

Appendix I
Gastrointestinal Assessment

TABLE I-1.

**Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables**

Ranch Hands - Log₂ (Initial Dioxin)

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Adj. Mean	Adj. Slope (Std. Error)	p-Value		
AST ^a (Minimal-- 10-12 [c])	Initial-by- Degreasing Chemical Exposure	No	Low	57	25.87	0.0322 (0.0207)	0.121		
			Medium	80	24.89				
			High	26	28.65				
		Yes	Low	73	28.29			-0.0179 (0.0133)	0.180
			Medium	173	27.09				
			High	102	26.07				

Ranch Hands - Log₂ (Current Dioxin) and Time

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Adj. Mean/(n) Current Dioxin			Adj. Slope (Std. Error)	p-Value
				Low	Medium	High		
AST ^a (Maximal-- 10-12 [h])	Current-by- Time-by- Current Alcohol Use	≤1	≤18.6	24.51 (82)	24.08 (153)	24.21 (68)	-0.0053 (0.0139)	0.225 ^b
			>18.6	23.42 (63)	26.01 (139)	26.03 (84)		0.705 ^c
			≤18.6	26.17 (22)	24.95 (35)	26.91 (12)		0.179 ^c
			>18.6	27.06 (15)	32.99 (37)	25.34 (18)		0.031 ^b
			≤18.6	26.17 (22)	24.95 (35)	26.91 (12)		0.647 ^c
			>18.6	27.06 (15)	32.99 (37)	25.34 (18)		0.006 ^c

TABLE I-1. (Continued)

**Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables**

Ranch Hands - Log₂ (Initial Dioxin)								
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Percent Abnormal High	Adj. Relative Risk (95% C.I.) ^d	p-Value	
AST (Minimal-- 10-13 [c])	Initial-by- Race	Black	Low	12	25.0	--	0.010	
			Medium	14	0.0			
			High	3	0.0			
	Initial-by- Degreasing Chemical Exposure	Non-Black No	Non-Black	Low	55	1.8	1.97 (0.95,4.09)	0.069
				Medium	77	0.0		
				High	27	11.1		
Non-Black Yes		Non-Black	Low	63	7.9	0.82 (0.54,1.23)	0.340	
			Medium	164	5.5			
			High	99	4.0			
AST (Maximal-- 10-13 [d])	Initial-by- Degreasing Chemical Exposure	No	Low	85	1.2	1.60 (0.94,2.72)	0.086	
			Medium	137	1.5			
			High	44	6.8			
		Yes	Non-Black	Low	98	6.1	0.85 (0.64,1.13)	0.258
				Medium	228	8.3		
				High	140	3.6		

Ranch Hands - Log₂ (Initial Dioxin)

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Adj. Mean	Adj. Slope (Std. Error)	p-Value	
ALT ^a (Maximal-- 10-14 [d])	Initial-by- Age	Born ≥1942	Low	70	18.29	0.0647 (0.0180)	<0.001	
			Medium	124	21.45			
			High	116	23.61			
		Born <1942	Born	Low	113	18.14	0.0091 (0.0198)	0.646
				Medium	241	20.24		
				High	68	18.64		

TABLE I-1. (Continued)

Summary of Dioxin-by-Covariate Interactions for Gastrointestinal Variables

Ranch Hands - Log₂ (Current Dioxin) and Time

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Adj. Mean/(n) Current Dioxin			Adj. Slope (Std. Error)	p-Value
				Low	Medium	High		
ALT ^a (Maximal-- 10-14 [h])	Current-by- Time-by- Current	≤1	≤18.6	17.73 (82)	18.68 (153)	19.85 (68)	0.0338 (0.0225)	0.388 ^b 0.134 ^c
			>18.6	16.45 (63)	20.48 (139)	21.86 (85)		0.0593 (0.0202)
	Alcohol Use	>1	≤18.6	23.22 (23)	22.96 (35)	26.30 (13)	0.0552 (0.0487)	0.068 ^b 0.257 ^c
			>18.6	22.87 (15)	28.81 (37)	23.12 (19)		-0.0603 (0.0408)

Ranch Hands and Comparisons by Current Dioxin Category

Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Adj. Mean	Contrast	Difference of Adj. Means (95% C.I.) ^e	p-Value ^f
ALT ^a (10-14 [j])	Categorized Current Dioxin-by- Lifetime Alcohol History	0	Background	58	21.11	All		0.434
			Unknown	28	20.64	U vs. B	-0.47 --	0.834
			Low	17	18.37	L vs. B	-2.74 --	0.285
			High	30	23.19	H vs. B	2.08 --	0.376
		>0-40	Background	530	20.28	All		0.002
			Unknown	251	18.13	U vs. B	-2.15 --	0.002
			Low	134	21.30	L vs. B	1.02 --	0.280
			High	110	21.07	H vs. B	0.79 --	0.443
		>40	Background	189	19.95	All		0.057
			Unknown	59	22.78	U vs. B	2.83 --	0.062
			Low	40	19.98	L vs. B	0.03 --	0.981
			High	42	23.93	H vs. B	3.98 --	0.024

TABLE I-1. (Continued)
Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables

Ranch Hands - Log₂ (Initial Dioxin)							
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Percent Abnormal High	Adj. Relative Risk (95% C.I.) ^d	p-Value
ALT (Minimal-- 10-15 [c])	Initial-by- Degreasing Chemical Exposure	No	Low	57	8.8	1.62 (1.11,2.38)	0.013
			Medium	80	6.3		
			High	27	33.3		
		Yes	Low	73	15.1	0.90 (0.70,1.17)	0.433
			Medium	175	16.0		
			High	102	11.8		
ALT (Maximal-- 10-15 [d])	Initial-by- Current Alcohol Use	≤1	Low	144	6.3	1.28 (1.07,1.54)	0.007
			Medium	291	10.3		
			High	155	14.8		
		>1-4	Low	35	14.3	0.95 (0.65,1.37)	0.774
			Medium	67	26.9		
			High	21	14.3		
		X	Low	4	25.0	0.67 (0.28,1.60)	0.371
			Medium	7	14.3		
			High	8	12.5		

TABLE I-1. (Continued)
Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables

Ranch Hands - Log₂ (Initial Dioxin)							
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Percent Abnormal High	Adj. Relative Risk (95% C.I.) ^d	p-Value
GGT (Minimal-- 10-17 [c])	Initial-by- Race	Black	Low	12	25.0	--	0.055
			Medium	14	0.0		
			High	3	0.0		
	Initial-by- Degreasing Chemical Exposure	Non-Black No	Low	55	7.3	1.65 (1.13,2.42)	0.010
			Medium	77	10.4		
			High	27	25.9		
Non-Black Yes	Low	63	9.5	0.85 (0.61,1.18)	0.336		
	Medium	164	10.4				
	High	99	6.1				
GGT (Maximal-- 10-17 [d])	Initial-by- Degreasing Chemical Exposure	No	Low	85	3.5	1.76 (1.30,2.39)	<0.001
			Medium	137	8.0		
			High	44	22.7		
	Yes	Low	98	6.1	1.01 (0.79,1.29)	0.930	
		Medium	228	10.5			
		High	140	5.7			

Ranch Hands and Comparisons by Current Dioxin Category

Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Percent Abnormal High	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	
GGT (10-17 [j])	Categorized Current Dioxin-by- Degreasing Chemical Exposure	No	Background	295	6.1	All		0.002	
			Unknown	166	4.8	U vs. B	0.93 (0.39,2.23)	0.876	
			Low	61	8.2	L vs. B	1.51 (0.53,4.30)	0.444	
		High	High	41	24.4	H vs. B	5.89 (2.43,14.29)	<0.001	
			Yes	Background	482	6.0	All		0.305
				Unknown	172	6.4	U vs. B	0.98 (0.47,2.05)	0.968
		Low		130	10.8	L vs. B	1.93 (0.98,3.82)	0.058	
		High	141	6.4	H vs. B	1.09 (0.50,2.39)	0.822		

TABLE I-1. (Continued)
Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables

Ranch Hands - Log₂ (Current Dioxin) and Time									
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Adj. Mean/(n) Current Dioxin			Adj. Slope (Std. Error)	p-Value	
				Low	Medium	High			
Alkaline Phosphatase ^a (Minimal-- 10-18 [g])	Current-by- Time-by- Lifetime	0	≤18.6	95.15 (30)	92.20 (76)	93.48 (33)	-0.0154 (0.0175)	0.160 ^b 0.378 ^c	
			>18.6	94.68 (28)	91.74 (78)	96.28 (55)	0.0154 (0.0133)	0.249 ^c	
	Wine History	>0	≤18.6	86.19 (42)	92.76 (50)	90.22 (19)	0.0211 (0.0214)	0.141 ^b 0.325 ^c	
			>18.6	94.98 (30)	91.37 (50)	88.75 (22)	-0.0221 (0.0202)	0.276 ^c	
			Black	≤18.6	80.67 (4)	81.52 (10)	107.82 (2)	0.0505 (0.1082)	0.205 ^b 0.644 ^c
			>18.6	105.61 (1)	105.77 (12)	81.26 (6)	-0.1099 (0.0654)	0.104 ^c	
Alkaline Phosphatase ^a (Maximal-- 10-18 [h])	Current-by- Time-by- Race	Non-Black	≤18.6	91.21 (48)	96.03 (105)	94.34 (57)	0.0039 (0.0124)	0.486 ^b 0.752 ^c	
			>18.6	89.16 (40)	95.32 (108)	97.08 (77)	0.0150 (0.0103)	0.147 ^c	
	Current Wine Use	Non-Black >0	≤18.6	84.79 (52)	90.26 (74)	89.11 (22)	0.0261 (0.0164)	0.288 ^b 0.112 ^c	
			>18.6	88.02 (37)	91.13 (56)	88.07 (20)	0.0015 (0.0168)	0.927 ^c	

TABLE I-1. (Continued)

**Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables**

Ranch Hands - Log₂ (Initial Dioxin)							
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Adj. Mean	Adj. Slope (Std. Error)	p-Value
D-Glucaric Acid ^g (Minimal-- 10-20 [c])	Initial-by- Race	Black	Low	12	26.89	-0.6782 (0.3606)	0.061
			Medium	15	13.82		
			High	3	8.67		
		Non-Black	Low	112	15.08	0.0665 (0.0696)	0.340
			Medium	237	14.85		
			High	124	15.38		
Total Bilirubin ^a (Maximal-- 10-22 [d])	Initial-by- Race	Black	Low	4	1.212	-0.1084 (0.0502)	0.031
			Medium	25	0.803		
			High	7	0.732		
		Non-Black	Low	180	0.781	0.0012 (0.0081)	0.885
			Medium	343	0.775		
			High	178	0.786		

Ranch Hands and Comparisons by Current Dioxin Category

Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Adj. Mean	Contrast	Difference of Adj. Means (95% C.I.) ^e	p-Value ^f
Direct Bilirubin ^h (10-24 [j])	Categorized Current Dioxin-by- Race	Black	Background	46	0.119	All		0.008
			Unknown	12	0.261	U vs. B	0.142 --	<0.001
			Low	10	0.162	L vs. B	0.043 --	0.271
			High	8	0.175	H vs. B	0.056 --	0.199
		Non- Black	Background	733	0.153	All		0.061
			Unknown	329	0.145	U vs. B	-0.008 --	0.279
			Low	183	0.159	L vs. B	0.006 --	0.555
			High	178	0.175	H vs. B	0.022 --	0.033

TABLE I-1. (Continued)

Summary of Dioxin-by-Covariate Interactions for Gastrointestinal Variables

Ranch Hands - Log₂ (Initial Dioxin)							
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Percent Abnormal High	Adj. Relative Risk (95% C.I.) ^d	p-Value
Direct Bilirubin (Minimal-- 10-25 [c])	Initial-by- Industrial Chemical Exposure	No	Low	65	3.1	1.30 (0.73,2.30)	0.371
			Medium	107	4.7		
			High	37	2.7		
		Yes	Low	65	12.3	0.42 (0.21,0.86)	0.018
			Medium	150	2.7		
			High	93	1.1		
Direct Bilirubin (Maximal-- 10-25 [d])	Initial-by- Industrial Chemical Exposure	No	Low	97	2.1	1.43 (0.93,2.21)	0.107
			Medium	172	2.9		
			High	63	4.8		
		Yes	Low	87	2.3	0.68 (0.44,1.05)	0.081
			Medium	196	6.1		
			High	122	1.6		

Ranch Hands - Log₂ (Current Dioxin) and Time

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Percent Abnormal High/(n) Current Dioxin			Adj. Relative Risk (95% C.I.) ^d	p-Value
				Low	Medium	High		
Direct Bilirubin (Minimal-- 10-25 [g])	Current-by- Time-by- Degreasing Chemical Exposure	No	≤18.6	10.7 (28)	5.7 (35)	0.0 (9)	0.44 (0.09,2.10)	0.232 ⁱ 0.302 ^j
			>18.6	3.3 (30)	11.1 (45)	5.6 (18)		
			Yes	≤18.6	4.5 (44)	3.3 (91)		
		>18.6	7.1 (28)	1.2 (86)	0.0 (59)	0.15 (0.01,1.60)	0.116 ^j	

TABLE I-1. (Continued)

**Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables**

Ranch Hands - Log₂ (Current Dioxin) and Time

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Adj. Mean/(n) Current Dioxin			Adj. Slope (Std. Error)	p-Value
				Low	Medium	High		
Cholesterol ^a (Maximal-- 10-28 [h])	Current-by- Time-by- Lifetime Alcohol History	0	≤18.6	199.1 (8)	212.6 (18)	213.3 (9)	0.0225 (0.0252)	0.952 ^b 0.371 ^c
			>18.6	210.6 (6)	197.0 (11)	218.5 (21)		0.0207 (0.0186)
		>0-40	≤18.6	210.2 (78)	214.1 (144)	221.2 (55)	0.0090 (0.0092)	0.916 ^b 0.326 ^c
			>18.6	214.4 (59)	210.5 (113)	216.7 (55)		0.0104 (0.0088)
		>40	≤18.6	206.8 (18)	209.1 (26)	197.5 (16)	-0.0059 (0.0176)	0.152 ^b 0.738 ^c
			>18.6	204.8 (13)	205.9 (52)	222.5 (26)		0.0262 (0.0138)

Ranch Hands - Log₂ (Current Dioxin) and Time

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Percent Abnormal High/(n) Current Dioxin			Adj. Relative Risk (95% C.I.) ^d	p-Value
				Low	Medium	High		
Cholesterol (Minimal-- 10-29 [g])	Current-by- Time-by- Industrial Chemical Exposure	No	≤18.6	6.3 (32)	8.2 (49)	23.1 (13)	1.73 (0.90,3.33)	0.060 ⁱ 0.102 ^j
			>18.6	13.9 (36)	12.5 (56)	4.3 (23)		0.75 (0.40,1.40)
		Yes	≤18.6	22.5 (40)	20.8 (77)	5.0 (40)	0.67 (0.42,1.06)	0.030 ⁱ 0.083 ^j
			>18.6	18.2 (22)	13.3 (75)	14.8 (54)		1.22 (0.86,1.73)

TABLE I-1. (Continued)
Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables

Ranch Hands - Log₂ (Initial Dioxin)									
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Adj. Mean	Adj. Slope (Std. Error)	p-Value		
HDL ^a (Maximal-- 10-30 [d])	Initial-by- Degreasing Chemical Exposure	No	Low	84	51.55	-0.0512 (0.0122)	<0.001		
			Medium	137	45.34				
			High	43	44.65				
		Yes	Low	98	45.69			-0.0105 (0.0082)	0.200
			Medium	228	44.80				
			High	138	44.12				

Ranch Hands - Log₂ (Current Dioxin) and Time										
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Adj. Mean/(n) Current Dioxin			Adj. Slope (Std. Error)	p-Value		
				Low	Medium	High				
HDL ^a (Minimal-- 10-30 [g])	Current-by- Time-by- Industrial Chemical Exposure	No	≤18.6	45.84 (32)	45.15 (49)	42.79 (13)	-0.0330 (0.0253)	0.115 ^b 0.193 ^c		
			>18.6	41.88 (36)	42.11 (55)	44.91 (23)			0.0163 (0.0190)	0.391 ^c
		Yes	≤18.6	46.45 (40)	45.25 (77)	49.24 (39)	0.0087 (0.0185)	0.110 ^b 0.639 ^c		
			>18.6	52.07 (22)	44.99 (74)	45.79 (54)			-0.0293 (0.0158)	0.065 ^c

TABLE I-1. (Continued)

**Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables**

Ranch Hands and Comparisons by Current Dioxin Category

Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Adj. Mean	Contrast	Difference of Adj. Means (95% C.I.) ^e	p-Value ^f		
HDL ^a (10-30 [j])	Categorized Current Dioxin-by- Lifetime Alcohol History	0	Background	58	43.77	All		0.657		
			Unknown	28	45.01	U vs. B	1.24 --	0.609		
			Low	17	46.00	L vs. B	2.23 --	0.446		
					High	30	46.62	H vs. B	2.85 --	0.236
		>0-40	Background	530	46.01	All		<0.001		
			Unknown	251	50.16	U vs. B	4.15 --	<0.001		
			Low	134	45.24	L vs. B	-0.77 --	0.455		
			High	110	44.06	H vs. B	-1.95 --	0.083		
			>40	Background	189	46.77	All		0.315	
				Unknown	59	46.65	U vs. B	-0.12 --	0.938	
		Low		40	43.78	L vs. B	-2.99 --	0.109		
					High	42	44.63	H vs. B	-2.14 --	0.245

Ranch Hands and Comparisons by Current Dioxin Category

Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Percent Abnormal Low	Contrast	Adj. Relative Risk (95% C.I.)	p-Value		
HDL (10-31 [j])	Categorized Current Dioxin-by- Degreasing Chemical Exposure	No	Background	296	2.0	All		0.058		
			Unknown	167	4.8	U vs. B	2.23 (0.76,6.55)	0.146		
			Low	61	0.0	L vs. B	--	--		
					High	42	7.1	H vs. B	3.43 (0.82,14.37)	0.091
		Yes	Background	483	4.6	All		0.429		
			Unknown	172	2.3	U vs. B	0.51 (0.17,1.52)	0.228		
			Low	130	6.2	L vs. B	1.35 (0.39,4.64)	0.630		
			High	143	4.9	H vs. B	1.07 (0.45,2.57)	0.874		

