

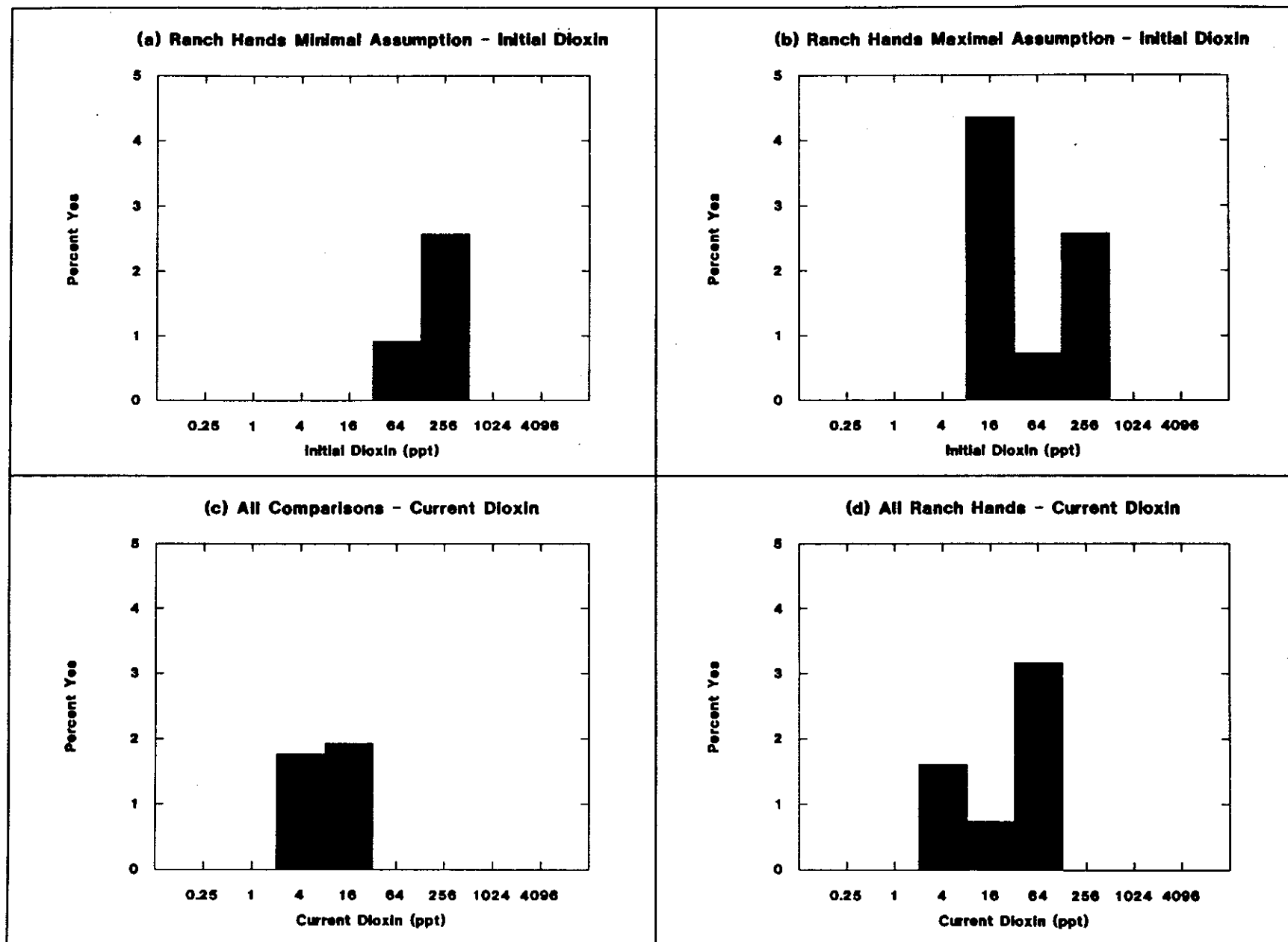
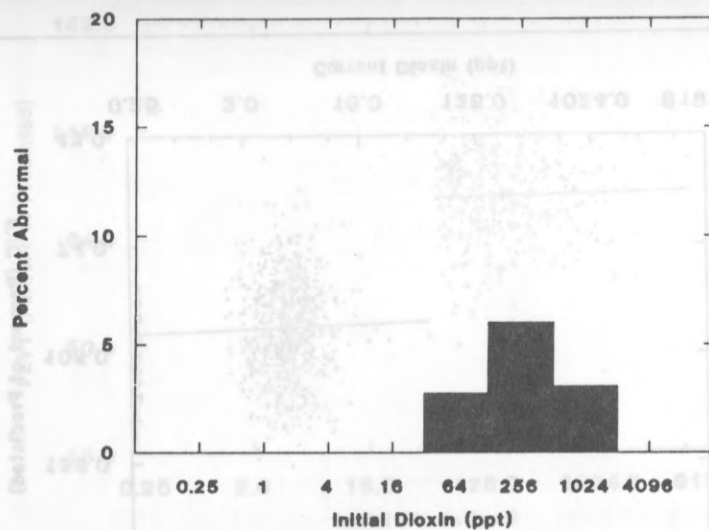
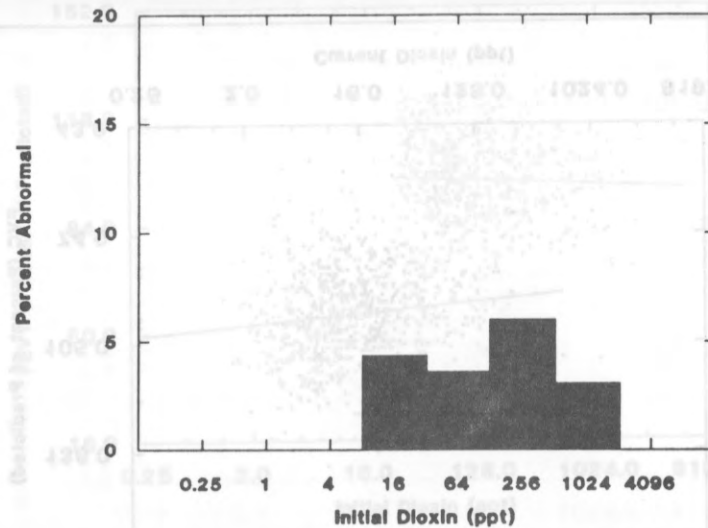


FIGURE P-1-10. Rales versus Dioxin

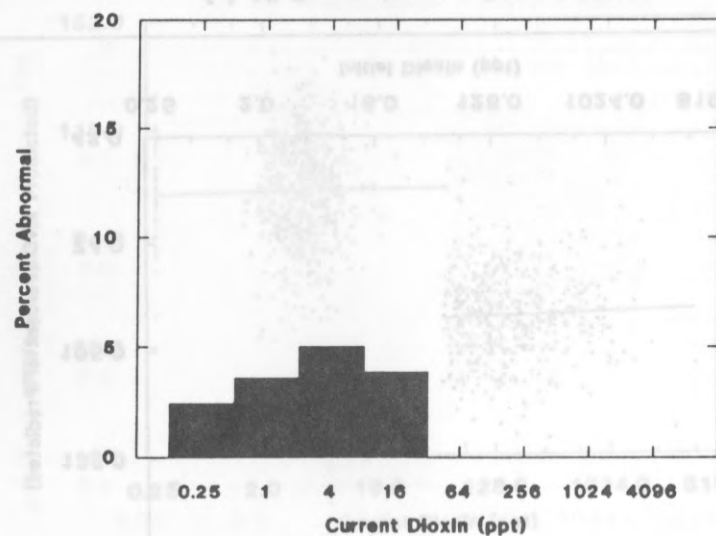
(a) Ranch Hands Minimal Assumption - Initial Dioxin



