

Appendix E
General Health Assessment

TABLE E-1.
Summary of Dioxin-by-Covariate Interactions for
General Health Variables

Ranch Hands - Log₂ (Initial Dioxin)

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Percent Fair/Poor	Adj. Relative Risk (95% C.I.) ^a	p-Value
Self-Perception of Health (Minimal-- 6-3 [c])	Initial-by- Age	Born ≥1942	Low	43	2.3	1.49 (1.00,2.23)	0.049
			Medium	111	6.3		
			High	83	8.4		
	Initial-by- Personality Type	Born <1942	Low	87	6.9	0.87 (0.56,1.34)	0.522
			Medium	149	8.7		
			High	48	6.3		
Self-Perception of Health (Maximal-- 6-3 [d])	Initial-by- Personality Type	Type A	Low	93	4.3	1.57 (1.15,2.05)	0.005
			Medium	159	3.8		
			High	79	11.4		
	Initial-by- Personality Type	Type B	Low	83	6.0	1.02 (0.76,1.36)	0.912
			Medium	202	7.4		
			High	101	4.0		

Ranch Hands - Log₂ (Current Dioxin) and Time

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Percent Fair or Poor/(n)			Adj. Relative Risk (95% C.I.) ^a	p-Value
				Current Dioxin	Low	Medium		
Self-Perception of Health (Minimal-- 6-3 [g])	Current-by- Time-by- Personality Type	Type A	≤18.6	10.8 (37)	2.0 (49)	0.0 (21)	0.16 (0.02,1.48)	0.106 ^b
			>18.6	0.0 (24)	8.8 (57)	20.6 (34)		
	Current-by- Time-by- Personality Type	Type B	≤18.6	3.1 (32)	6.7 (75)	6.7 (30)	0.93 (0.47,1.85)	0.837 ^c
			>18.6	9.1 (33)	8.3 (72)	4.8 (42)		

TABLE E-1. (Continued)
Summary of Dioxin-by-Covariate Interactions for
General Health Variables

Ranch Hands - Log₂ (Current Dioxin) and Time

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Percent Fair or Poor/(n) <u>Current Dioxin</u>			Adj. Relative Risk (95% C.I.) ^a	p-Value
				Low	Medium	High		
Self-Perception of Health (Maximal-- 6-3 [h])	Current-by- Time-by- Personality	Type A	≤18.6	2.0 (50)	7.0 (86)	0.0 (32)	0.69 (0.31,1.52)	0.360 ^c
			>18.6	0.0 (35)	4.9 (82)	17.4 (46)	2.11 (1.37,3.26)	0.001 ^c
			≤18.6	2.0 (49)	5.1 (98)	6.4 (47)	1.20 (0.73,1.98)	0.462 ^c
	Type	Type B	>18.6	7.1 (42)	10.6 (94)	3.6 (56)	0.84 (0.56,1.26)	0.398 ^c
			≤18.6	2.0 (49)	5.1 (98)	6.4 (47)	1.20 (0.73,1.98)	0.462 ^c
			>18.6	7.1 (42)	10.6 (94)	3.6 (56)	0.84 (0.56,1.26)	0.398 ^c

Ranch Hands and Comparisons by Current Dioxin Category

Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Percent Yes	Contrast	Adj. Relative Risk (95% C.I.)		p-Value
Appearance of Illness or Distress by Physician (6-4 [j])	Categorized Current Dioxin-by- Age	Born ≥1942	Background	322	0.3	All			0.805 ^d
			Unknown	118	0.0	U vs. B	--	--	--
			Low	81	0.0	L vs. B	--	--	--
			High	117	0.0	H vs. B	--	--	--
		Born <1942	Background	463	0.6	All			0.236
			Unknown	227	0.9	U vs. B	1.36 (0.29,6.49)	0.697	
			Low	115	0.0	L vs. B	--	--	--
			High	70	2.9	H vs. B	4.51 (0.65,31.42)	0.128	

TABLE E-1. (Continued)
Summary of Dioxin-by-Covariate Interactions for
General Health Variables

Ranch Hands and Comparisons by Current Dioxin Category		Stratum	Current Dioxin Category	n	Adj. Mean	Difference of Adj. Contrast Means (95% C.I.) ^f		p-Value ^g
Variable/ (Table Ref.)	Interaction					All	p	
Sedimentation Rate ^e (Continuous) (6-8 [j])	Categorized Current Dioxin-by Age	Born ≥1942	Background	311	4.36	All		0.009
			Unknown	110	3.72	U vs. B	-0.63 --	0.080
			Low	78	5.52	L vs. B	1.16 --	0.021
			High	113	4.72	H vs. B	0.36 --	0.368
	Born <1942	Background	440	5.77	All			<0.001
			Unknown	218	5.01	U vs. B	-0.78 --	0.037
			Low	114	6.05	L vs. B	0.28 --	0.576
			High	68	7.94	H vs. B	2.17 --	0.003

^aRelative risk for a twofold increase in dioxin.

^bTest of significance for homogeneity of relative risks (current dioxin continuous, time categorized).

^cTest of significance for relative risk equal to 1 (current dioxin continuous, time categorized).

^dBased on Pearson's chi-square statistic.

^eAdjusted means transformed from natural logarithm scale.

^fDifference of means after transformation to original scale; confidence interval on difference of means not given because analysis was preformed on natural logarithm scale.

^gp-value is based on difference of means on natural logarithm scale.

--: Relative risk, confidence interval, and p-value not given due to the sparse number of abnormalities; confidence interval not given due to analysis on natural logarithm scale.

Note: Initial Dioxin: Minimal--Low: 52-93 ppt; Medium: >93-292 ppt; High: >292 ppt.

Maximal--Low: 25-56.9 ppt; Medium: >56.9-218 ppt; High: >218 ppt.

Current Dioxin: Minimal--Low: >10-14.65 ppt; Medium: >14.65-45.75 ppt; High: >45.75 ppt.

Maximal--Low: >5-9.01 ppt; Medium: >9.01-33.3 ppt; High: >33.3 ppt.

All: All categories.

Background (B) (Comparisons): Current Dioxin ≤10 ppt.

Unknown (U) (Ranch Hands): Current Dioxin ≤10 ppt.

Low (L) (Ranch Hands): 15 ppt < Current Dioxin ≤33.3 ppt.

High (H) (Ranch Hands): Current Dioxin >33.3 ppt.

APPENDIX E-1.
Data Displays for the General Health Assessment

The following figures graphically display relationships between the dependent variables and measures of dioxin for the general health assessment. The panels are arranged as follows:

Panel	Group	Assumption	Dioxin Measure
a	Ranch Hand	Minimal	Initial
b	Ranch Hand	Maximal	Initial
c	Comparison	--	Current
d	Ranch Hand	--	Current

Dioxin measures are presented in original units, but spacing of intervals is based on the logarithm (base 2) scale, similar to the statistical analysis. The dependent variable is also presented in original units, but spacing is based on the scale used for analysis, as described in the chapter. For continuous variables, current dioxin values of 0.0 ppt are displayed as 0.3 ppt. For these variables, the reference line indicates the general relationship, unadjusted for any covariates, between the (transform of the) dependent variable and log₂ dioxin. For discrete variables, the percent of participants that exhibited an abnormal condition is displayed on the vertical axis for given intervals of dioxin. The intervals of dioxin and the sample sizes (assuming no missing data) for each of these intervals are given below. A list of figures found in this appendix follows the table.