TABLE I-1. (Continued)
Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables

Ranch Hands - Log₂ (Initial Dioxin)							
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Adj. Mean	Adj. Slope (Std. Error)	p-Value
Cholesterol- HDL Ratio ^a (Minimal-- 10-32 [d])	Initial-by- Degreasing Chemical Exposure	No	Low	85	3.98	0.0633 (0.0133)	<0.001
			Medium	137	4.63		
			High	44	4.87		
		Yes	Low	98	4.64	0.0221 (0.0091)	0.015
			Medium	228	4.64		
			High	140	4.87		

Ranch Hands - Log₂ (Current Dioxin) and Time										
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Adj. Mean/(n) Current Dioxin			Adj. Slope (Std. Error)	p-Value		
				Low	Medium	High				
Cholesterol- HDL Ratio ^a (Minimal-- 10-32 [g])	Current-by- Time-by- Industrial Chemical Exposure	No	≤18.6	4.56 (32)	4.64 (49)	5.25 (13)	0.0482 (0.0275)	0.217 ^b 0.080 ^c		
			>18.6	4.79 (36)	5.02 (55)	4.74 (23)			0.0062 (0.0206)	0.762 ^c
		Yes	≤18.6	4.49 (40)	4.72 (77)	4.11 (39)	-0.0104 (0.0200)	0.008 ^b 0.602 ^c		
			>18.6	3.86 (22)	4.61 (74)	4.70 (54)			0.0576 (0.0172)	<0.001 ^c

TABLE I-1. (Continued)

**Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables**

Ranch Hands - Log₂ (Initial Dioxin)

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Percent Abnormal		Adj. Relative Risk (95% C.I.) ^d	p-Value
					High	High		
Cholesterol- HDL Ratio (Maximal-- 10-33 [d])	Initial-by- Age	Born ≥ 1942 No	Low	29	20.7	1.49 (1.18,1.89)	0.001	
			Medium	38	39.5			
			High	30	50.0			
	Initial-by- Degreasing Chemical Exposure	Born ≥ 1942 Yes	Low	41	51.2	1.00 (0.84,1.19)	0.999	
			Medium	86	44.2			
			High	86	45.3			
		Born < 1942 No	Low	56	26.8	1.89 (1.45,2.46)	<0.001	
			Medium	99	52.5			
			High	14	71.4			
	Born < 1942 Yes	Low	57	45.6	1.27 (1.05,1.53)	0.012		
		Medium	142	43.7				
		High	54	53.7				

Ranch Hands - Log₂ (Current Dioxin) and Time

Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Time (Yrs.)	Percent Abnormal High/(n) Current Dioxin			Adj. Relative Risk (95% C.I.) ^d	p-Value	
				Low	Medium	High			
Cholesterol- HDL Ratio (Minimal-- 10-33 [g])	Current-by- Time-by- Industrial Chemical Exposure	No	≤ 18.6	43.8 (32)	36.7 (49)	69.2 (13)	1.46 (0.94,2.27)	0.527 ⁱ 0.089 ^j	
			> 18.6	50.0 (36)	61.8 (55)	52.2 (23)		1.23 (0.88,1.73)	0.230 ^j
			Yes	≤ 18.6	50.0 (40)	50.6 (77)		28.2 (39)	0.90 (0.66,1.24)
		> 18.6	22.7 (22)	51.4 (74)	57.4 (54)	1.55 (1.17,2.06)	0.002 ^j		

TABLE I-1. (Continued)
Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables

Ranch Hands and Comparisons by Current Dioxin Category								
Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Adj. Mean	Contrast	Difference of Adj. Means (95% C.I.) ^e	p-Value ^f
Triglycerides ^a (10-34 [j])	Categorized Current Dioxin-by- Current Alcohol Use	≤1	Background	609	106.2	All		<0.001
			Unknown	273	92.4	U vs. B	-13.8 --	0.002
			Low	154	122.2	L vs. B	16.0 --	0.014
			High	152	126.7	H vs. B	20.5 --	0.002
		>1-4	Background	140	103.2	All		0.076
			Unknown	58	95.6	U vs. B	-7.6 --	0.435
			Low	34	133.8	L vs. B	30.6 --	0.030
			High	23	96.6	H vs. B	-6.6 --	0.641
		>4	Background	28	72.7	All		0.129
			Unknown	7	85.3	U vs. B	12.6 --	0.552
			Low	3	103.0	L vs. B	30.3 --	0.362
			High	7	134.4	H vs. B	61.7 --	0.021

Ranch Hands and Comparisons by Current Dioxin Category								
Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Percent Abnormal High	Contrast	Adj. Relative Risk (95% C.I.)	p-Value
Triglycerides (10-35 [j])	Categorized Current Dioxin-by- Current Alcohol Use	≤1	Background	611	5.2	All		<0.001
			Unknown	273	2.2	U vs. B	0.39 (0.16,0.94)	0.035
			Low	154	8.4	L vs. B	1.63 (0.83,3.19)	0.155
			High	153	13.7	H vs. B	3.08 (1.70,5.58)	<0.001
		>1-4	Background	140	7.1	All		0.225
			Unknown	59	6.8	U vs. B	0.91 (0.27,3.02)	0.872
			Low	34	11.8	L vs. B	1.85 (0.54,6.34)	0.328
			High	24	0.0	H vs. B	--	--
		>4	Background	28	0.0	All		0.051
			Unknown	7	14.3	U vs. B	--	--
			Low	3	0.0	L vs. B	--	--
			High	8	12.5	H vs. B	--	--

TABLE I-1. (Continued)

Summary of Dioxin-by-Covariate Interactions for Gastrointestinal Variables

Ranch Hands - Log₂ (Initial Dioxin)							
Variable/ (Assumption-- Table Ref.)	Interaction	Stratum	Initial Dioxin	n	Adj. Mean	Adj. Slope (Std. Error)	p-Value
Creatine Kinase ^a (Minimal-- 10-36 [c])	Initial-by- Age	Born ≥1942	Low	43	132.9	0.0457 (0.0233)	0.051
			Medium	109	137.3		
			High	82	159.5		
		Born <1942	Low	87	143.8	-0.0556 (0.0245)	0.024
		Medium	146	137.6			
		High	47	119.0			
Creatine Kinase ^a (Maximal-- 10-36 [d])	Initial-by- Age	Born ≥1942	Low	71	155.4	0.0233 (0.0165)	0.158
			Medium	124	140.8		
			High	117	165.4		
		Born <1942	Low	113	148.2	-0.0371 (0.0179)	0.039
		Medium	244	145.3			
		High	68	130.0			

Ranch Hands and Comparisons by Current Dioxin Category

Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Adj. Mean	Contrast	Difference of Adj. Means (95% C.I.) ^e	p-Value ^f
Creatine Kinase ^a (10-36 [j])	Categorized Current Dioxin-by- Race	Black	Background	46	247.4	All		0.031
			Unknown	12	173.1	U vs. B	-74.3 --	0.023
			Low	10	176.3	L vs. B	-71.1 --	0.045
			High	8	182.4	H vs. B	-65.0 --	0.101
		Non- Black	Background	733	105.2	All		0.613
			Unknown	329	105.4	U vs. B	0.2 --	0.942
			Low	183	105.4	L vs. B	0.2 --	0.951
			High	178	111.0	H vs. B	5.8 --	0.189

TABLE I-1. (Continued)

Summary of Dioxin-by-Covariate Interactions for
Gastrointestinal Variables

Ranch Hands and Comparisons by Current Dioxin Category

Variable/ (Table Ref.)	Interaction	Stratum	Current Dioxin Category	n	Percent Abnormal High	Contrast	Adj. Relative Risk (95% C.I.)	p-Value		
Creatine Kinase (10-37 [j])	Categorized Current Dioxin-by- Race	Black	Background	46	54.3	All		0.001		
			Unknown	12	25.0	U vs. B	0.30 (0.07,1.36)	0.119		
			Low	9	0.0	L vs. B	--	--		
					High	8	25.0	H vs. B	0.29 (0.05,1.66)	0.165
		Non- Black	Background	733	4.9	All		0.664		
			Unknown	327	4.6	U vs. B	0.93 (0.50,1.74)	0.832		
			Low	182	4.9	L vs. B	0.95 (0.45,2.01)	0.887		
					High	177	2.8	H vs. B	0.55 (0.21,1.44)	0.224

^aAdjusted means transformed from natural logarithm scale; adjusted slope and standard error based on natural logarithm of the dependent variable versus log₂ dioxin.

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

^cTest of significance for slope equal to 0 (current dioxin continuous, time categorized).

^dRelative risk for a twofold increase in dioxin.

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

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

^gAdjusted means transformed from square root scale; adjusted slope and standard error based on square root of the dependent variable versus log₂ dioxin.

^hAdjusted means transformed from natural logarithm (X + 0.1) scale; adjusted slope and standard error based on natural logarithm (X + 0.1) of direct bilirubin versus log₂ dioxin.

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

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

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.

TABLE I-2.
Summary of Models With Adjustment for Occupation
for Viral Hepatitis

Ranch Hands - Log₂ (Initial Dioxin)			
Assumption/ (Table Ref.)	Adj. Relative Risk (95% C.I.) ^a	p-Value	Covariate Remarks
Minimal (10-3 [c]) (n=506)	1.01 (0.85,1.20)	0.912	AGE (p<0.001) RACE (p=0.052) OCC (p<0.001)
Maximal (10-3 [d]) (n=720)	1.02 (0.89,1.17)	0.777	AGE (p<0.001) RACE (p=0.034) OCC (p<0.001)

Ranch Hands - Log₂ (Current Dioxin) and Time				
Assumption/ (Table Ref.)	Time (Yrs.)	Adj. Relative Risk (95% C.I.) ^a	p-Value	Covariate Remarks
Minimal (10-3 [g]) (n=506)			0.342 ^b	AGE (p<0.001)
	≤18.6	1.09 (0.83,1.44)	0.531 ^c	RACE (p=0.059)
	>18.6	0.93 (0.74,1.17)	0.522 ^c	OCC (p<0.001)
Maximal (10-3 [h]) (n=720)			0.360 ^b	AGE (p<0.001)
	≤18.6	1.07 (0.88,1.31)	0.503 ^c	RACE (p=0.036)
	>18.6	0.96 (0.80,1.14)	0.612 ^c	OCC (p<0.001)

Ranch Hands and Comparisons by Current Dioxin Category

Current Dioxin Category/ (Table Ref.)	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	761	All Categories		0.667	AGE (p<0.001) RACE (p=0.002) OCC (p<0.001)
Unknown	335	Unknown vs. Background	1.01 (0.75,1.35)	0.963	
Low	191	Low vs. Background	0.82 (0.58,1.16)	0.251	
High	181	High vs. Background	1.03 (0.72,1.47)	0.859	
Total	1,468				
(10-3 [j])					

^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).

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.

APPENDIX I-1.

Data Displays for the Gastrointestinal Assessment

The following figures graphically display relationships between the dependent variables and measures of dioxin for the gastrointestinal 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 \log_2 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 or exclusions) 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
		Sample Size			
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

Figure		Page
I-1-1	Viral Hepatitis versus Dioxin	I-1-3
I-1-2	Chronic Liver Disease and Cirrhosis (Alcohol-Related) versus Dioxin	I-1-4
I-1-3	Chronic Liver Disease and Cirrhosis (Nonalcohol-Related) versus Dioxin	I-1-5
I-1-4	Other Disorders of the Liver versus Dioxin	I-1-6
I-1-5	Jaundice versus Dioxin	I-1-7
I-1-6	Hepatomegaly versus Dioxin	I-1-8
I-1-7	Ulcer versus Dioxin.....	I-1-9
I-1-8	Skin Bruises, Patches, or Sensitivity versus Dioxin.....	I-1-10
I-1-9	Hepatomegaly (Current) versus Dioxin.....	I-1-11
I-1-10	AST (Continuous) versus Dioxin	I-1-12
I-1-11	AST (Discrete) versus Dioxin.....	I-1-13
I-1-12	ALT (Continuous) versus Dioxin	I-1-14
I-1-13	ALT (Discrete) versus Dioxin.....	I-1-15
I-1-14	GGT (Continuous) versus Dioxin.....	I-1-16
I-1-15	GGT (Discrete) versus Dioxin.....	I-1-17
I-1-16	Alkaline Phosphatase (Continuous) versus Dioxin.....	I-1-18
I-1-17	Alkaline Phosphatase (Discrete) versus Dioxin.....	I-1-19
I-1-18	D-Glucaric Acid (Continuous) versus Dioxin.....	I-1-20
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I-1-20	Total Bilirubin (Continuous) versus Dioxin.....	I-1-22
I-1-21	Total Bilirubin (Discrete) versus Dioxin.....	I-1-23
I-1-22	Direct Bilirubin (Continuous) versus Dioxin.....	I-1-24
I-1-23	Direct Bilirubin (Discrete) versus Dioxin.....	I-1-25
I-1-24	LDH (Continuous) versus Dioxin.....	I-1-26
I-1-25	LDH (Discrete) versus Dioxin	I-1-27
I-1-26	Cholesterol (Continuous) versus Dioxin	I-1-28
I-1-27	Cholesterol (Discrete) versus Dioxin.....	I-1-29
I-1-28	HDL (Continuous) versus Dioxin.....	I-1-30
I-1-29	HDL (Discrete) versus Dioxin	I-1-31
I-1-30	Cholesterol-HDL Ratio (Continuous) versus Dioxin	I-1-32
I-1-31	Cholesterol-HDL Ratio (Discrete) versus Dioxin.....	I-1-33
I-1-32	Triglycerides (Continuous) versus Dioxin	I-1-34
I-1-33	Triglycerides (Discrete) versus Dioxin.....	I-1-35
I-1-34	Creatine Kinase (Continuous) versus Dioxin	I-1-36
I-1-35	Creatine Kinase (Discrete) versus Dioxin	I-1-37