(b) Ranch Hands Maximal Assumption - Initial Dioxin



(c) All Comparisons - Current Dioxin



(d) All Ranch Hands - Current Dioxin

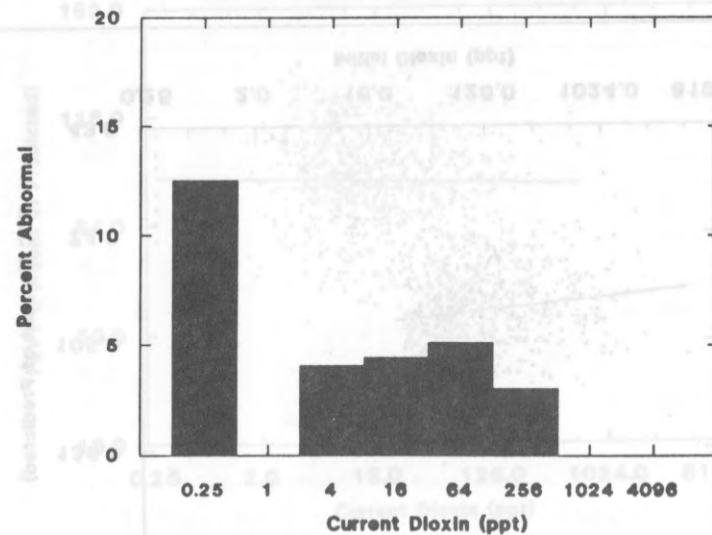


FIGURE P-1-11. X-Ray Interpretation versus Dioxin

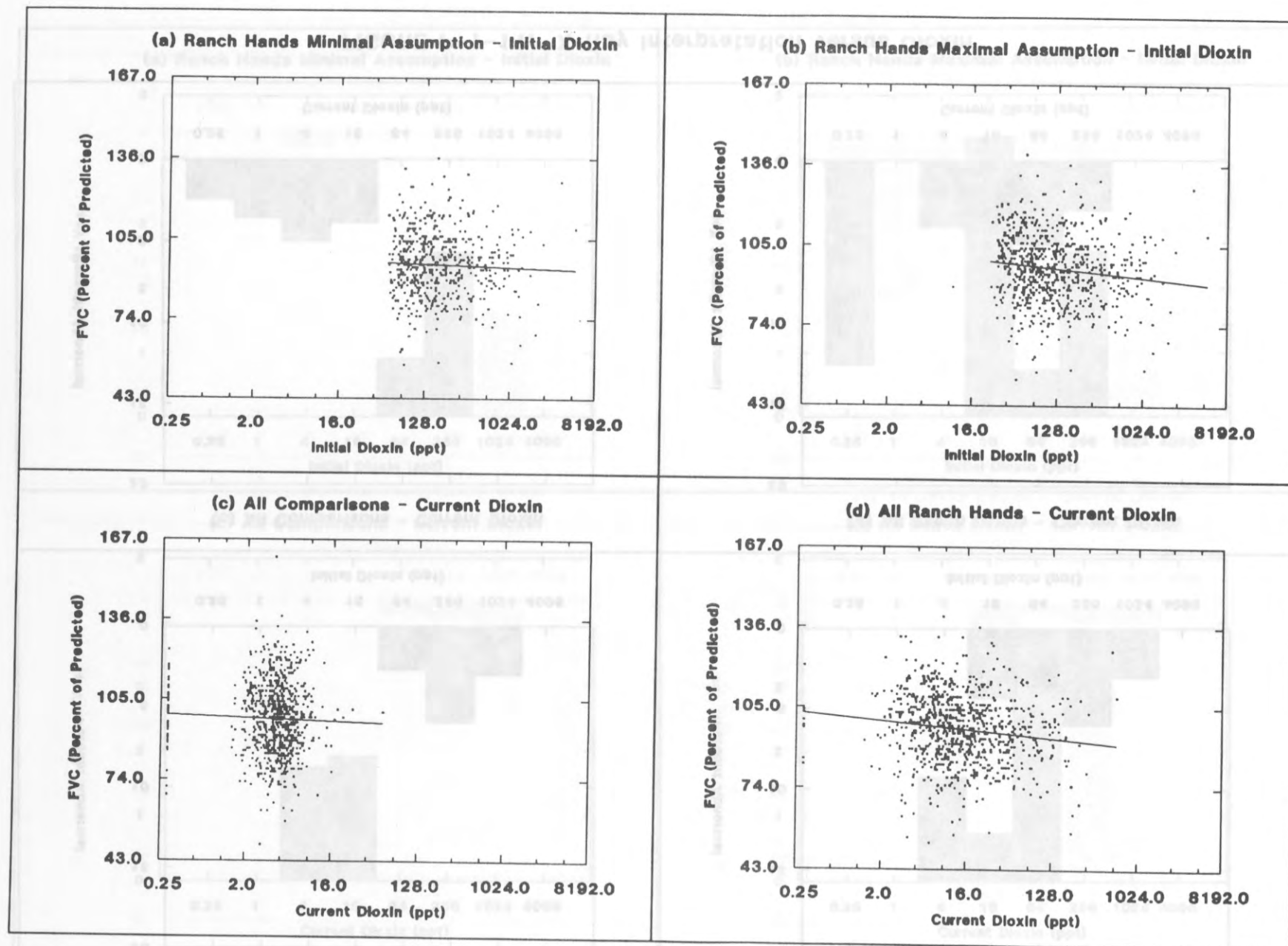


FIGURE P-1-12. FVC versus Dioxin

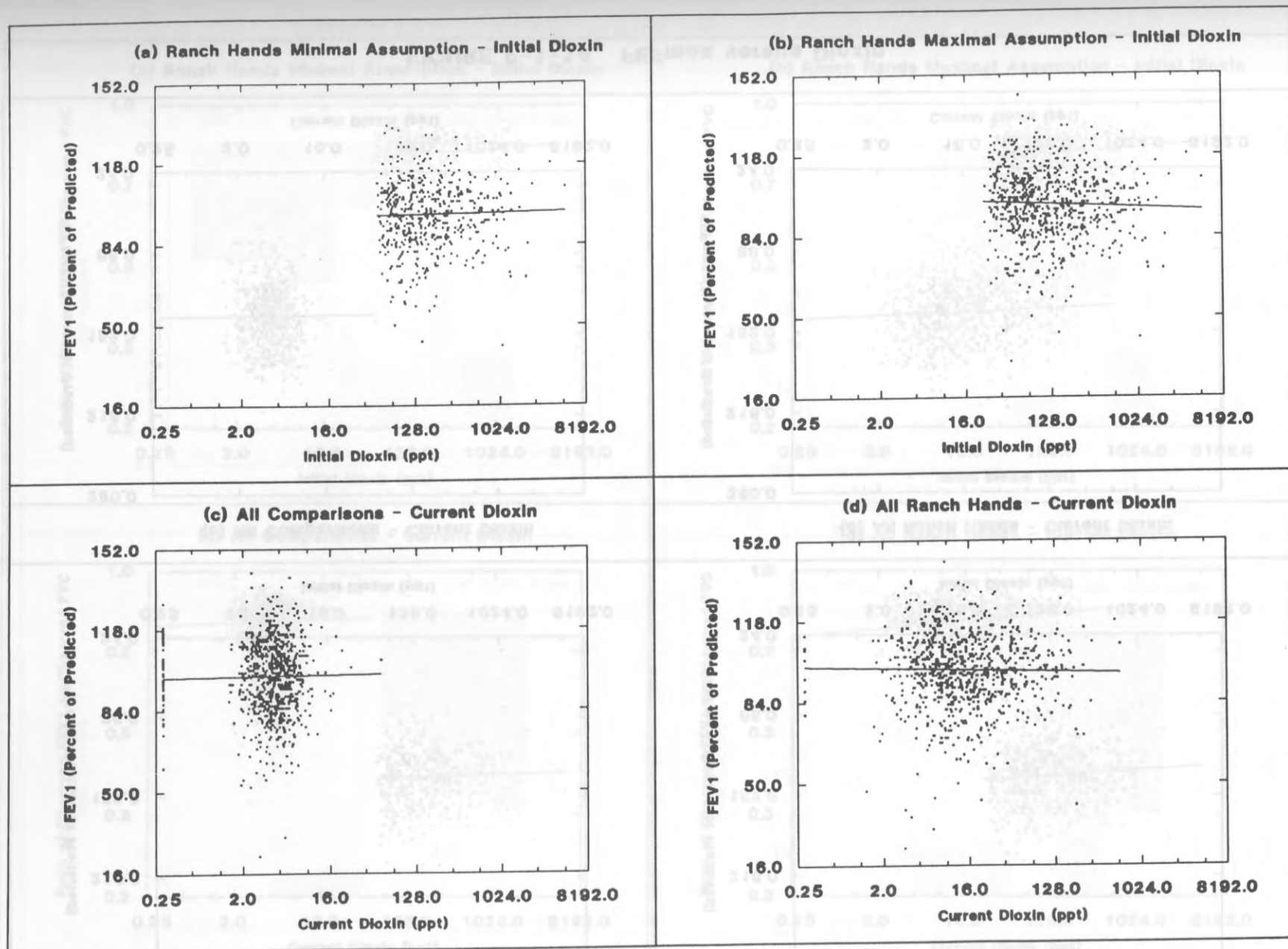


FIGURE P-1-13. FEV1 versus Dioxin

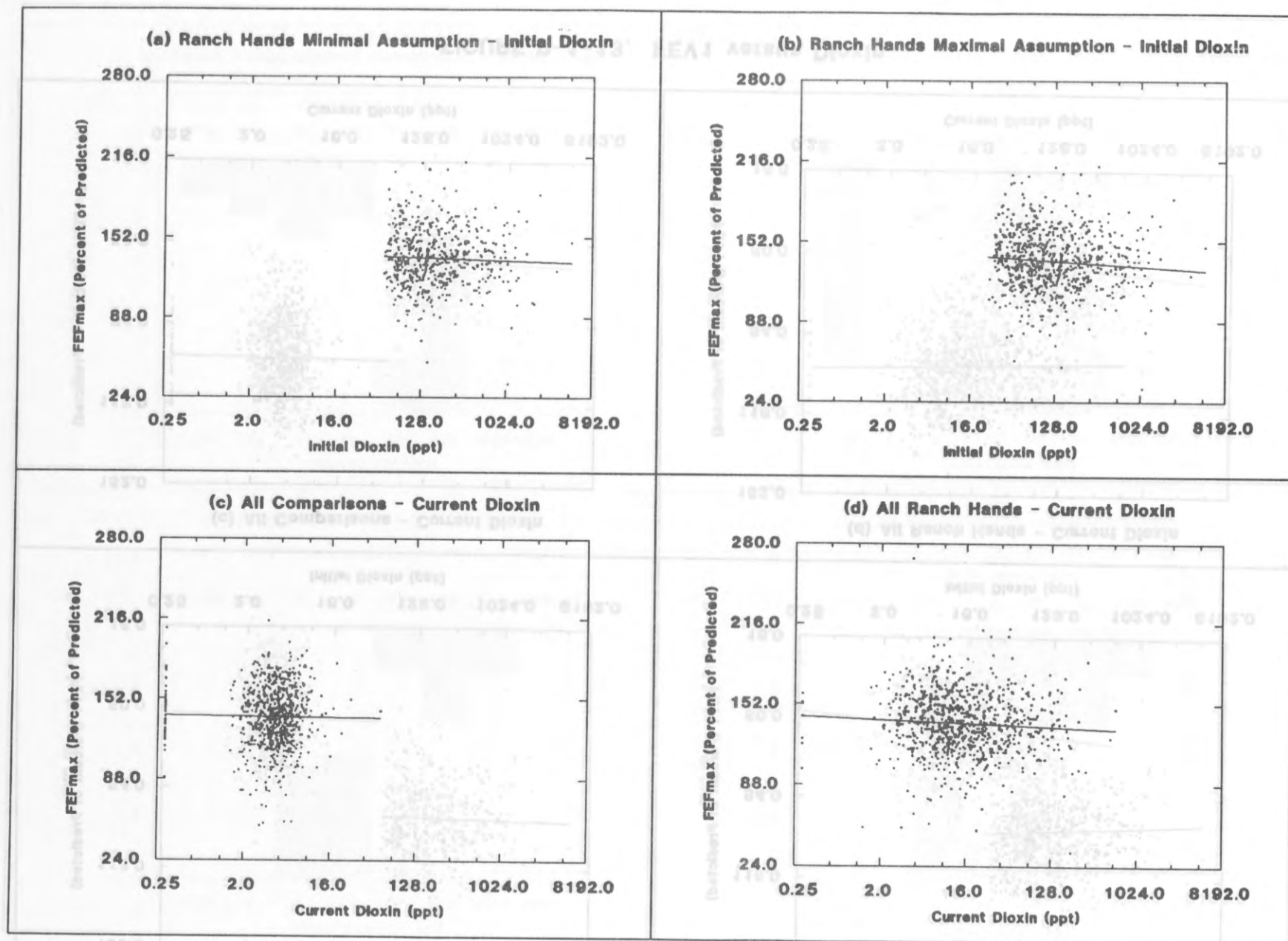


FIGURE P-1-14. FEFmax versus Dioxin

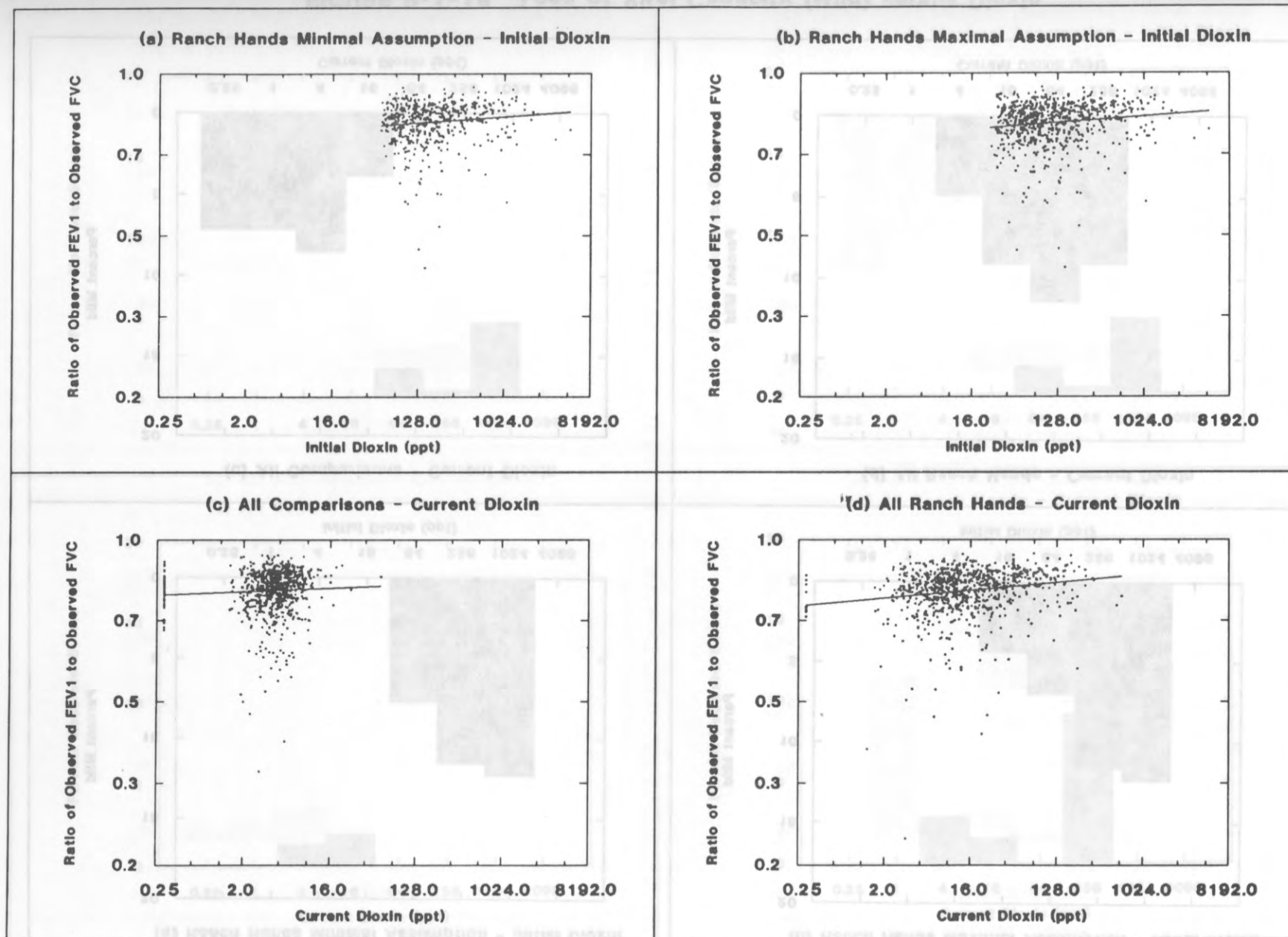


FIGURE P-1-15. Ratio of Observed FEV1 to Observed FVC versus Dioxin

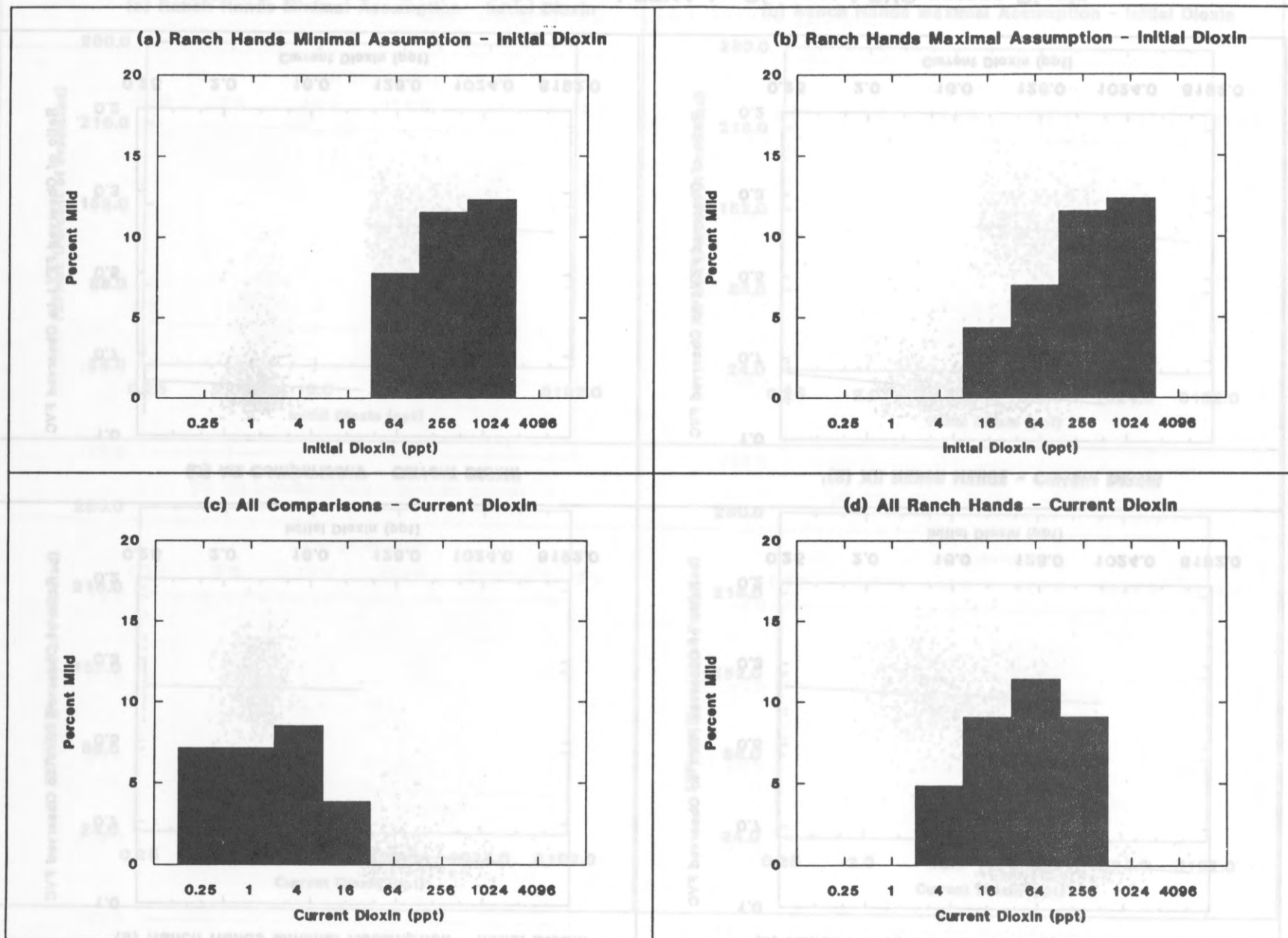


FIGURE P-1-16. Loss of Vital Capacity (Mild) versus Dioxin

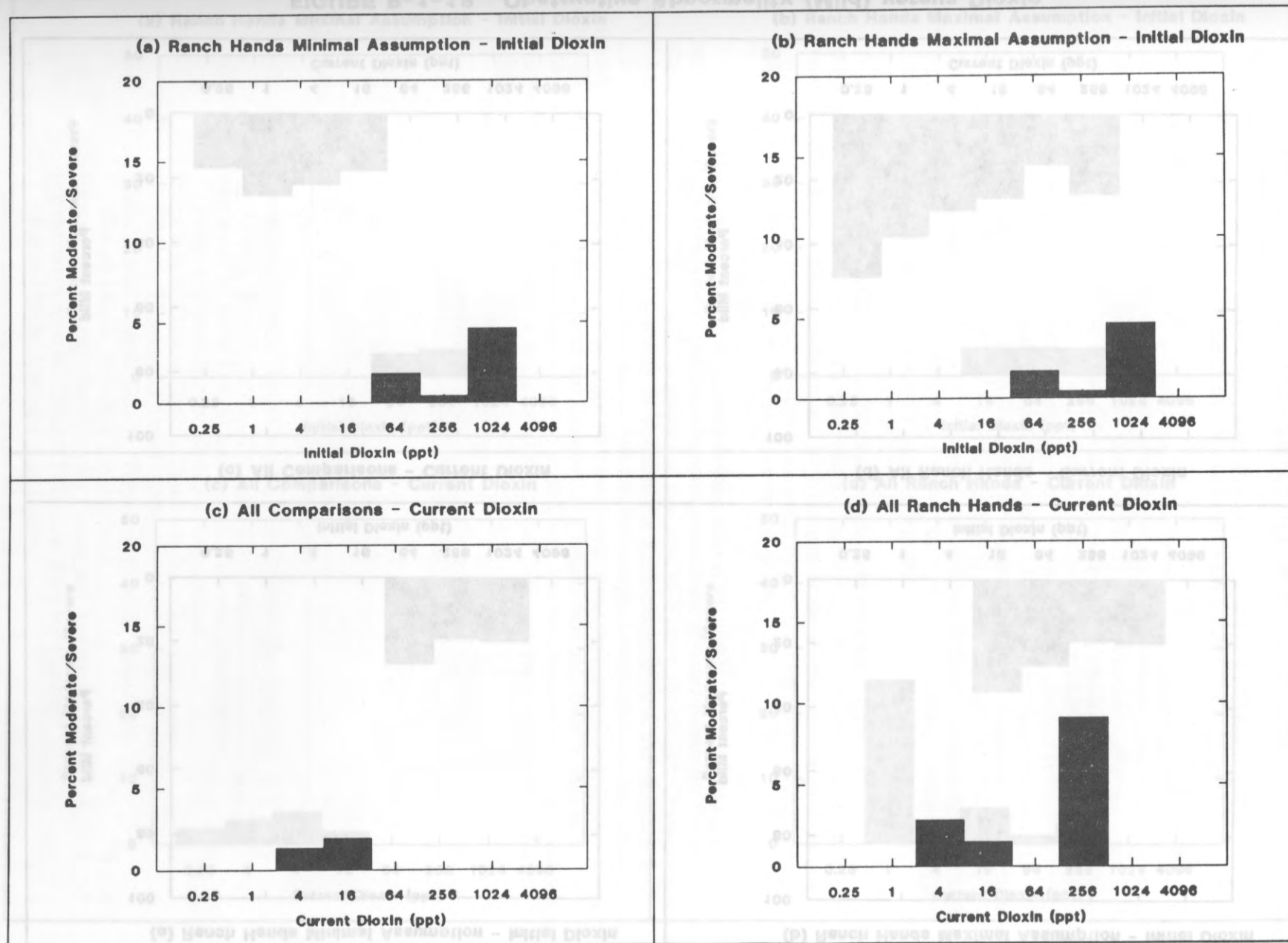


FIGURE P-1-17. Loss of Vital Capacity (Moderate/Severe) versus Dioxin

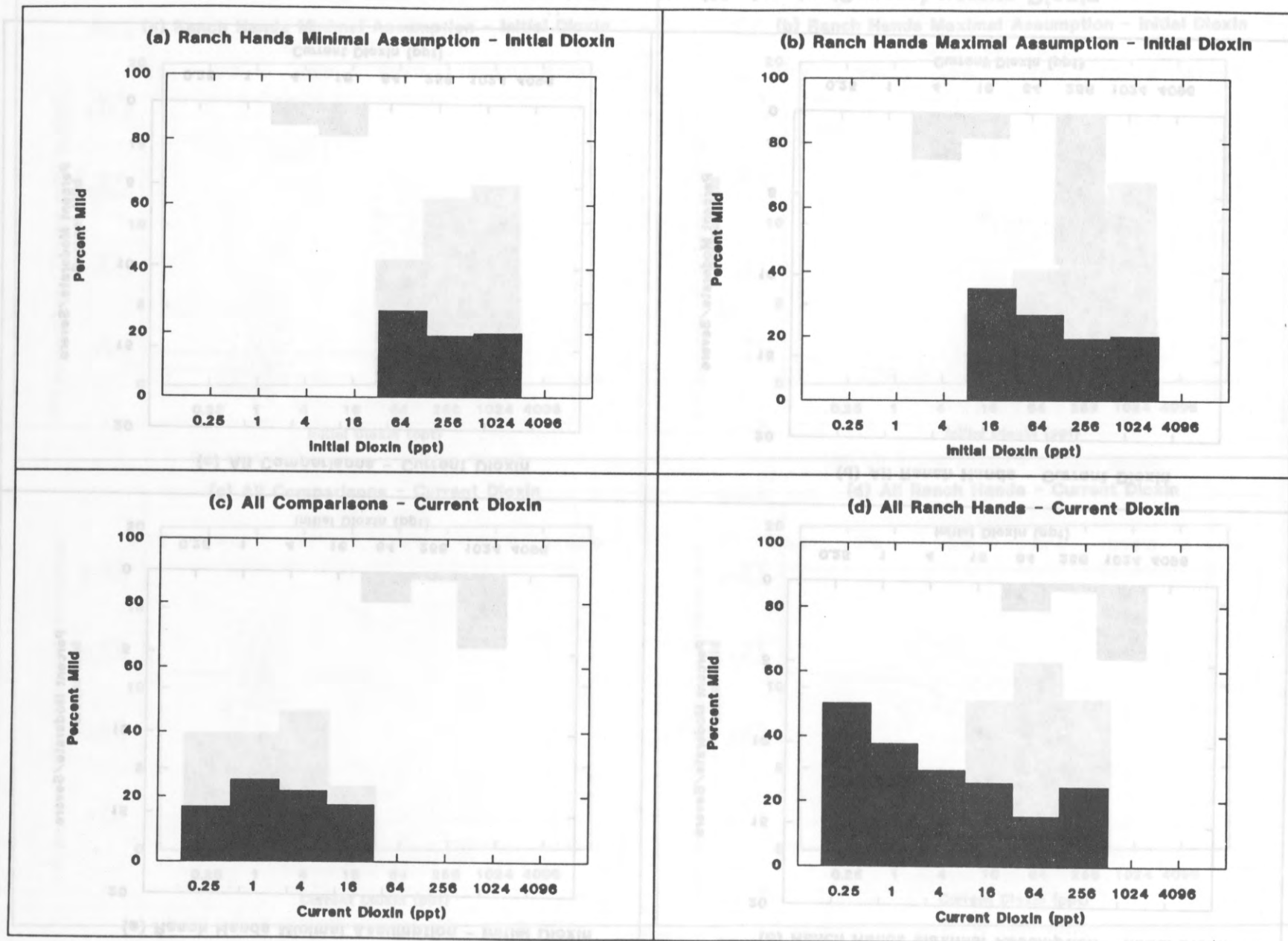


FIGURE P-1-18. Obstructive Abnormality (Mild) versus Dioxin

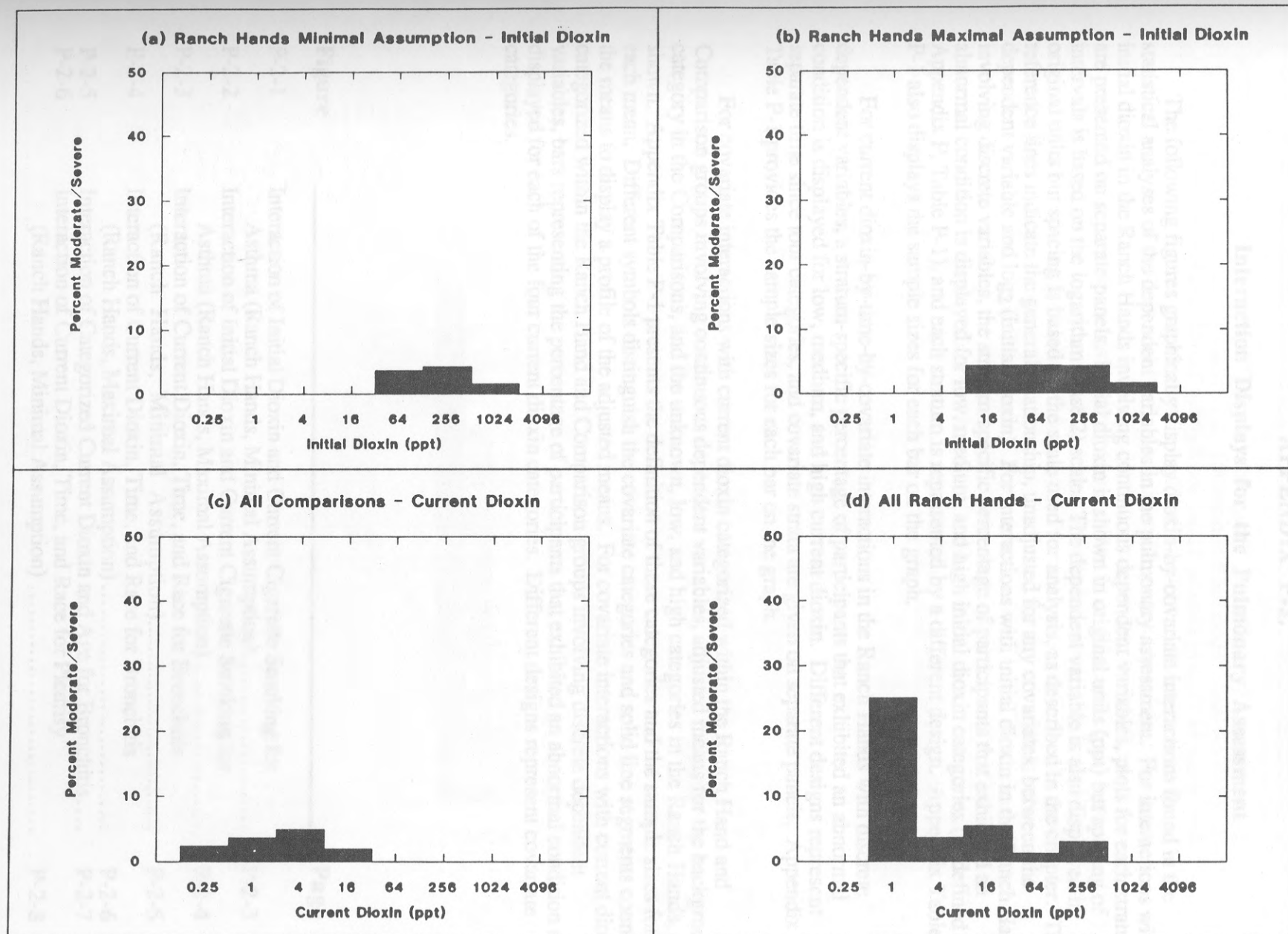


FIGURE P-1-19. Obstructive Abnormality (Moderate/Severe) versus Dioxin

APPENDIX P-2.

Interaction Displays for the Pulmonary Assessment

The following figures graphically display dioxin-by-covariate interactions found in the statistical analyses of the dependent variables in the pulmonary assessment. For interactions with initial dioxin in the Ranch Hands involving continuous dependent variables, plots for each stratum are presented on separate panels. Initial dioxin is shown in original units (ppt) but spacing of intervals is based on the logarithm (base 2) scale. The dependent variable is also displayed in original units but spacing is based on the scale used for analysis, as described in the chapter. The reference lines indicate the general relationship, unadjusted for any covariates, between the dependent variable and $\log_2$ (initial dioxin). For interactions with initial dioxin in the Ranch Hands involving discrete variables, the stratum-specific percentage of participants that exhibited an abnormal condition is displayed for low, medium, and high initial dioxin categories (as defined in Appendix P, Table P-1), and each stratum is represented by a different design. Appendix Table P-1 also displays the sample sizes for each bar on the graph.

For current dioxin-by-time-by-covariate interactions in the Ranch Hands with discrete dependent variables, a stratum-specific percentage of participants that exhibited an abnormal condition is displayed for low, medium, and high current dioxin. Different designs represent separate time since tour categories, and covariate strata are given on separate panels. Appendix Table P-1 provides the sample sizes for each bar on the graph.

