0.0264)	0.178	RACE (p=0.235) PERS (p=0.057)
6[b]	7.61 (295)	7.63 (287)	7.74 (290)	0.009	0.0441 (0.0285)	0.123	RACE (p=0.207) PERS (p=0.067)

[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 = $\leq$ 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-3-11.
Analysis of Fasting Glucose (mg/dl) (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	170	108.67	0.147	0.0178 (0.0076)	0.020	AGE ($p<0.001$) RACE ($p=0.055$) PERS*FAMDIAB ($p=0.001$)
Medium	167	110.02				
High	168	114.09				

[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 fasting glucose versus log_2 (initial dioxin).

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

Table N-3-11. (Continued)
Analysis of Fasting Glucose (mg/dl) (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.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,045	107.69			AGE ($p<0.001$) RACE ($p=0.005$) FAMDIAB ($p<0.001$)
Background RH	368	107.17	-0.52 --	0.676	
Low RH	252	107.02	-0.67 --	0.641	
High RH	254	110.64	2.95 --	0.044	
Low plus High RH	506	108.83	1.13 --	0.311	

[a] Transformed from natural logarithm scale.

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

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not given 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-3-11. (Continued)
Analysis of Fasting Glucose (mg/dl) (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	102.36 (290)	106.29 (294)	109.17 (290)	0.070	0.0235 (0.0046)	<0.001	AGE (p<0.001) FAMDIAB (p=0.003)
5	102.25 (296)	104.57 (290)	111.09 (288)	0.079	0.0228 (0.0039)	<0.001	AGE (p<0.001) FAMDIAB (p=0.004)
6[d]	105.81 (295)	016.81 (290)	111.60 (288)	0.105	0.0612 (0.0042)	<0.001	AGE*FAMDIAB (p=0.024) RACE (p=0.092)

[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 fasting glucose 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-3-12.
Analysis of Fasting Glucose (All Participants)
(Discrete)
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
505	1.04 (0.85,1.28)	0.682	AGE (p<0.001) RACE (p=0.011) PERS*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) 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	1.28 (1.11,1.48)	0.001	AGE (p<0.001) RACE (p=0.028) PERS*FAMDIAB (p=0.089)
5	873	1.30 (1.14,1.49)	<0.001	AGE (p<0.001) RACE (p=0.022) PERS*FAMDIAB (p=0.106)
6[c]	873	1.20 (1.04,1.38)	0.010	AGE (p<0.001) RACE (p=0.009) FAMDIAB (p=0.020)

[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-3-13.
Analysis of Fasting Glucose (mg/dl) (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	158.98	0.301	0.0438	0.061	RACE (p=0.082) DIABSEV (p=0.001)
Medium	31	163.34				
High	34	188.09				

[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 fasting glucose versus log_2 (initial dioxin).

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

Table N-3-13. (Continued)
Analysis of Fasting Glucose (mg/dl) (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	147	165.40			FAMDIAB (p=0.928) AGE*DIABSEV (p=0.042) RACE*PERS (p=0.058)
Background RH	39	158.72	-6.68--	0.490	
Low RH	48	151.55	-13.85--	0.105	
High RH	46	174.29	8.89--	0.345	
Low plus High RH	94	162.28	-3.12--	0.653	

[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 given 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-3-13. (Continued)
Analysis of Fasting Glucose (mg/dl) (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	148.79 (26)	159.16 (55)	170.82 (52)	0.276	0.515 (0.0194)	0.009	RACE (p=0.297) FAMDIAB*DIABSEV (p=0.093)
5	152.35 (24)	147.91 (53)	182.01 (56)	0.294	0.0515 (0.0159)	0.002	RACE (p=0.266) FAMDIAB*DIABSEV (p=0.092)
6[d]	160.14 (24)	150.27 (53)	175.97 (56)	0.316	0.0345 (0.0179)	0.057	RACE (p=0.218) FAMDIAB*DIABSEV (p=0.070)

[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 fasting glucose 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-3-14.
Analysis of Fasting Glucose (Diabetics)
(Discrete)
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	0.90 (0.62,1.29)	0.552	DIABSEV ($p<0.001$)

[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.