Dioxin Interval	Dioxin Scale Midpoint	Panel			
		a	b	c	d
0.0-0.5	0.25	0	0	42	8
>0.5-2.0	1	0	0	28	8
>2.0-8.0	4	0	0	681	249
>8.0-32.0	16	0	23	52	408
>32.0-128.0	64	219	417	1	158
>128.0-512.0	256	234	234	0	33
>512.0-2,048.0	1024	65	65	0	2
>2,048.0	4096	3	3	0	0

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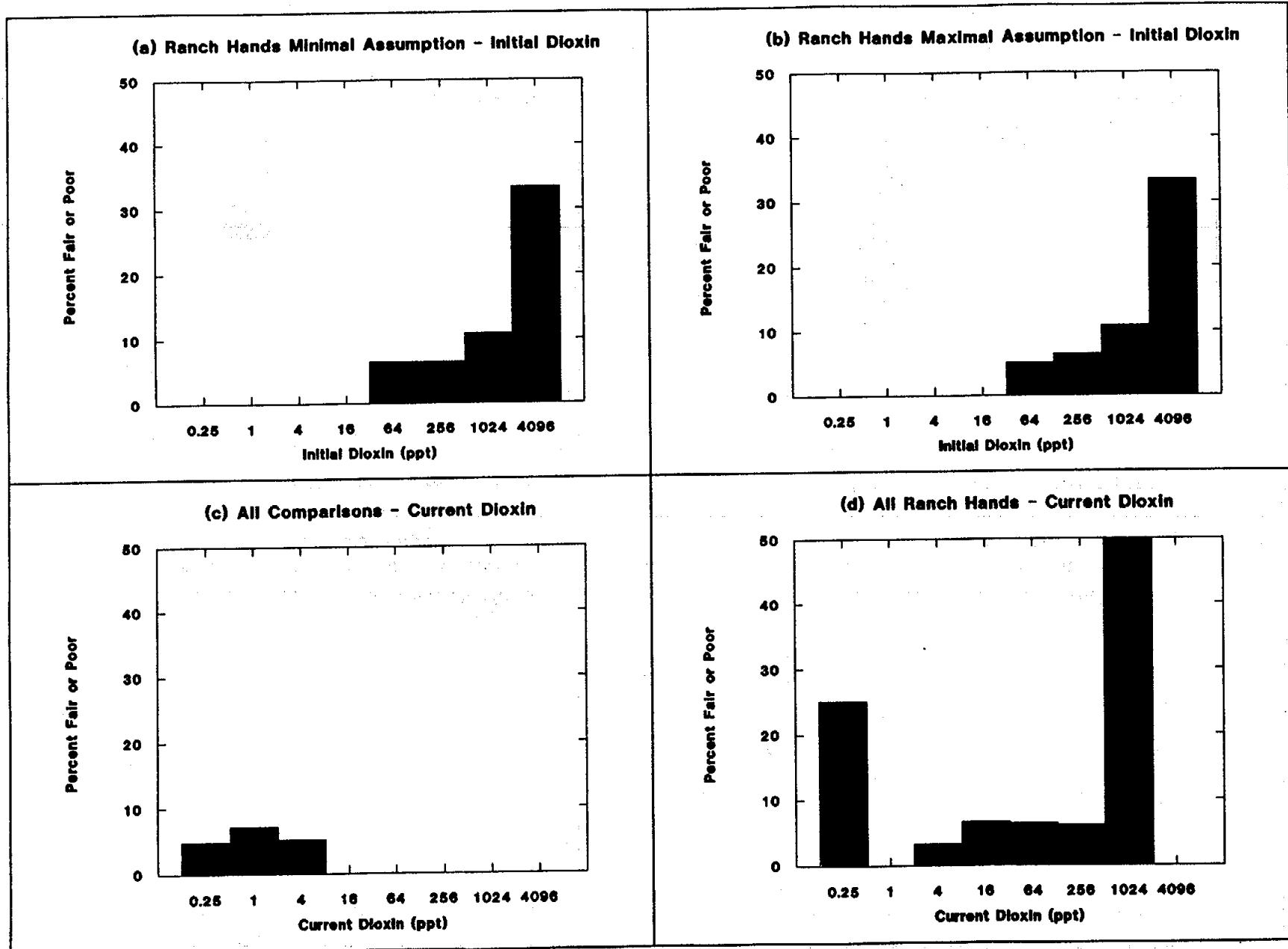