For covariate interactions with current dioxin categorized within the Ranch Hand and Comparison groups involving continuous dependent variables, adjusted means for the background category in the Comparisons, and the unknown, low, and high categories in the Ranch Hands, are shown. Appendix Table P-1 presents the definition of these categories and the sample sizes for each mean. Different symbols distinguish the covariate categories and solid line segments connect the means to display a profile of the adjusted means. For covariate interactions with current dioxin categorized within the Ranch Hand and Comparison groups involving discrete dependent variables, bars representing the percentage of participants that exhibited an abnormal condition are displayed for each of the four current dioxin categories. Different designs represent covariate categories.

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P-2-1	Interaction of Initial Dioxin and Current Cigarette Smoking for Asthma (Ranch Hands, Minimal Assumption).....	P-2-3
P-2-2	Interaction of Initial Dioxin and Current Cigarette Smoking for Asthma (Ranch Hands, Maximal Assumption)	P-2-4
P-2-3	Interaction of Current Dioxin, Time, and Race for Bronchitis (Ranch Hands, Minimal Assumption).....	P-2-5
P-2-4	Interaction of Current Dioxin, Time, and Race for Bronchitis (Ranch Hands, Maximal Assumption)	P-2-6
P-2-5	Interaction of Categorized Current Dioxin and Age for Bronchitis....	P-2-7
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Figure		Page
P-2-7	Interaction of Current Dioxin, Time, and Race for Pleurisy (Ranch Hands, Maximal Assumption)	P-2-9
P-2-8	Interaction of Current Dioxin, Time, and Age for Thorax and Lung Abnormalities (Ranch Hands, Minimal Assumption)	P-2-10
P-2-9	Interaction of Current Dioxin, Time, and Age for Wheezes (Ranch Hands, Minimal Assumption)	P-2-11
P-2-10	Interaction of Initial Dioxin and Current Cigarette Smoking for FVC (Ranch Hands, Minimal Assumption)	P-2-12
P-2-11	Interaction of Categorized Current Dioxin and Current Cigarette Smoking for FVC	P-2-13
P-2-12	Interaction of Initial Dioxin and Current Cigarette Smoking for FEV ₁ (Ranch Hands, Minimal Assumption)	P-2-14
P-2-13	Interaction of Categorized Current Dioxin and Current Cigarette Smoking for FEV ₁	P-2-15

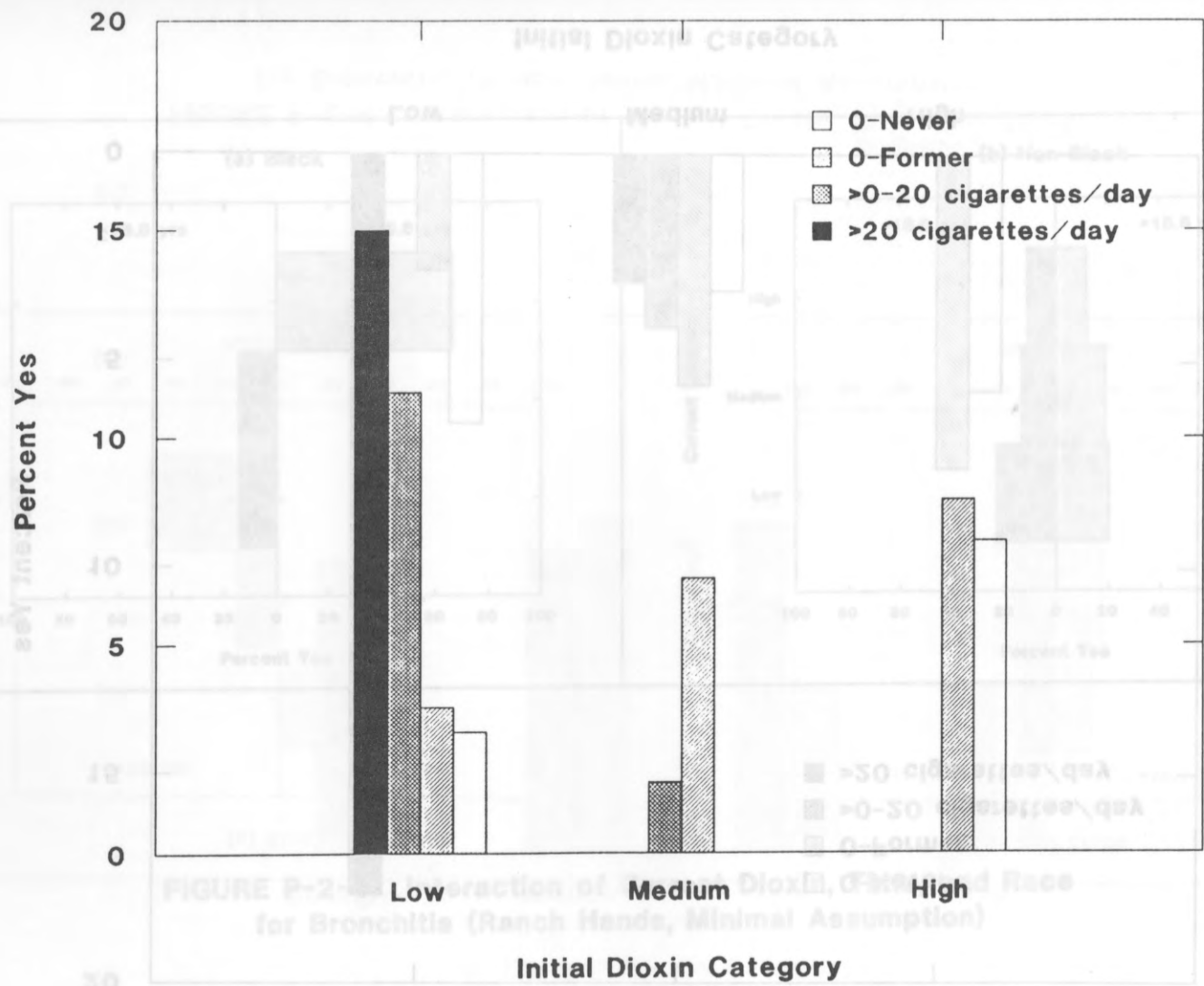


FIGURE P-2-1. Interaction of Initial Dioxin and Current Cigarette Smoking for Asthma (Ranch Hands, Minimal Assumption)

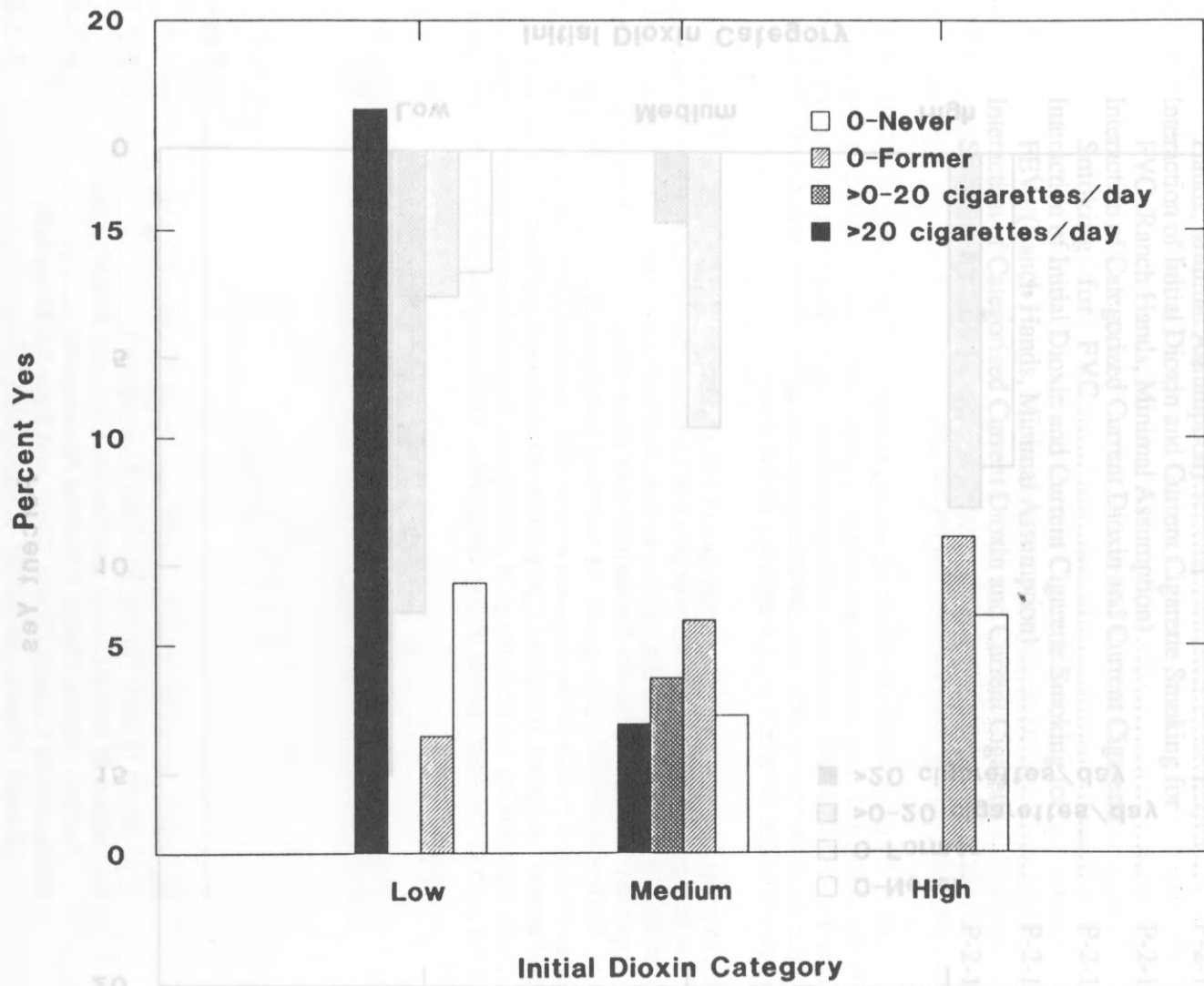


FIGURE P-2-2. Interaction of Initial Dioxin and Current Cigarette Smoking for Asthma (Ranch Hands, Maximal Assumption)

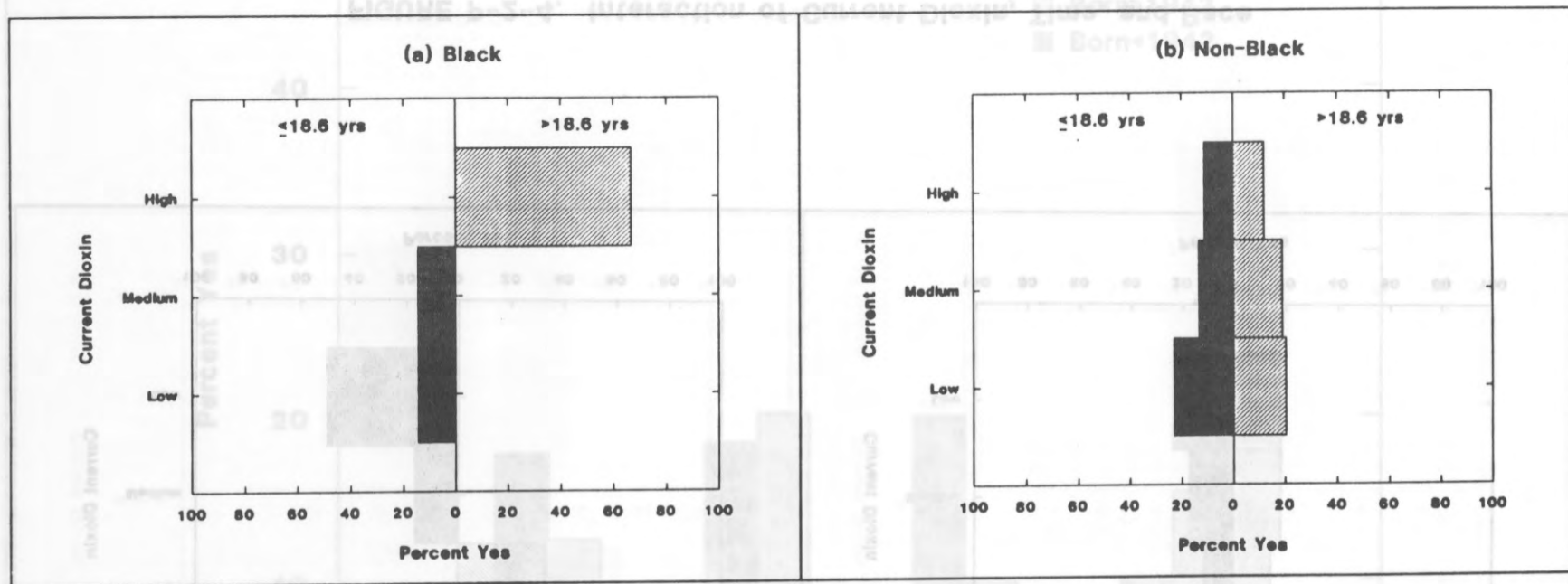


FIGURE P-2-3. Interaction of Current Dioxin, Time, and Race for Bronchitis (Ranch Hands, Minimal Assumption)