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	147			AGE ($p=0.028$) RACE ($p=0.010$) FAMDIAB ($p=0.273$) DIABSEV ($p<0.001$)
Background RH	39	1.09 (0.48,2.47)	0.841	
Low RH	48	0.82 (0.38,1.77)	0.619	
High RH	46	1.08 (0.47,2.44)	0.862	
Low plus High RH	94	0.93 (0.50,1.72)	0.823	

[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-3-14. (Continued)
Analysis of Fasting Glucose (Diabetics)
(Discrete)
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	1.08 (0.81,1.43)	0.597	DIABSEV (p=0.006)
5	138	1.14 (0.90,1.45)	0.274	DIABSEV (p=0.006)
6[c]	138	1.03 (0.78,1.35)	0.850	DIABSEV (p=0.006)

[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-3-15.
Analysis of Fasting Glucose (mg/dl) (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	139	99.68	0.059	-0.0033 (0.0034)	0.323	AGE (p=0.010)
Medium	137	98.79				PERS*FAMDIAB (p=0.079)
High	135	98.54				

[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 fasting glucose versus log_2 (initial dioxin).

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

Table N-3-15. (Continued)
Analysis of Fasting Glucose (mg/dl) (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	897	99.03			PERS (p=0.162) AGE*FAMDIAB (p=0.043)
Background RH	329	99.41	0.38 --	0.492	
Low RH	203	99.27	0.24 --	0.711	
High RH	208	98.55	-0.48 --	0.463	
Low plus High RH	411	98.91	-0.12 --	0.807	

[a] Transformed from natural logarithm of fasting glucose.

[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 given 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-3-15. (Continued)
Analysis of Fasting Glucose (mg/dl) (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	99.03 (264)	99.82 (238)	98.78 (238)	0.026	0.0006 (0.0022)	0.776	PERS (p=0.144) AGE*FAMDIAB (p=0.134)
5	98.92 (272)	99.89 (236)	98.85 (232)	0.027	0.0014 (0.0019)	0.458	PERS (p=0.153) AGE*FAMDIAB (p=0.142)
6[d]	98.96 (273)	99.54 (241)	98.40 (238)	0.025	0.0005 (0.0020)	0.805	AGE (p<0.001) PERS (p=0.150)

[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 fasting glucose 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-3-16.
Analysis of Fasting Glucose (Nondiabetics)
(Discrete)
Occupation and 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	898			AGE (p=0.014) FAMDIAB (p=0.473)
Background RH	329	0.68 (0.32,1.44)	0.320	
Low RH	204	1.13 (0.55,2.32)	0.749	
High RH	208	0.60 (0.23,1.57)	0.300	
Low plus High RH	412	0.87 (0.47,1.62)	0.671	

[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.

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	754	1.02 (0.77,1.34)	0.907	
5	754	1.05 (0.82,1.33)	0.714	
6[c]	753	0.98 (0.76,1.28)	0.907	RACE (p=0.144)

[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-3-17.
Analysis of 2-Hour Postprandial Glucose (mg/dl) (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	141	101.98	0.127	0.0202 (0.0108)	0.061	AGE ($p<0.001$) PERS ($p=0.076$)
Medium	141	106.51				
High	139	108.39				

[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 2-hour postprandial glucose versus log_2 (initial dioxin).

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

Table N-3-17. (Continued)
Analysis of 2-Hour Postprandial Glucose (mg/dl) (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	896	104.45**			DXCAT*FAMDIAB (p=0.031) PERS (p=0.004) AGE (p<0.001)
Background RH	328	102.70**	-1.75 -- **	0.308**	
Low RH	203	105.36**	0.91 -- **	0.661**	
High RH	208	108.99**	4.54 -- **	0.032**	
Low plus High RH	411	107.19**	2.75 -- **	0.091**	

[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 mean, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table N-4-3 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-3-17. (Continued)
Analysis of 2-Hour Postprandial Glucose (mg/dl) (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	98.74 (266)	102.15 (242)	109.88 (244)	0.074	0.0371 (0.0071)	<0.001	AGE (p<0.001) PERS (p=0.338)
5	97.80 (273)	102.95 (241)	110.48 (238)	0.082	0.0355 (0.0061)	<0.001	AGE (p<0.001) PERS (p=0.322)
6[d]	98.86 (272)	102.98 (241)	109.11 (238)	0.088	0.0303 (0.0065)	<0.001	AGE (p<0.001) PERS (p=0.240)

[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 2-hour postprandial glucose 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-3-18.
Analysis of 2-Hour Postprandial Glucose (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
421	1.18 (0.95,1.45)**	0.128**	INIT*RACE (p=0.007) PERS (p=0.199) AGE (p=0.004)

[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 ($p \leq 0.05$); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table N-4-4 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	896			AGE (p<0.001) PERS (p=0.019) RACE*FAMDIAB (p=0.025)
Background RH	328	0.88 (0.57,1.35)	0.553	
Low RH	203	1.25 (0.80,1.96)	0.325	
High RH	208	1.86 (1.22,2.84)	0.004	
Low plus High RH	411	1.53 (1.09,2.15)	0.014	