FIGURE E-1-1. Self-Perception of Health versus Dioxin

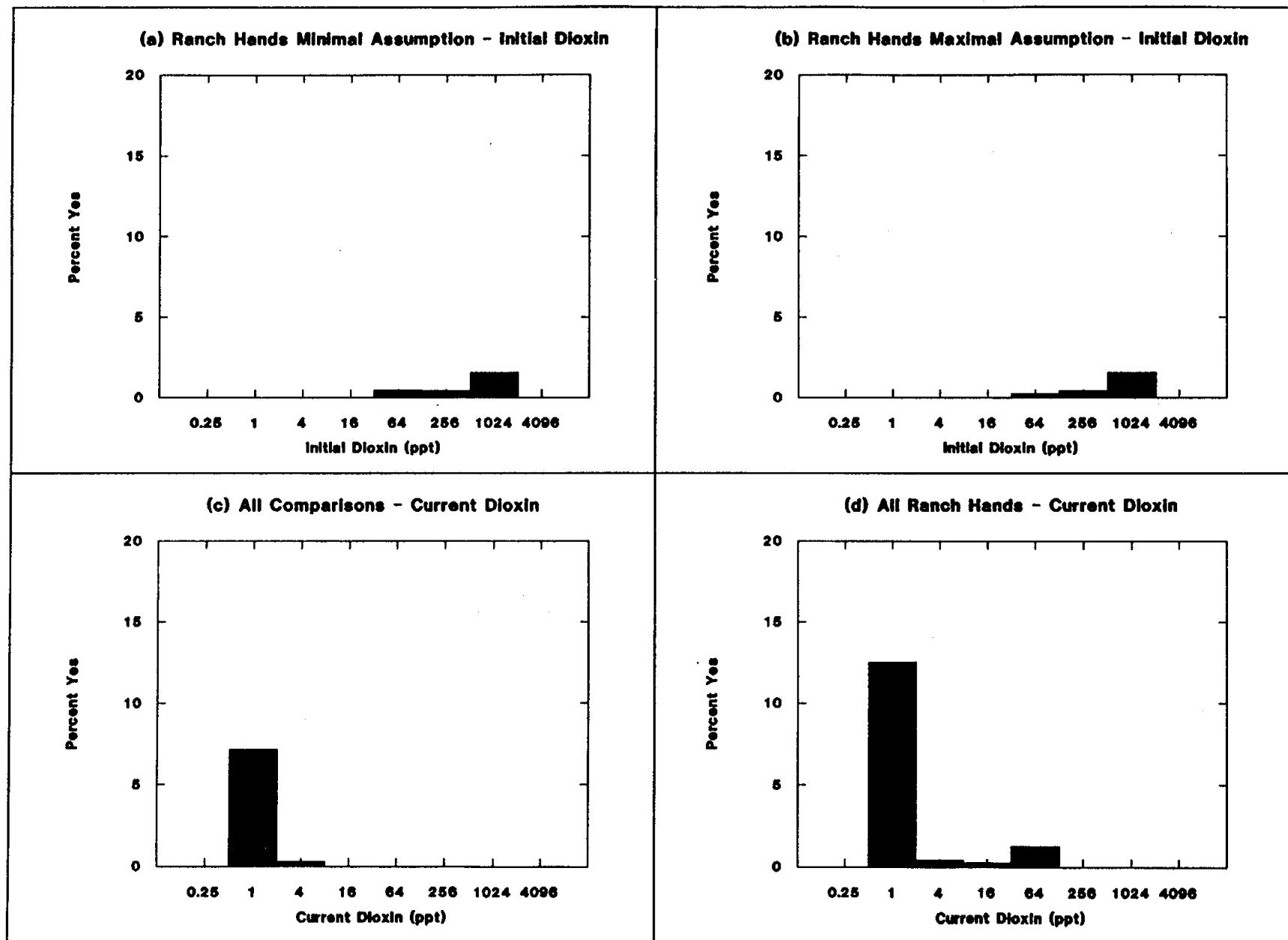


FIGURE E-1-2. Appearance of Illness or Distress versus Dioxin

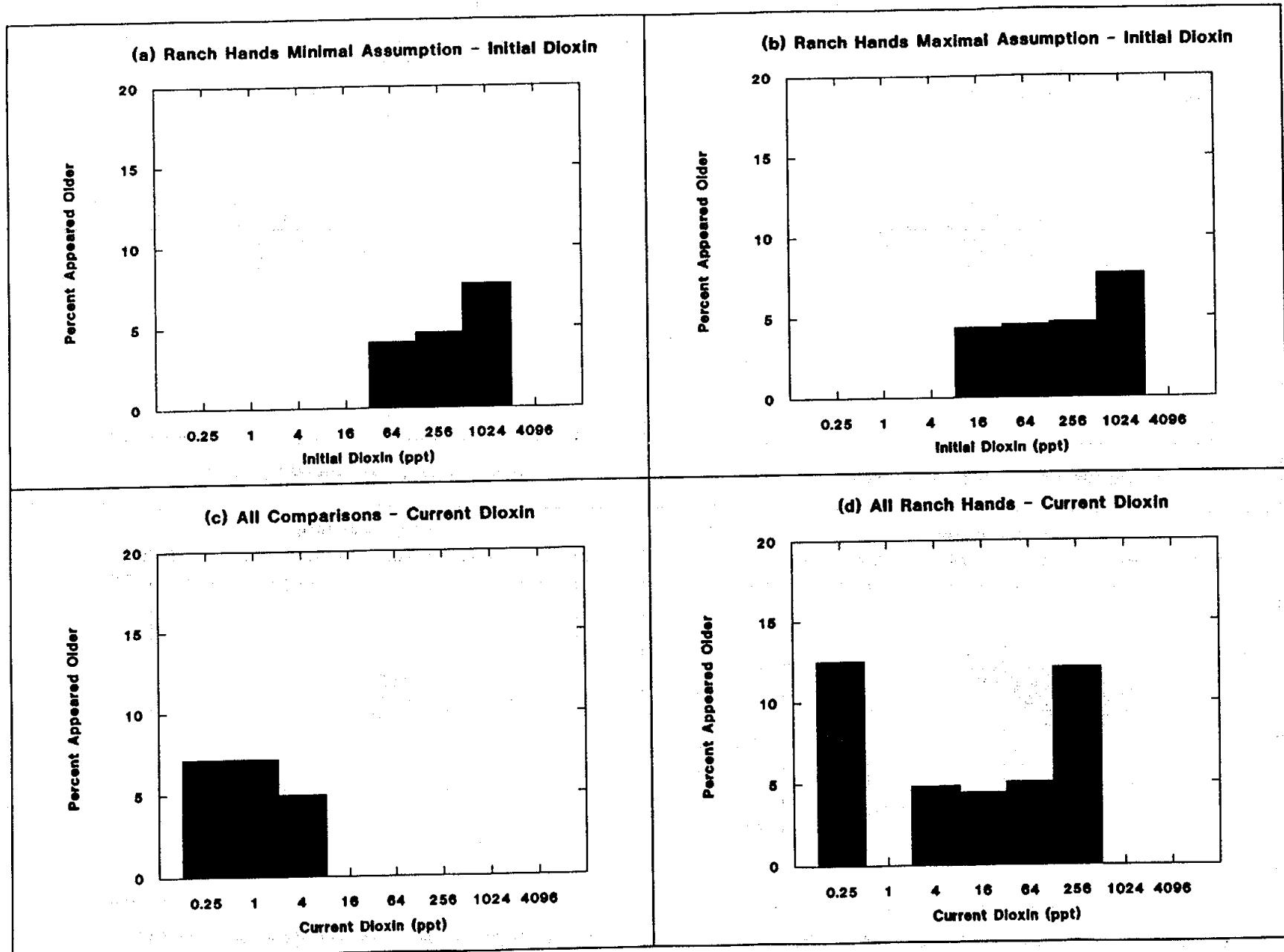


FIGURE E-1-3. Relative Age versus Dioxin

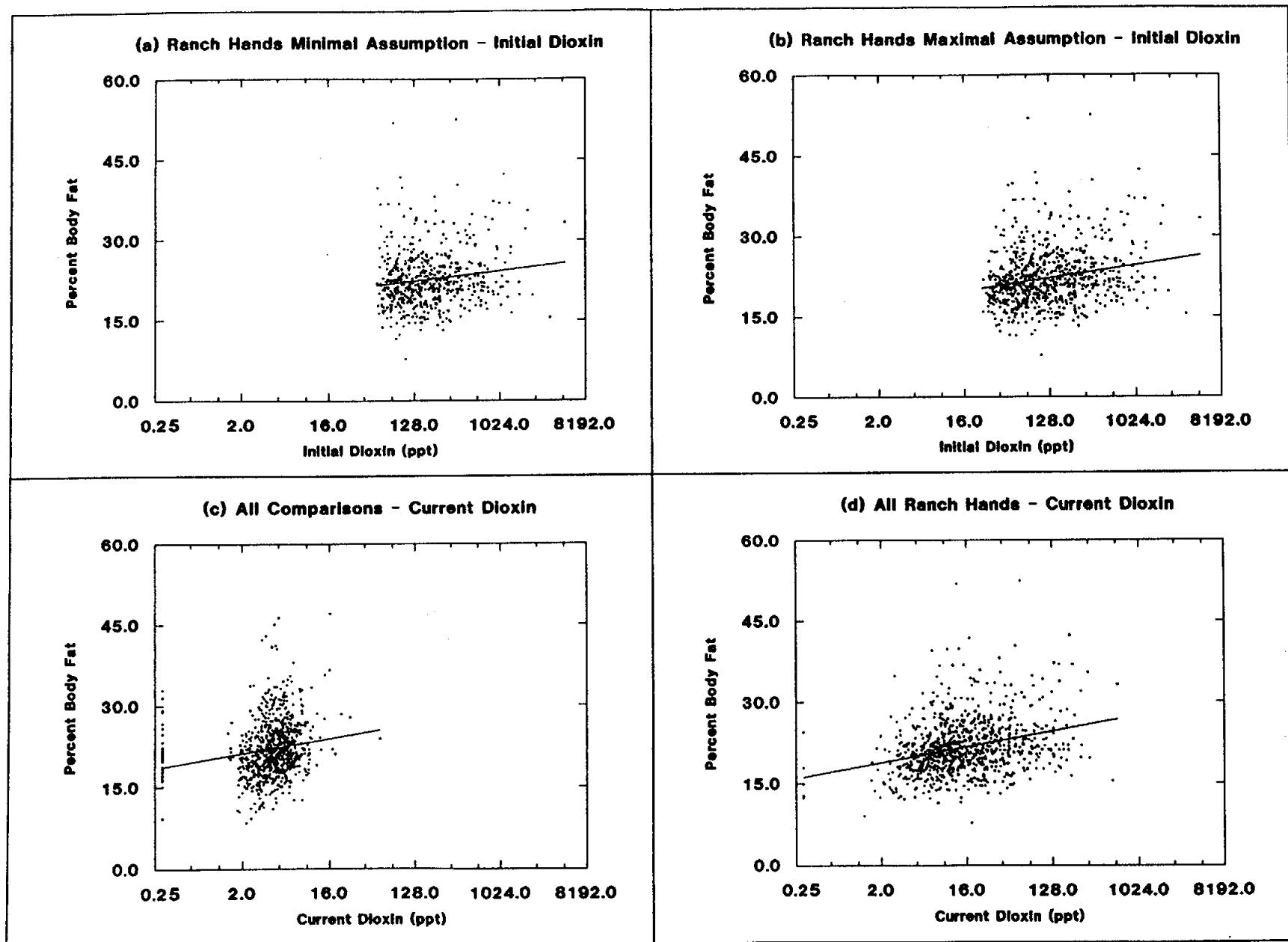


FIGURE E-1-4. Percent Body Fat (Continuous) versus Dioxin