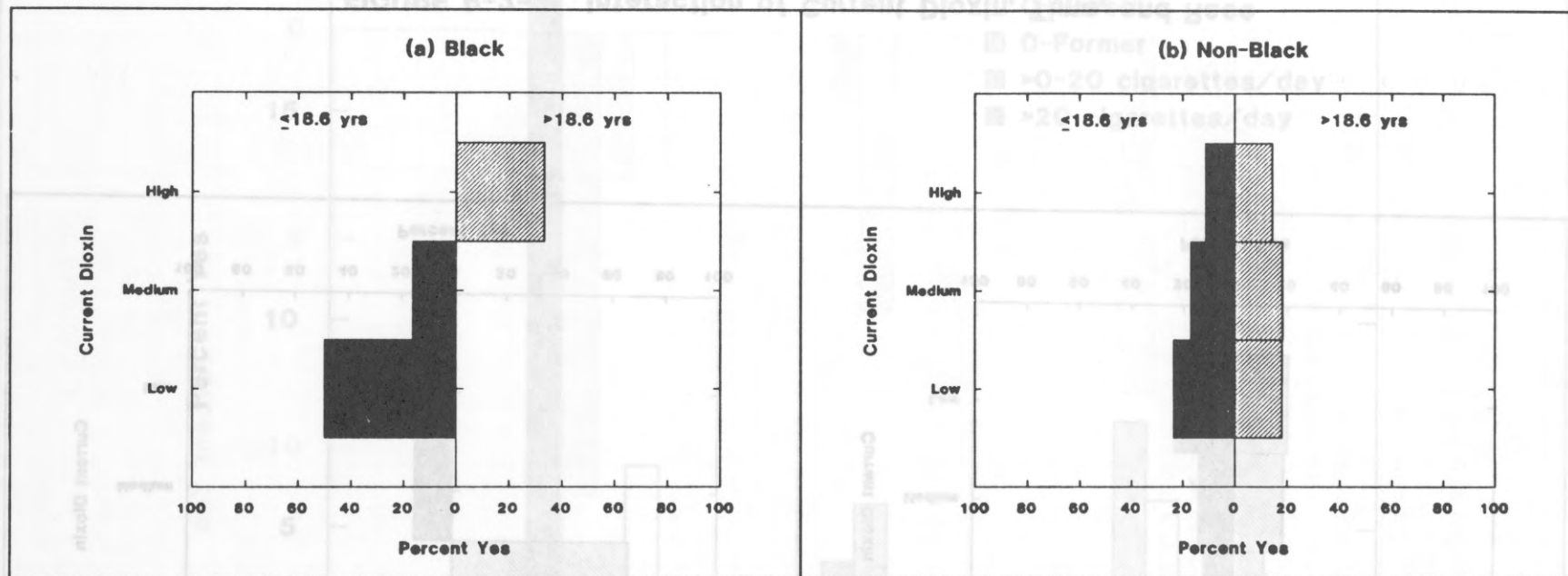


FIGURE P-2-4. Interaction of Current Dioxin, Time, and Race for Bronchitis (Ranch Hands, Maximal Assumption)

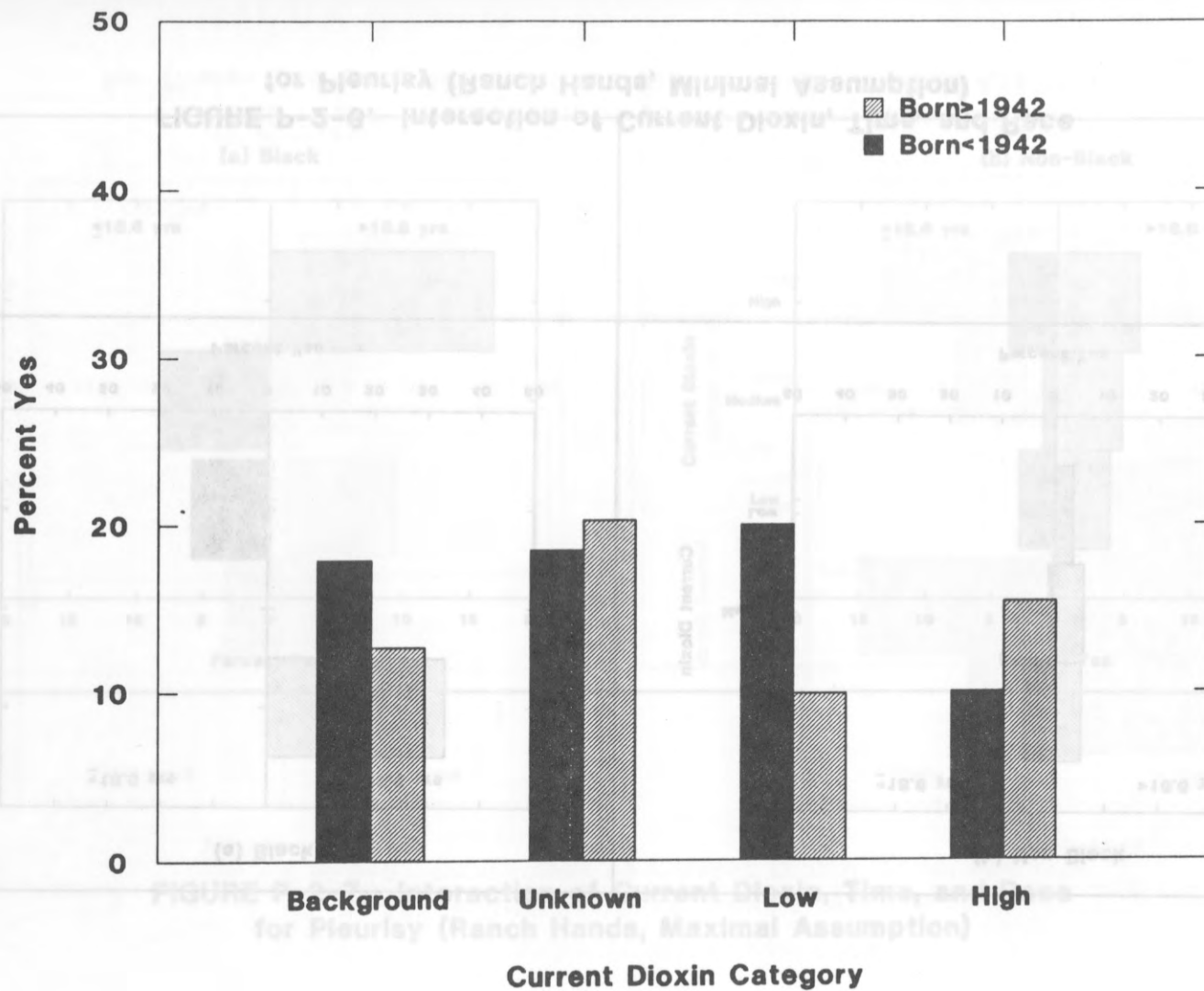


FIGURE P-2-5. Interaction of Categorized Current Dioxin and Age for Bronchitis

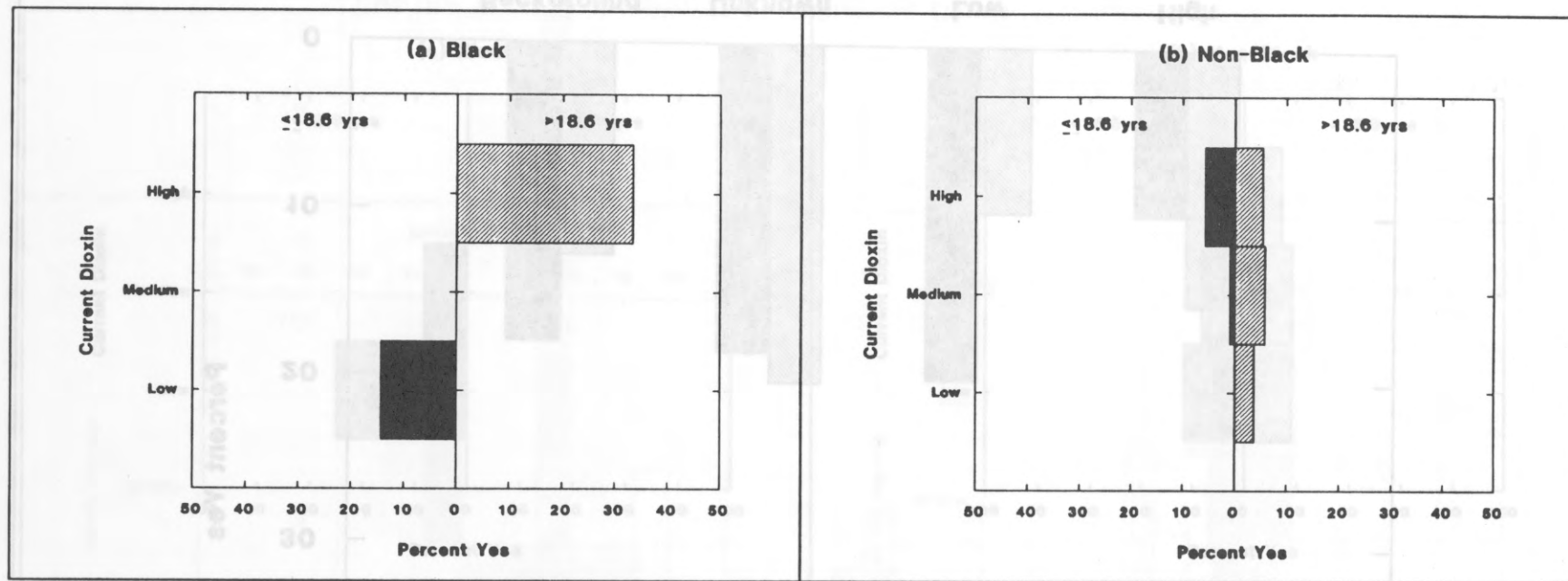


FIGURE P-2-6. Interaction of Current Dioxin, Time, and Race for Pleurisy (Ranch Hands, Minimal Assumption)

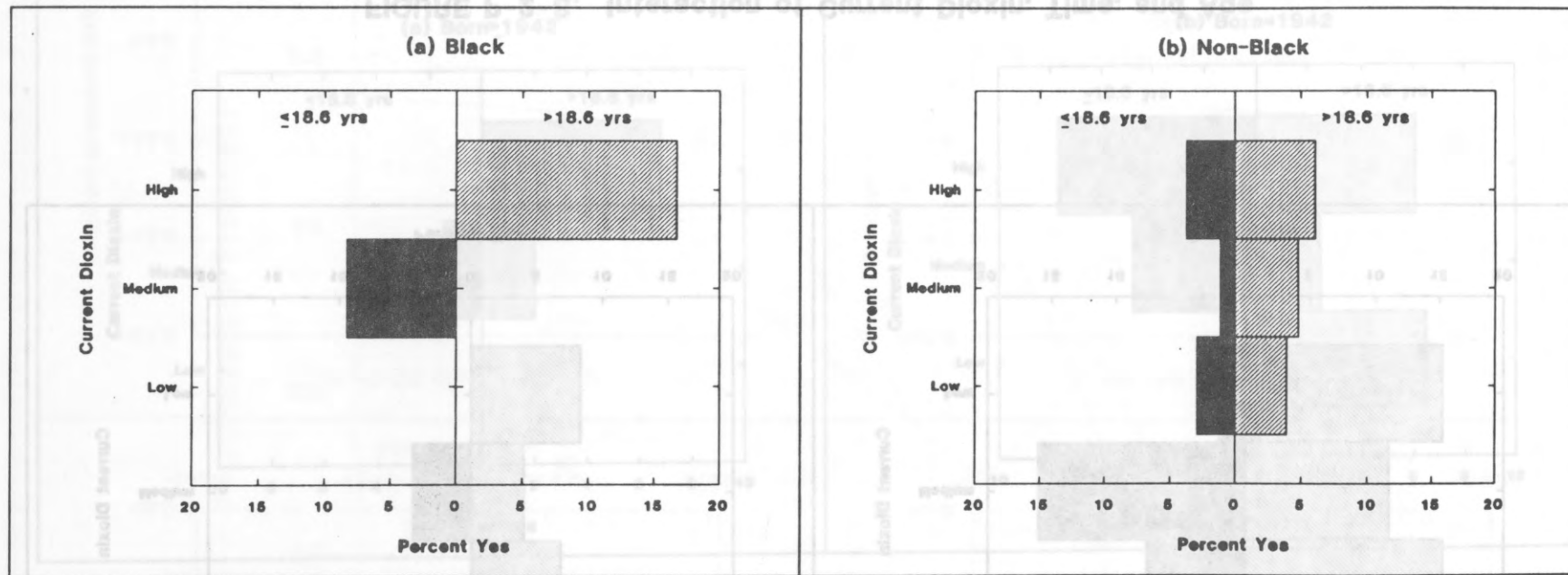


FIGURE P-2-7. Interaction of Current Dioxin, Time, and Race for Pleurisy (Ranch Hands, Maximal Assumption)

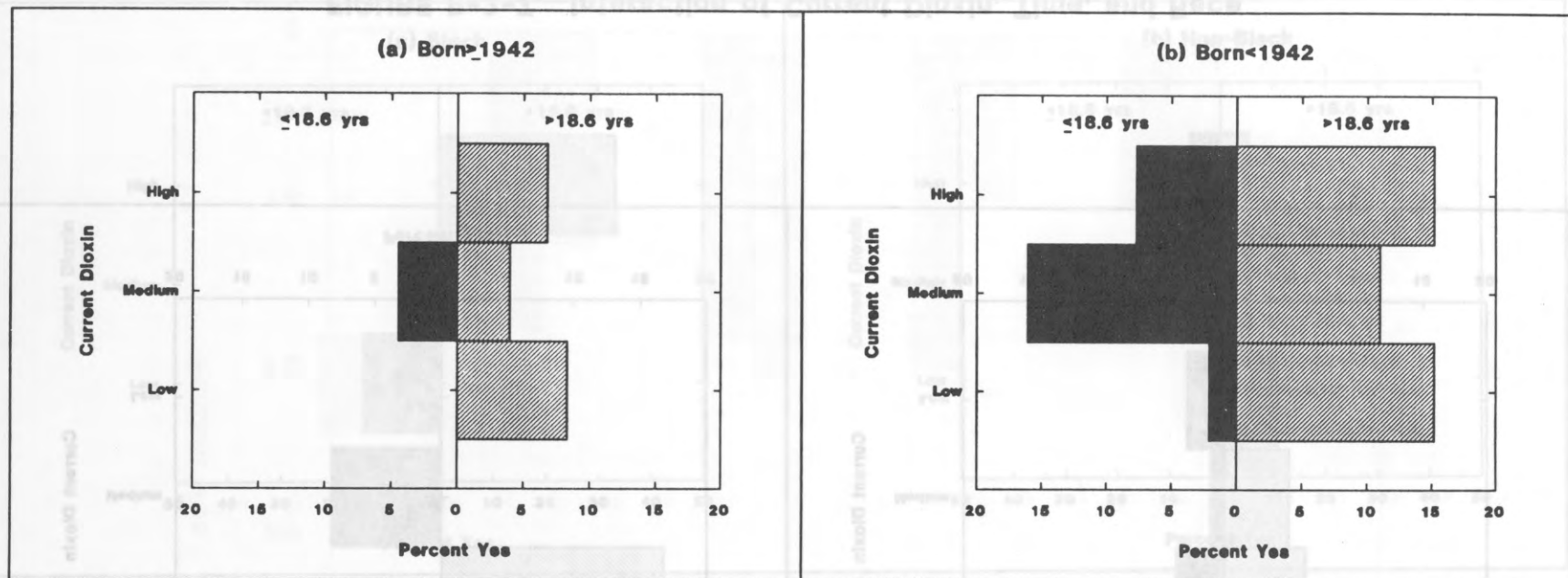


FIGURE P-2-8. Interaction of Current Dioxin, Time, and Age for Thorax and Lung Abnormalities (Ranch Hands, Minimal Assumption)

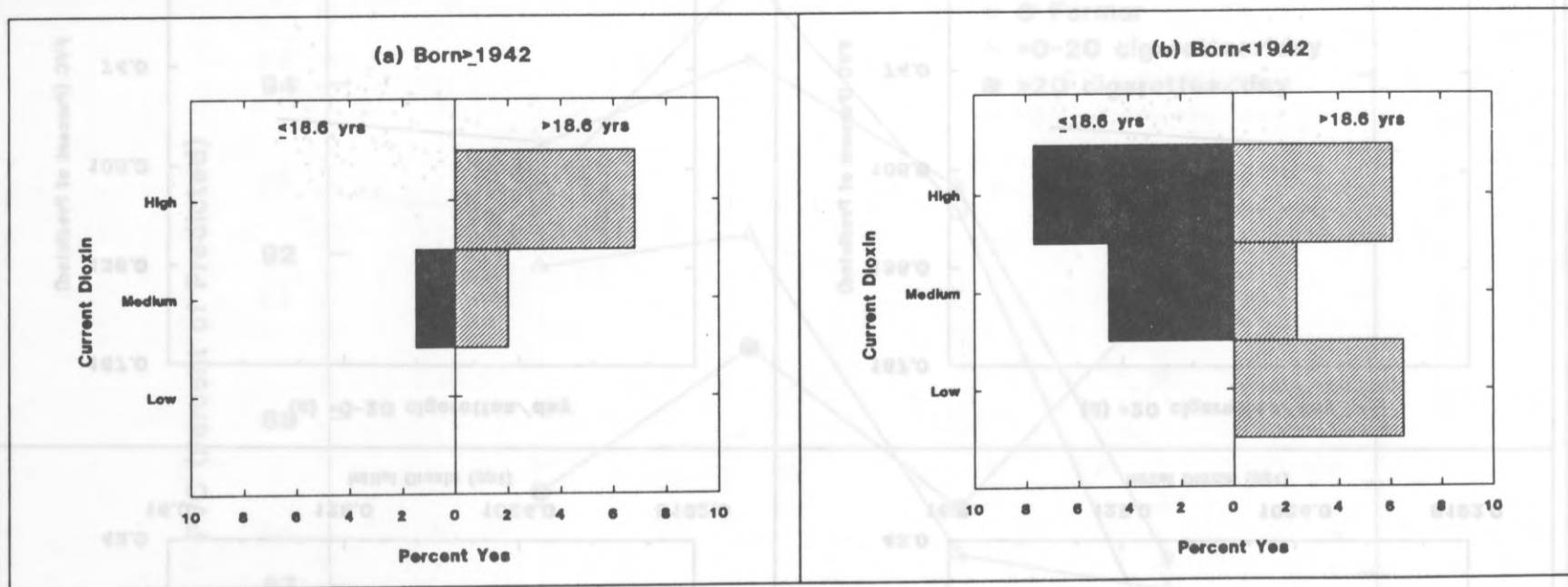


FIGURE P-2-9. Interaction of Current Dioxin, Time, and Age for Wheezes (Ranch Hands, Minimal Assumption)