[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-3-18. (Continued)
Analysis of 2-Hour Postprandial Glucose (Nondiabetics)
(Discrete)
Occupation and 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	753	1.40 (1.21,1.63)**	<0.001**	CURR*RACE (p=0.003) AGE (p=0.001)
5	740	1.39 (1.21,1.60)**	<0.001**	CURR*RACE (p=0.020) AGE (p=0.001) RACE*FAMDIAB (p=0.062)
6[c]	739	1.35 (1.17,1.57)**	<0.001**	CURR*RACE (p=0.020) AGE (p=0.001) RACE*FAMDIAB (p=0.058)

[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 after deletion of this interaction; refer to Appendix Table N-4-4 for further analysis of this interaction.

Table N-3-19.
Analysis of Fasting Urinary Glucose (All Participants)
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
503	1.38 (1.02,1.87)	0.036	RACE (p=0.172) PERS*FAMDIAB (p=0.012)

[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	1,058			DXCAT*PERS (p=0.012) AGE (p=0.005) RACE (p=0.036)
Background RH	374	0.62 (0.26,1.52)**	0.300**	
Low RH	256	0.72 (0.32,1.64)**	0.435**	
High RH	259	1.80 (0.93,3.50)**	0.081**	
Low plus High RH	515	1.19 (0.68,2.10)**	0.541**	

[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-4-5 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-3-19. (Continued)
Analysis of Fasting Urinary Glucose (All Participants)
(Discrete)
Occupation and Body Fat Removed from Final Model

c) 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	872	1.70 (1.32,2.19)	<0.001	AGE (p=0.005) FAMDIAB (p=0.372)
5	871	1.72 (1.35,2.18)**	<0.001**	CURR*PERS (p=0.042) AGE (p=0.003) FAMDIAB (p=0.438)

[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.

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

Table N-3-20.
Analysis of Fasting Urinary Glucose (Diabetics)
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	1.41 (0.98,2.03)	0.054	RACE (p=0.333) DIABSEV (p=0.020)

[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	146			RACE (p=0.061) FAMDIAB (p=0.435) AGE*DIABSEV (p=0.120)
Background RH	39	0.71 (0.24,2.13)	0.541	
Low RH	48	0.70 (0.28,1.79)	0.460	
High RH	46	1.17 (0.50,2.75)	0.722	
Low plus High RH	94	0.92 (0.46,1.83)	0.812	

[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-3-21.
Analysis of 2-Hour Postprandial Urinary Glucose (Nondiabetics)
Occupation and 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	910			AGE (p=0.110)
Background RH	331	0.95 (0.68,1.33)	0.749	
Low RH	208	1.10 (0.75,1.63)	0.623	
High RH	213	1.45 (1.00,2.10)	0.048	
Low plus High RH	421	1.27 (0.95,1.70)	0.111	

[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.

b) MODELS 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
5	752	1.20 (1.07,1.34)	0.002	AGE (p=0.091)
6[c]	751	1.13 (1.00,1.28)	0.051	AGE (p=0.173)

[a] 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-3-22.
Analysis of Serum Insulin (mIU/ml) (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)[a]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	173	37.38	0.245	0.0607 (0.0300)	0.043	AGE ($p<0.001$) FAST ($p<0.001$)
Medium	172	41.98				
High	173	43.94				

[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-3-22. (Continued)
Analysis of Serum Insulin (mIU/ml) (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.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,044				DXCAT*AGE (p=0.003) RACE (p=0.149) FAST (p<0.001) FAMDIAB*PERS (p=0.022)
Background RH	368	****	****	****	
Low RH	251	****	****	****	
High RH	254	****	****	****	
Low plus High RH	505	****	****	****	

