APPENDIX D

Statistical Methods

Table D-1.
Summary of Statistical Analysis Situations by Dependent Variable Form, Exposure Estimate, Analysis Cohort, and Analysis Type

Dependent Variable Form	Exposure Estimate	Analysis Cohort	Analysis Type	Statistical Method	Independent Variables
Continuous	Group (Ranch Hands vs. Comparisons)	All RH & C	Unadjusted	t-Test	Group
			Adjusted	Analysis of Covariance	Group; Covariates; Group x Covariates; Covariates x Covariates
			Longitudinal*	Analysis of Covariance	Group; Age in 1992; 1982 Measurement
	Log_2(Initial)	RH > 10 ppt lipid-adjusted current dioxin	Unadjusted	Linear Regression	Log_2(Initial)
			Adjusted	Linear Regression	Log_2(Initial); Covariates; Log_2(Initial) x Covariates; Covariates x Covariates
			Longitudinal*	Linear Regression	Log_2(Initial); Age in 1992; 1982 Measurement
	Categorized Dioxin	All RH with a current dioxin measurement, C ≤ 10 ppt lipid-adjusted current dioxin	Unadjusted	Analysis of Variance	DXCAT
			Adjusted	Analysis of Covariance	DXCAT; Covariates; DXCAT x Covariates; Covariates x Covariates
			Longitudinal*	Analysis of Covariance	DXCAT; Age in 1992; 1982 Measurement
	Log_2(Current + 1)	All RH with a current dioxin measurement	Unadjusted	Linear Regression	Log_2(Current + 1)
			Adjusted	Linear Regression	Log_2(Current + 1); Covariates; Log_2(Current + 1) x Covariates; Covariates x Covariates
Discrete	Group (Ranch Hands vs. Comparisons)	All RH & C	Unadjusted	Chi-Square Contingency Table	Group
			Adjusted	Logistic Regression	Group; Covariates; Group x Covariates; Covariates x Covariates

Table D-1. (Continued)
Summary of Statistical Analysis Situations by Dependent Variable Form, Exposure Estimate, Analysis Cohort, and Analysis Type

Dependent Variable Form	Exposure Estimate	Analysis Cohort	Analysis Type	Statistical Method	Independent Variables
Discrete (Continued)			Longitudinal**	Logistic Regression	Group; Age in 1992
	Log_2(Initial)	RH > 10 ppt lipid-adjusted current-dioxin	Unadjusted	Logistic Regression	Log_2(Initial)
			Adjusted	Logistic Regression	Log_2(Initial); Covariates; Log_2(Initial) x Covariates; Covariates x Covariates
			Longitudinal**	Logistic Regression	Log_2(Initial); Age in 1992
	Categorized Dioxin	All RH with a current dioxin measurement, C ≤ 10 ppt lipid-adjusted current dioxin	Unadjusted	Logistic Regression	DXCAT
			Adjusted	Logistic Regression	DXCAT; Covariates; DXCAT x Covariates; Covariates x Covariates
			Longitudinal**	Logistic Regression	DXCAT; Age in 1992
	Log_2(Current + 1)	All RH with a current dioxin measurement	Unadjusted	Logistic Regression	Log_2(Current + 1)
			Adjusted	Logistic Regression	Log_2(Current + 1); Covariates; Log_2(Current + 1) x Covariates; Covariates x Covariates

* Dependent variable usually paired difference score of (1992 to 1982) dependent variable values. For some clinical areas, paired difference scores will be (1992 to 1985) differences.

** Analysis performed subject to the constraint that participant was normal at the 1982 Baseline (or 1985) examination.

Note: Log_2(Initial) = Logarithm (base 2) of estimated initial dioxin level.
Log_2(Current + 1) = Logarithm (base 2) of (current dioxin level + 1).
DXCAT = Categorized dioxin (incorporating group membership — three categories for Ranch Hands, one category for Comparisons).
RH = Ranch Hand.
C = Comparison.
Analyses using log_2(initial) and categorized dioxin exposure estimates adjusted for percent body fat at the time of duty in SEA and change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin.

Table D-2.
Approximate Power to Detect an Initial Dioxin Effect at a 5 Percent Level of Significance (Discrete Dependent Variable)

Prevalence of Condition	Relative Risk						
	1.10	1.20	1.30	1.40	1.50	1.75	2.00
0.005	0.06	0.07	0.10	0.14	0.19	0.37	0.59
0.01	0.06	0.09	0.15	0.22	0.32	0.62	0.85
0.02	0.07	0.13	0.24	0.39	0.55	0.87	0.98
0.03	0.08	0.18	0.33	0.52	0.71	0.95	1.00
0.04	0.09	0.22	0.41	0.63	0.81	0.98	1.00
0.05	0.10	0.25	0.49	0.72	0.88	1.00	1.00
0.10	0.15	0.42	0.73	0.92	0.98	1.00	1.00
0.15	0.19	0.54	0.85	0.97	1.00	1.00	1.00
0.20	0.22	0.63	0.91	0.99	1.00	1.00	1.00

Table D-3.
Approximate Power to Detect an Categorized Dioxin Effect (Low plus High Ranch Hands versus Comparisons) at a 5 Percent Level of Significance (Discrete Dependent Variable)