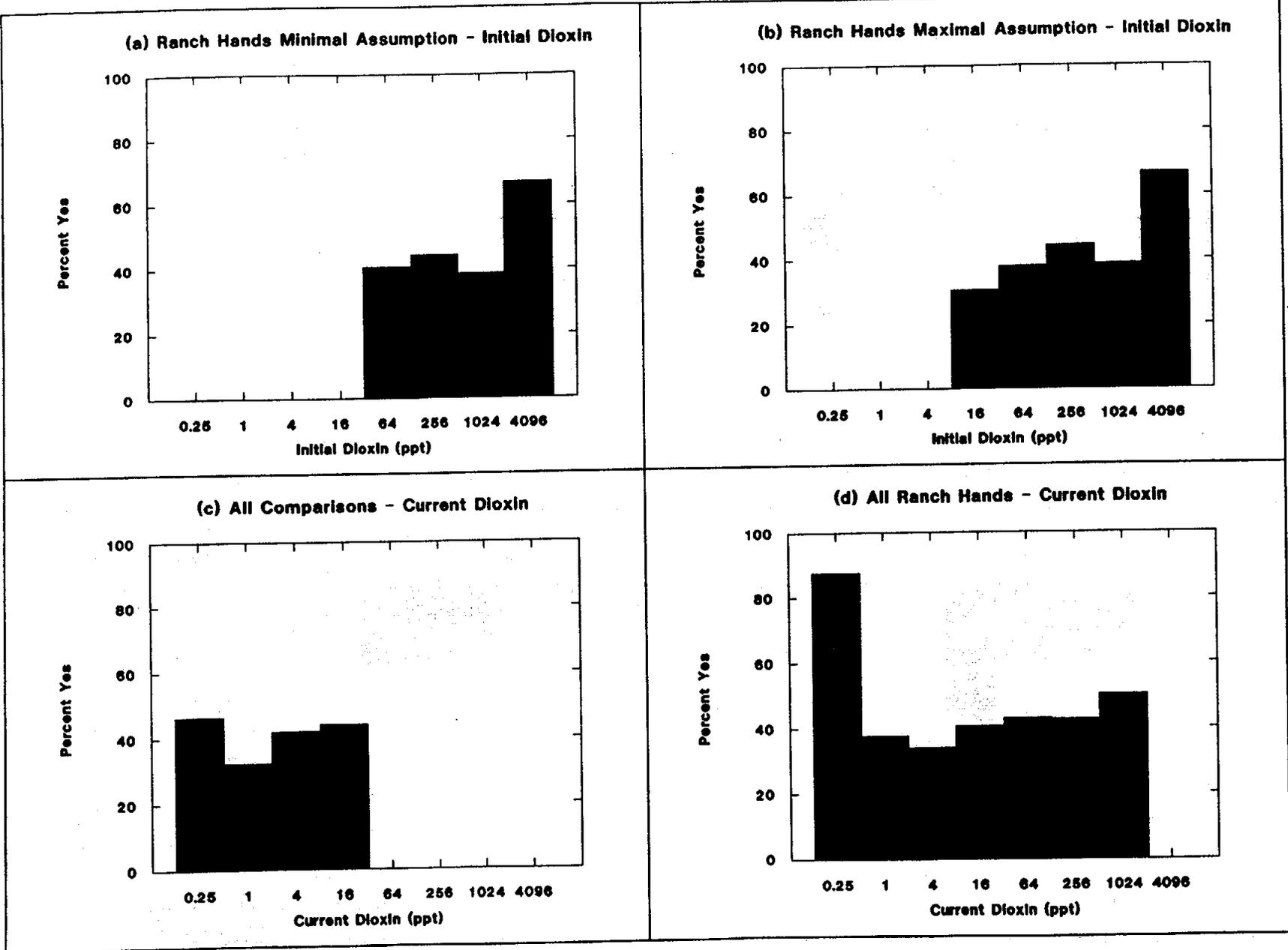


FIGURE I-1-1. Viral Hepatitis versus Dioxin

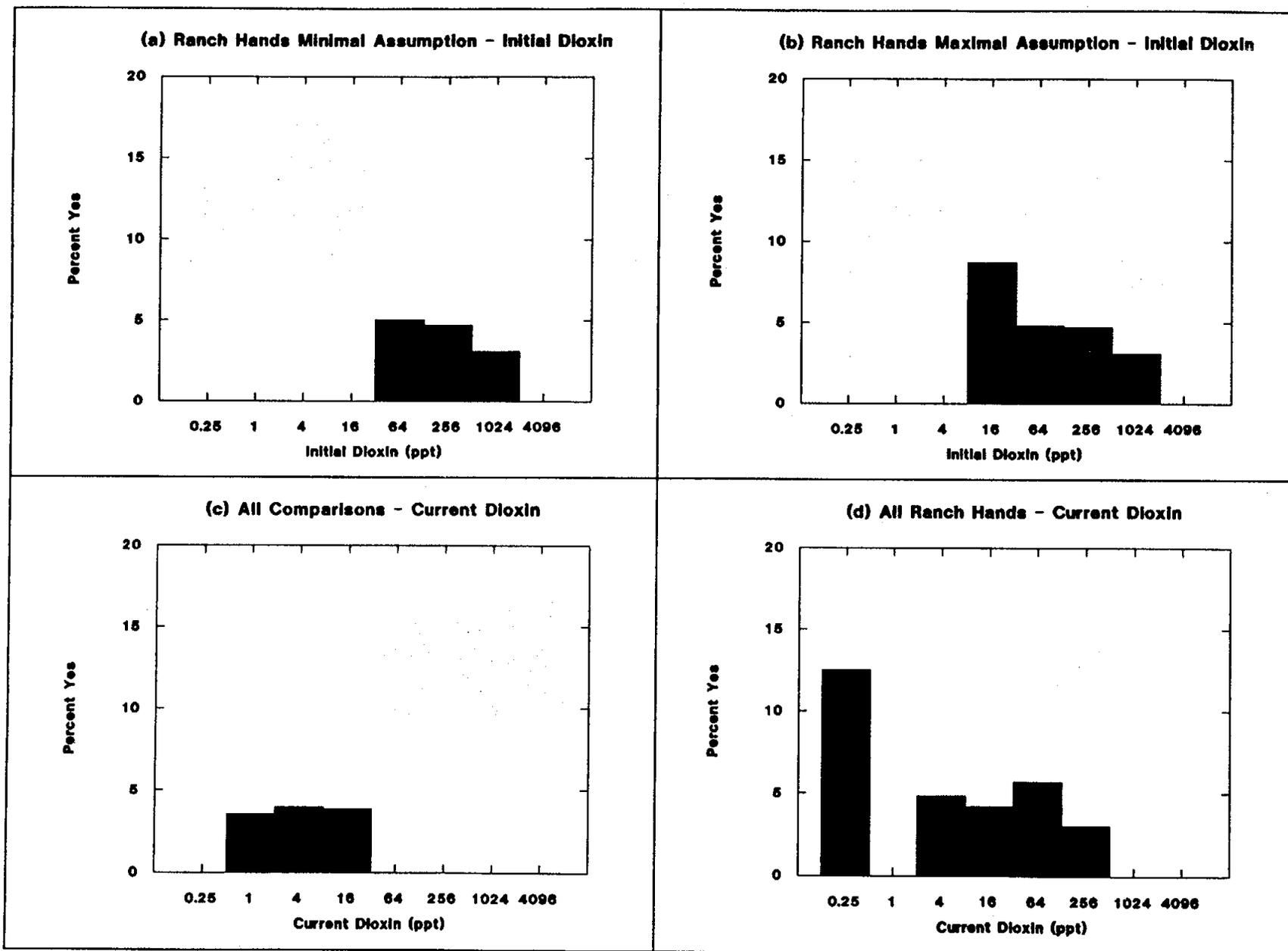


FIGURE I-1-2. Chronic Liver Disease and Cirrhosis (Alcohol-Related) versus Dioxin

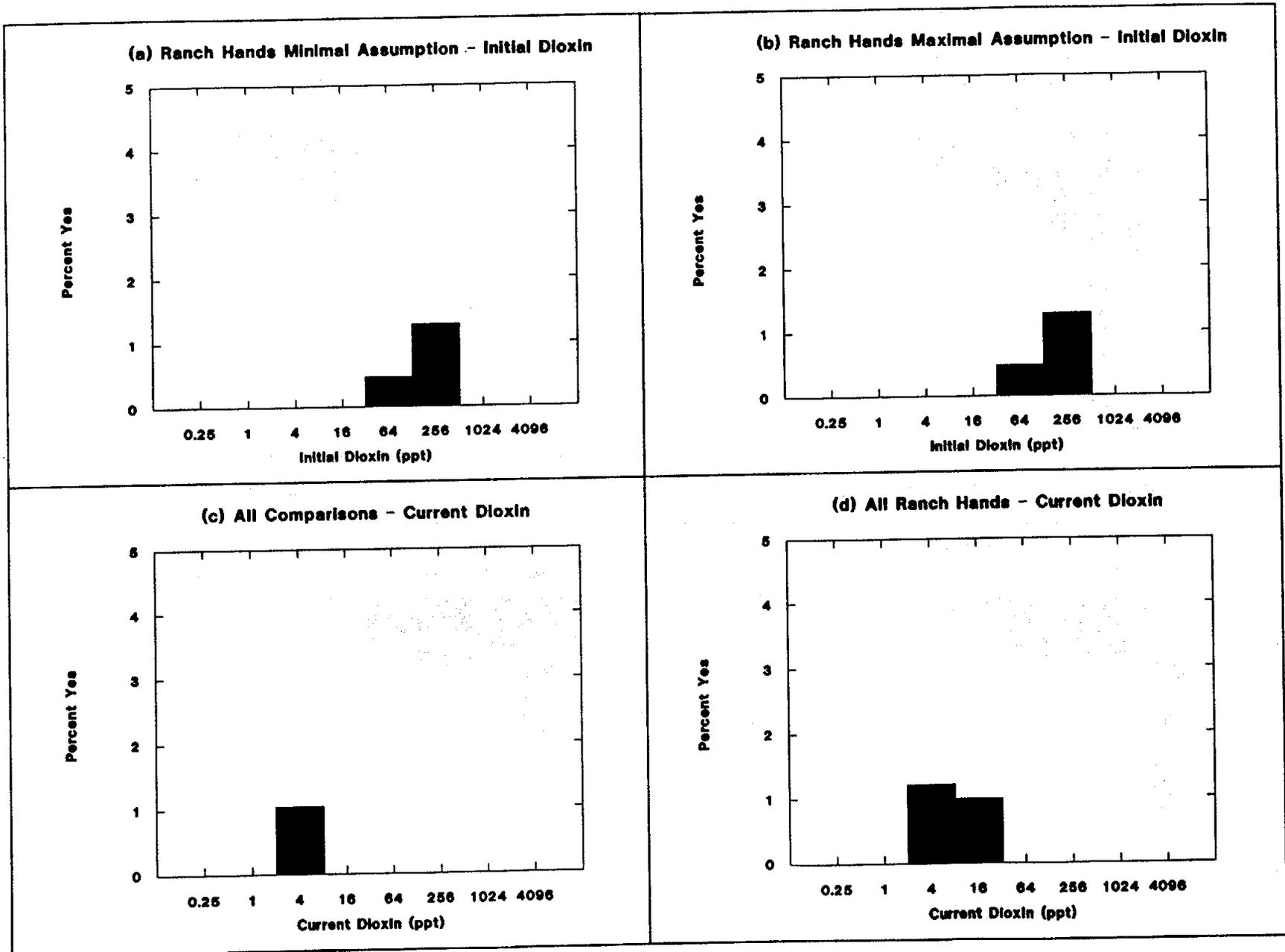


FIGURE I-1-3. Chronic Liver Disease and Cirrhosis (Nonalcohol-Related) versus Dioxin