[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, fasting status, 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 ($p \leq 0.01$); adjusted mean, difference of adjusted mean, confidence interval, and p-value not presented; refer to Appendix Table N-4-6 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-3-22. (Continued)
Analysis of Serum Insulin (mIU/ml) (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	31.45 (290)	39.97 (294)	49.42 (290)	0.159	0.1314 (0.0208)	<0.001	AGE (p<0.001) FAMDIAB (p=0.617) FAST (p<0.001)
5	30.93 (296)	39.93 (290)	49.49 (288)	0.168	0.1249 (0.0177)	<0.001	AGE (p<0.001) FAMDIAB (p=0.670) FAST (p<0.001)
6[d]	32.03 (299)	39.01 (296)	46.03 (296)	0.180	0.1014 (0.0187)	<0.001	AGE (p<0.001) 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 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-3-23.
Analysis of Serum Insulin (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]					
	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
518	0.71 (0.47,1.10)	0.103	1.00 (0.89,1.20)	0.656	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-3-23. (Continued)
Analysis of Serum Insulin (All Participants)
(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	1,044					DXCAT*PERS (p=0.018) AGE (p<0.001) FAMDIAB (p=0.175) RACE*PERS (p=0.049)
Background RH	368	0.79 (0.44,1.41)**	0.422**	0.76 (0.59,0.99)**	0.040**	
Low RH	251	0.80 (0.39,1.67)**	0.556**	0.98 (0.72,1.32)**	0.878**	
High RH	254	0.79 (0.37,1.70)**	0.547**	1.01 (0.74,1.36)**	0.970**	
Low plus High RH	505	0.80 (0.45,1.41)**	0.436**	0.99 (0.78,1.25)**	0.940**	

[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.

** Categorized dioxin-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted relative risk, confidence interval, and p-value derived from a model after deletion of this interaction; refer to Appendix Table N-4-7 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-3-23. (Continued)
Analysis of Serum Insulin (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)				
		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	891	0.74 (0.58,0.94)	0.016	1.19 (1.08,1.32)	0.001	AGE ($p<0.001$) PERS ($p=0.957$)
5	891	0.79 (0.65,0.94)	0.010	1.20 (1.10,1.31)	<0.001	AGE ($p<0.001$) PERS ($p=0.963$)
6[c]	890	0.77 (0.63,0.93)	0.008	1.17 (1.07,1.28)	0.001	AGE ($p<0.001$) PERS ($p=0.968$)

[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-3-24.
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) FAST (p=0.882) PERS*FAMDIAB (p=0.104)
Background RH	329	62.07**	-5.94 -- **	0.072**	
Low RH	203	67.83**	-0.18 -- **	0.965**	
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.I.)[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 $\leq$ 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-3-33. (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 $\leq$ 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-3-34. (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 $\leq$ 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-3-35. (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 = $\leq$ 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-3-36.
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 $\leq$ 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-3-36. (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 = ≤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-3-38.
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.

Table N-3-48.
Analysis of Estradiol
(Discrete)
Occupation 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	894	1.12 (0.88,1.43)	0.363	RACE (p=0.033)
5	894	1.08 (0.87,1.35)	0.461	RACE (p=0.032)
6[c]	893	1.05 (0.83,1.32)	0.702	RACE (p=0.027)

[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-3-49.
Analysis of Luteinizing Hormone (LH) (mIU/ml)
(Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED					
Dioxin Category	n	Adj. Mean[a]	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,063	3.84			AGE*RACE (p=0.013)
Background RH	374	3.92	0.08 --	0.560	
Low RH	260	4.18	0.34 --	0.020	
High RH	260	3.83	-0.01 --	0.878	
Low plus High RH	520	4.00	0.16 --	0.160	

[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.

Table N-3-50.
Analysis of Luteinizing Hormone (LH)
(Discrete)
Occupation Removed from Final Model

a) MODEL 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
6[c]	893	0.94 (0.65,1.36)	0.739	AGE ($p<0.001$)

[a] 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.

APPENDIX N-4.

Interaction Tables for the Endocrine Assessment

Occupation, Body Fat, HDL Cholesterol, and Cholesterol Removed from Final Model

This appendix contains exposure analyses results of interactions between covariates and dioxin after occupation, body fat, high-density lipoprotein (HDL) cholesterol, and cholesterol have been removed from those final dioxin models (Models 2 through 6) that contained these covariates. These tables are supplements to tables in Appendix N-3, which are main effects results with these covariates removed from the model. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The analysis model, covariate involved in the interaction, and a reference to the analysis table in Chapter 18 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix N-4 Table	Chapter 18 Table	Appendix N-3 Table	Dependent Variable	Model	Covariate
N-4-1	18-5	N-3-2	Diabetic Severity	6	Age
N-4-2	18-15	N-3-8	Dorsalis Pedis Pulses (Doppler) (Diabetics)	5 6	Lifetime Cigarette Smoking History Lifetime Cigarette Smoking History
N-4-3	18-30	N-3-17	2-Hour Postprandial Glucose (Nondiabetics) (Continuous)	3	Family History Of Diabetes
N-4-4	18-31	N-3-18	2-Hour Postprandial Glucose (Nondiabetics) (Discrete)	2 4 5 6	Race Race Race Race
N-4-5	18-32	N-3-19	Fasting Urinary Glucose (All Participants)	3 5	Personality Type Personality Type
N-4-6	18-36	N-3-22	Serum Insulin (All Participants) (Continuous)	3	Age
N-4-7	18-37	N-3-23	Serum Insulin (All Participants) (Discrete)	3	Personality Type
N-4-8	18-39	N-3-25	Serum Insulin (Diabetics) (Discrete)	3	Age
N-4-9	18-40	N-3-26	Serum Insulin (Nondiabetics) (Continuous)	3	Age
N-4-10	18-41	N-3-27	Serum Insulin (Nondiabetics) (Discrete)	6	Age