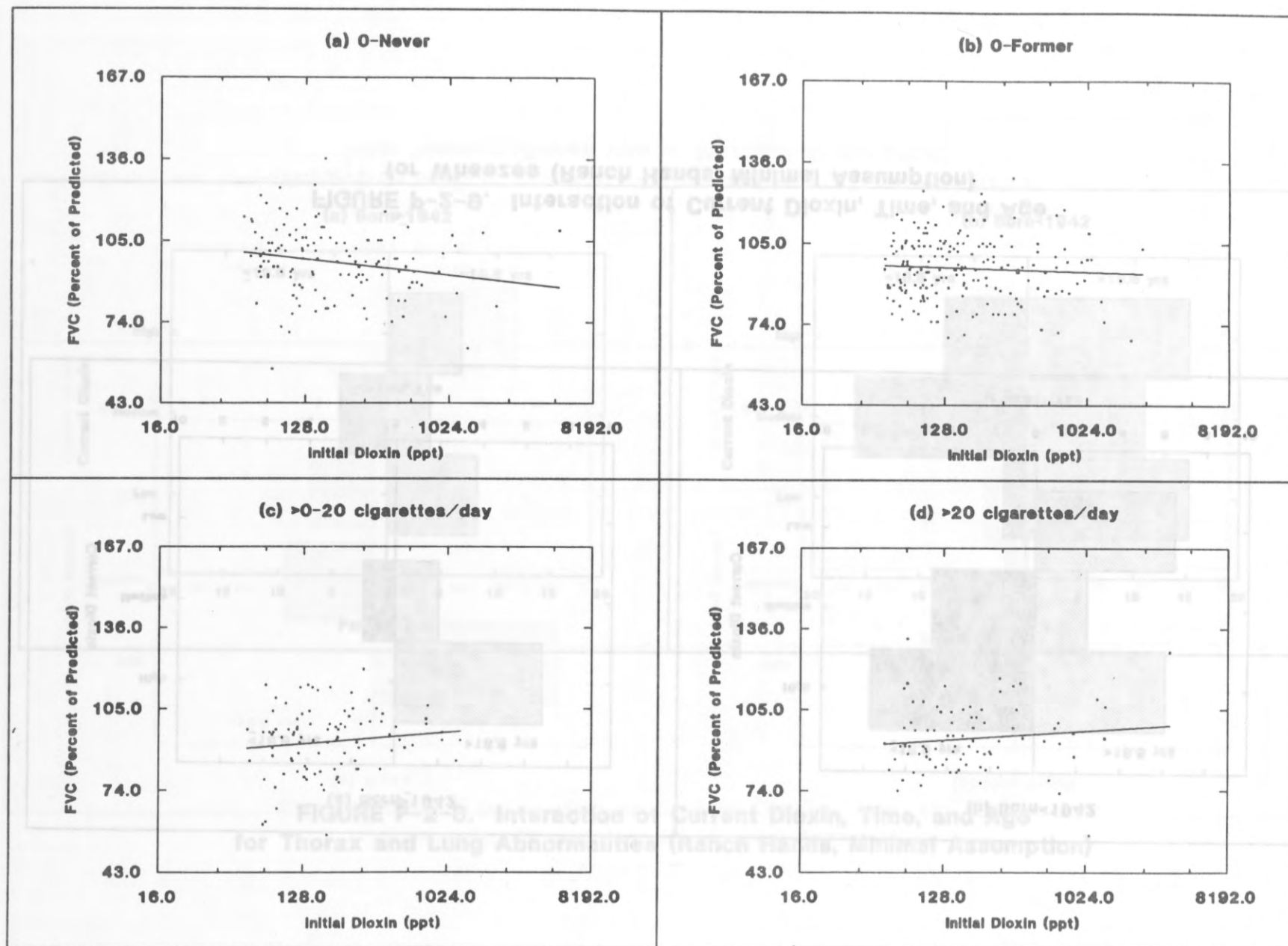


FIGURE P-2-10. Interaction of Initial Dioxin and Current Cigarette Smoking for FVC (Ranch Hands, Minimal Assumption)

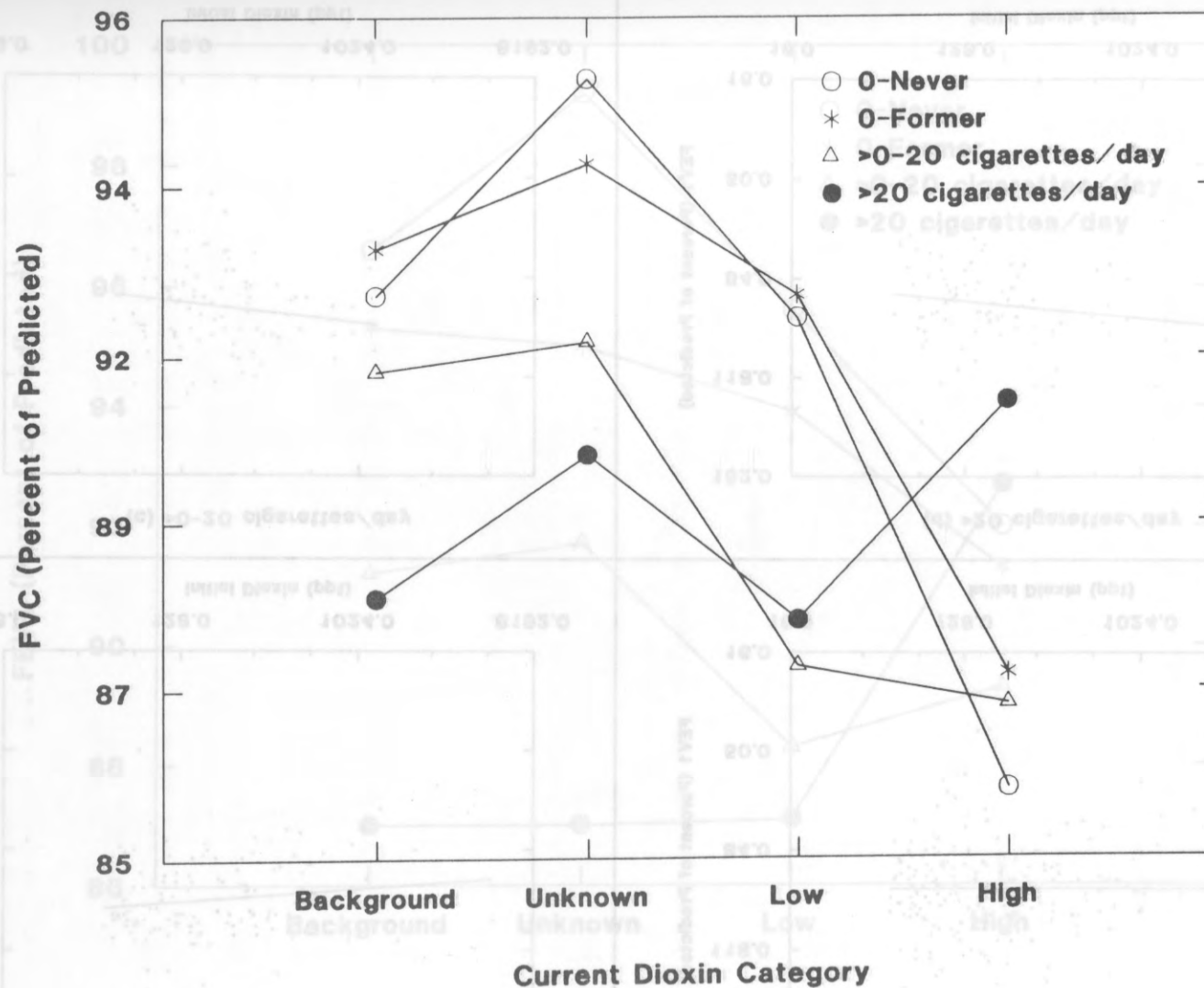


FIGURE P-2-11. Interaction of Categorized Current Dioxin and Current Cigarette Smoking for FVC

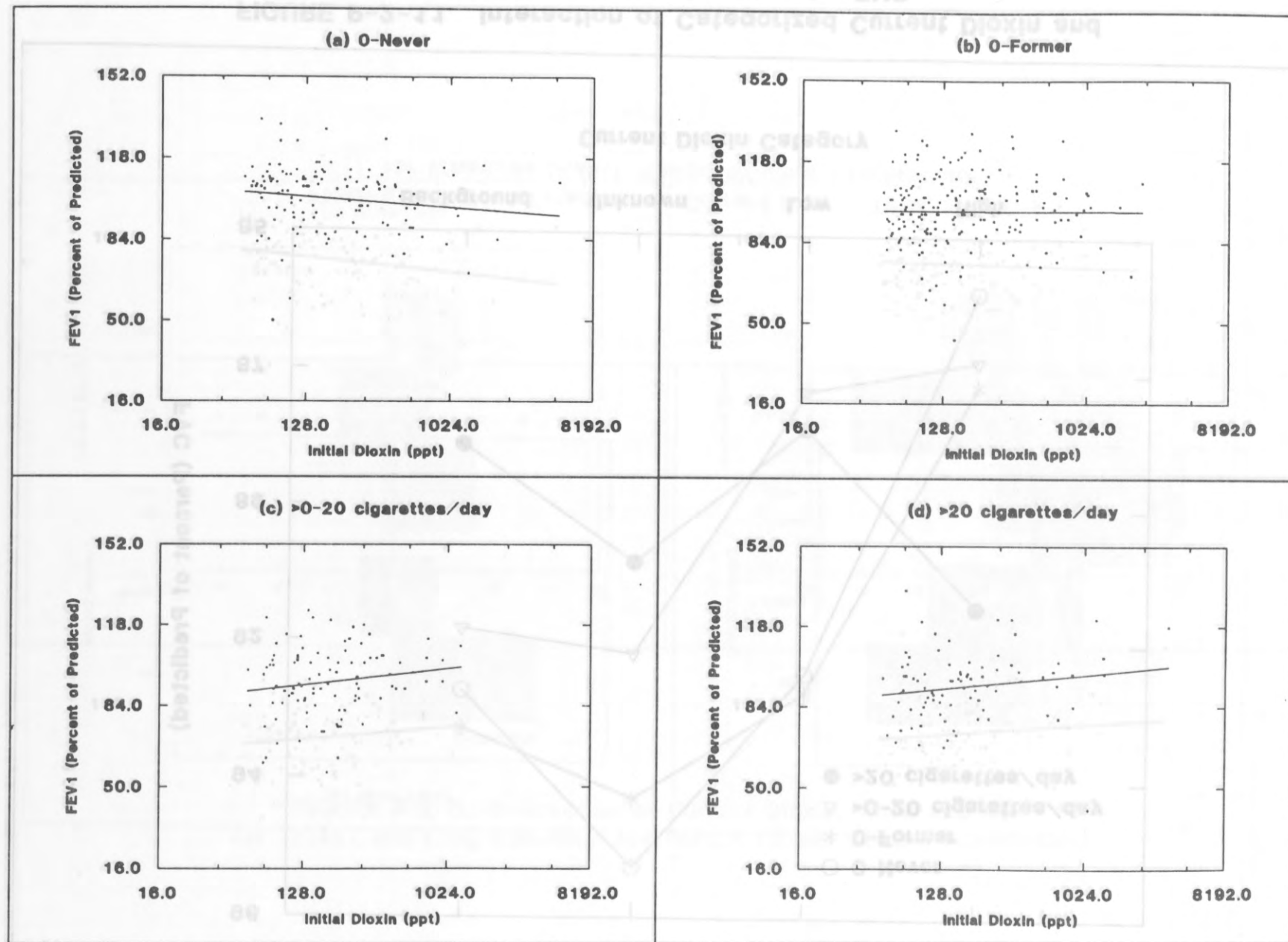


FIGURE P-2-12. Interaction of Initial Dioxin and Current Cigarette Smoking for FEV1 (Ranch Hands, Minimal Assumption)

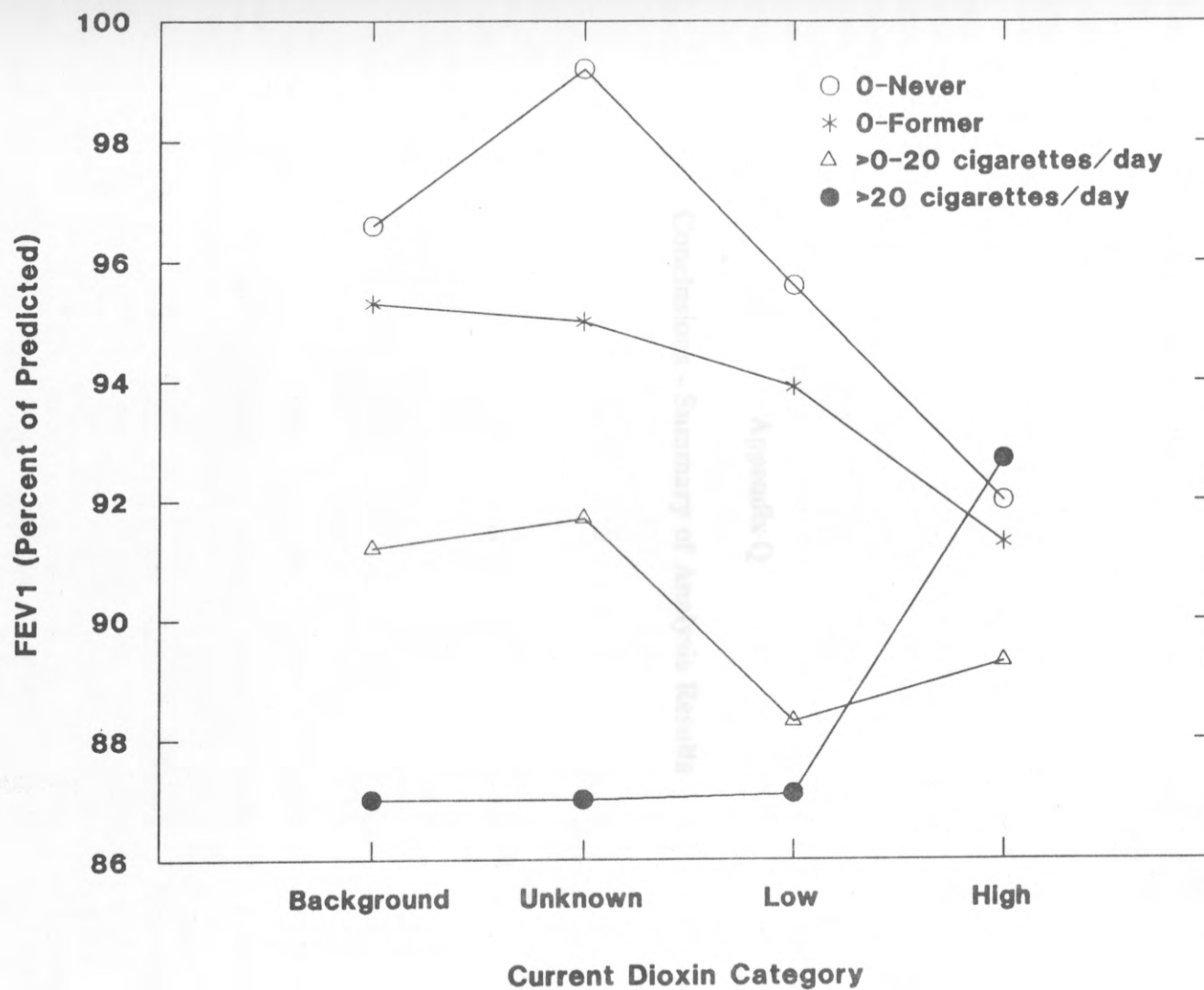


FIGURE P-2-13. Interaction of Categorized Current Dioxin and Current Cigarette Smoking for FEV1

Appendix Q

Conclusions - Summary of Analysis Results

TABLE Q-1.

Summary of Unadjusted Results for Continuous Variables
Model 1: Ranch Hands - Log₂ (Initial Dioxin)

Clinical Parameter	Reference Chapter	<u>Minimal Assumption</u>			<u>Maximal Assumption</u>		
		R ²	Slope	p-Value	R ²	Slope	p-Value
Percent Body Fat	6	0.019	0.627	0.001	0.044	0.792	<0.001
Sedimentation Rate ^a	6	0.006	0.053	0.092	0.016	0.078	<0.001
Average Sleep Each Night	9	0.001	-0.025	0.544	0.002	-0.033	0.250
<u>MCMI: Basic Personality</u>							
<u>Patterns</u>							
Schizoid Score ^a	9	0.025	0.077	<0.001	0.023	0.065	<0.001
Avoidant Score ^b	9	0.027	0.110	<0.001	0.020	0.082	<0.001
Dependent Score ^c	9	0.009	0.123	0.027	0.009	0.108	0.009
Histrionic Score ^d	9	0.018	-192.7	0.003	0.013	-150.8	0.002
Narcissistic Score	9	0.014	-1.454	0.007	0.012	-1.206	0.003
Antisocial Score	9	0.001	-0.557	0.417	<0.001	-0.236	0.643
Compulsive Score ^d	9	0.003	-58.779	0.193	0.002	-42.347	0.178
Passive-Aggressive Score ^c	9	0.008	0.130	0.046	0.015	0.156	<0.001
<u>MCMI: Pathological</u>							
<u>Personality Disorders</u>							
Schizotypal Score	9	0.034	2.836	<0.001	0.028	2.298	<0.001
Borderline Score	9	0.003	0.794	0.202	0.007	0.991	0.028
Paranoid Score	9	<0.001	0.227	0.675	<0.001	0.139	0.729
<u>MCMI: Clinical Symptom</u>							
<u>Syndromes</u>							
Anxiety Score	9	0.008	1.551	0.046	0.016	1.943	<0.001
Somatoform Score	9	0.002	0.617	0.327	0.006	0.981	0.033
Hypomania Score ^c	9	0.007	-0.189	0.054	0.003	-0.108	0.133
Dysthymia Score	9	0.003	1.052	0.184	0.006	1.293	0.031
Alcohol Abuse Score	9	<0.001	0.171	0.781	<0.001	0.244	0.588
Drug Abuse Score	9	<0.001	-0.501	0.495	<0.001	0.151	0.783
Psychotic Thinking Score	9	0.030	2.866	<0.001	0.022	2.147	<0.001
Psychotic Depression Score	9	0.016	2.122	0.005	0.016	1.842	<0.001
Psychotic Delusion Score	9	0.004	1.050	0.141	0.005	0.982	0.065
AST ^a	10	<0.001	0.0018	0.878	0.001	0.0087	0.304
ALT ^a	10	0.008	0.0372	0.039	0.017	0.0475	<0.001
GGT ^a	10	0.002	0.0230	0.357	0.017	0.0616	<0.001
Alkaline Phosphatase ^a	10	0.001	0.0072	0.380	0.010	0.0167	0.007
D-Glucaric Acid ^c	10	0.002	0.0585	0.377	0.005	0.0907	0.065
Total Bilirubin ^a	10	<0.001	-0.0009	0.934	<0.001	-0.0018	0.828
Direct Bilirubin ^c	10	<0.001	0.0105	0.522	0.004	0.0200	0.097
LDH ^a	10	<0.001	-0.0031	0.599	<0.001	0.0003	0.935
Cholesterol ^a	10	0.004	0.0088	0.175	0.002	0.0066	0.179
HDL ^a	10	0.004	-0.0126	0.169	0.021	-0.0266	<0.001