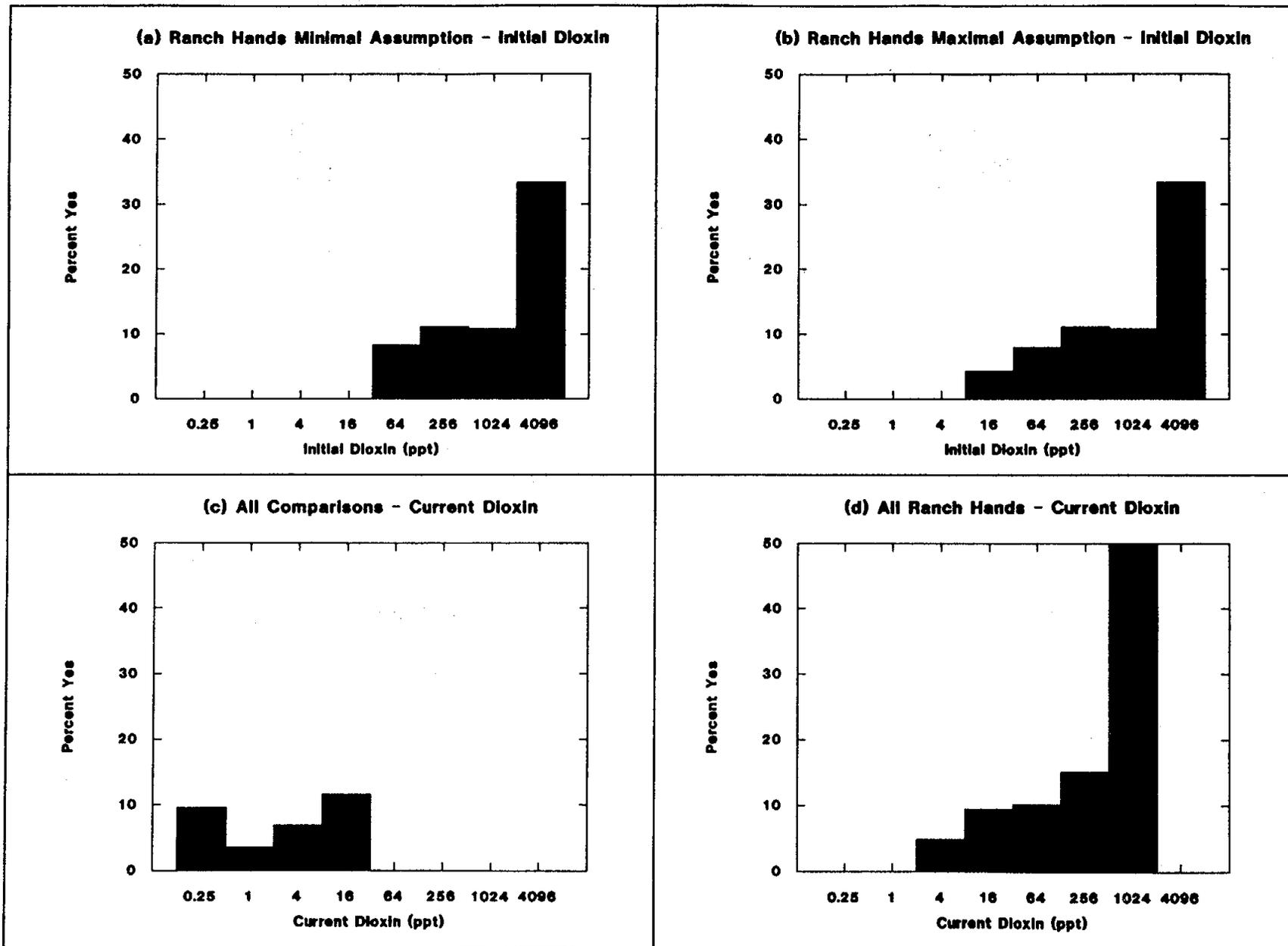


FIGURE I-1-4. Other Disorders of the Liver versus Dioxin

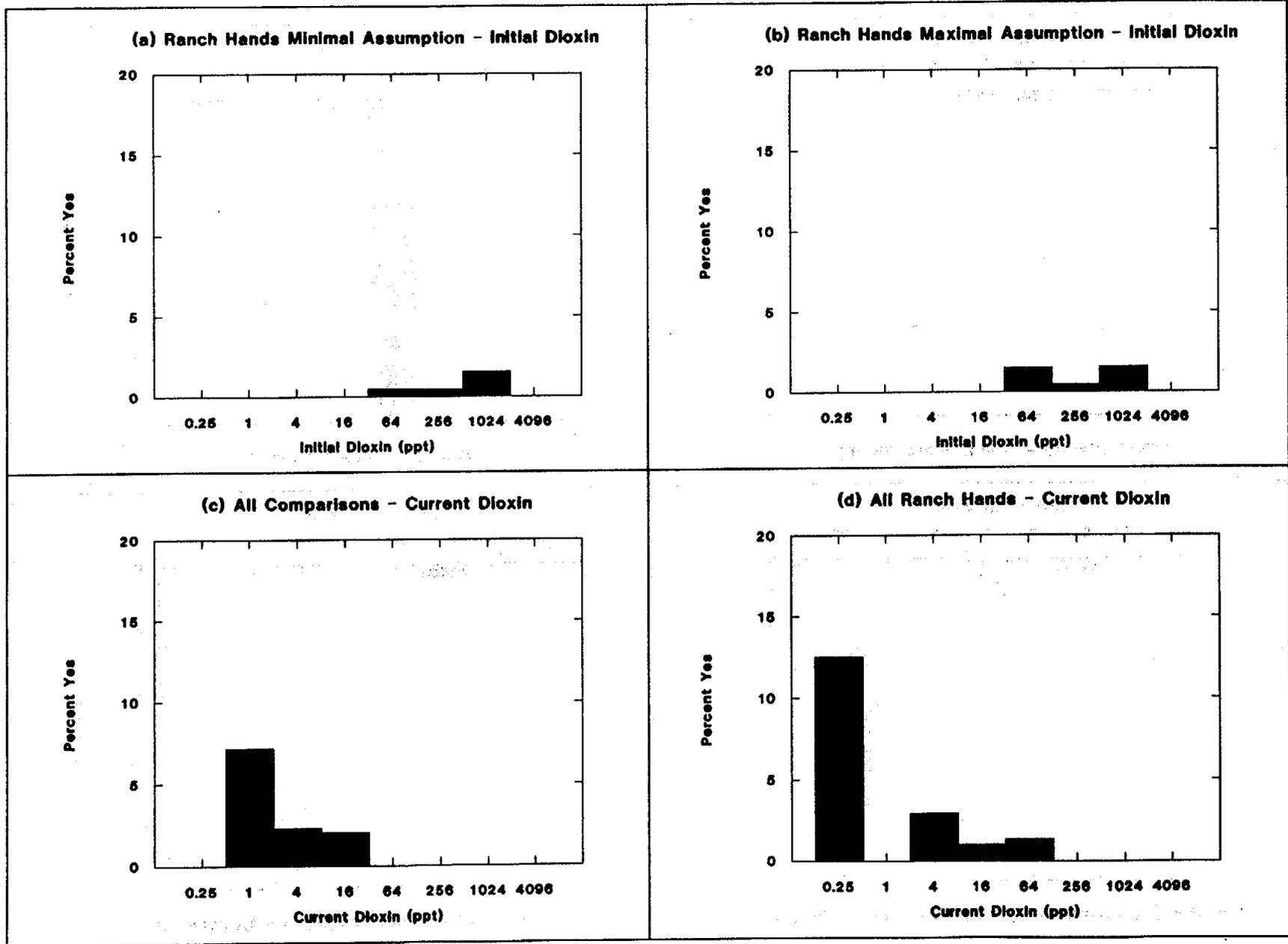


FIGURE I-1-5. Jaundice versus Dioxin

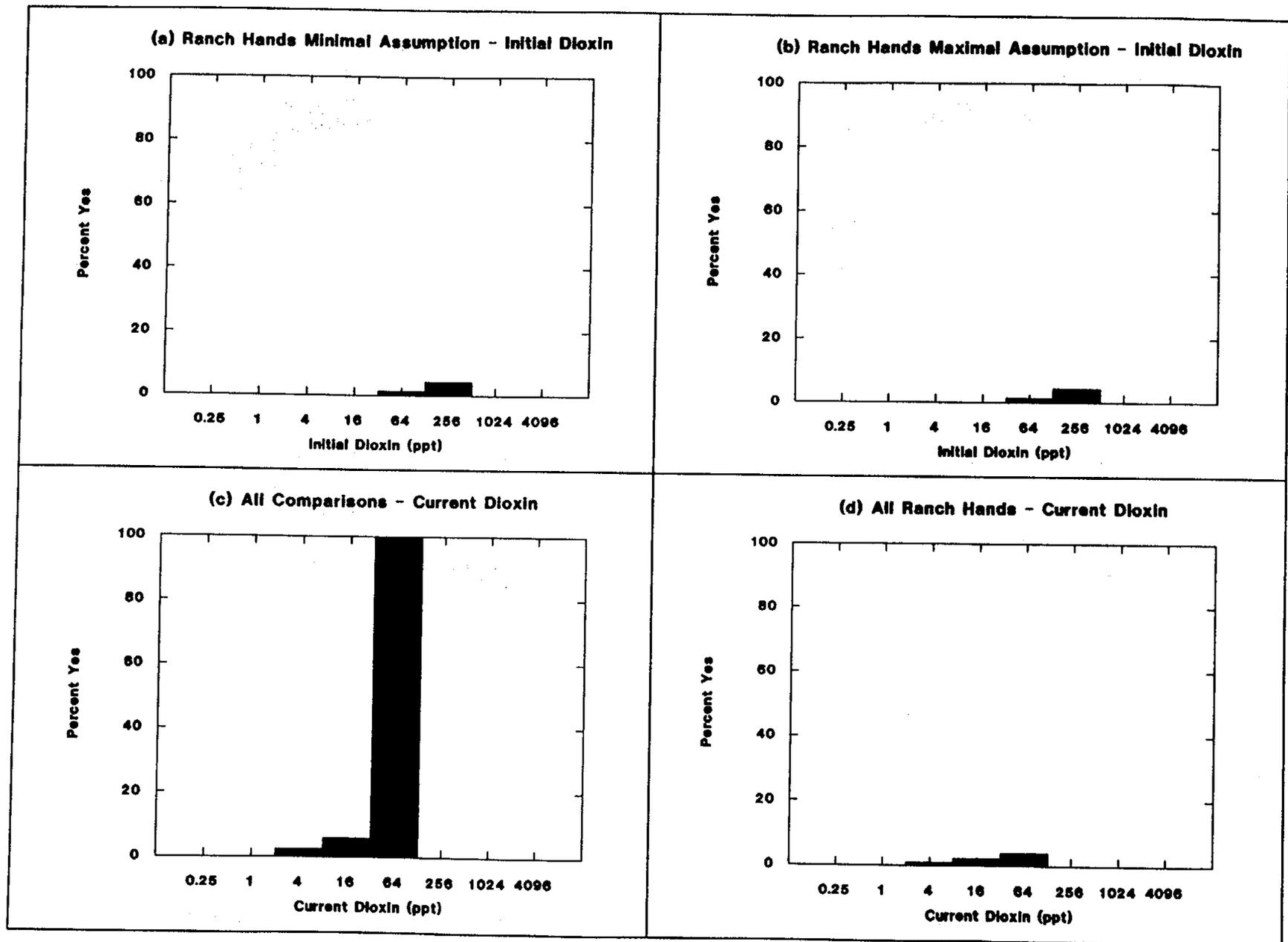


FIGURE I-1-6. Hepatomegaly versus Dioxin

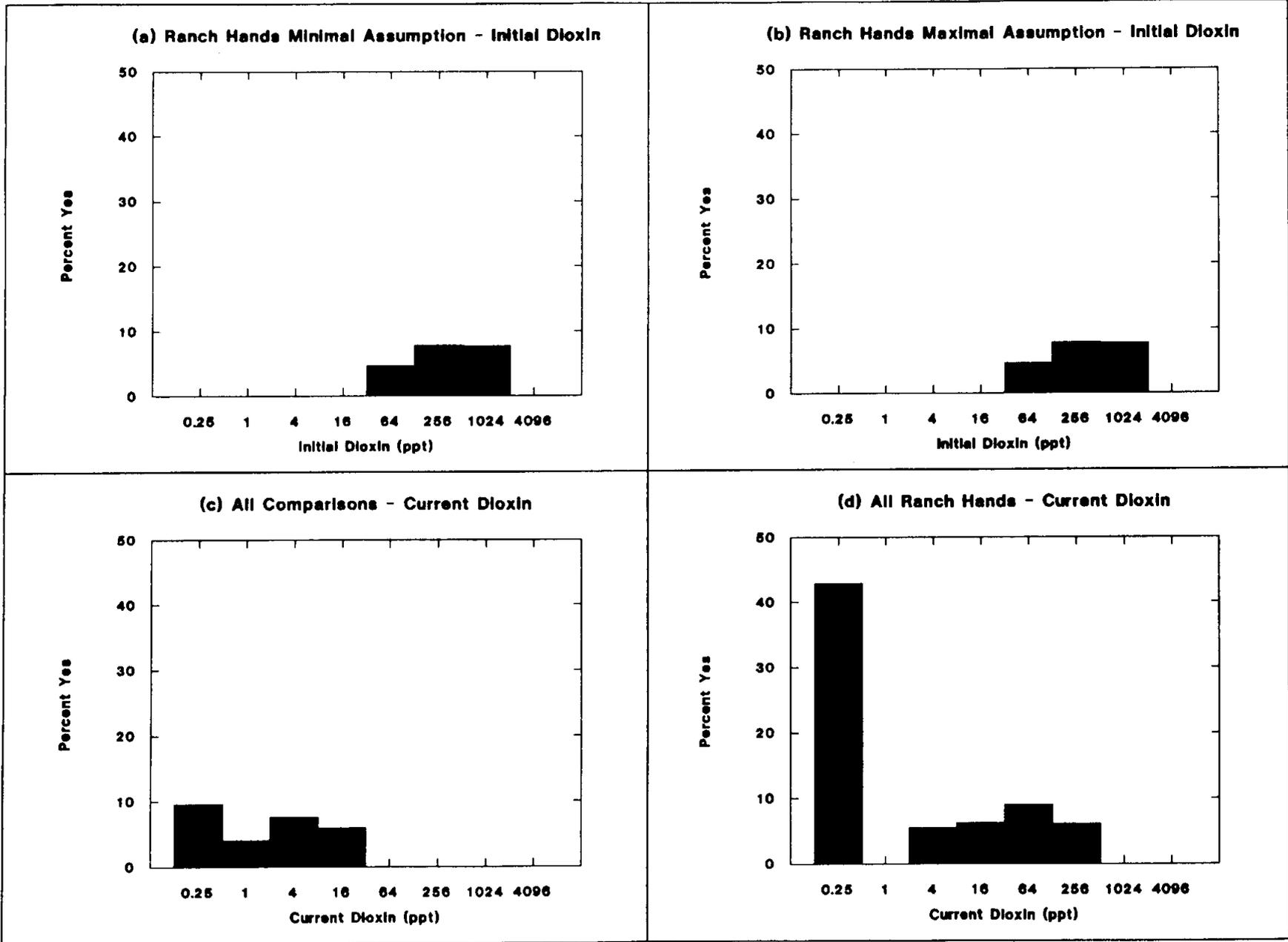


FIGURE I-1-7. Ulcer versus Dioxin

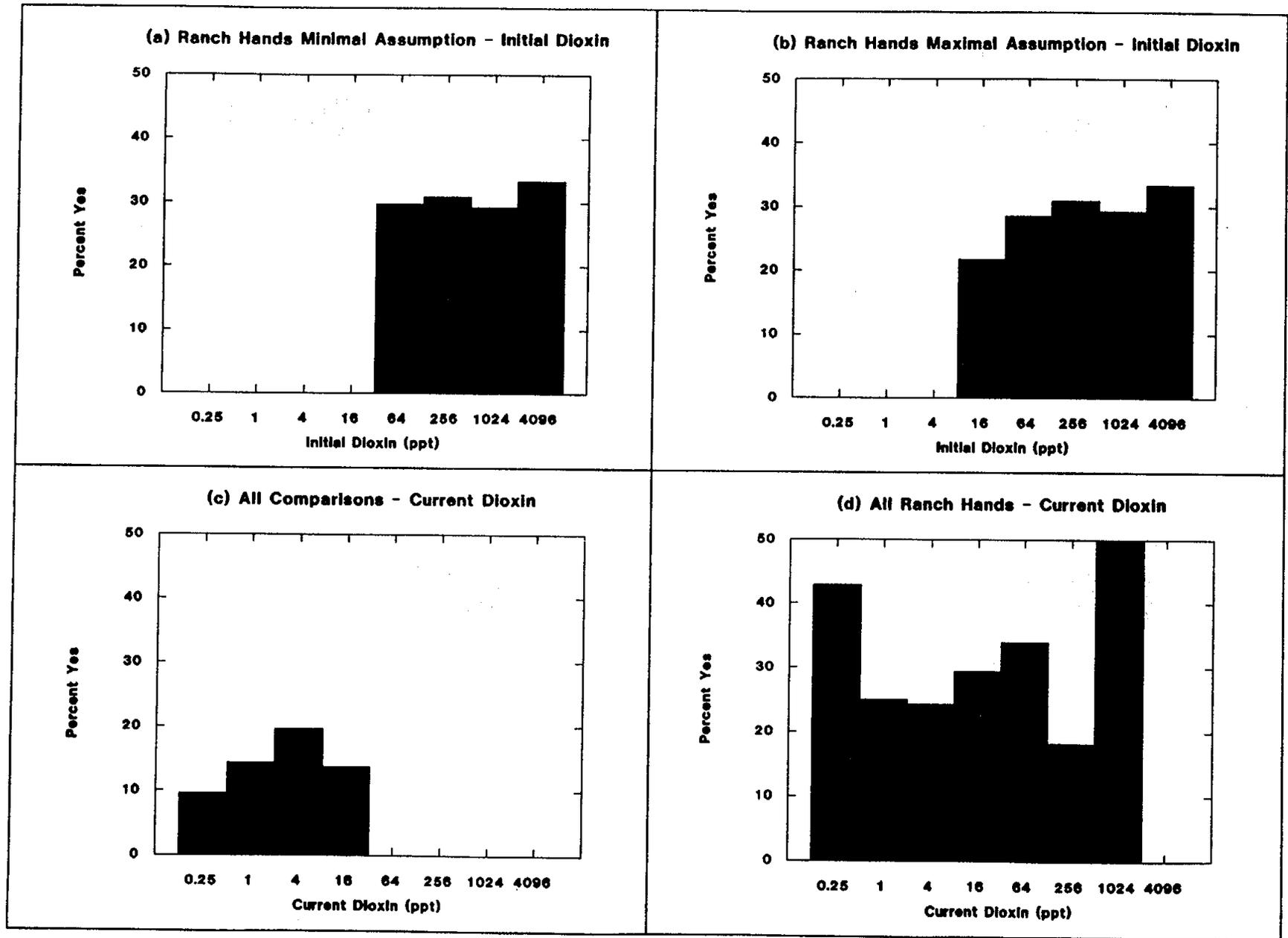


FIGURE I-1-8. Skin Bruises, Patches, or Sensitivity versus Dioxin

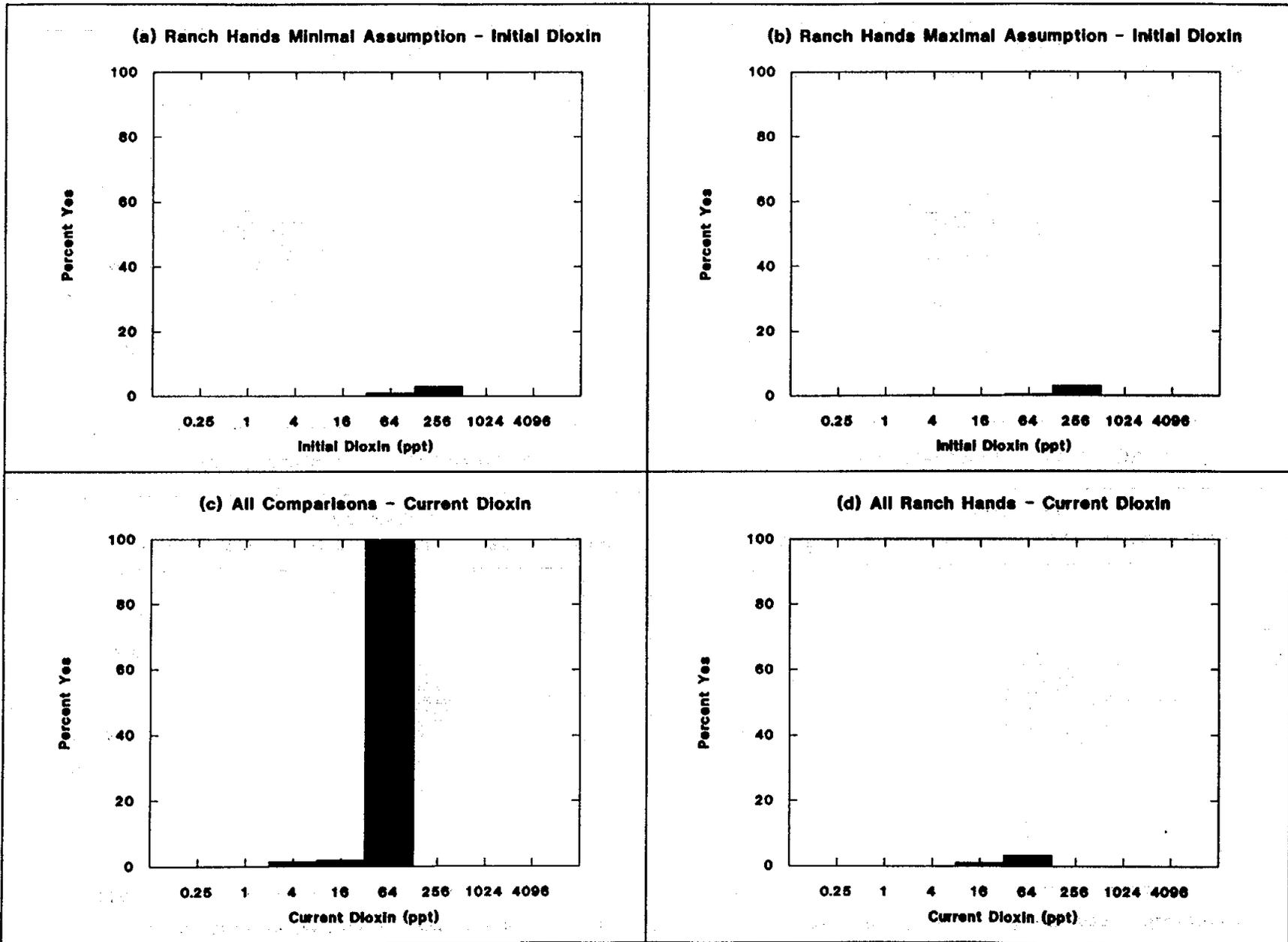