Appendix N-4 Table	Chapter 18 Table	Appendix N-3 Table	Dependent Variable	Model	Covariate
N-4-11	18-42	N-3-28	Serum Glucagon (All Participants) (Continuous)	3 4	Family History of Diabetes Family History of Diabetes
N-4-12	18-44	N-3-30	Serum Glucagon (Diabetics) (Continuous)	3	Diabetic Severity
N-4-13	18-56	N-3-40	Serum Proinsulin (Diabetics) (Discrete)	6	Diabetic Severity
N-4-14	18-58	N-3-42	Serum C Peptide (Diabetics) (Discrete)	3 5 6	Age Diabetic Severity Diabetic Severity
N-4-15	18-60	N-3-44	Total Testosterone (Discrete)	3	Personality Type

Table N-4-1.
Interaction Table for Diabetic Severity
Body Fat Removed from Final Model

a) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Age: Tables 18-5 and N-3-2)

Stratum	Current Dioxin Category	n	Current Dioxin Category Summary Statistics: Percent					Analysis Results for Log_2 (Current Dioxin + 1)		
			Nondiabetic	No Treatment	Diet Only	Oral Hypoglycemic	Insulin Dependent	Contrast vs. Nondiabetic	Est. Relative Risk (95% C.I.)[b]	p-Value
Born ≥1942	Low	102	95.1	2.9	1.0	0.0	1.0	No Treatment	1.16 (0.88,1.53)	0.297
	Medium	96	93.8	6.3	0.0	0.0	0.0	Diet Only	1.42 (0.96,2.10)	0.083
	High	163	88.3	4.9	4.3	2.5	0.0	Oral Hypoglycemic	2.60 (1.27,5.31)	0.009
								Insulin Dependent	--	--
Born <1942	Low	193	90.2	5.7	1.0	0.0	3.1	No Treatment	1.30 (1.06,1.60)	0.010
	Medium	194	75.8	12.9	7.2	2.1	2.1	Diet Only	1.47 (1.10,1.99)	0.010
	High	125	70.4	13.6	4.8	7.2	4.0	Oral Hypoglycemic	2.75 (1.89,4.00)	<0.001
								Insulin Dependent	0.93 (0.67,1.28)	0.661

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

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

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

Table N-4-2.
Interaction Table for Dorsalis Pedis Pulses (Doppler) (Diabetics)
Cholesterol Removed from Final Model

a) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Lifetime Cigarette Smoking History: Tables 18-15 and N-3-8)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
0 Pack-years	Low	8	0.0	2.02 (0.83,4.92)	0.121
	Medium	10	0.0		
	High	12	33.3		
>0-10 Pack-years	Low	6	16.7	1.41 (0.84,2.36)	0.198
	Medium	13	0.0		
	High	18	22.2		
>10 Pack-years	Low	11	36.4	1.00 (0.70,1.43)	0.997
	Medium	29	10.3		
	High	26	23.1		

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Lifetime Cigarette Smoking History: Tables 18-15 and N-3-8)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Abnormal**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
0 Pack-years	Low	8	0.0	2.00 (0.81,4.96)	0.134
	Medium	10	0.0		
	High	12	33.3		
>0-10 Pack-years	Low	6	16.7	1.39 (0.79,2.44)	0.254
	Medium	13	0.0		
	High	18	22.2		
>10 Pack-years	Low	11	36.4	0.99 (0.68,1.45)	0.964
	Medium	29	10.3		
	High	26	23.1		

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

Note: Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-4-3.
Interaction Table for 2-Hour Postprandial Glucose (mg/dl) (Nondiabetics) (Continuous)
Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Family History of Diabetes: Tables 18-30 and N-3-17)					
Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]	p-Value[c]
No	Comparison	695	101.17		
	Background RH	264	100.11	-1.06 --	0.569
	Low RH	162	103.21	2.04 --	0.368
	High RH	161	108.87	7.70 --	0.001
	Low plus High RH	323	106.00	4.83 --	0.007
Yes	Comparison	201	109.58		
	Background RH	64	105.46	-4.12 --	0.296
	Low RH	41	106.10	-3.48 --	0.460
	High RH	47	102.77	-6.81 --	0.121
	Low plus High RH	88	104.30	-5.28 --	0.131

[a] Transformed from natural logarithm scale.