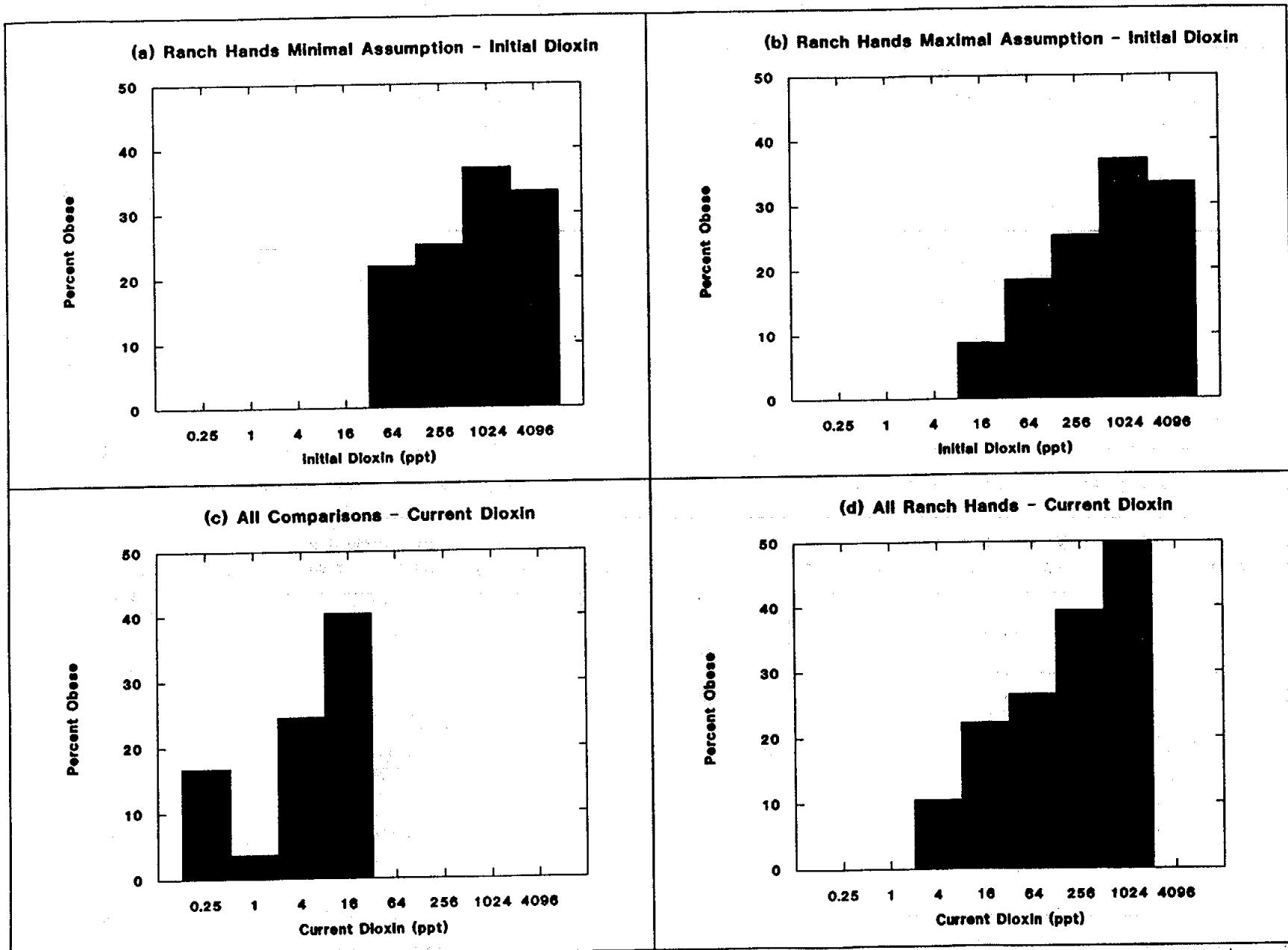


FIGURE E-1-5. Percent Body Fat (Discrete) versus Dioxin

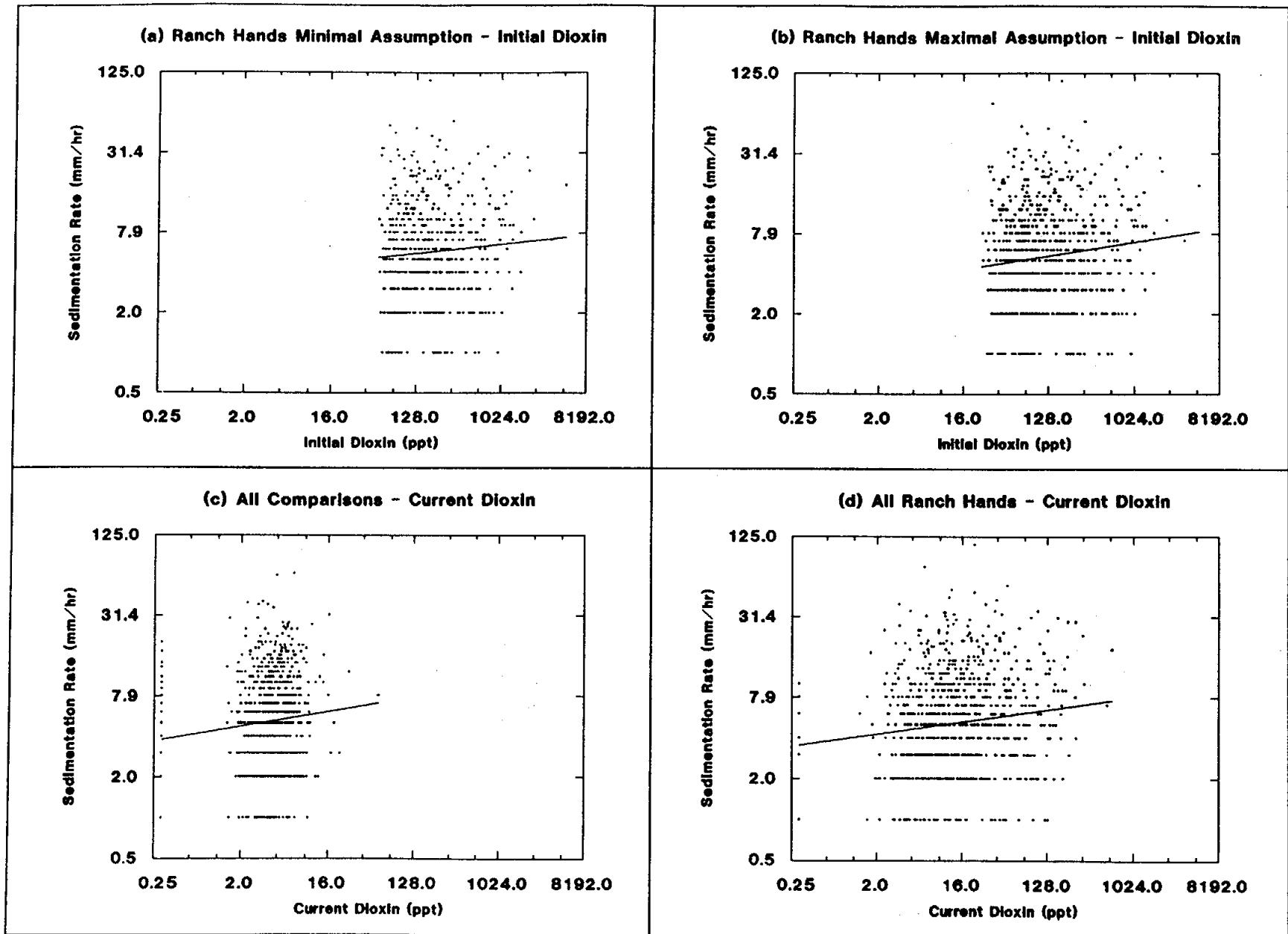


FIGURE E-1-6. Sedimentation Rate (Continuous) versus Dioxin

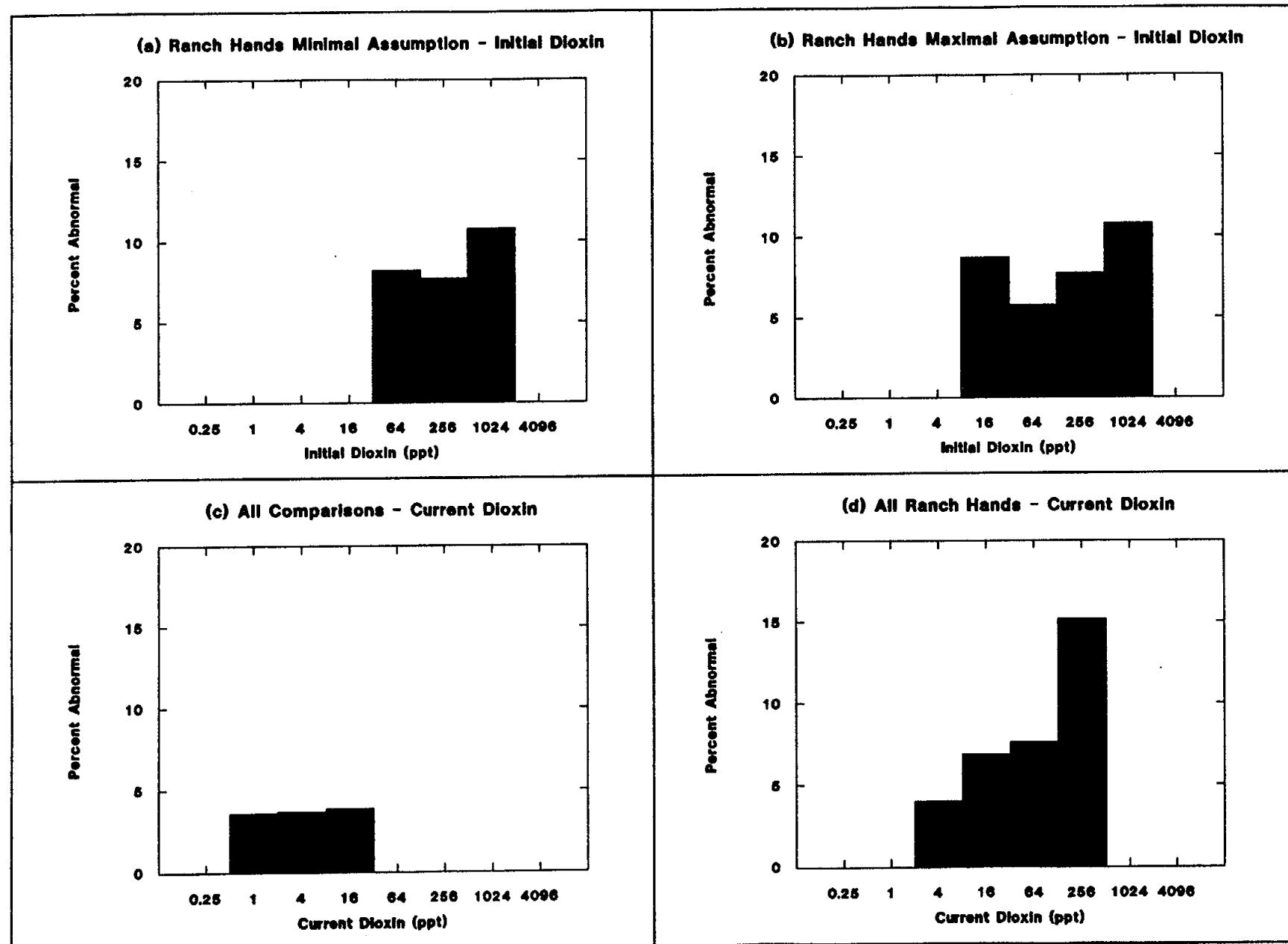


FIGURE E-1-7. Sedimentation Rate (Discrete) versus Dioxin

APPENDIX E-2.

Interaction Displays for the General Health Assessment

The following figures graphically display dioxin-by-covariate interactions found in the statistical analyses of the dependent variables in the general health assessment. 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 E, Table E-1), and each stratum is represented by a different design. Appendix Table E-1 also displays the sample sizes for each bar on the graph.