FIGURE I-1-9. Hepatomegaly (Current) versus Dioxin

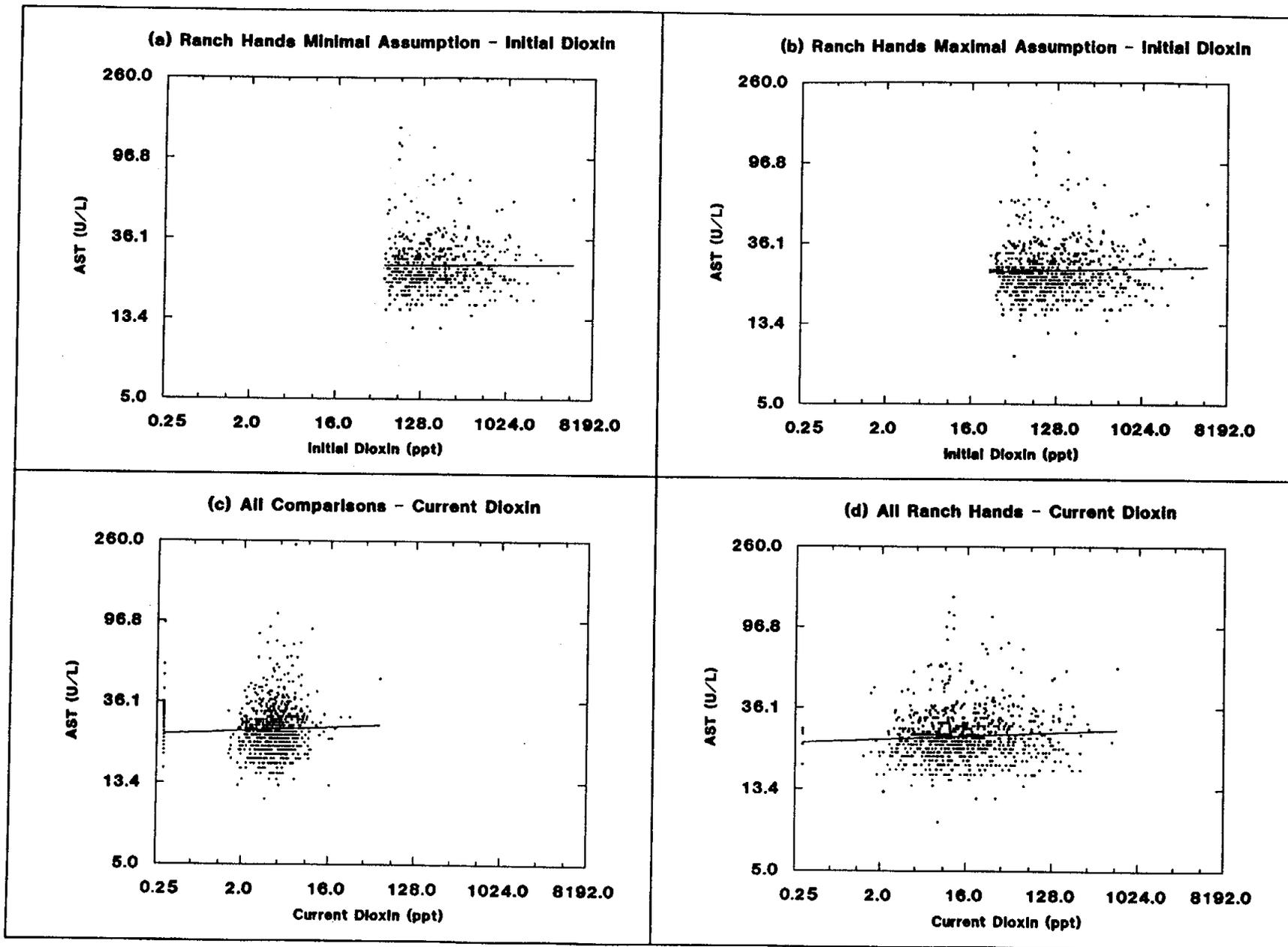


FIGURE I-1-10. AST (Continuous) versus Dioxin

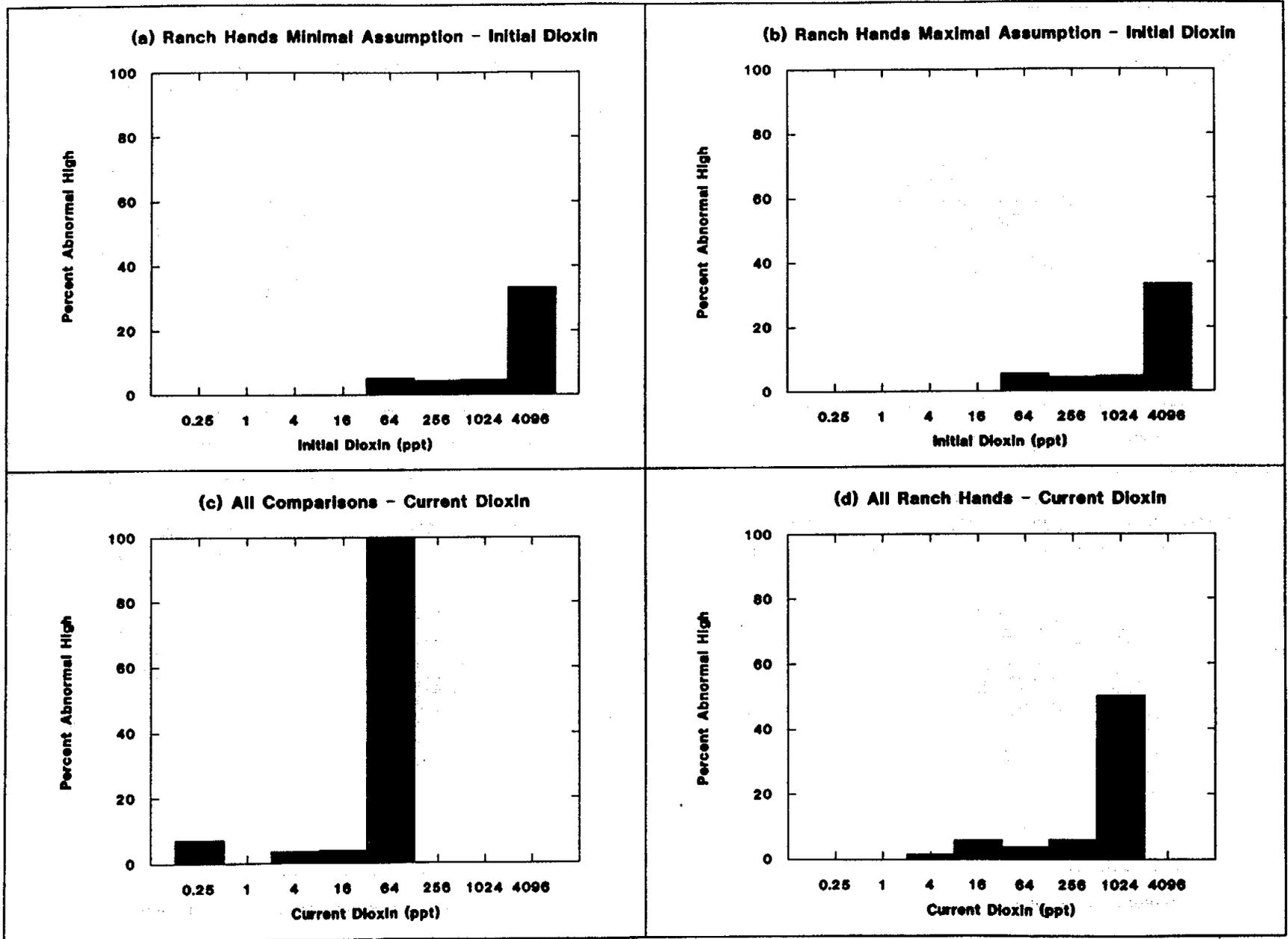


FIGURE I-1-11. AST (Discrete) versus Dioxin

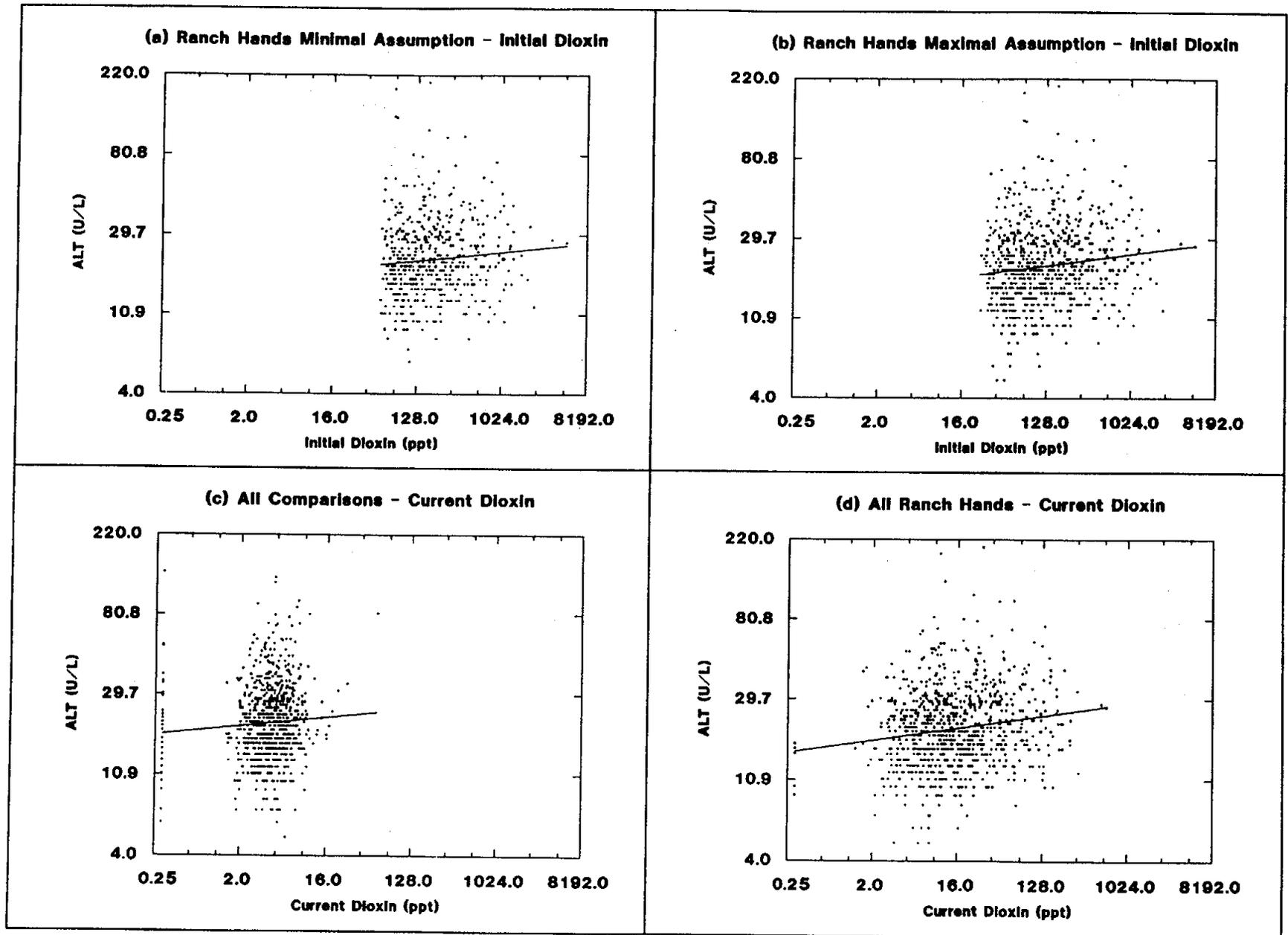


FIGURE I-1-12. ALT (Continuous) versus Dioxin

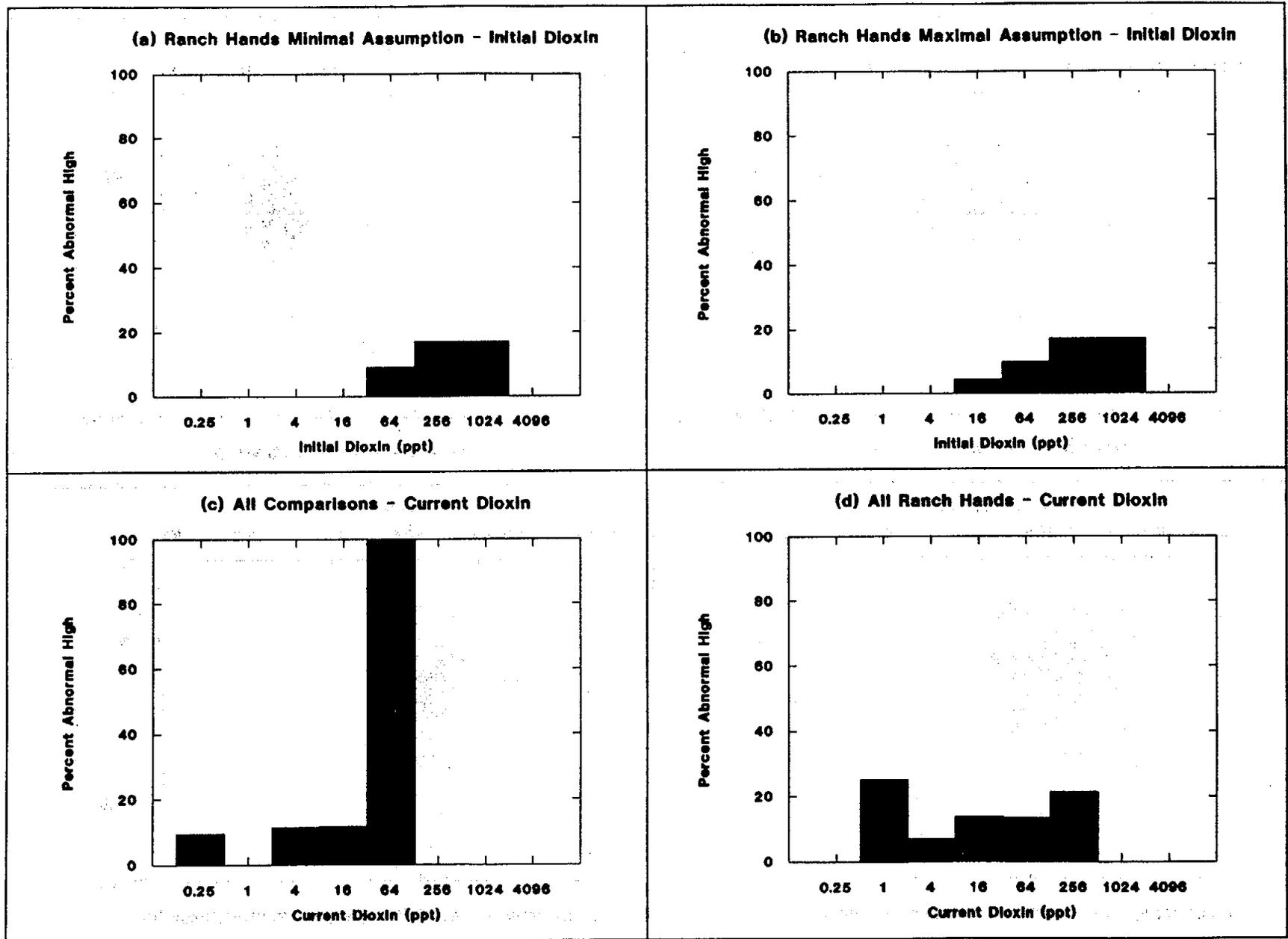


FIGURE I-1-13. ALT (Discrete) versus Dioxin

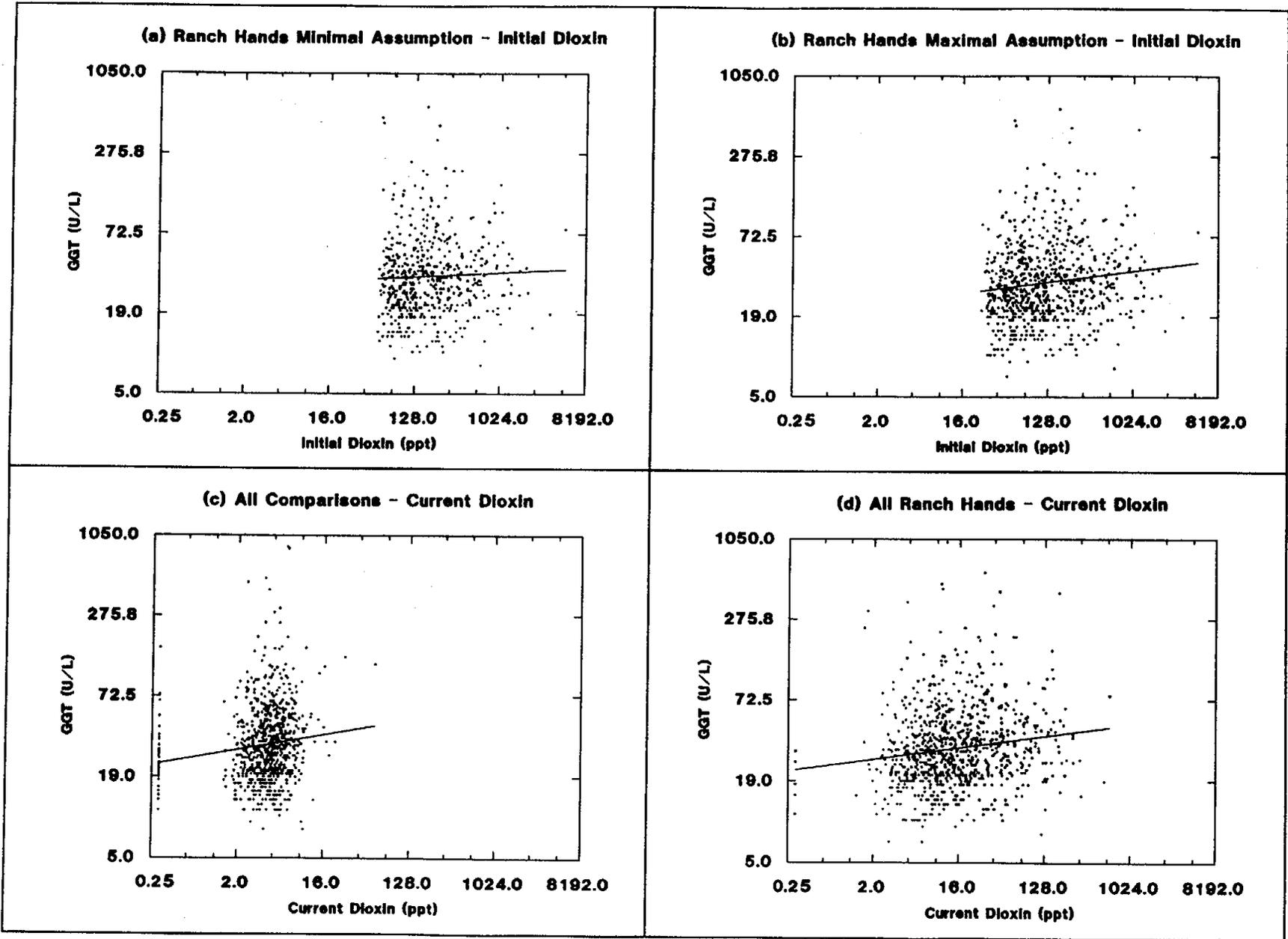


FIGURE I-1-14. GGT (Continuous) versus Dioxin