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

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 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-4-4.
Interaction Table for 2-Hour Postprandial Glucose (Nondiabetics)
(Discrete)
Body Fat Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Race: Tables 18-31 and N-3-18)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Percent Impaired	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	128	16.4	1.16 (0.94,1.43)	0.168
	Medium	133	18.1		
	High	133	20.3		
Black	Low	13	0.0	--	--
	Medium	8	0.0		
	High	6	16.7		

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 18-31 and N-3-18)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Impaired	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Non-Black	Low	255	10.6	1.39 (1.19,1.62)	<0.001
	Medium	226	14.2		
	High	232	20.3		
Black	Low	11	0.0	--	--
	Medium	17	0.0		
	High	12	8.3		

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 18-31 and N-3-18)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Impaired	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Non-Black	Low	259	8.9	1.38 (1.20,1.59)	<0.001
	Medium	220	15.0		
	High	221	21.3		
Black	Low	12	0.0	--	--
	Medium	17	0.0		
	High	11	9.1		

Table N-4-4. (Continued)
Interaction Table for 2-Hour Postprandial Glucose (Nondiabetics)
(Discrete)
Body Fat Removed from Final Model

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Race: Tables 18-31 and N-3-18)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Impaired	Adjusted Relative Risk (95% C.I.)[b]	p-Value
Non-Black	Low	258	8.9	1.34 (1.16,1.56)	<0.001
	Medium	220	15.0		
	High	221	21.3		
Black	Low	12	0.0	--	--
	Medium	17	0.0		
	High	11	9.1		

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

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

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
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-4-5.
Interaction Table for Fasting Urinary Glucose (All Participants)
Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Personality Type: Tables 18-32 and N-3-19)					
Stratum	**Dioxin Category**	**n**	**Percent Present**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Type A	Comparison	443	3.4		
	Background RH	175	0.0	--	--
	Low RH	113	3.5	0.64 (0.10,4.07)	0.635
	High RH	99	6.1	2.05 (0.49,8.66)	0.327
	Low plus High RH	212	4.7	1.14 (0.35,3.72)	0.828
Type B	Comparison	615	2.9		
	Background RH	199	3.0	1.41 (0.54,3.70)	0.481
	Low RH	143	2.8	0.78 (0.26,2.38)	0.665
	High RH	160	5.6	1.70 (0.72,4.03)	0.227
	Low plus High RH	303	4.3	1.23 (0.58,2.61)	0.582

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Personality Type: Tables 18-32 and N-3-19)					
Current Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Current Dioxin + 1)**	
Stratum	**Current Dioxin**	**n**	**Percent Present**	**Adjusted Relative Risk (95% C.I.)[b]**	**p-Value**
Type A	Low	127	0.0	2.56 (1.59,4.12)	<0.001
	Medium	139	0.7		
	High	113	7.1		
Type B	Low	169	2.4	1.50 (1.14,1.97)	0.004
	Medium	149	3.4		
	High	174	5.8		

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

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 5: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table N-4-6.
Interaction Table for Serum Insulin (mIU/ml) (All Participants)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 18-36 and N-3-22)					
Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]	p-Value[c]
Born ≥ 1942	Comparison	446	32.92		
	Background RH	127	26.89	-6.03 --	0.013
	Low RH	83	32.63	-0.29 --	0.928
	High RH	151	36.55	3.63 --	0.169
	Low plus High RH	234	35.11	2.19 --	0.322
Born < 1942	Comparison	598	40.18		
	Background RH	241	40.57	0.39 --	0.878
	Low RH	168	44.10	3.92 --	0.188
	High RH	103	43.29	3.11 --	0.388
	Low plus High RH	271	43.79	3.61 --	0.148

[a] Transformed from natural logarithm scale.