Prevalence of Condition	Relative Risk						
	1.10	1.20	1.30	1.40	1.50	1.75	2.00
0.005	0.05	0.06	0.06	0.08	0.09	0.13	0.17
0.01	0.05	0.06	0.08	0.10	0.13	0.20	0.29
0.02	0.06	0.08	0.11	0.15	0.20	0.35	0.51
0.03	0.06	0.09	0.14	0.20	0.28	0.48	0.67
0.04	0.06	0.11	0.17	0.25	0.35	0.59	0.79
0.05	0.07	0.12	0.20	0.30	0.41	0.69	0.86
0.10	0.08	0.18	0.33	0.50	0.66	0.92	0.99
0.15	0.10	0.24	0.44	0.64	0.80	0.98	1.00
0.20	0.11	0.28	0.52	0.74	0.88	0.99	1.00

Table D-4.
Approximate Power to Detect a Lipid-Adjusted Current Dioxin Effect at a 5 Percent Level of Significance (Discrete Dependent Variable)

Prevalence of Condition	Relative Risk						
	1.10	1.20	1.30	1.40	1.50	1.75	2.00
0.005	0.06	0.09	0.15	0.23	0.33	0.64	0.88
0.01	0.07	0.14	0.25	0.40	0.57	0.90	0.99
0.02	0.09	0.22	0.43	0.66	0.84	0.99	1.00
0.03	0.11	0.31	0.58	0.82	0.94	1.00	1.00
0.04	0.13	0.38	0.70	0.90	0.98	1.00	1.00
0.05	0.15	0.45	0.78	0.95	0.99	1.00	1.00
0.10	0.25	0.71	0.96	1.00	1.00	1.00	1.00
0.15	0.33	0.84	0.99	1.00	1.00	1.00	1.00
0.20	0.39	0.90	1.00	1.00	1.00	1.00	1.00

Table D-5.
Approximate Power to Detect a Whole-Weight Current Dioxin Effect at a 5 Percent Level of Significance (Discrete Dependent Variable)

Prevalence of Condition	Relative Risk						
	1.10	1.20	1.30	1.40	1.50	1.75	2.00
0.005	0.06	0.10	0.17	0.27	0.40	0.74	0.94
0.01	0.08	0.16	0.30	0.48	0.66	0.95	1.00
0.02	0.11	0.27	0.51	0.75	0.91	1.00	1.00
0.03	0.13	0.37	0.67	0.89	0.98	1.00	1.00
0.04	0.16	0.46	0.79	0.95	0.99	1.00	1.00
0.05	0.19	0.54	0.86	0.98	1.00	1.00	1.00
0.10	0.31	0.80	0.98	1.00	1.00	1.00	1.00
0.15	0.41	0.91	1.00	1.00	1.00	1.00	1.00
0.20	0.49	0.96	1.00	1.00	1.00	1.00	1.00

Table D-6.
Approximate Power to Detect an Initial Dioxin Effect at a 5 Percent Level of Significance (Continuous Dependent Variable)

	Coefficient of Variation ($100\sigma/\mu$)				
Mean Change	**5**	**10**	**25**	**50**	**75**
0.005	0.99	0.59	0.14	0.07	0.06
0.01	1.00	0.99	0.41	0.14	0.09
0.02	1.00	1.00	0.94	0.41	0.21
0.03	1.00	1.00	1.00	0.74	0.41
0.04	1.00	1.00	1.00	0.94	0.64
0.05	1.00	1.00	1.00	0.99	0.83
0.10	1.00	1.00	1.00	1.00	1.00

Table D-7.
Approximate Power to Detect an Categorized Dioxin Effect (Low plus High Ranch Hands versus Comparisons) at a 5 Percent Level of Significance (Continuous Dependent Variable)

	Coefficient of Variation ($100\sigma/\mu$)				
Mean Change	**5**	**10**	**25**	**50**	**75**
0.005	0.46	0.15	0.07	0.05	0.05
0.01	0.96	0.46	0.12	0.07	0.06
0.02	1.00	0.96	0.32	0.12	0.08
0.03	1.00	1.00	0.61	0.20	0.12
0.04	1.00	1.00	0.85	0.32	0.17
0.05	1.00	1.00	0.96	0.46	0.24
0.10	1.00	1.00	1.00	0.96	0.70

Table D-8.
Approximate Power to Detect a Lipid-Adjusted Current Dioxin Effect at a 5 Percent Level of Significance (Continuous Dependent Variable)

	Coefficient of Variation ($100\sigma/\mu$)				
Mean Change	5	10	25	50	75
0.005	0.86	0.33	0.09	0.06	0.05
0.01	1.00	0.86	0.23	0.09	0.07
0.02	1.00	1.00	0.68	0.23	0.13
0.03	1.00	1.00	0.95	0.44	0.23
0.04	1.00	1.00	1.00	0.68	0.37
0.05	1.00	1.00	1.00	0.86	0.52
0.10	1.00	1.00	1.00	1.00	0.98

Table D-9.
Approximate Power to Detect a Whole-Weight Current Dioxin Effect at a 5 Percent Level of Significance (Continuous Dependent Variable)

	Coefficient of Variation ($100\sigma/\mu$)				
Mean Change	5	10	25	50	75
0.005	1.00	0.72	0.17	0.08	0.06
0.01	1.00	1.00	0.53	0.17	0.10
0.02	1.00	1.00	0.98	0.53	0.27
0.03	1.00	1.00	1.00	0.86	0.53
0.04	1.00	1.00	1.00	0.98	0.77
0.05	1.00	1.00	1.00	1.00	0.92
0.10	1.00	1.00	1.00	1.00	1.00