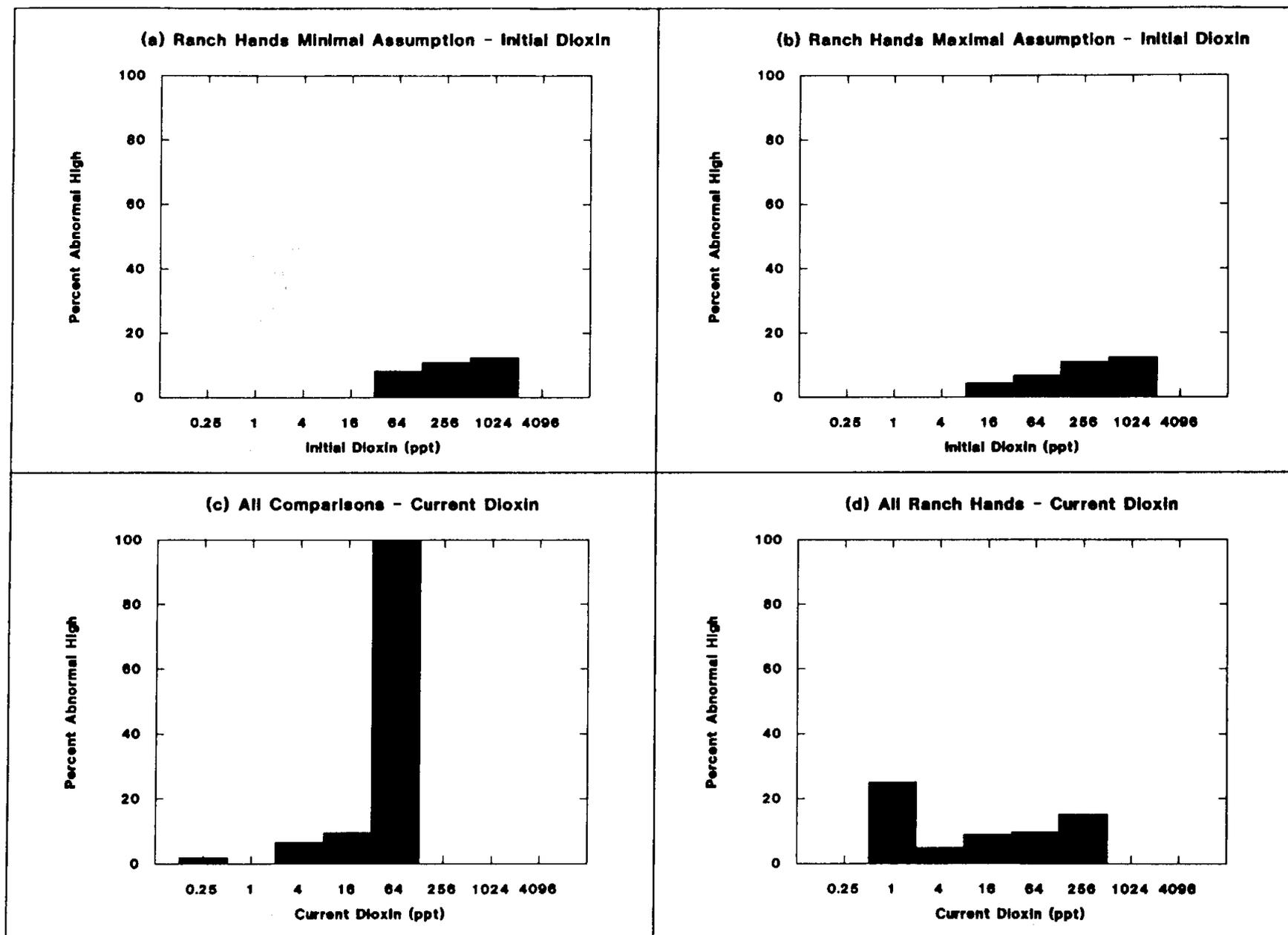


FIGURE I-1-15. GGT (Discrete) versus Dioxin

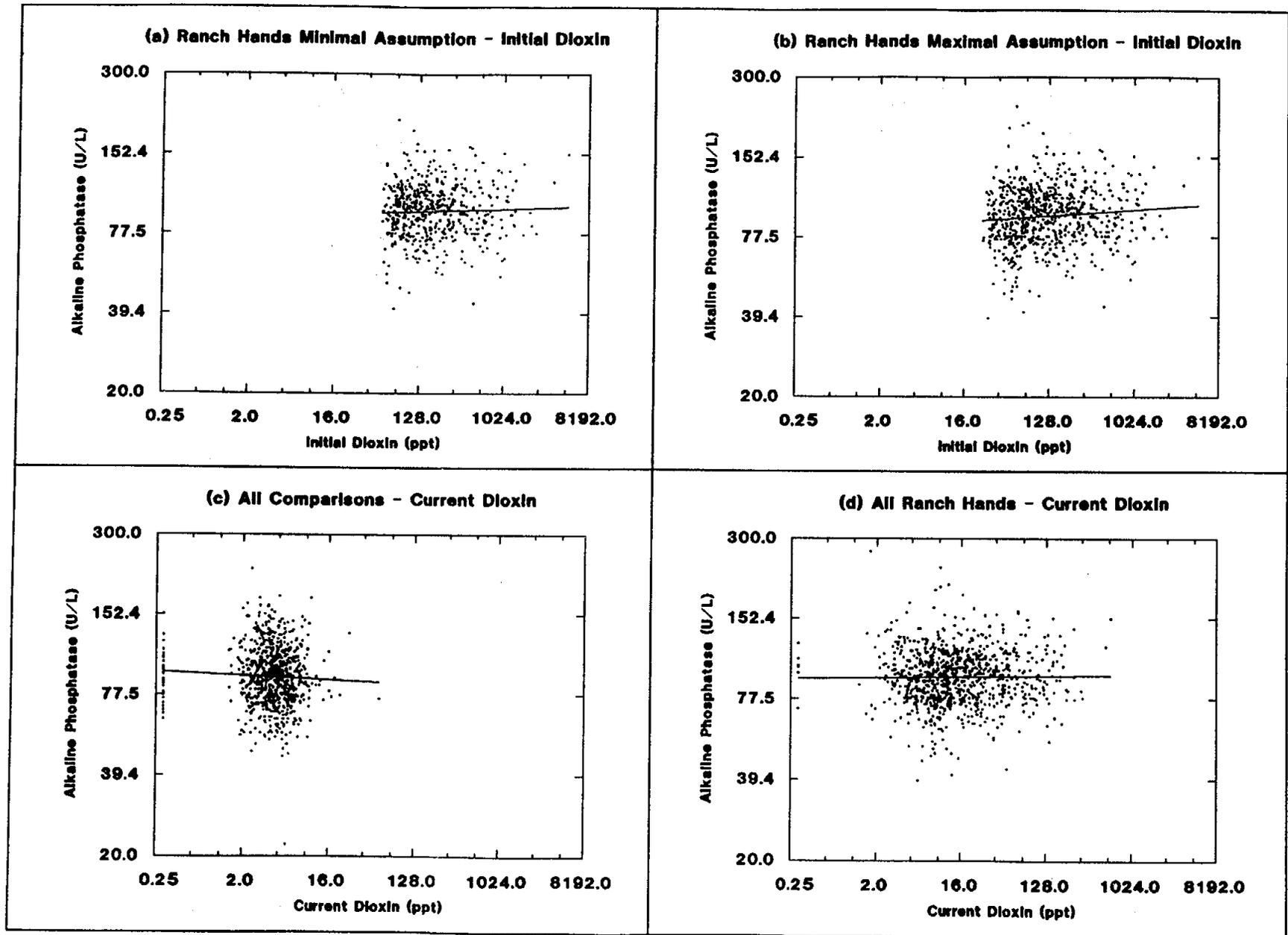


FIGURE I-1-16. Alkaline Phosphatase (Continuous) versus Dioxin

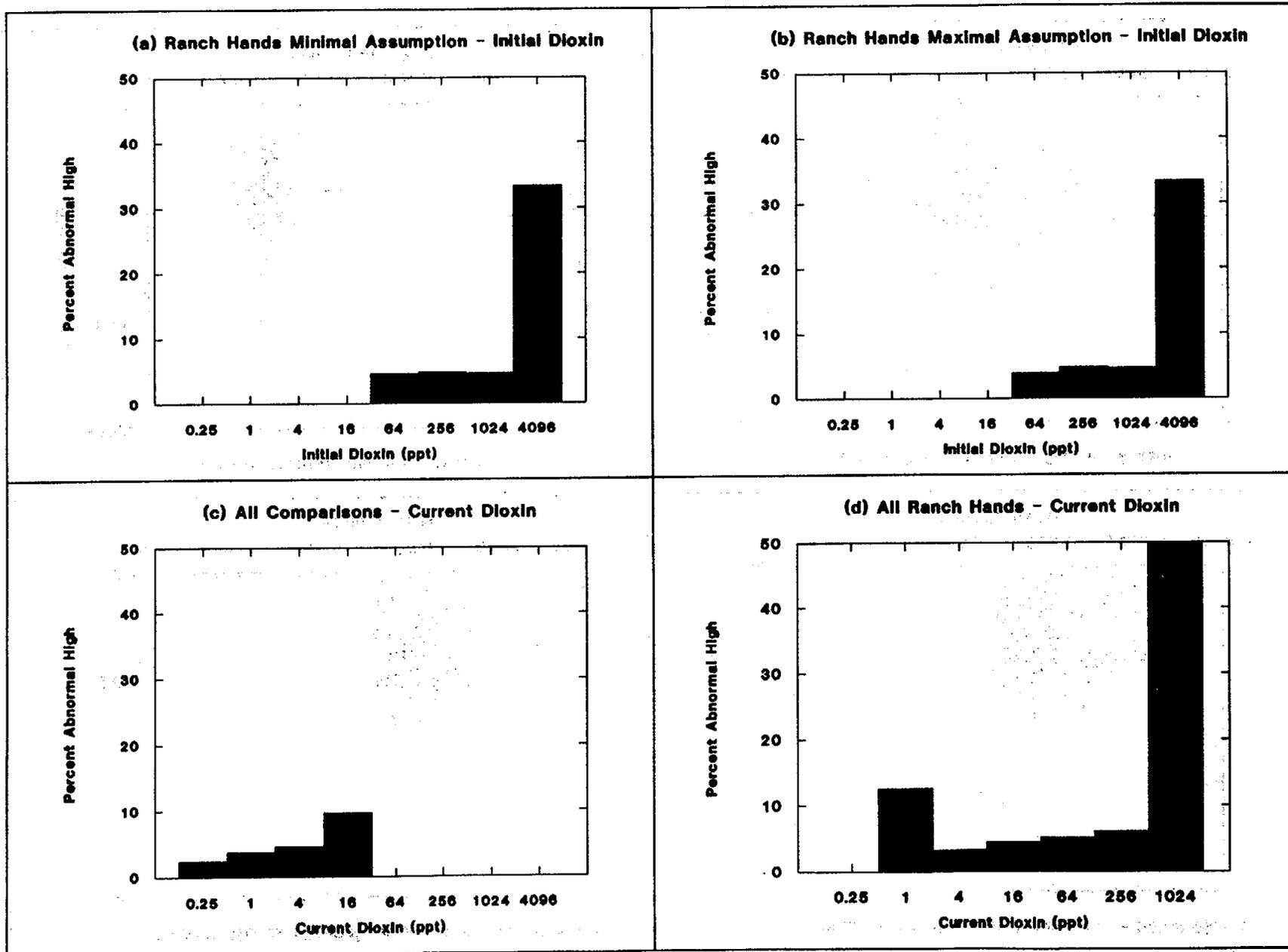


FIGURE I-1-17. Alkaline Phosphatase (Discrete) versus Dioxin

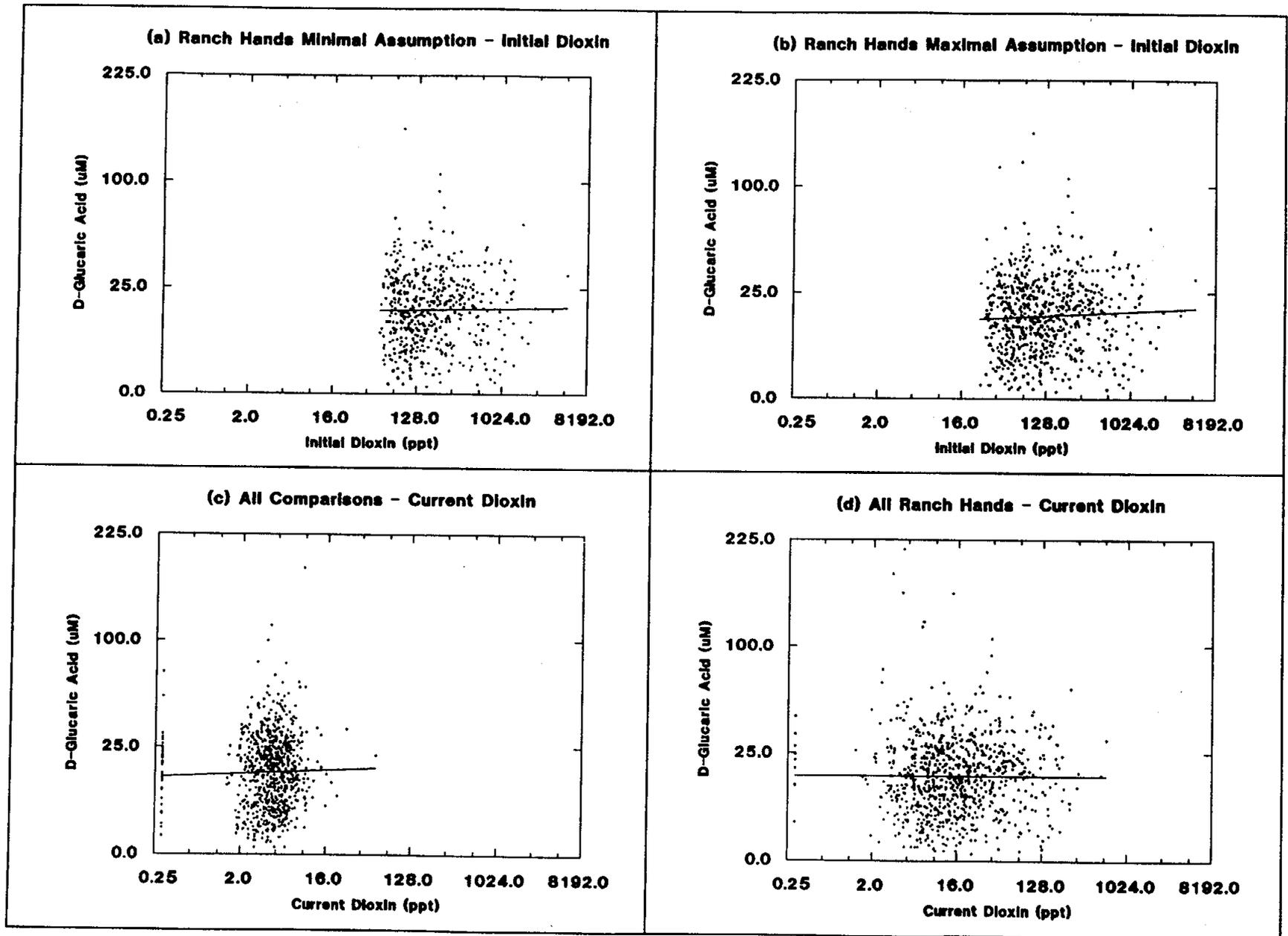


FIGURE I-1-18. D-Gluconic Acid (Continuous) versus Dioxin

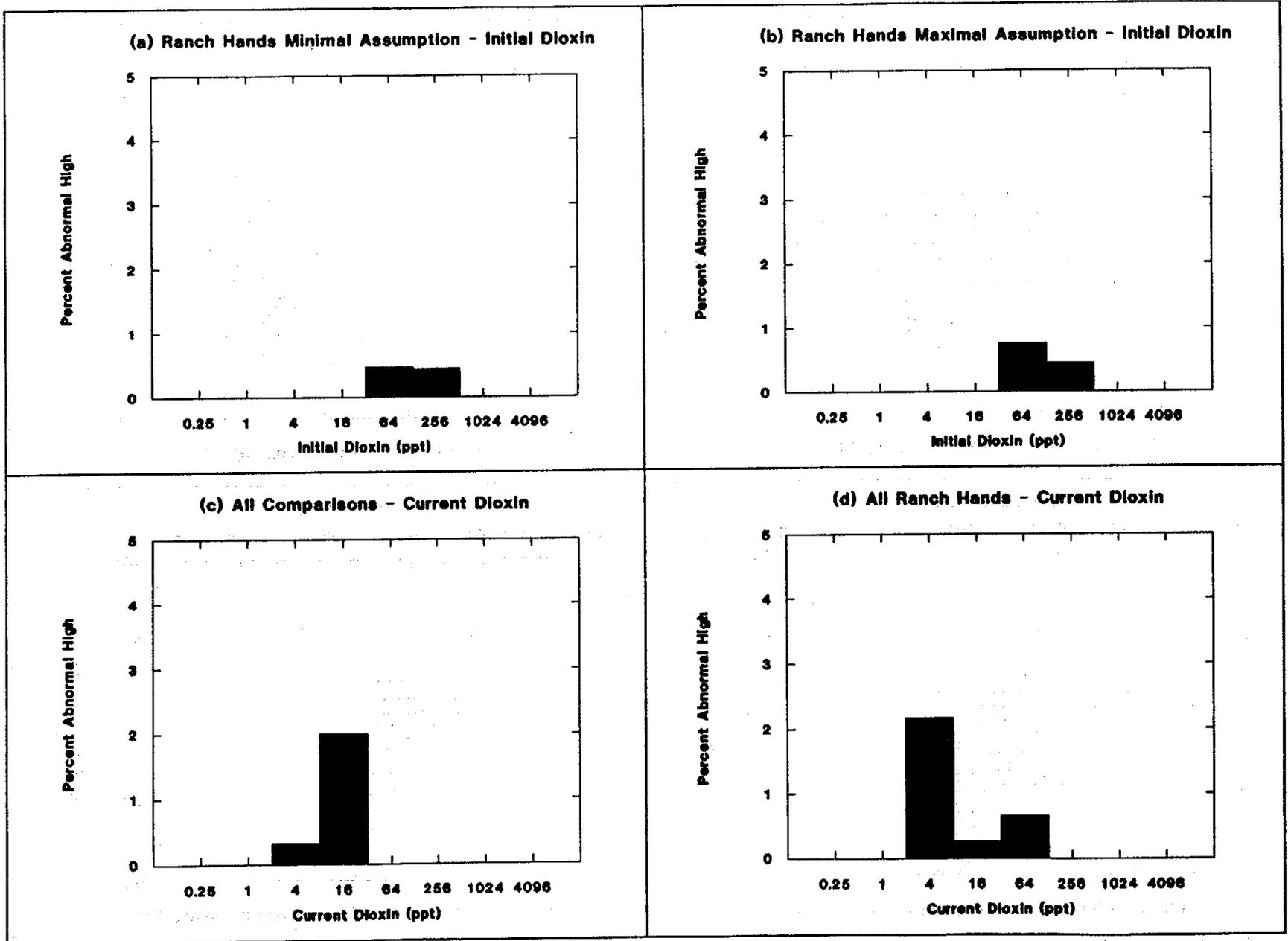


FIGURE I-1-19. D-Glucaric Acid (Discrete) versus Dioxin