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

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 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-4-7.
Interaction Table for Serum Insulin (All Participants)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Personality Type: Tables 18-37 and N-3-23)

			Percent			Low vs. Normal		High vs. Normal	
Stratum	Dioxin Category	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Type A	Comparison	437	6.4	42.6	51.0				
	Background RH	172	5.2	46.5	48.3	0.81 (0.36,1.86)	0.626	0.69 (0.49,0.97)	0.034
	Low RH	111	6.3	32.4	61.3	0.42 (0.12,1.49)	0.178	0.68 (0.46,1.01)	0.057
	High RH	97	1.0	41.2	57.7	1.38 (0.56,3.36)	0.484	0.91 (0.61,1.35)	0.626
	Low plus High RH	208	3.9	36.5	59.6	0.86 (0.39,1.88)	0.707	0.79 (0.58,1.07)	0.125
Type B	Comparison	607	3.6	32.1	64.3				
	Background RH	196	4.6	44.4	51.0	0.82 (0.36,1.84)	0.626	0.89 (0.61,1.29)	0.531
	Low RH	140	2.1	40.0	57.9	1.41 (0.56,3.52)	0.467	1.56 (0.98,2.49)	0.060
	High RH	157	5.1	31.9	63.1	0.17 (0.02,1.28)	0.086	1.17 (0.73,1.87)	0.510
	Low plus High RH	297	3.7	35.7	60.6	0.73 (0.32,1.69)	0.466	1.35 (0.95,1.94)	0.095

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

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-4-8.
Interaction Table for Serum Insulin (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 18-39 and N-3-25)					
Stratum	**Dioxin Category**	**n**	**Percent Abnormal High**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Born ≥ 1942	Comparison	36	52.8		
	Background RH	8	50.0	0.86 (0.15,4.83)	0.865
	Low RH	4	25.0	0.19 (0.01,2.45)	0.202
	High RH	19	52.6	1.49 (0.41,5.32)	0.543
	Low plus High RH	23	47.8	1.02 (0.32,3.28)	0.972
Born < 1942	Comparison	112	59.8		
	Background RH	34	67.6	1.21 (0.49,2.98)	0.675
	Low RH	45	71.1	2.34 (1.02,5.39)	0.045
	High RH	28	42.9	0.44 (0.16,1.21)	0.111
	Low plus High RH	73	60.3	1.20 (0.60,2.39)	0.604

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

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-4-9.
Interaction Table for Serum Insulin (mIU/ml) (Nondiabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 18-40 and N-3-26)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]**	**p-Value[c]**
Born ≥ 1942	Comparison	410	59.30		
	Background RH	119	48.39	-10.91 --	0.013
	Low RH	80	57.71	-1.59 --	0.776
	High RH	132	64.94	5.64 --	0.248
	Low plus High RH	212	62.11	2.81 --	0.485
Born < 1942	Comparison	487	71.33		
	Background RH	210	69.67	-1.66 --	0.717
	Low RH	123	72.54	1.21 --	0.832
	High RH	76	86.40	15.07 --	0.048
	Low plus High RH	199	77.55	6.22 --	0.206

[a] Transformed from natural logarithm scale.

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

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

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 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-4-10.
Interaction Table for Serum Insulin (Nondiabetics)
(Discrete)
Body Fat Removed from Final Model

a) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Age: Tables 18-41 and N-3-27)									
Analysis Results for Log_2 (Current Dioxin + 1)									
			Percent			Low vs. Normal		High vs. Normal	
Stratum	Current Dioxin	n	Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Born ≥ 1942	Low	98	9.2	60.2	30.6	0.86 (0.67,1.12)	0.262	1.22 (1.06,1.39)	0.004
	Medium	90	6.7	40.0	53.3				
	High	148	5.4	40.5	54.1				
Born < 1942	Low	175	5.1	40.6	54.3	0.75 (0.55,1.03)	0.077	1.43 (1.22,1.68)	<0.001
	Medium	151	4.0	37.8	58.3				
	High	90	1.1	16.7	82.2				

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

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

Table N-4-11.
Interaction Table for Serum Glucagon (pg/ml) (All Participants)
(Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Family History of Diabetes: Tables 18-42 and N-3-28)

Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.L.)[b]	p-Value[c]
No	Comparison	709	61.22		
	Background RH	256	59.54	-1.68 --	0.135
	Low RH	175	59.89	-1.33 --	0.306
	High RH	162	63.93	2.71 --	0.052
	Low plus High RH	337	61.80	0.58 --	0.576
Yes	Comparison	235	62.06		
	Background RH	74	61.73	-0.33 --	0.875
	Low RH	48	61.64	-0.42 --	0.867
	High RH	56	56.74	-5.32 --	0.018
	Low plus High RH	104	58.96	-3.10 --	0.086

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Family History of Diabetes: Tables 18-42 and N-3-28)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
No	Low	204	57.70	0.0259 (0.0073)	<0.001
	Medium	201	57.91		
	High	188	62.88		
Yes	Low	54	58.49	-0.0165 (0.0125)	0.187
	Medium	61	60.20		
	High	63	58.25		

[a] Transformed from natural logarithm scale.

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

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

[d] Slope and standard error based on natural logarithm of serum glucagon versus log_2 dioxin.