TABLE Q-1. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 1: Ranch Hands - Log₂ (Initial Dioxin)

Clinical Parameter	Reference Chapter	<u>Minimal Assumption</u>			<u>Maximal Assumption</u>		
		R ²	Slope	p-Value	R ²	Slope	p-Value
Cholesterol-HDL Ratio ^a	10	0.009	0.0214	0.031	0.027	0.0332	<0.001
Triglycerides ^a	10	0.006	0.0416	0.068	0.025	0.0733	<0.001
Creatine Kinase ^a	10	<0.001	-0.0036	0.830	<0.001	-0.0007	0.955
Systolic Blood Pressure	12	<0.001	0.232	0.732	0.002	0.592	0.220
Diastolic Blood Pressure	12	<0.001	0.172	0.640	0.003	0.359	0.176
Red Blood Cell Count	13	0.001	0.0105	0.442	0.005	0.0194	0.048
White Blood Cell Count ^c	13	0.006	0.0182	0.071	0.016	0.0260	<0.001
Hemoglobin	13	0.003	0.0473	0.232	0.004	0.0500	0.079
Hematocrit	13	0.002	0.1183	0.299	0.004	0.1485	0.070
Mean Corpuscular Volume	13	<0.001	0.0621	0.730	<0.001	-0.0424	0.737
Mean Corpuscular Hemoglobin	13	<0.001	0.0301	0.643	<0.001	-0.0193	0.674
Mean Corpuscular Hemoglobin Concentration	13	<0.001	0.0077	0.695	<0.001	-0.0062	0.670
Platelet Count	13	0.003	2.638	0.211	0.006	3.252	0.030
Prothrombin Time ^a	13	0.001	0.0013	0.417	<0.001	0.0009	0.444
Blood Urea Nitrogen ^c	14	0.006	-0.030	0.067	0.007	-0.028	0.022
Urine Specific Gravity	14	0.001	0.0002	0.419	0.002	0.0002	0.217
T ₃ % Uptake ^a	15	0.008	-0.0059	0.042	0.013	-0.0065	0.002
TSH ^f	15	<0.001	-0.0157	0.618	<0.001	-0.0136	0.560
FSH ^a	15	0.002	-0.0258	0.331	<0.001	-0.0145	0.463
Testosterone ^c	15	<0.001	-0.0527	0.679	0.003	-0.1436	0.126
Fasting Glucose ^a	15	0.010	0.0160	0.027	0.016	0.0168	<0.001
2-Hour Postprandial Glucose ^a	15	0.004	0.0146	0.177	0.008	0.0178	0.021
CD2 Cells ^a	16	<0.001	-0.007	0.747	<0.001	0.008	0.628
CD4 Cells ^a	16	<0.001	0.006	0.809	0.007	0.027	0.157
CD8 Cells ^a	16	<0.001	-0.002	0.934	0.001	-0.008	0.705
CD20 Cells ^a	16	0.389	0.074	0.102	0.341	0.036	0.212
CD14 Cells ^a	16	0.651	0.011	0.842	0.568	-0.017	0.633
CD25 Cells ^a	16	0.715	-0.096	0.339	0.665	0.006	0.933
HLA-DR Cells ^a	16	0.573	-0.007	0.848	0.540	0.001	0.960
CD4/CD8 Ratio ^a	16	0.635	0.040	0.230	0.578	0.042	0.074
TLC ^a	16	<0.001	-0.004	0.841	<0.001	0.006	0.679
Unstimulated PHA Response ^a	16	0.660	0.021	0.604	0.613	0.035	0.174
PHA Net Response (Concentration 1)	16	0.784	2,988	0.418	0.786	137	0.950
PHA Net Response (Concentration 2)	16	0.847	8,529	0.016	0.775	6,768	0.008
PHA Net Response (Concentration 3)	16	0.823	4,598	0.161	0.694	3,352	0.199

TABLE Q-1. (Continued)

**Summary of Unadjusted Results for Continuous Variables
Model 1: Ranch Hands - Log₂ (Initial Dioxin)**

Clinical Parameter	Reference Chapter	Minimal Assumption			Maximal Assumption		
		R ²	Slope	p-Value	R ²	Slope	p-Value
PHA Net Response (Across Day and Concentration)	16	0.839	5,372	0.078	0.785	3,419	0.105
Maximum PHA Net Response	16	0.861	10,112	0.005	0.804	6,606	0.009
Unstimulated MLC Response ^a	16	0.742	0.065	0.238	0.645	0.074	0.069
MLC Net Response	16	0.714	96	0.977	0.665	215	0.922
NKCA 50/1 Net Response	16	0.342	1.0	0.946	0.380	-4.8	0.629
NKCA 50/1 Percent Release	16	<0.001	0.228	0.813	0.001	-0.391	0.575
NKCI 50/1 Net Response	16	0.896	2.6	0.790	0.898	1.6	0.790
NKCI 50/1 Percent Release	16	0.693	0.1	0.894	0.705	0.1	0.758
IgA ^a	16	0.005	0.027	0.109	0.009	0.031	0.009
IgG ^a	16	<0.001	0.003	0.720	0.002	0.008	0.195
IgM ^a	16	0.001	0.014	0.425	<0.001	-0.009	0.471
FVC (% of predicted)	17	0.002	-0.412	0.361	0.016	-1.173	<0.001
FEV ₁ (% of predicted)	17	<0.001	0.216	0.681	0.002	-0.493	0.216
FEFmax (% of predicted)	17	0.001	-0.718	0.396	0.007	-1.454	0.021
Ratio of Observed FEV ₁ to Observed FVC ^g	17	0.020	-0.040	0.001	0.025	-0.040	<0.001

^aAnalysis performed on natural logarithm scale; slope based on natural logarithm of clinical parameter versus log₂ (initial dioxin).

^bAnalysis performed on natural logarithm (X + 1.0) scale; slope based on natural logarithm (avoidant score + 1.0) versus log₂ (initial dioxin).

^cAnalysis performed on square root scale; slope based on square root of clinical parameter versus log₂ (initial dioxin).

^dAnalysis performed on square scale; slope based on square of clinical parameter versus log₂ (initial dioxin).

^eAnalysis performed on natural logarithm (X + 0.1) scale; slope based on natural logarithm (direct bilirubin + 0.1) versus log₂ (initial dioxin).

^fAnalysis performed on natural logarithm (X - 0.4) scale; slope based on natural logarithm (TSH - 0.4) of clinical parameter versus log₂ (initial dioxin).

^gAnalysis performed on natural logarithm (1 - X) scale; slope based on natural logarithm (1 - ratio of observed FEV₁ to observed FVC) versus log₂ (initial dioxin).

Note: Statistics are based on the relationship between clinical parameter and log₂ (initial dioxin) unless otherwise specified.

TABLE Q-2.

**Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time**

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*T ^a	Time (Yrs.)	Slope	p-Value	R ²	C*T ^a	Time (Yrs.)	Slope	p-Value
Percent Body Fat	6	0.018	0.817	≤18.6 >18.6	0.549 0.644	0.086 0.014	0.045	0.438	≤18.6 >18.6	0.893 0.674	<0.001 <0.001
Sedimentation Rate ^b	6	0.014	0.500	≤18.6 >18.6	-0.007 0.037	0.892 0.368	0.018	0.311	≤18.6 >18.6	0.032 0.079	0.367 0.011
Average Sleep Each Night	9	0.007	0.758	≤18.6 >18.6	-0.031 -0.058	0.644 0.295	0.005	0.444	≤18.6 >18.6	-0.069 -0.024	0.118 0.544
<u>MCMI: Basic Personality Patterns</u>											
Schizoid Score ^b	9	0.033	0.070	≤18.6 >18.6	0.027 0.107	0.442 <0.001	0.029	0.054	≤18.6 >18.6	0.029 0.091	0.231 <0.001
Avoidant Score ^c	9	0.036	0.028	≤18.6 >18.6	0.023 0.158	0.624 <0.001	0.024	0.076	≤18.6 >18.6	0.033 0.112	0.317 <0.001
Dependent Score ^d	9	0.010	0.401	≤18.6 >18.6	0.060 0.159	0.506 0.033	0.010	0.541	≤18.6 >18.6	0.077 0.129	0.231 0.023
Histrionic Score ^e	9	0.022	0.099	≤18.6 >18.6	-52.0 -274.0	0.616 0.001	0.017	0.073	≤18.6 >18.6	-48.6 -226.9	0.513 <0.001
Narcissistic Score	9	0.021	0.217	≤18.6 >18.6	-0.352 -1.741	0.686 0.015	0.017	0.153	≤18.6 >18.6	-0.376 -1.569	0.548 0.005

TABLE Q-2. (Continued)

**Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time**

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*Ta	Time (Yrs.)	Slope	p-Value	R ²	C*Ta	Time (Yrs.)	Slope	p-Value
Antisocial Score	9	0.006	0.323	≤18.6 >18.6	0.526 -0.901	0.638 0.325	0.004	0.378	≤18.6 >18.6	0.450 -0.478	0.568 0.493
Compulsive Score ^e	9	0.005	0.576	≤18.6 >18.6	-35.019 -88.219	0.634 0.144	0.003	0.832	≤18.6 >18.6	-42.543 -56.414	0.384 0.192
Passive-Aggressive Score ^d	9	0.009	0.371	≤18.6 >18.6	0.059 0.182	0.578 0.037	0.016	0.768	≤18.6 >18.6	0.145 0.174	0.044 0.007
<u>MCMI: Pathological Personality Disorders</u>											
Schizotypal Score	9	0.036	0.264	≤18.6 >18.6	1.724 3.296	0.114 <0.001	0.031	0.290	≤18.6 >18.6	1.610 2.701	0.037 <0.001
Borderline Score	9	0.005	0.311	≤18.6 >18.6	-0.016 1.315	0.988 0.115	0.007	0.809	≤18.6 >18.6	0.891 1.118	0.204 0.072
Paranoid Score	9	0.010	0.979	≤18.6 >18.6	0.522 0.551	0.551 0.443	0.008	0.891	≤18.6 >18.6	0.476 0.362	0.443 0.509
<u>MCMI: Clinical Symptom Syndromes</u>											
Anxiety Score	9	0.010	0.155	≤18.6 >18.6	-0.023 2.307	0.986 0.026	0.016	0.917	≤18.6 >18.6	1.838 1.716	0.038 0.028
Somatoform Score	9	0.003	0.683	≤18.6 >18.6	0.374 0.915	0.716 0.277	0.008	0.394	≤18.6 >18.6	1.374 0.560	0.055 0.375

TABLE Q-2. (Continued)

**Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time**

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*T ^a	Time (Yrs.)	Slope	p-Value	R ²	C*T ^a	Time (Yrs.)	Slope	p-Value
Hypomania Score ^d	9	0.008	0.674	≤18.6 >18.6	-0.136 -0.222	0.394 0.089	0.005	0.237	≤18.6 >18.6	-0.017 -0.193	0.875 0.050
Dysthymia Score	9	0.005	0.576	≤18.6 >18.6	0.328 1.262	0.799 0.233	0.008	0.616	≤18.6 >18.6	0.886 1.507	0.340 0.067
Alcohol Abuse Score	9	0.002	0.325	≤18.6 >18.6	-0.668 0.609	0.506 0.459	0.002	0.384	≤18.6 >18.6	-0.230 0.583	0.742 0.347
Drug Abuse Score	9	0.012	0.247	≤18.6 >18.6	0.963 -0.823	0.419 0.399	0.009	0.204	≤18.6 >18.6	1.274 -0.169	0.134 0.822
Psychotic Thinking Score	9	0.038	0.059	≤18.6 >18.6	1.324 4.209	0.262 <0.001	0.028	0.083	≤18.6 >18.6	1.262 3.179	0.127 <0.001
Psychotic Depression Score	9	0.017	0.262	≤18.6 >18.6	0.988 2.755	0.417 0.006	0.019	0.195	≤18.6 >18.6	1.128 2.571	0.176 <0.001
Psychotic Delusion Score	9	0.009	0.218	≤18.6 >18.6	0.096 1.947	0.934 0.041	0.009	0.271	≤18.6 >18.6	0.487 1.698	0.554 0.020
AST ^b	10	0.012	0.599	≤18.6 >18.6	0.0038 -0.0090	0.840 0.559	0.009	0.758	≤18.6 >18.6	0.0018 0.0072	0.889 0.532
ALT ^b	10	0.011	0.464	≤18.6 >18.6	0.0525 0.0249	0.073 0.298	0.018	0.989	≤18.6 >18.6	0.0472 0.0468	0.022 0.010

TABLE Q-2. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*Ta	Time (Yrs.)	Slope	p-Value	R ²	C*Ta	Time (Yrs.)	Slope	p-Value
GGT ^b	10	0.004	0.715	≤18.6 >18.6	0.0289 0.0097	0.477 0.770	0.019	0.537	≤18.6 >18.6	0.0701 0.0476	0.011 0.048
Alkaline Phosphatase ^b	10	0.002	0.715	≤18.6 >18.6	0.0027 0.0090	0.838 0.408	0.009	0.704	≤18.6 >18.6	0.0177 0.0128	0.069 0.135
D-Glucaric Acid ^d	10	0.002	0.846	≤18.6 >18.6	0.0462 0.0735	0.673 0.402	0.004	0.993	≤18.6 >18.6	0.0900 0.0890	0.245 0.185
Total Bilirubin ^b	10	<0.001	0.607	≤18.6 >18.6	-0.0068 0.0052	0.707 0.724	0.002	0.346	≤18.6 >18.6	-0.0082 0.0076	0.516 0.491
Direct Bilirubin ^f	10	0.001	0.760	≤18.6 >18.6	0.0042 0.0148	0.876 0.500	0.004	0.915	≤18.6 >18.6	0.0183 0.0210	0.331 0.205
LDH ^b	10	0.008	0.252	≤18.6 >18.6	-0.0141 -0.0000	0.139 0.999	0.006	0.611	≤18.6 >18.6	-0.0047 -0.0003	0.473 0.963
Cholesterol ^b	10	0.010	0.069	≤18.6 >18.6	-0.0053 0.0195	0.612 0.024	0.003	0.335	≤18.6 >18.6	0.0007 0.0104	0.931 0.120
HDL ^b	10	0.004	0.920	≤18.6 >18.6	-0.0086 -0.0105	0.566 0.389	0.020	0.727	≤18.6 >18.6	-0.0276 -0.0227	0.008 0.014
Cholesterol-HDL Ratio ^b	10	0.012	0.200	≤18.6 >18.6	0.0032 0.0300	0.841 0.023	0.025	0.749	≤18.6 >18.6	0.0282 0.0331	0.015 0.001

TABLE Q-2. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*Ta	Time (Yrs.)	Slope	p-Value	R ²	C*Ta	Time (Yrs.)	Slope	p-Value
Triglycerides ^b	10	0.006	0.476	≤18.6 >18.6	0.0551 0.0208	0.139 0.493	0.025	0.086	≤18.6 >18.6	0.0993 0.0389	<0.001 0.094
Creatine Kinase ^b	10	0.003	0.507	≤18.6 >18.6	-0.0134 0.0103	0.629 0.647	<0.001	0.655	≤18.6 >18.6	0.0079 -0.0036	0.682 0.834
Systolic Blood Pressure	12	0.002	0.961	≤18.6 >18.6	0.017 0.087	0.987 0.924	0.003	0.781	≤18.6 >18.6	0.263 0.540	0.719 0.427
Diastolic Blood Pressure	12	0.004	0.884	≤18.6 >18.6	0.188 0.077	0.747 0.877	0.004	0.680	≤18.6 >18.6	0.180 0.406	0.655 0.277
Red Blood Cell Count	13	0.006	0.710	≤18.6 >18.6	0.0110 0.0216	0.621 0.234	0.007	0.208	≤18.6 >18.6	0.0343 0.0086	0.025 0.525
White Blood Cell Count ^b	13	0.008	0.479	≤18.6 >18.6	0.0077 0.0227	0.636 0.090	0.017	0.712	≤18.6 >18.6	0.0219 0.0275	0.059 0.007
Hemoglobin	13	0.006	0.875	≤18.6 >18.6	0.0692 0.0561	0.283 0.287	0.010	0.036	≤18.6 >18.6	0.1135 -0.0101	0.010 0.795
Hematocrit	13	0.003	0.904	≤18.6 >18.6	0.1624 0.1335	0.382 0.380	0.010	0.063	≤18.6 >18.6	0.3016 -0.0140	0.018 0.901
Mean Corpuscular Volume	13	0.004	0.527	≤18.6 >18.6	0.1380 -0.1019	0.638 0.671	0.005	0.564	≤18.6 >18.6	-0.0098 -0.1606	0.960 0.354

TABLE Q-2. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*T ^a	Time (Yrs.)	Slope	p-Value	R ²	C*T ^a	Time (Yrs.)	Slope	p-Value
Mean Corpuscular Hemoglobin	13	0.002	0.497	≤18.6 >18.6	0.0710 -0.0220	0.503 0.800	0.004	0.386	≤18.6 >18.6	0.0134 -0.0690	0.851 0.273
Mean Corpuscular Hemoglobin Concentration	13	0.009	0.915	≤18.6 >18.6	0.0200 0.0156	0.532 0.552	0.004	0.316	≤18.6 >18.6	0.0158 -0.0146	0.487 0.467
Platelet Count	13	0.005	0.491	≤18.6 >18.6	4.167 1.114	0.226 0.691	0.007	0.834	≤18.6 >18.6	3.552 2.904	0.127 0.158
Prothrombin Time ^b	13	0.006	0.701	≤18.6 >18.6	0.0016 0.0003	0.536 0.880	0.003	0.653	≤18.6 >18.6	0.0002 0.0013	0.895 0.408
Blood Urea Nitrogen ^d	14	0.014	0.214	≤18.6 >18.6	-0.048 -0.006	0.070 0.800	0.009	0.538	≤18.6 >18.6	-0.020 -0.035	0.296 0.035
Urine Specific Gravity	14	0.003	0.444	≤18.6 >18.6	0.0004 <0.0001	0.250 0.843	0.003	0.437	≤18.6 >18.6	0.0003 <0.0001	0.170 0.703
T ₃ % Uptake ^b	15	0.017	0.060	≤18.6 >18.6	0.0021 -0.0093	0.650 0.016	0.016	0.119	≤18.6 >18.6	-0.0018 -0.0087	0.593 0.003
TSH ^g	15	0.005	0.440	≤18.6 >18.6	0.0066 -0.0449	0.900 0.279	0.002	0.834	≤18.6 >18.6	-0.0138 -0.0240	0.707 0.451
FSH ^b	15	0.016	0.068	≤18.6 >18.6	-0.1058 -0.0043	0.014 0.902	0.011	0.014	≤18.6 >18.6	-0.0819 0.0184	0.007 0.495