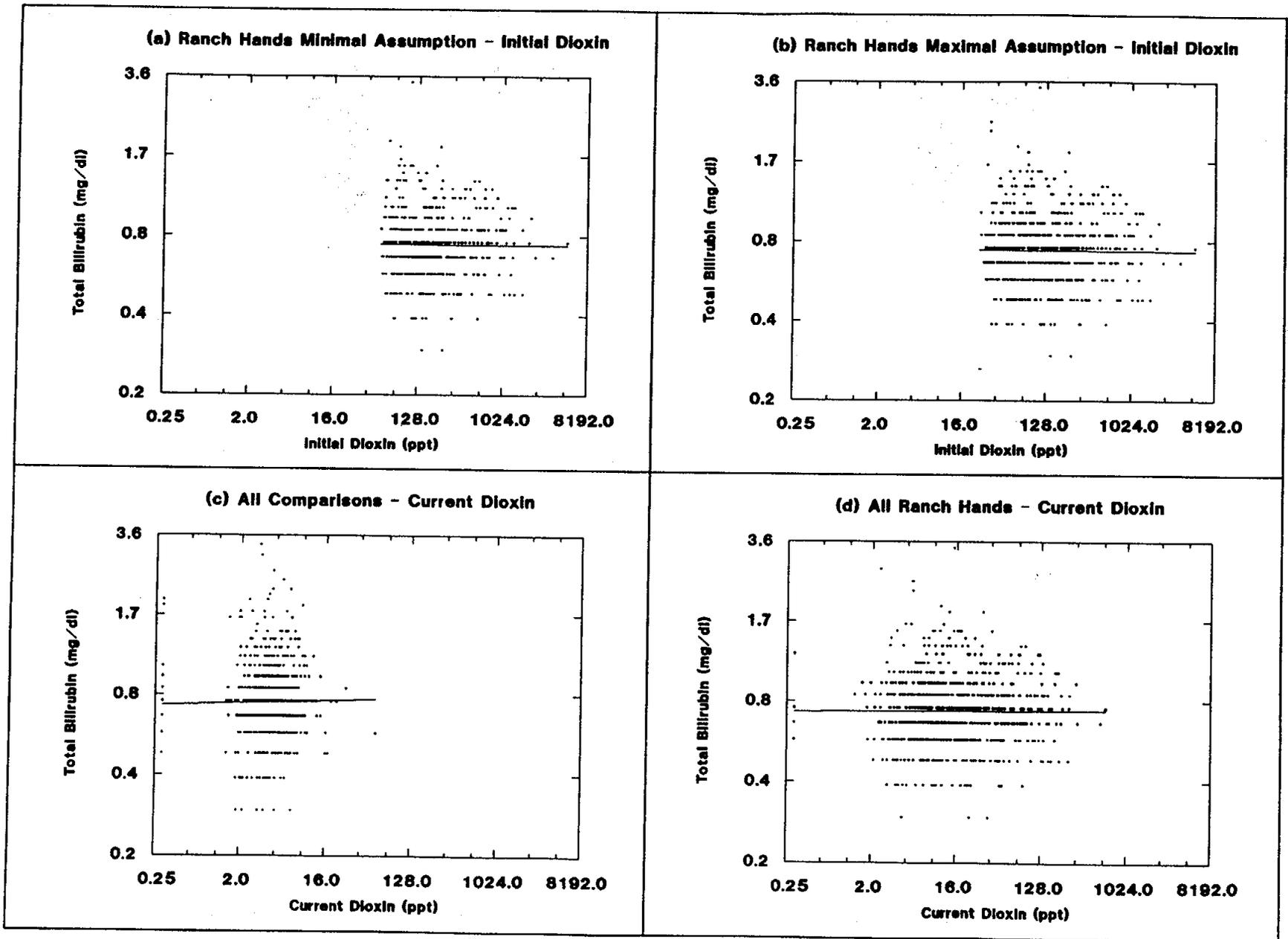


FIGURE I-1-20. Total Bilirubin (Continuous) versus Dioxin

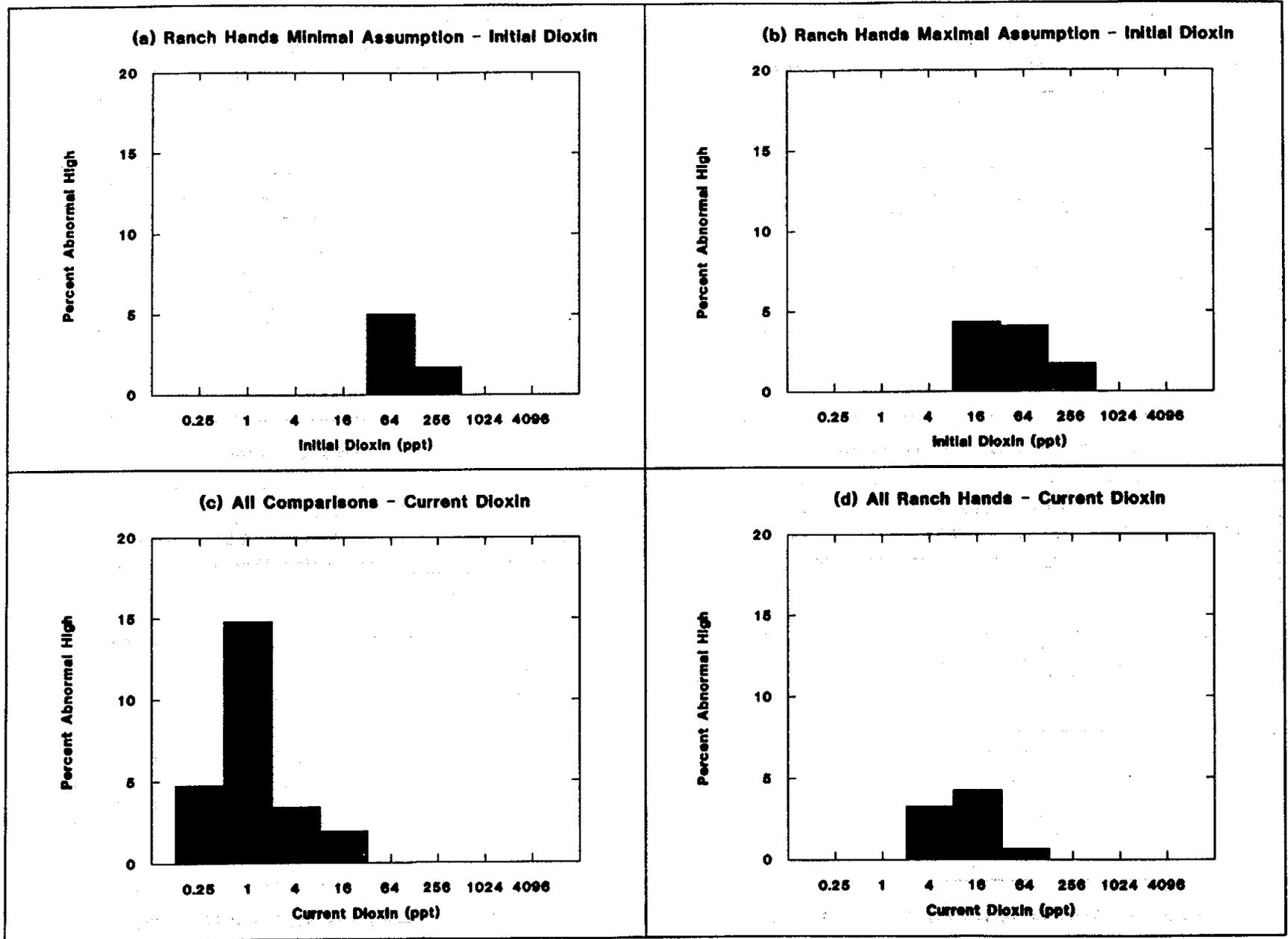


FIGURE I-1-21. Total Bilirubin (Discrete) versus Dioxin

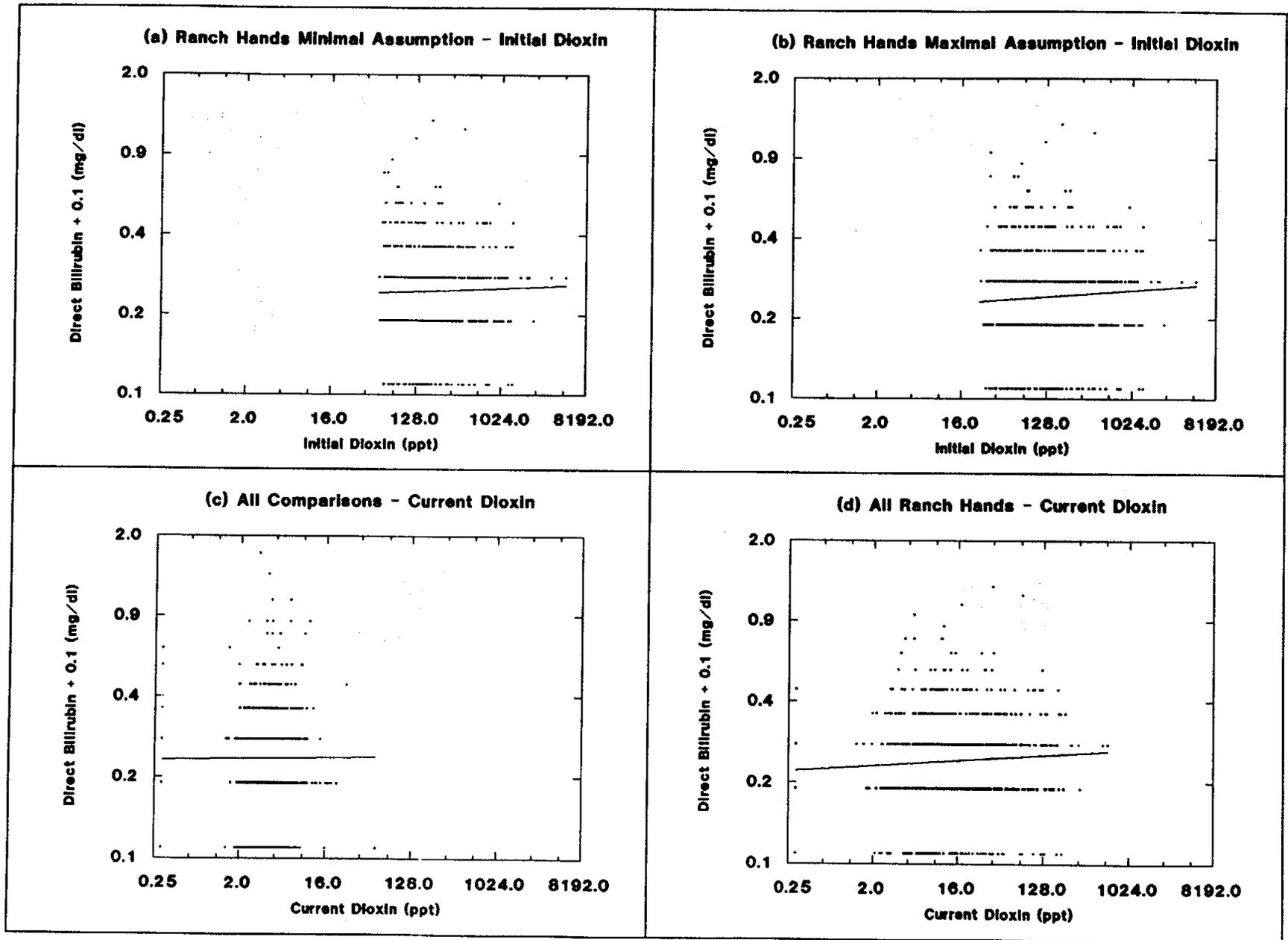


FIGURE I-1-22. Direct Bilirubin (Continuous) versus Dioxin

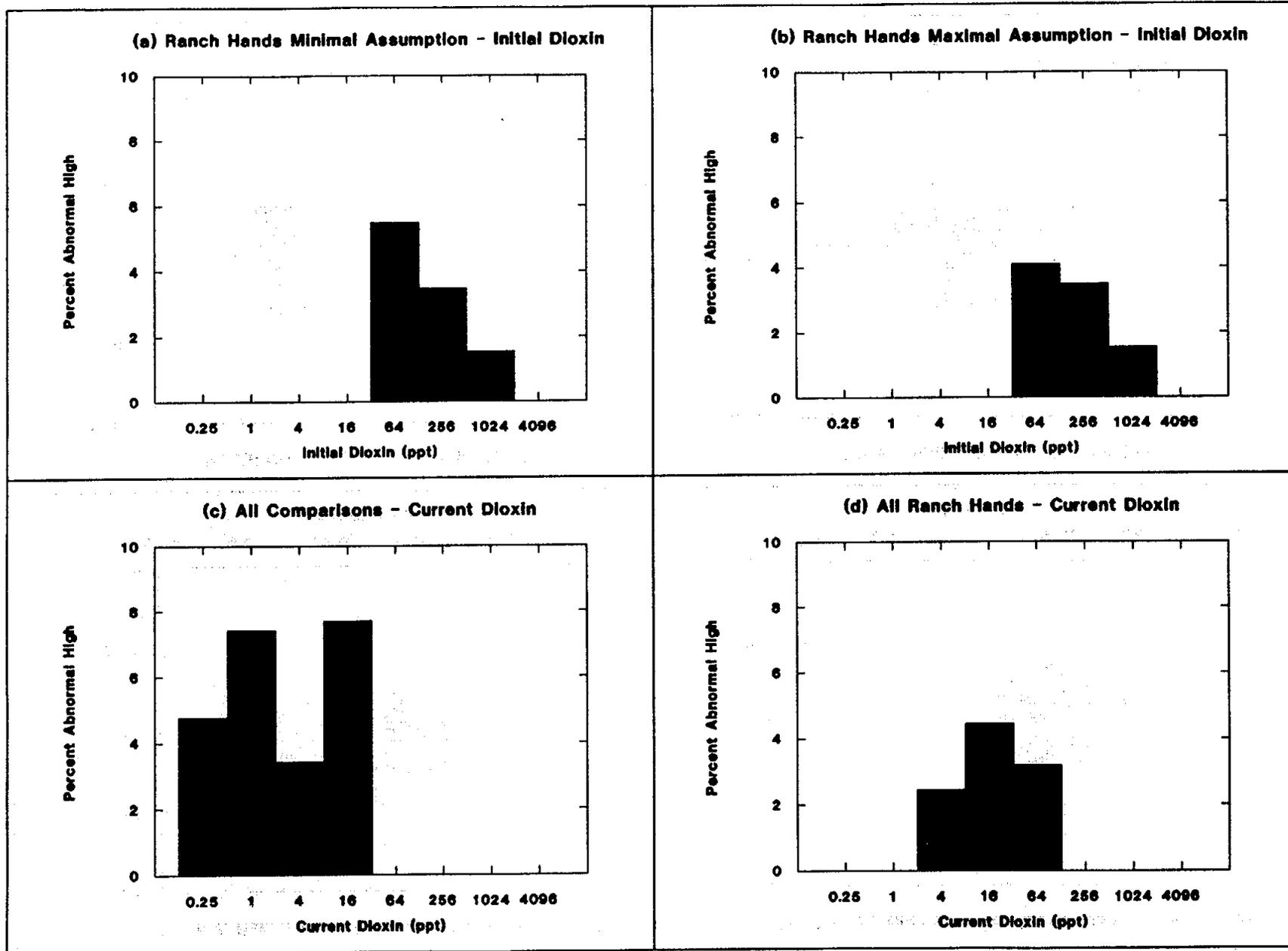


FIGURE I-1-23. Direct Bilirubin (Discrete) versus Dioxin

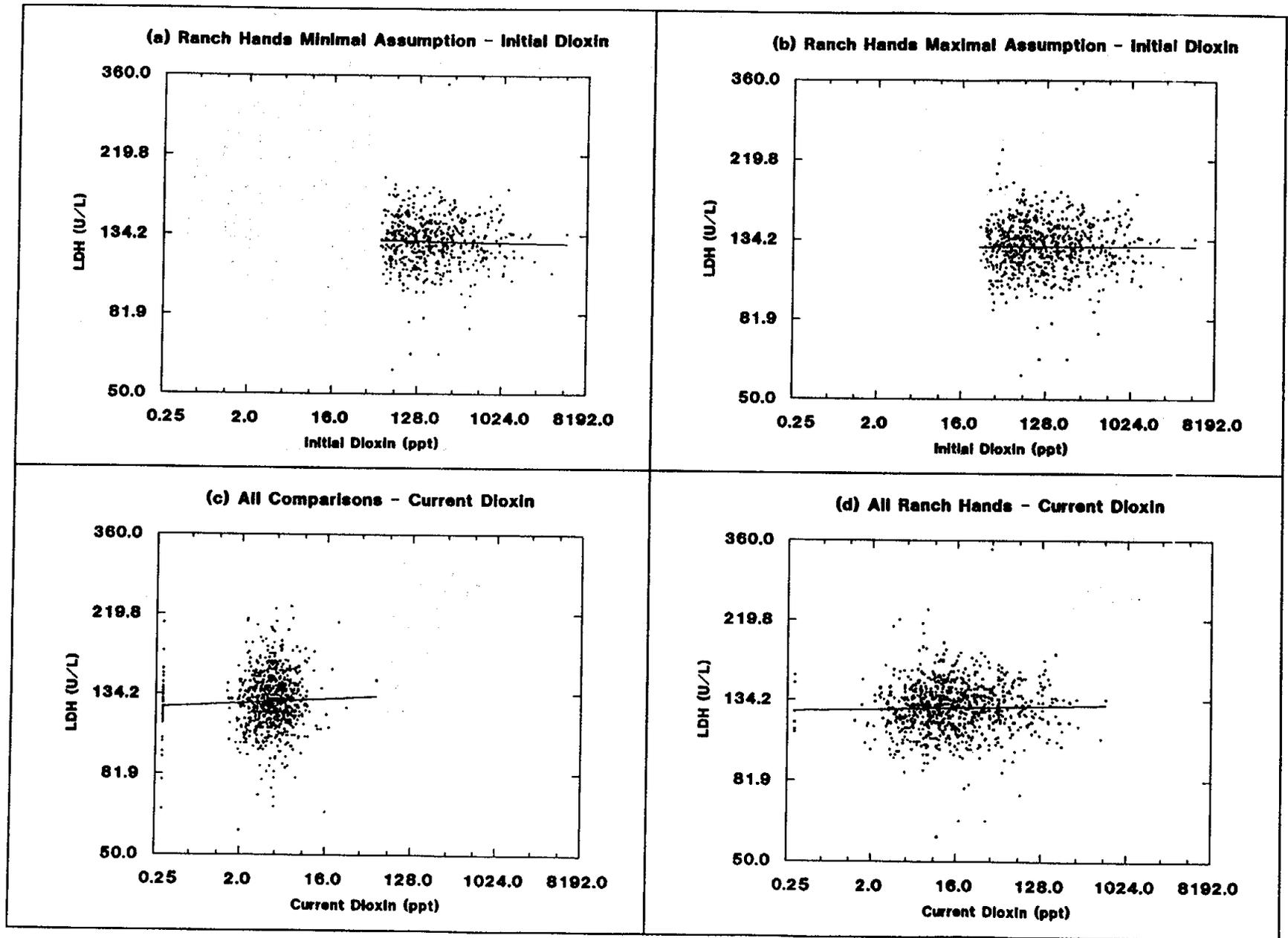