For current dioxin-by-time-by-covariate interactions in the Ranch Hands for 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 E-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 E-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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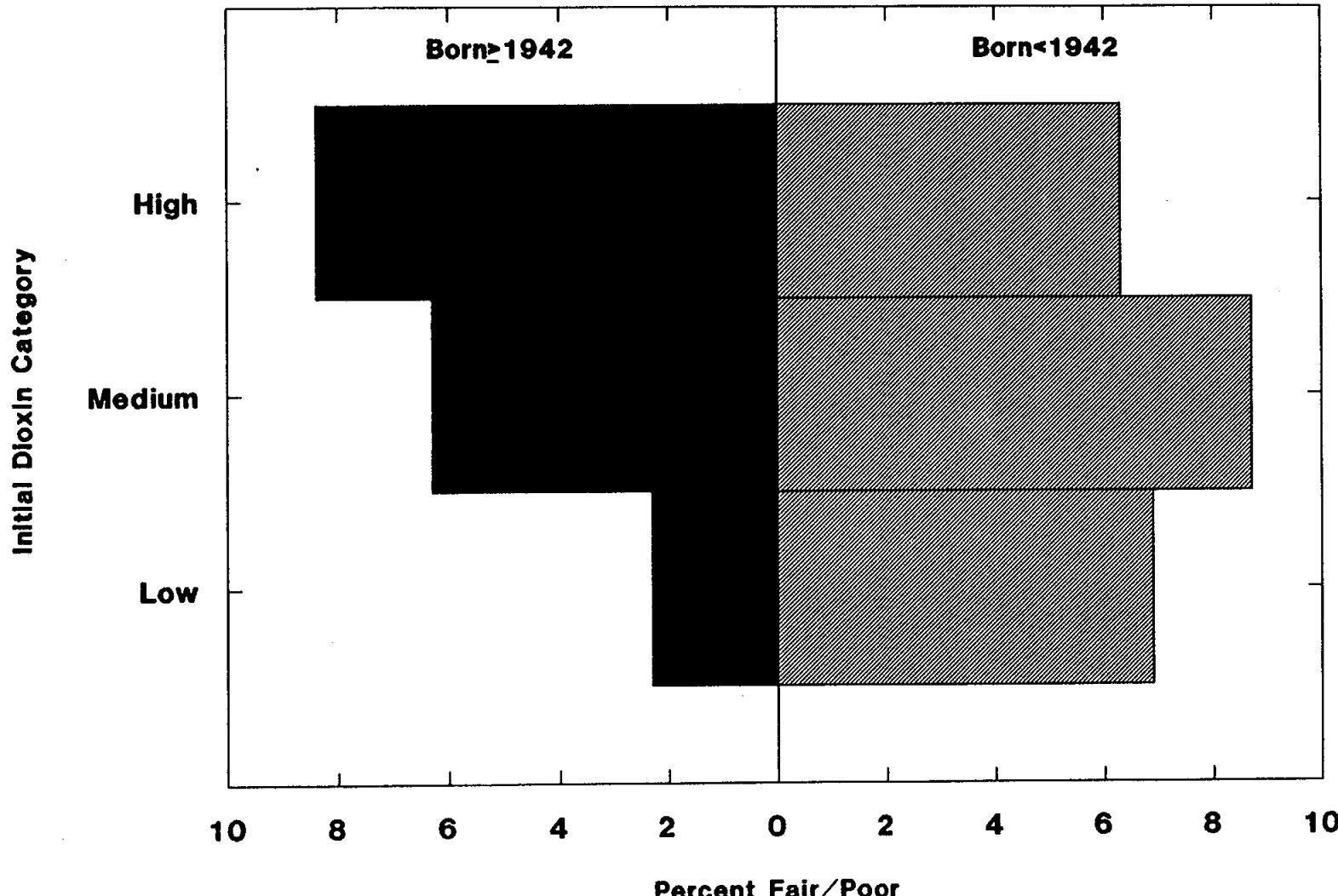


FIGURE E-2-1. Interaction of Initial Dioxin and Age for Self-Perception of Health (Ranch Hands, Minimal Assumption)

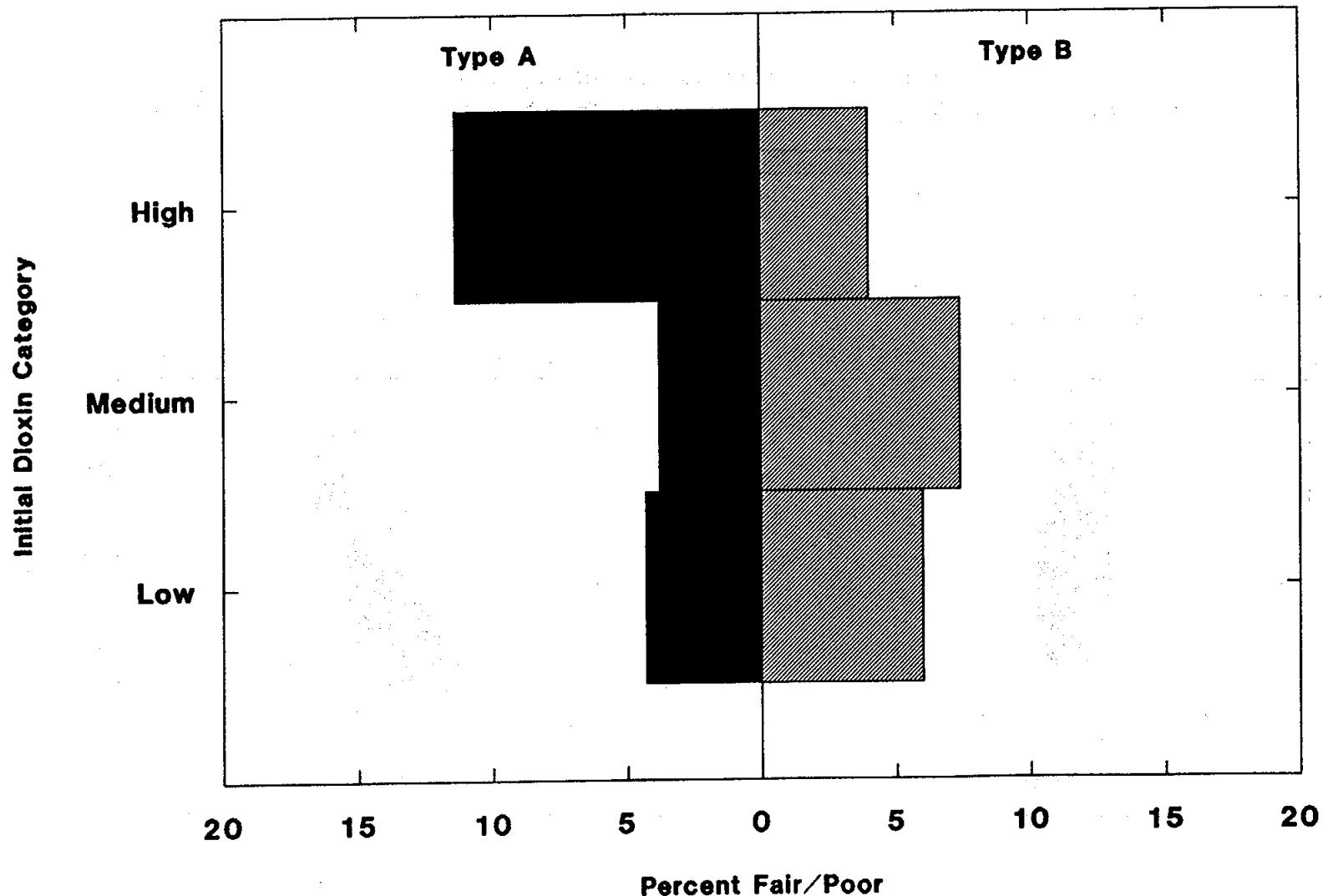


FIGURE E-2-2. Interaction of Initial Dioxin and Personality Type for Self-Perception of Health (Ranch Hands, Maximal Assumption)