TABLE Q-2. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*Ta	Time (Yrs.)	Slope	p-Value	R ²	C*Ta	Time (Yrs.)	Slope	p-Value
Testosterone ^d	15	0.010	0.669	≤18.6 >18.6	-0.0063 0.1077	0.976 0.524	0.011	0.509	≤18.6 >18.6	-0.1240 0.0042	0.394 0.974
Fasting Glucose ^b	15	0.015	0.096	≤18.6 >18.6	-0.0001 0.0251	0.993 0.009	0.018	0.242	≤18.6 >18.6	0.0088 0.0205	0.241 0.002
2-Hour Postprandial Glucose ^b	15	0.014	0.555	≤18.6 >18.6	0.0137 0.0005	0.421 0.975	0.010	0.406	≤18.6 >18.6	0.0073 0.0204	0.530 0.057
CD2 Cells ^a	16	0.007	0.739	≤18.6 >18.6	-0.019 -0.005	0.563 0.870	0.004	0.880	≤18.6 >18.6	0.001 0.006	0.961 0.786
CD4 Cells ^a	16	0.008	0.510	≤18.6 >18.6	-0.017 0.016	0.657 0.621	0.009	0.453	≤18.6 >18.6	0.008 0.038	0.772 0.161
CD8 Cells ^a	16	0.005	0.982	≤18.6 >18.6	-0.009 -0.010	0.840 0.788	0.013	0.472	≤18.6 >18.6	-0.003 -0.035	0.931 0.257
CD20 Cells ^a	16	0.388	0.825	≤18.6 >18.6	0.052 0.071	0.436 0.262	0.345	0.302	≤18.6 >18.6	0.007 0.069	0.877 0.099
CD14 Cells ^a	16	0.662	0.156	≤18.6 >18.6	-0.045 0.111	0.559 0.161	0.573	0.300	≤18.6 >18.6	-0.046 0.039	0.415 0.488
CD25 Cells ^a	16	0.738	0.051	≤18.6 >18.6	-0.351 0.070	0.028 0.624	0.670	0.314	≤18.6 >18.6	-0.091 0.070	0.413 0.524

TABLE Q-2. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*T ^a	Time (Yrs.)	Slope	p-Value	R ²	C*T ^a	Time (Yrs.)	Slope	p-Value
HLA-DR Cells ^a	16	0.582	0.198	≤18.6 >18.6	-0.058 0.033	0.244 0.516	0.548	0.131	≤18.6 >18.6	-0.043 0.033	0.216 0.336
CD4/CD8 Ratio ^a	16	0.639	0.318	≤18.6 >18.6	0.075 0.005	0.142 0.917	0.581	0.657	≤18.6 >18.6	0.062 0.038	0.093 0.283
TLC ^a	16	0.013	0.264	≤18.6 >18.6	-0.033 0.013	0.283 0.636	0.006	0.367	≤18.6 >18.6	-0.011 0.016	0.604 0.446
Unstimulated PHA Response ^a	16	0.663	0.884	≤18.6 >18.6	0.038 0.026	0.514 0.656	0.615	0.878	≤18.6 >18.6	0.048 0.039	0.228 0.322
PHA Net Response	16	0.848	0.057	≤18.6 >18.6	12,371 613	0.006 0.887	0.791	0.891	≤18.6 >18.6	5,291 4,641	0.109 0.151
Maximum PHA Net Response	16	0.867	0.145	≤18.6 >18.6	16,692 6,241	0.002 0.217	0.812	0.662	≤18.6 >18.6	7,706 10,170	0.049 0.008
Unstimulated MLC Response ^a	16	0.743	0.881	≤18.6 >18.6	0.082 0.065	0.300 0.424	0.648	0.621	≤18.6 >18.6	0.066 0.109	0.283 0.075
MLC Net Response	16	0.717	0.537	≤18.6 >18.6	1,066 -3,186	0.826 0.524	0.665	0.826	≤18.6 >18.6	-778 286	0.816 0.932
NKCA 50/1 Net Response	16	0.355	0.480	≤18.6 >18.6	19.3 -1.9	0.380 0.932	0.385	0.277	≤18.6 >18.6	9.6 -13.1	0.521 0.368

TABLE Q-2. (Continued)

**Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time**

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*Ta	Time (Yrs.)	Slope	p-Value	R ²	C*Ta	Time (Yrs.)	Slope	p-Value
NKCA 50/1 Percent Release	16	0.003	0.735	≤18.6 >18.6	0.718 0.047	0.632 0.971	0.002	0.745	≤18.6 >18.6	-0.062 -0.528	0.953 0.593
NKCI 50/1 Net Response	16	0.899	0.151	≤18.6 >18.6	19.4 -9.0	0.172 0.524	0.901	0.056	≤18.6 >18.6	15.8 -9.1	0.080 0.312
NKCI 50/1 Percent Release	16	0.703	0.176	≤18.6 >18.6	1.4 -0.7	0.206 0.531	0.714	0.063	≤18.6 >18.6	1.3 -0.7	0.077 0.355
IgA ^a	16	0.011	0.613	≤18.6 >18.6	0.026 0.008	0.339 0.725	0.012	0.594	≤18.6 >18.6	0.018 0.031	0.317 0.056
IgG ^a	16	<0.001	0.815	≤18.6 >18.6	0.007 0.003	0.612 0.810	0.004	0.938	≤18.6 >18.6	0.009 0.010	0.311 0.212
IgM ^a	16	0.003	0.725	≤18.6 >18.6	0.0006 0.013	0.983 0.567	0.004	0.174	≤18.6 >18.6	-0.033 0.004	0.099 0.844
FVC (% of predicted)	17	0.004	0.386	≤18.6 >18.6	-0.771 0.050	0.293 0.933	0.018	0.249	≤18.6 >18.6	-1.537 -0.732	0.003 0.114
FEV ₁ (% of predicted)	17	0.005	0.251	≤18.6 >18.6	-0.353 0.917	0.680 0.191	0.006	0.192	≤18.6 >18.6	-0.924 0.152	0.135 0.781

TABLE Q-2. (Continued)

**Summary of Unadjusted Results for Continuous Variables
Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time**

Clinical Parameter	Reference Chapter	Minimal Assumption					Maximal Assumption				
		R ²	C*T ^a	Time (Yrs.)	Slope	p-Value	R ²	C*T ^a	Time (Yrs.)	Slope	p-Value
Ratio of Observed FEV ₁ to Observed FVC ^h	17	0.024	0.779	≤18.6	-0.041	0.045	0.034	0.524	≤18.6	-0.039	0.005
				>18.6	-0.048	0.004			>18.6	-0.051	<0.001
FEFmax (% of predicted)	17	0.006	0.105	≤18.6	-2.370	0.085	0.009	0.160	≤18.6	-2.435	0.013
				>18.6	0.513	0.649			>18.6	-0.610	0.478

^aP-value for test of significance for homogeneity of slopes (current dioxin continuous, time categorized); C*T=current dioxin-by-time interaction.

^bAnalysis performed on natural logarithm scale; slope based on natural logarithm of clinical parameter versus log₂ (current dioxin).

^cAnalysis performed on natural logarithm (X + 1.0) scale; slope based on natural logarithm (avoidant score + 1.0) versus log₂ (current dioxin).

^dAnalysis performed on square root scale; slope based on square root of clinical parameter versus log₂ (current dioxin).

^eAnalysis performed on square scale; slope based on square of clinical parameter versus log₂ (current dioxin).

^fAnalysis performed on natural logarithm (X + 0.1) scale; slope based on natural logarithm (direct bilirubin + 0.1) versus log₂ (current dioxin).

^gAnalysis performed on natural logarithm (X - 0.4) scale; slope based on natural logarithm (TSH - 0.4) of clinical parameter versus log₂ (current dioxin).

^hAnalysis performed on natural logarithm (1 - X) scale; slope based on natural logarithm (1 - ratio of observed FEV₁ to observed FVC) versus log₂ (current dioxin).

Note: Statistics are based on the relationship of clinical parameter with log₂ (current dioxin) and time unless otherwise specified.

TABLE Q-3.

**Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category**

Clinical Parameter (Units)	Reference Chapter	R ²	Statistic ^a	Current Dioxin Category				Overall p-Value
				Background	Unknown	Low	High	
Percent Body Fat	6	0.042	Mean (n): Difference (p-value):	21.91 (786)	20.03 (345) -1.88 (<0.001)	22.15 (196) 0.24 (0.549)	23.55 (187) 1.64 (<0.001)	<0.001
Sedimentation Rate ^b (mm/hr)	6	0.010	Mean (n): Difference (p-value):	5.09 (786)	4.52 (345) -0.57 (0.025)	5.77 (196) 0.68 (0.053)	5.68 (187) 0.59 (0.099)	0.002
Average Sleep Each Night (hours)	9	0.002	Mean (n): Difference (p-value):	6.89 (783)	6.92 (341) 0.03 (0.638)	6.91 (194) 0.02 (0.809)	6.77 (185) -0.12 (0.149)	0.403
MCMI: Basic Personality Patterns								
Schizoid Score ^b	9	0.011	Mean (n): Difference (p-value):	23.7 (781)	22.7 (340) -1.1 (0.229)	24.9 (194) 1.2 (0.306)	27.9 (184) 4.2 (<0.001)	<0.001
Avoidant Score ^c	9	0.006	Mean (n): Difference (p-value):	16.3 (781)	15.0 (340) -1.3 (0.164)	16.8 (194) 0.5 (0.667)	19.1 (184) 2.8 (0.032)	0.035
Dependent Score ^d	9	0.006	Mean (n): Difference (p-value):	42.1 (781)	39.3 (340) -2.8 (0.032)	39.2 (194) -2.9 (0.066)	43.4 (184) 1.3 (0.451)	0.033
Histrionic Score ^e	9	0.007	Mean (n): Difference (p-value):	64.4 (781)	64.6 (340) 0.2 (0.806)	63.2 (194) -1.2 (0.287)	60.9 (184) -3.5 (0.003)	0.014
Narcissistic Score	9	0.006	Mean (n): Difference (p-value):	64.0 (781)	66.0 (340) 2.0 (0.048)	65.5 (194) 1.5 (0.225)	62.1 (184) -1.9 (0.122)	0.025
Antisocial Score	9	0.005	Mean (n): Difference (p-value):	59.6 (781)	61.6 (340) 2.0 (0.117)	63.3 (194) 3.7 (0.016)	61.2 (184) 1.6 (0.300)	0.074

TABLE Q-3. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category

Clinical Parameter (Units)	Reference Chapter	R ²	Statistic ^a	Current Dioxin Category				Overall p-Value
				Background	Unknown	Low	High	
Compulsive Score ^e	9	<0.001	Mean (n): Difference (p-value):	68.4 (781)	68.7 (340) 0.3 (0.621)	68.7 (194) 0.3 (0.641)	68.1 (184) -0.3 (0.621)	0.838
Passive-Aggressive Score ^d	9	0.005	Mean (n): Difference (p-value):	19.0 (781)	17.6 (340) -1.4 (0.132)	20.8 (194) 1.8 (0.128)	20.4 (184) 1.4 (0.268)	0.054
<u>MCMI: Pathological Personality Disorders</u>								
Schizotypal Score	9	0.009	Mean (n): Difference (p-value):	33.9 (781)	31.9 (340) -1.9 (0.114)	34.0 (194) 0.2 (0.914)	38.4 (184) 4.5 (0.004)	0.003
Borderline Score	9	0.003	Mean (n): Difference (p-value):	33.3 (781)	31.0 (340) -2.4 (0.033)	32.5 (194) -0.8 (0.567)	33.5 (184) 0.2 (0.882)	0.170
Paranoid Score	9	0.003	Mean (n): Difference (p-value):	51.5 (781)	52.9 (340) 1.3 (0.187)	53.6 (194) 2.0 (0.104)	53.5 (184) 2.0 (0.118)	0.191
<u>MCMI: Clinical Symptom Syndromes</u>								
Anxiety Score	9	0.006	Mean (n): Difference (p-value):	47.2 (781)	44.1 (340) -3.1 (0.023)	46.4 (194) -0.8 (0.630)	49.3 (184) 2.1 (0.231)	0.038
Somatoform Score	9	0.002	Mean (n): Difference (p-value):	51.1 (781)	50.2 (340) -0.9 (0.445)	50.1 (194) -0.9 (0.500)	52.7 (184) 1.6 (0.260)	0.407
Hypomania Score ^d	9	0.003	Mean (n): Difference (p-value):	21.9 (781)	22.4 (340) 0.5 (0.742)	22.4 (194) 0.5 (0.795)	18.3 (184) -3.5 (0.071)	0.251
Dysthymia Score	9	0.003	Mean (n): Difference (p-value):	49.7 (781)	47.1 (340) -2.5 (0.078)	49.4 (194) -0.3 (0.886)	51.5 (184) 1.8 (0.329)	0.159

TABLE Q-3. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category

Clinical Parameter (Units)	Reference Chapter	R ²	Statistic ^a	Current Dioxin Category				Overall p-Value
				Background	Unknown	Low	High	
Alcohol Abuse Score	9	<0.001	Mean (n): Difference (p-value):	31.3 (781)	30.5 (340) -0.8 (0.443)	31.0 (194) -0.3 (0.810)	31.0 (184) -0.3 (0.811)	0.898
Drug Abuse Score	9	0.001	Mean (n): Difference (p-value):	48.2 (781)	47.2 (340) -1.0 (0.429)	48.9 (194) 0.7 (0.659)	47.4 (184) -0.8 (0.619)	0.746
Psychotic Thinking Score	9	0.009	Mean (n): Difference (p-value):	32.6 (781)	30.1 (340) -2.5 (0.053)	31.9 (194) -0.7 (0.643)	36.7 (184) 4.1 (0.012)	0.004
Psychotic Depression Score	9	0.005	Mean (n): Difference (p-value):	23.6 (781)	21.4 (340) -2.2 (0.091)	22.8 (194) -0.8 (0.633)	26.1 (184) 2.6 (0.119)	0.070
Psychotic Delusion Score	9	0.005	Mean (n): Difference (p-value):	42.1 (781)	43.1 (340) 0.9 (0.497)	45.1 (194) 3.0 (0.073)	45.9 (184) 3.7 (0.026)	0.076
AST ^b (U/L)	10	0.003	Mean (n): Difference (p-value):	25.70 (779)	24.93 (341) -0.77 (0.120)	25.46 (193) -0.24 (0.704)	26.20 (186) 0.50 (0.434)	0.276
ALT ^b (U/L)	10	0.012	Mean (n): Difference (p-value):	20.62 (779)	19.06 (341) -1.56 (0.011)	21.01 (193) 0.39 (0.634)	22.97 (186) 2.35 (0.006)	<0.001
GGT ^b (U/L)	10	0.015	Mean (n): Difference (p-value):	32.03 (779)	28.75 (341) -3.28 (0.009)	34.99 (193) 2.96 (0.083)	36.82 (186) 4.79 (0.007)	<0.001
Alkaline Phosphatase ^b (U/L)	10	0.005	Mean (n): Difference (p-value):	90.28 (779)	91.94 (341) 1.66 (0.245)	93.92 (193) 3.64 (0.041)	94.07 (186) 3.79 (0.036)	0.064
D-Glucaric Acid ^d (μM)	10	0.002	Mean (n): Difference (p-value):	14.14 (746)	14.09 (328) -0.05 (0.953)	14.62 (190) 0.48 (0.672)	15.85 (182) 1.71 (0.147)	0.504

TABLE Q-3. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category

Clinical Parameter (Units)	Reference Chapter	R ²	Statistic ^a	Current Dioxin Category				Overall p-Value
				Background	Unknown	Low	High	
Total Bilirubin ^b (mg/dl)	10	0.002	Mean (n): Difference (p-value):	0.793 (779)	0.773 (341) -0.020 (0.191)	0.770 (193) -0.023 (0.229)	0.786 (186) -0.007 (0.715)	0.466
Direct Bilirubin ^f (mg/dl)	10	0.004	Mean (n): Difference (p-value):	0.149 (779)	0.148 (341) -0.001 (0.846)	0.157 (193) 0.008 (0.444)	0.171 (186) 0.022 (0.025)	0.120
LDH ^b (U/L)	10	<0.001	Mean (n): Difference (p-value):	127.9 (779)	126.7 (341) -1.2 (0.361)	127.6 (193) -0.3 (0.821)	128.6 (186) 0.7 (0.715)	0.751
Cholesterol ^b (mg/dl)	10	0.002	Mean (n): Difference (p-value):	213.3 (779)	214.3 (341) 1.0 (0.669)	215.0 (193) 1.7 (0.570)	218.7 (186) 5.4 (0.085)	0.386
HDL ^b (mg/dl)	10	0.019	Mean (n): Difference (p-value):	44.98 (779)	47.81 (341) 2.83 (<0.001)	43.60 (193) -1.38 (0.115)	43.07 (186) -1.91 (0.031)	<0.001
Cholesterol-HDL Ratio ^b	10	0.019	Mean (n): Difference (p-value):	4.74 (779)	4.48 (341) -0.26 (0.002)	4.93 (193) 0.19 (0.082)	5.08 (186) 0.34 (0.003)	<0.001
Triglycerides ^b (mg/dl)	10	0.024	Mean (n): Difference (p-value):	116.8 (779)	104.1 (341) -12.7 (0.005)	140.0 (193) 23.2 (<0.001)	135.8 (186) 19.0 (0.004)	<0.001
Creatine Kinase ^b (U/L)	10	0.002	Mean (n): Difference (p-value):	109.4 (779)	106.2 (341) -3.2 (0.368)	107.1 (193) -2.3 (0.604)	113.5 (186) 4.1 (0.374)	0.504