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.

Table N-4-12.
Interaction Table for Serum Glucagon (pg/ml) (Diabetics)
(Continuous)
Occupation and Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Diabetic Severity: Tables 18-44 and N-3-30)					
Stratum	**Dioxin Category**	**n**	**Adjusted Mean[a]**	**Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]**	**p-Value[c]**
No Treatment/ Diet Only	Comparison	103	61.38		
	Background RH	30	66.17	4.79 --	0.251
	Low RH	35	64.29	2.91 --	0.450
	High RH	23	69.26	7.88 --	0.098
	Low plus High RH	58	66.22	4.84 --	0.140
Oral Hypo-glycemics/ Insulin Dependent	Comparison	29	84.41		
	Background RH	8	75.43	-8.98 --	0.381
	Low RH	10	70.12	-14.29 --	0.115
	High RH	15	57.52	-26.89 --	<0.001
	Low plus High RH	25	62.26	-22.15 --	<0.001

[a] Transformed from natural logarithm scale.

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table N-4-13.
Interaction Table for Serum Proinsulin (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Diabetic Severity: Tables 18-56 and N-3-40)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
No Treatment	Low	14	7.1	1.60 (1.03,2.50)	0.037
	Medium	28	10.7		
	High	24	50.0		
Diet Only	Low	3	66.7	0.74 (0.41,1.31)	0.298
	Medium	14	50.0		
	High	13	53.9		
Oral Hypoglycemic	Low	0	0.0	0.68 (0.35,1.31)	0.246
	Medium	4	75.0		
	High	13	76.9		
Insulin Dependent	Low	7	42.9	0.87 (0.58,1.32)	0.516
	Medium	4	75.0		
	High	6	33.3		

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

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

Table N-4-14.
Interaction Table for Serum C Peptide (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Age: Tables 18-58 and N-3-42)					
Stratum	Dioxin Category	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Born ≥ 1942	Comparison	34	58.8		
	Background RH	7	14.3	0.08 (0.01,0.92)	0.042
	Low RH	3	66.7	0.82 (0.06,11.83)	0.886
	High RH	19	68.4	3.77 (0.89,16.05)	0.073
	Low plus High RH	22	68.2	2.85 (0.76,10.70)	0.120
Born < 1942	Comparison	109	65.1		
	Background RH	32	65.6	1.37 (0.44,4.27)	0.588
	Low RH	43	69.8	1.85 (0.71,4.78)	0.205
	High RH	26	42.3	0.40 (0.13,1.19)	0.099
	Low plus High RH	69	59.4	0.99 (0.46,2.14)	0.976

MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Diabetic Severity: Tables 18-58 and N-3-42)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
No Treatment or Diet Only	Low	15	73.3	0.79 (0.57,1.09)	0.154
	Medium	41	75.6		
	High	36	66.7		
Oral Hypoglycemic or Insulin Dependent	Low	7	0.0	1.38 (0.92,2.08)	0.122
	Medium	8	12.5		
	High	18	44.4		

Table N-4-14. (Continued)
Interaction Table for Serum C Peptide (Diabetics)
(Discrete)
Occupation and Body Fat Removed from Final Model

MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Diabetic Severity: Tables 18-58 and N-3-42)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal High	Adjusted Relative Risk (95% C.I.)[b]	p-Value
No Treatment or Diet Only	Low	15	73.3	0.82 (0.58,1.17)	0.269
	Medium	41	75.6		
	High	36	66.7		
Oral Hypoglycemic or Insulin Dependent	Low	7	0.0	1.42 (0.94,2.15)	0.098
	Medium	8	12.5		
	High	18	44.4		

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

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table N-4-15.
Interaction Table for Total Testosterone
(Discrete)
Body Fat Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Personality Type: Tables 18-60 and N-3-44)					
Stratum	Dioxin Category	n	Percent Abnormal Low	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Type A	Comparison	441	3.2		
	Background RH	168	4.2	1.61 (0.62,4.17)	0.326
	Low RH	113	6.2	1.76 (0.66,4.70)	0.263
	High RH	100	7.0	2.40 (0.91,6.31)	0.075
	Low plus High RH	213	6.6	2.04 (0.93,4.49)	0.075
Type B	Comparison	614	6.7		
	Background RH	196	1.5	0.29 (0.09,0.95)	0.042
	Low RH	142	2.8	0.32 (0.11,0.93)	0.036
	High RH	159	7.5	0.88 (0.43,1.80)	0.729
	Low plus High RH	301	5.3	0.61 (0.32,1.13)	0.116

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

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.