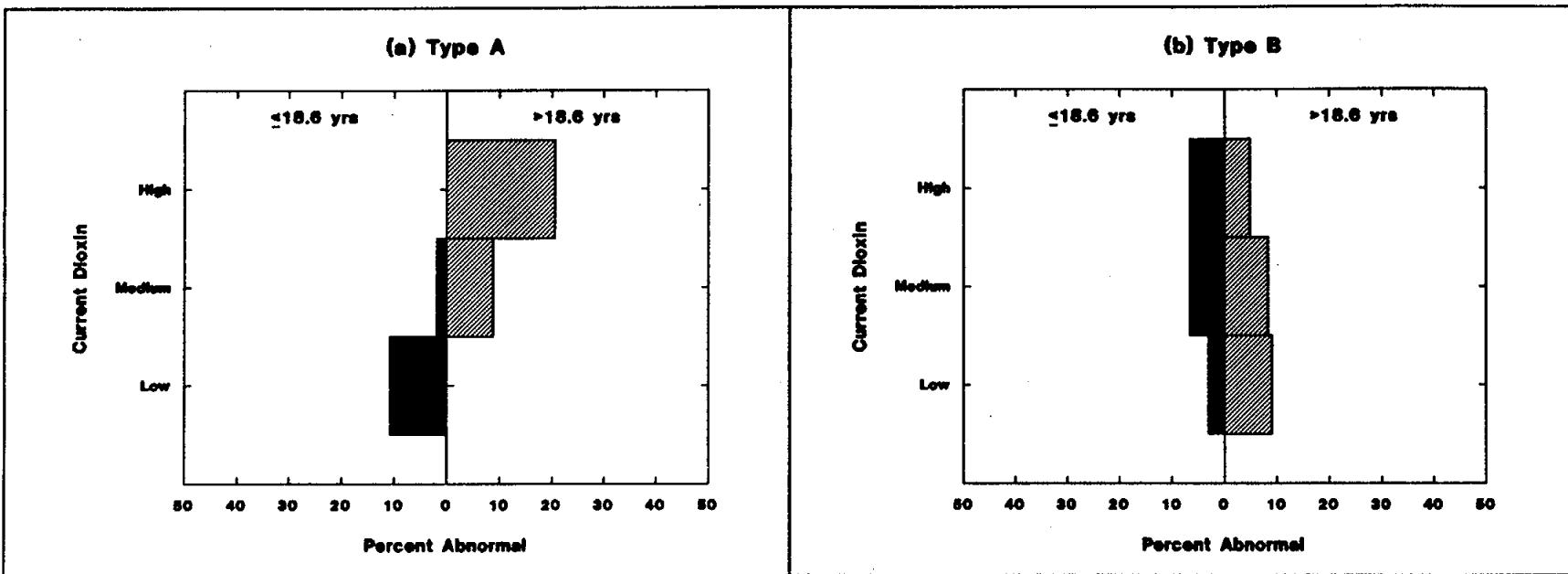


FIGURE E-2-3. Interaction of Current Dioxin, Time, and Personality Type for Self-Perception of Health (Ranch Hands, Minimal Assumption)

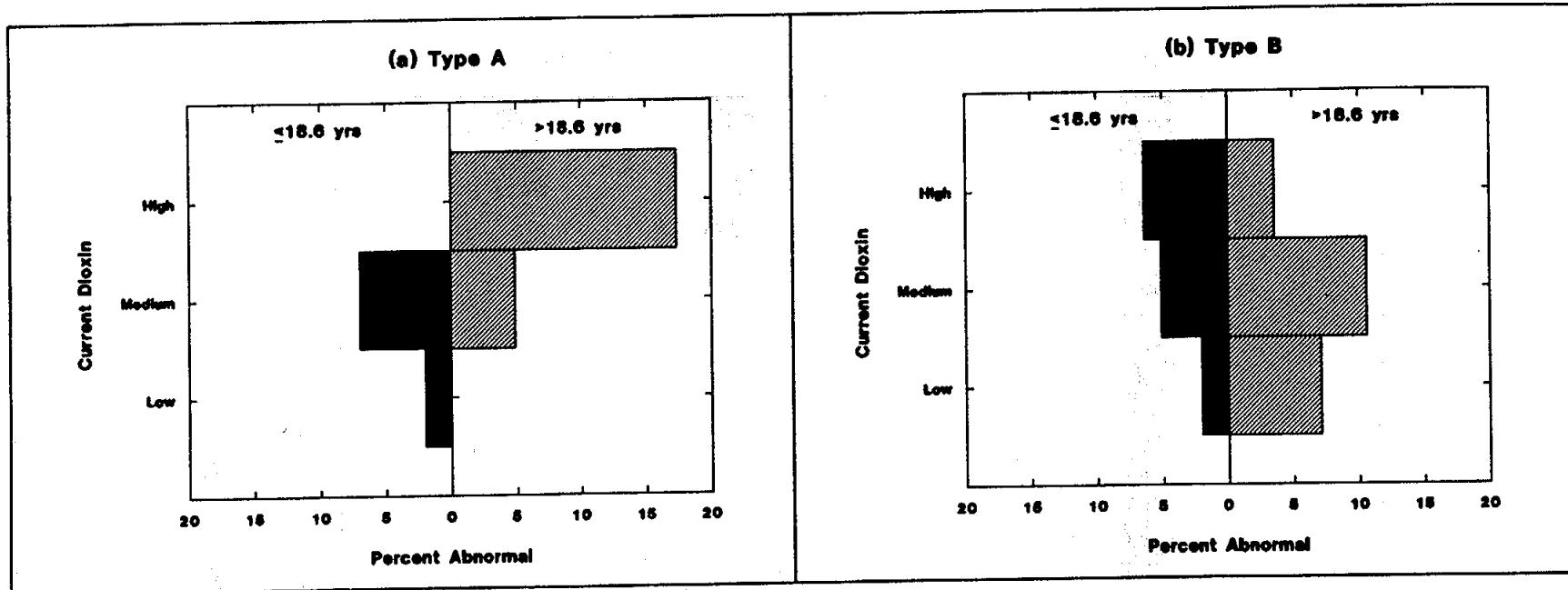


FIGURE E-2-4. Interaction of Current Dioxin, Time, and Personality Type for Self-Perception of Health (Ranch Hands, Maximal Assumption)