TABLE Q-3. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category

Clinical Parameter (Units)	Reference Chapter	R ²	Statistic ^a	Current Dioxin Category				Overall p-Value
				Background	Unknown	Low	High	
Systolic Blood Pressure (mm Hg)	12	0.003	Mean (n): Difference (p-value):	126.65 (703)	125.17 (320) -1.48 (0.205)	126.79 (177) 0.13 (0.927)	128.54 (155) 1.89 (0.218)	0.247
Diastolic Blood Pressure (mm Hg)	12	0.008	Mean (n): Difference (p-value):	74.54 (703)	74.04 (320) -0.50 (0.429)	76.25 (177) 1.71 (0.028)	76.15 (155) 1.61 (0.051)	0.017
Red Blood Cell Count (million/mm ³)	13	0.004	Mean (n): Difference (p-value):	4.960 (783)	4.918 (345) -0.041 (0.088)	4.959 (195) -0.001 (0.983)	4.993 (187) 0.033 (0.274)	0.147
White Blood Cell Count ^b (thousand/mm ³)	13	0.007	Mean (n): Difference (p-value):	6.668 (783)	6.700 (345) 0.032 (0.799)	6.950 (195) 0.282 (0.072)	7.124 (187) 0.456 (0.005)	0.017
Hemoglobin (gm/dl)	13	0.002	Mean (n): Difference (p-value):	15.652 (783)	15.673 (345) 0.021 (0.755)	15.740 (195) 0.088 (0.291)	15.796 (187) 0.144 (0.090)	0.323
Hematocrit (percent)	13	0.002	Mean (n): Difference (p-value):	45.208 (783)	45.132 (345) -0.075 (0.700)	45.336 (195) 0.128 (0.597)	45.559 (187) 0.351 (0.155)	0.428
Mean Corpuscular Volume (cubic micra)	13	0.003	Mean (n): Difference (p-value):	91.276 (783)	91.871 (345) 0.594 (0.057)	91.559 (195) 0.283 (0.463)	91.325 (187) 0.049 (0.901)	0.277
Mean Corpuscular Hemoglobin (micromicrogram)	13	0.005	Mean (n): Difference (p-value):	31.633 (783)	31.923 (345) 0.289 (0.012)	31.814 (195) 0.180 (0.203)	31.678 (187) 0.044 (0.760)	0.072
Mean Corpuscular Hemoglobin Concentration (gm/dl)	13	0.006	Mean (n): Difference (p-value):	34.629 (783)	34.723 (345) 0.094 (0.007)	34.722 (195) 0.093 (0.031)	34.657 (187) 0.029 (0.515)	0.022

TABLE Q-3. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category

Clinical Parameter (Units)	Reference Chapter	R ²	Statistic ^a	Current Dioxin Category				Overall p-Value
				Background	Unknown	Low	High	
Platelet Count (thousand/mm ³)	13	0.004	Mean (n): Difference (p-value):	259.01 (783)	261.81 (345) 2.80 (0.440)	265.22 (195) 6.21 (0.168)	270.05 (187) 11.05 (0.016)	0.083
Prothrombin Time ^b (seconds)	13	0.002	Mean (n): Difference (p-value):	12.256 (785)	12.219 (345) -0.037 (0.278)	12.207 (195) -0.049 (0.247)	12.292 (186) 0.036 (0.409)	0.305
Blood Urea Nitrogen ^d (mg/dl)	14	0.002	Mean (n): Difference (p-value):	14.7 (786)	14.6 (345) -0.1 (0.668)	14.3 (196) -0.4 (0.162)	14.4 (187) -0.3 (0.269)	0.443
Q-19 Urine Specific Gravity	14	0.002	Mean (n): Difference (p-value):	1.0200 (786)	1.0197 (345) -0.0004 (0.363)	1.0201 (196) 0.0001 (0.911)	1.0205 (187) 0.0005 (0.351)	0.518
T ₃ % Uptake ^b	15	0.008	Mean (n): Difference (p-value):	30.65 (772)	30.66 (338) 0.01 (0.947)	30.35 (194) -0.30 (0.133)	30.03 (181) -0.62 (0.002)	0.010
TSH ^g (μIU/ml)	15	0.003	Mean (n): Difference (p-value):	0.964 (641)	0.997 (278) 0.033 (0.328)	1.023 (155) 0.059 (0.165)	1.032 (157) 0.068 (0.113)	0.275
FSH ^b (mIU/ml)	15	0.001	Mean (n): Difference (p-value):	7.57 (786)	7.96 (345) 0.39 (0.277)	7.77 (196) 0.20 (0.636)	7.36 (187) -0.21 (0.639)	0.602
Testosterone ^d (ng/dl)	15	0.007	Mean (n): Difference (p-value):	525.3 (785)	554.2 (343) 28.9 (0.005)	525.6 (193) 0.3 (0.977)	515.0 (187) -10.3 (0.422)	0.016
Fasting Glucose ^b (mg/dl)	15	0.017	Mean (n): Difference (p-value):	99.5 (779)	98.3 (341) -1.2 (0.206)	100.7 (193) 1.2 (0.331)	105.1 (186) 5.6 (<0.001)	<0.001
2-Hour Postprandial Glucose ^b (mg/dl)	15	0.005	Mean (n): Difference (p-value):	111.3 (740)	107.5 (331) -3.8 (0.049)	109.8 (179) -1.5 (0.527)	114.2 (166) 2.9 (0.263)	0.082

TABLE Q-3. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category

Clinical Parameter (Units)	Reference Chapter	R ²	Statistic ^a	Current Dioxin Category				Overall p-Value
				Background	Unknown	Low	High	
CD2 Cells ^b (cells/mm ³)	16	0.002	Mean (n): Difference (p-value):	1,615.9 (307)	1,568.6 (130) -47.3 (0.405)	1,636.2 (74) 20.3 (0.777)	1,651.5 (76) 35.6 (0.618)	0.712
CD4 Cells ^b (cells/mm ³)	16	0.006	Mean (n): Difference (p-value):	907.8 (301)	861.5 (127) -46.3 (0.216)	938.6 (72) 30.8 (0.525)	942.2 (72) 34.4 (0.478)	0.351
CD8 Cells ^b (cells/mm ³)	16	<0.001	Mean (n): Difference (p-value):	471.8 (301)	485.2 (126) 13.4 (0.581)	469.2 (72) -2.6 (0.930)	481.6 (73) 9.8 (0.741)	0.937
CD20 Cells ^b (cells/mm ³)	16	0.213	Mean (n): Difference (p-value):	148.9 (301)	154.3 (127) 5.4 (0.544)	161.7 (72) 12.8 (0.260)	171.1 (73) 22.2 (0.066)	0.269
CD14 Cells ^b (cells/mm ³)	16	0.348	Mean (n): Difference (p-value):	32.7 (301)	32.2 (127) -0.5 (0.844)	30.4 (73) -2.3 (0.476)	29.1 (74) -3.6 (0.260)	0.674
CD25 Cells ^b (cells/mm ³)	16	0.538	Mean (n): Difference (p-value):	11.0 (214)	13.0 (90) 2.0 (0.221)	10.4 (51) -0.6 (0.770)	11.5 (57) 0.5 (0.760)	0.612
HLA-DR Cells ^b (cells/mm ³)	16	0.360	Mean (n): Difference (p-value):	422.5 (300)	433.7 (127) 11.2 (0.574)	459.5 (73) 37.0 (0.138)	433.2 (74) 10.7 (0.664)	0.520
CD4/CD8 Ratio ^b	16	0.302	Mean (n): Difference (p-value):	1.89 (301)	1.71 (126) -0.18 (0.068)	1.90 (72) 0.01 (0.969)	1.98 (72) 0.09 (0.548)	0.196
TLC ^b (cpm)	16	0.002	Mean (n): Difference (p-value):	1,972.0 (301)	1,954.2 (127) -17.8 (0.789)	2,011.6 (73) 39.6 (0.635)	2,032.4 (74) 60.4 (0.468)	0.817

TABLE Q-3. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category

Clinical Parameter (Units)	Reference Chapter	R ²	Statistic ^a	Current Dioxin Category				Overall p-Value
				Background	Unknown	Low	High	
Unstimulated PHA Response ^b (cpm)	16	0.541	Mean (n): Difference (p-value):	2,003 (297)	1,962 (123) -41 (0.689)	2,129 (71) 126 (0.332)	2,064 (73) 61 (0.640)	0.679
PHA Net Response (cpm) (Concentration 1)	16	0.668	Mean (n): Difference (p-value):	126,096 (297)	129,147 (121) 3,051 (0.552)	130,539 (71) 4,444 (0.472)	130,671 (72) 4,575 (0.471)	0.810
PHA Net Response (cpm) (Concentration 2)	16	0.670	Mean (n): Difference (p-value):	166,313 (297)	160,792 (121) -5,521 (0.301)	171,010 (71) 4,696 (0.465)	181,128 (72) 14,815 (0.025)	0.042
PHA Net Response (cpm) (Concentration 3)	16	0.577	Mean (n): Difference (p-value):	131,602 (297)	129,248 (121) -2,354 (0.658)	141,174 (71) 9,572 (0.135)	140,193 (72) 8,591 (0.191)	0.223
PHA Net Response (cpm) (Across Day and Concentration)	16	0.678	Mean (n): Difference (p-value):	141,337 (297)	139,729 (121) -1,608 (0.723)	147,574 (71) 6,237 (0.253)	150,664 (72) 9,327 (0.096)	0.221
Maximum PHA Net Response (cpm)	16	0.699	Mean (n): Difference (p-value):	200,475 (297)	194,152 (121) -6,323 (0.255)	201,590 (71) 1,115 (0.867)	216,159 (72) 15,684 (0.022)	0.037
Unstimulated MLC Response (cpm)	16	0.443	Mean (n): Difference (p-value):	3,619 (294)	3,691 (124) 72 (0.820)	4,065 (72) 446 (0.269)	4,773 (71) 1,154 (0.011)	0.070
MLC Net Response ^b (cpm)	16	0.558	Mean (n): Difference (p-value):	88,293 (294)	89,021 (124) 728 (0.876)	91,936 (72) 3,643 (0.516)	82,307 (71) -5,986 (0.304)	0.582
NCKA 50/1 Net Response (cpm)	16	0.347	Mean (n): Difference (p-value):	416.7 (291)	423.3 (126) 6.6 (0.759)	373.6 (71) -43.1 (0.106)	387.9 (72) -28.8 (0.291)	0.266

TABLE Q-3. (Continued)

**Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category**

Clinical Parameter (Units)	Reference Chapter	R ²	Statistic ^a	Current Dioxin Category				Overall p-Value
				Background	Unknown	Low	High	
NCKA 50/1 Percent Release	16	0.008	Mean (n): Difference (p-value):	35.9 (291)	36.8 (126) 0.9 (0.562)	32.4 (71) -3.6 (0.072)	34.6 (72) -1.3 (0.499)	0.199
NCKI 50/1 Net Response (cpm)	16	0.819	Mean (n): Difference (p-value):	808.9 (298)	802.3 (123) -6.6 (0.620)	817.5 (72) 8.6 (0.596)	802.6 (74) -6.3 (0.701)	0.843
NCKI 50/1 Percent Release	16	0.499	Mean (n): Difference (p-value):	66.6 (298)	65.9 (123) -0.7 (0.488)	66.8 (72) 0.2 (0.867)	65.7 (74) -0.9 (0.500)	0.821
IgA ^b (mg/dl)	16	0.007	Mean (n): Difference (p-value):	212.1 (759)	195.1 (338) -17.0 (0.003)	210.0 (192) -2.1 (0.769)	216.1 (179) 4.0 (0.604)	0.013
IgG ^b (mg/dl)	16	0.005	Mean (n): Difference (p-value):	1,024.2 (759)	986.5 (338) -37.7 (0.008)	1,021.3 (192) -2.9 (0.874)	1,020.4 (179) -3.8 (0.837)	0.058
IgM ^b (mg/dl)	16	0.005	Mean (n): Difference (p-value):	110.3 (759)	113.9 (338) 3.6 (0.301)	103.1 (192) -7.2 (0.076)	115.0 (179) 4.7 (0.294)	0.079
FVC (% of predicted)	17	0.013	Mean (n): Difference (p-value):	97.5 (786)	99.1 (344) 1.5 (0.075)	96.0 (196) -1.6 (0.141)	93.9 (187) -3.6 (0.001)	<0.001
FEV ₁ (% of predicted)	17	0.002	Mean (n): Difference (p-value):	98.4 (786)	98.7 (344) 0.3 (0.795)	96.4 (196) -2.0 (0.102)	97.5 (187) -1.0 (0.449)	0.321
FEFmax (% of predicted)	17	0.005	Mean (n): Difference (p-value):	137.7 (786)	139.1 (344) 1.5 (0.347)	134.2 (196) -3.5 (0.066)	135.4 (187) -2.3 (0.228)	0.077
Ratio of Observed FEV ₁ to Observed FVC ^h	17	0.028	Mean (n): Difference (p-value):	0.814 (786)	0.802 (344) -0.011 (0.007)	0.810 (196) -0.003 (0.504)	0.838 (187) 0.025 (<0.001)	<0.001

TABLE Q-3. (Continued)

Summary of Unadjusted Results for Continuous Variables
Model 3: Ranch Hands and Comparisons by Current Dioxin Category

^aDifferences are relative to background mean.

^bMeans transformed from natural logarithm scale; difference of means calculated after transformation to original scale; p-value based on difference of means on natural logarithm scale.

^cMeans transformed from natural logarithm (X + 1.0) scale; difference of means calculated after transformation to original scale; p-value based on difference of means on natural logarithm (X + 1.0) scale.

^dMeans transformed from square root scale; difference of means calculated after transformation to original scale; p-value based on difference of means on square root scale.

^eMeans transformed from square scale; difference of means calculated after transformation to original scale; p-value based on difference of means of square scale.

^fMeans transformed from natural logarithm (X + 0.1) scale; difference of means calculated after transformation to original scale; p-value based on difference of means on natural logarithm (X + 0.1) scale.

^gMeans transformed from natural logarithm (X - 0.4) scale; difference of means calculated after transformation to original scale; p-value based on difference of means on natural logarithm (TSH - 0.4) scale.

^hMeans transformed from natural logarithm (1 - X) scale; difference of means calculated after transformation to original scale; p-value based on difference of means on natural logarithm (1 - X) scale.

Note: Background (Comparisons): Current Dioxin ≤ 10 ppt.
Unknown (Ranch Hands): Current Dioxin ≤ 10 ppt.
Low (Ranch Hands): 15 ppt < Current Dioxin ≤ 33.3 ppt.
High (Ranch Hands): Current Dioxin > 33.3 ppt.

TABLE Q-4.

**Summary of Unadjusted Results for Dichotomous Variables
Model 1: Ranch Hands - Log₂ (Initial Dioxin)**

Clinical Parameter	Reference Chapter	Minimal Assumption		Maximal Assumption	
		Est. Relative Risk (95% C.I.)	p-Value	Est. Relative Risk (95% C.I.)	p-Value
Self-Perception of Health	6	1.10 (0.85,1.44)	0.471	1.23 (1.00,1.50)	0.058
Appearance of Illness or Distress by Physician	6	1.36 (0.60,3.09)	0.478	1.61 (0.81,3.21)	0.195
Relative Age	6	1.11 (0.81,1.53)	0.517	1.08 (0.86,1.37)	0.512
Percent Body Fat	6	1.23 (1.05,1.44)	0.012	1.32 (1.17,1.49)	<0.001
Sedimentation Rate	6	1.09 (0.85,1.40)	0.509	1.20 (0.99,1.46)	0.064
All Skin Neoplasms	7	0.77 (0.62,0.96)	0.014	0.88 (0.75,1.02)	0.092
Malignant Skin Neoplasms	7	0.70 (0.52,0.95)	0.014	0.86 (0.70,1.05)	0.136
Benign Skin Neoplasms (Non-Blacks Only)	7	0.93 (0.70,1.25)	0.635	0.97 (0.79,1.20)	0.771
Benign Skin Neoplasms (Blacks Included)	7	0.93 (0.70,1.24)	0.609	0.97 (0.79,1.20)	0.773
Skin Neoplasms of Uncertain Behavior or Unspecified Nature	7	--	--	--	--
<u>Basal Cell Carcinoma</u>	7	0.73 (0.53,1.00)	0.037	0.84 (0.68,1.05)	0.114
Ear, Face, Head, and Neck	7	0.51 (0.31,0.83)	0.002	0.71 (0.53,0.96)	0.017
Trunk	7	0.89 (0.54,1.46)	0.632	1.00 (0.70,1.43)	0.999
Upper Extremities	7	0.45 (0.08,2.68)	0.305	0.62 (0.24,1.58)	0.264
Lower Extremities	7	--	--	--	--
Other Sites	7	1.32 (0.64,2.69)	0.469	1.58 (0.87,2.86)	0.151
<u>Sun Exposure-Related</u>					
Malignant Skin Neoplasms	7	0.70 (0.51,0.95)	0.014	0.85 (0.69,1.04)	0.103
Ear, Face, Head, and Neck	7	0.56 (0.36,0.86)	0.003	0.75 (0.58,0.99)	0.031
Trunk	7	0.69 (0.41,1.16)	0.132	0.92 (0.66,1.30)	0.648
Upper Extremities	7	1.06 (0.43,2.62)	0.908	0.96 (0.50,1.83)	0.890
Lower Extremities	7	--	--	--	--
Other Sites	7	1.32 (0.64,2.69)	0.469	1.58 (0.87,2.86)	0.151
<u>Melanoma</u>	7	0.01 (0.00,1.60)	0.011	0.52 (0.16,1.74)	0.223
Ear, Face, Head, and Neck	7	--	--	--	--
Trunk	7	--	0.011	0.52 (0.12,2.28)	0.315
Upper Extremities	7	--	--	--	--
Lower Extremities	7	--	--	--	--
Other Sites	7	--	--	--	--
Squamous Cell Carcinoma	7	0.90 (0.34,2.42)	0.836	1.24 (0.60,2.60)	0.573
<u>Basal Cell Carcinoma by</u>					
<u>Occupation</u>					
Officer-Ear, Face, Head, and Neck vs. None	7	1.15 (0.25,5.26)	0.860	1.41 (0.67,2.97)	0.372
Officer-Other Sites vs. None	7	--	--	0.87 (0.27,2.78)	0.814