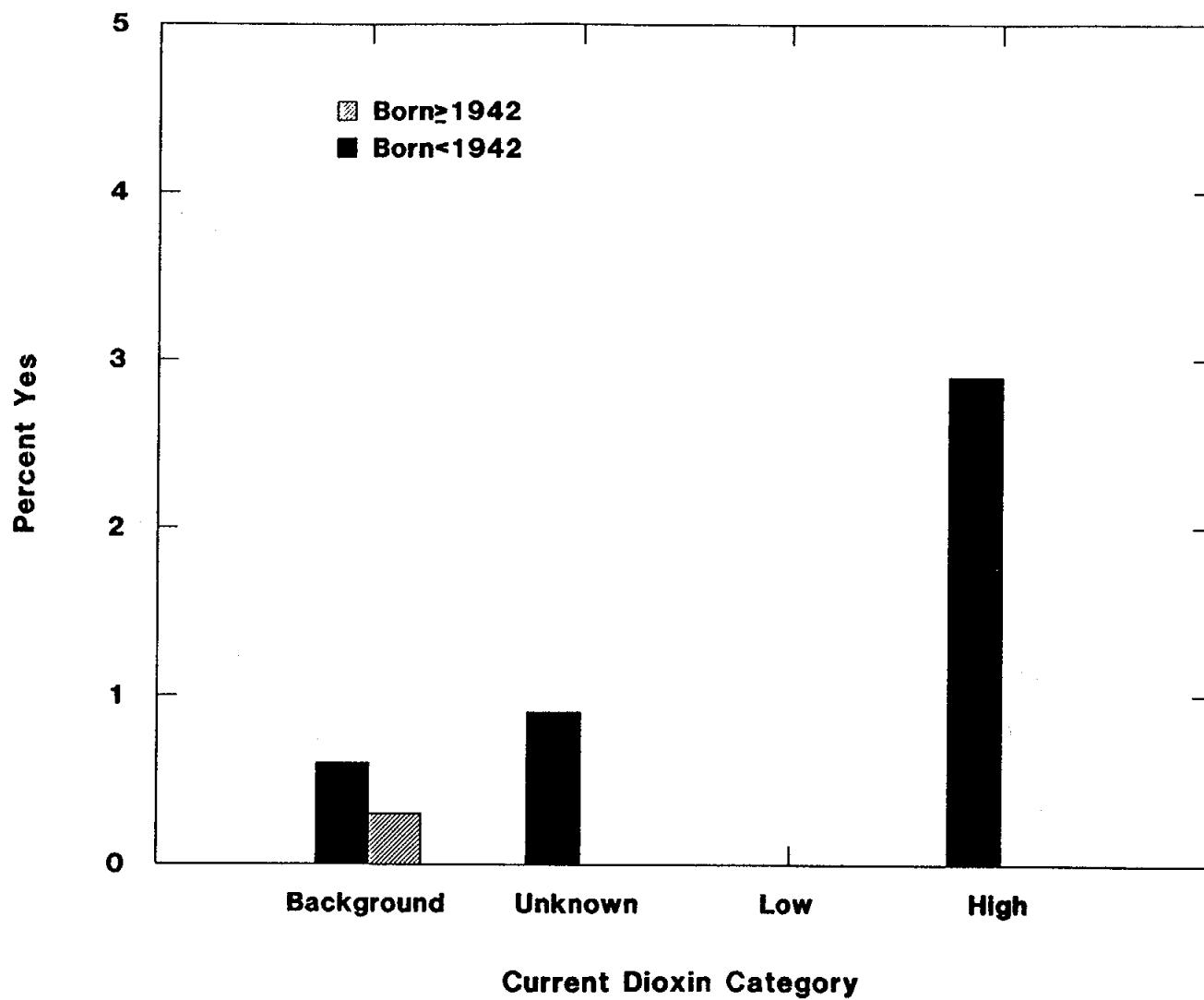


FIGURE E-2-5. Interaction of Categorized Current Dioxin and Age for Appearance of Illness or Distress by Physician

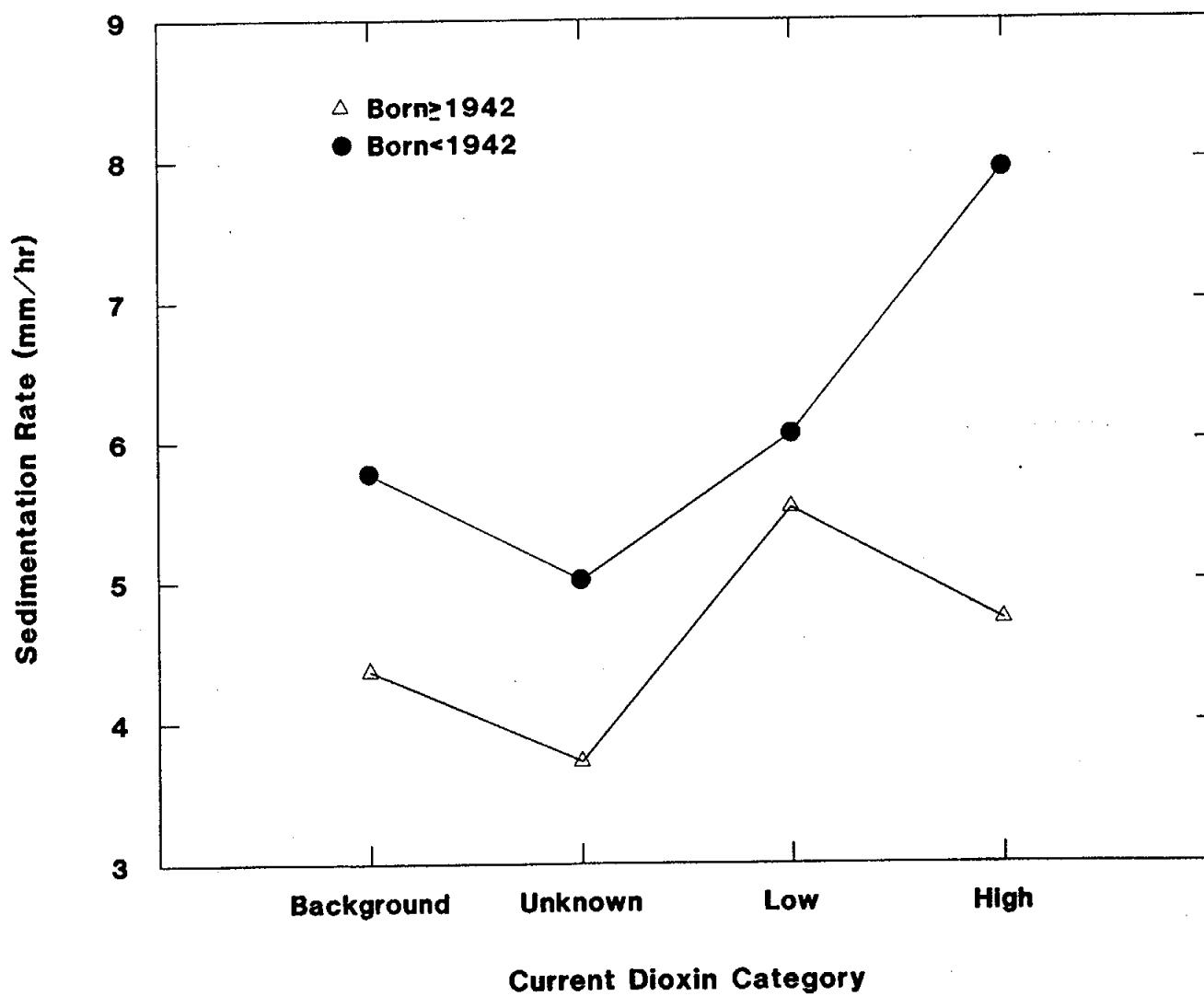


FIGURE E-2-6. Interaction of Categorized Current Dioxin and Age for Sedimentation Rate (Continuous)