FIGURE I-1-24. LDH (Continuous) versus Dioxin

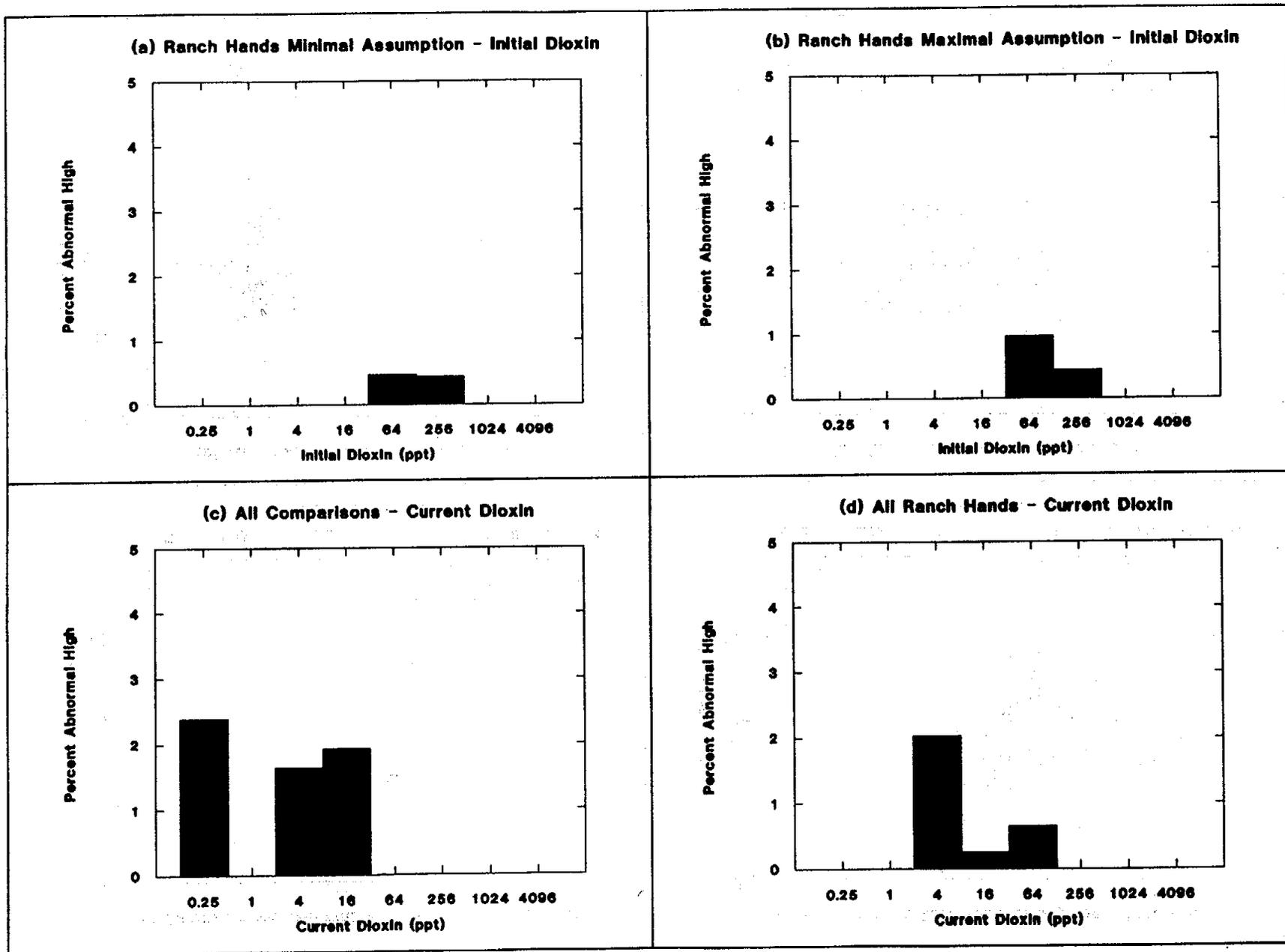


FIGURE I-1-25. LDH (Discrete) versus Dioxin

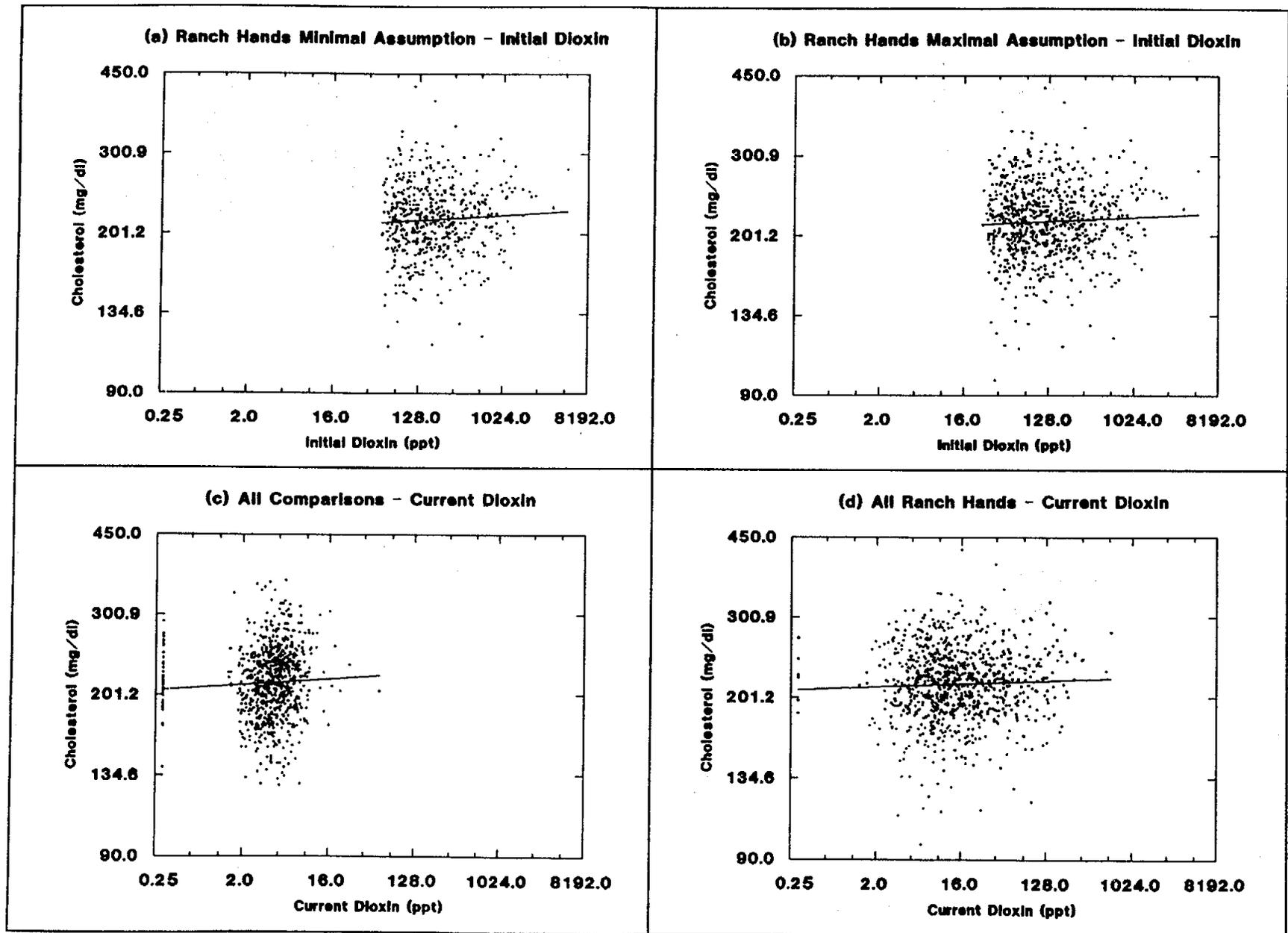


FIGURE I-1-26. Cholesterol (Continuous) versus Dioxin

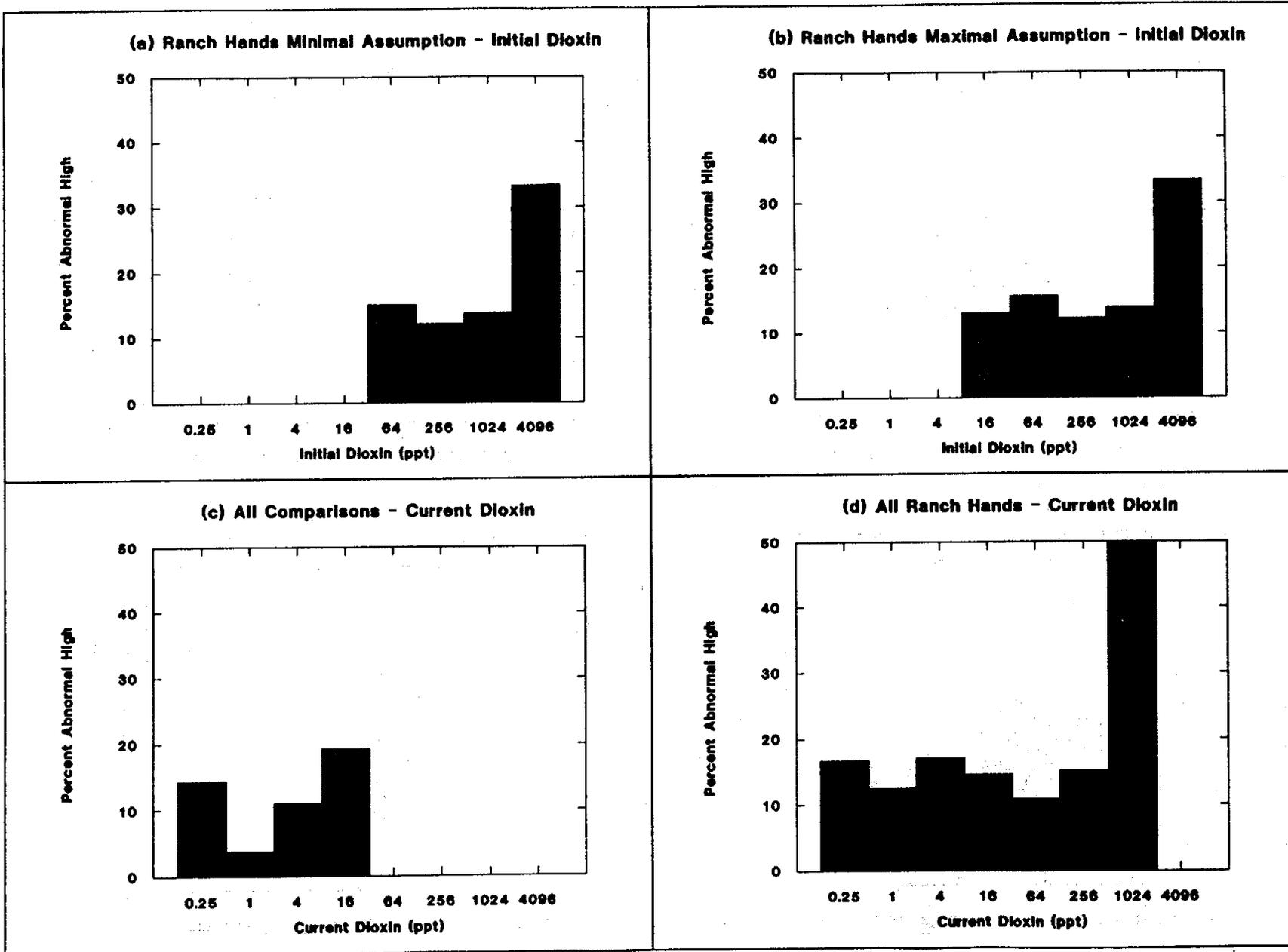


FIGURE I-1-27. Cholesterol (Discrete) versus Dioxin

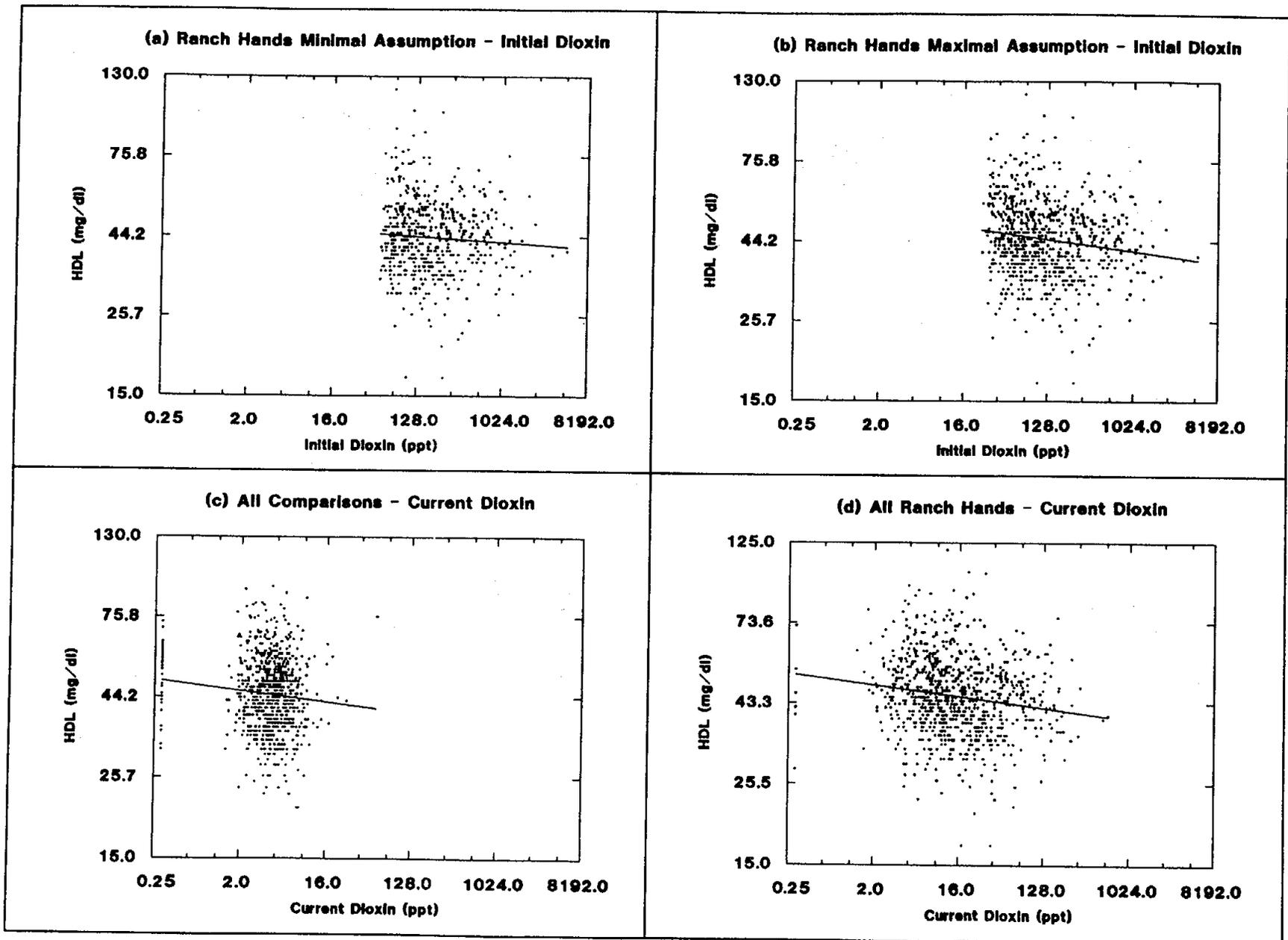


FIGURE I-1-28. HDL (Continuous) versus Dioxin

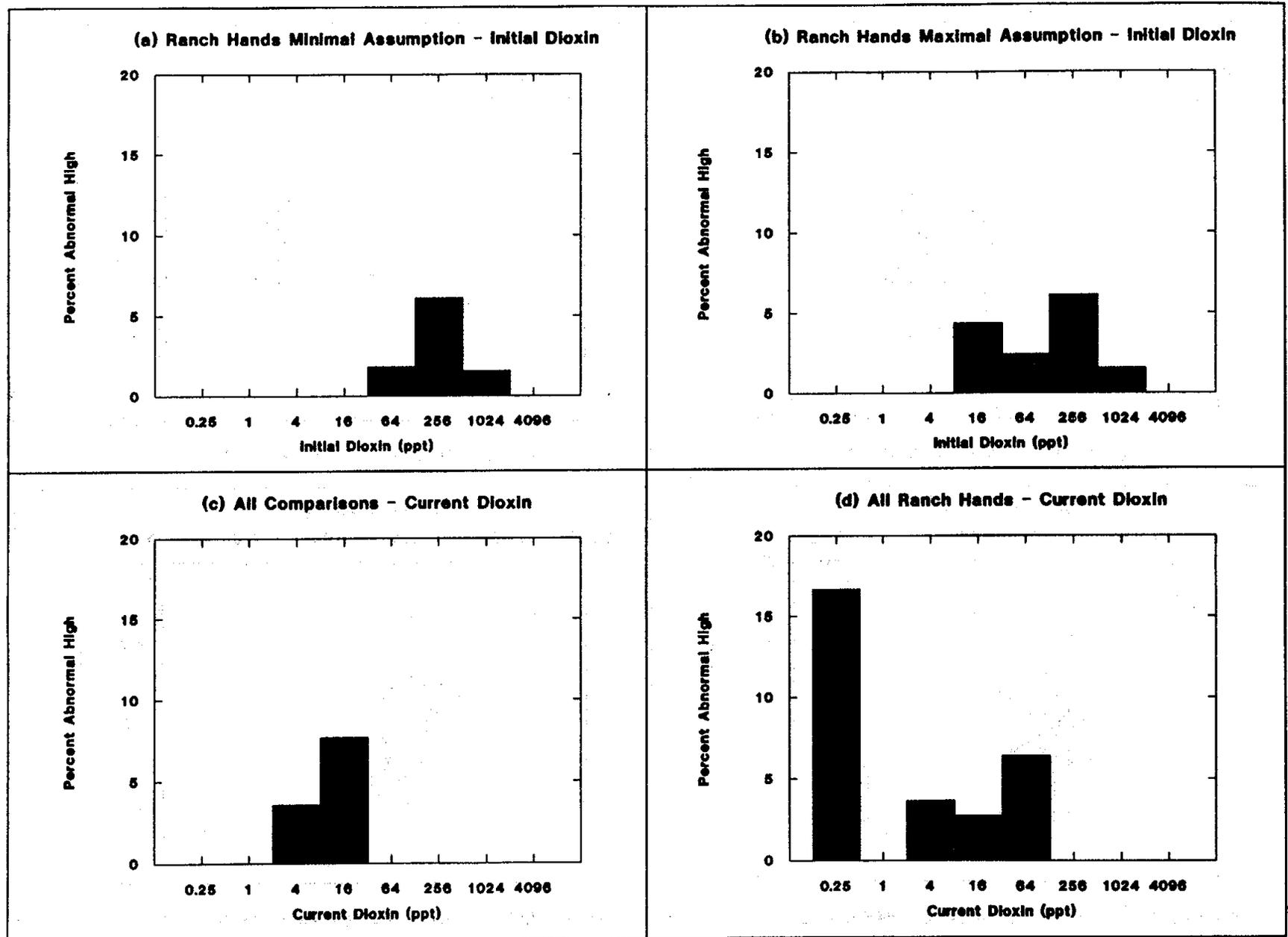


FIGURE I-1-29. HDL (Discrete) versus Dioxin

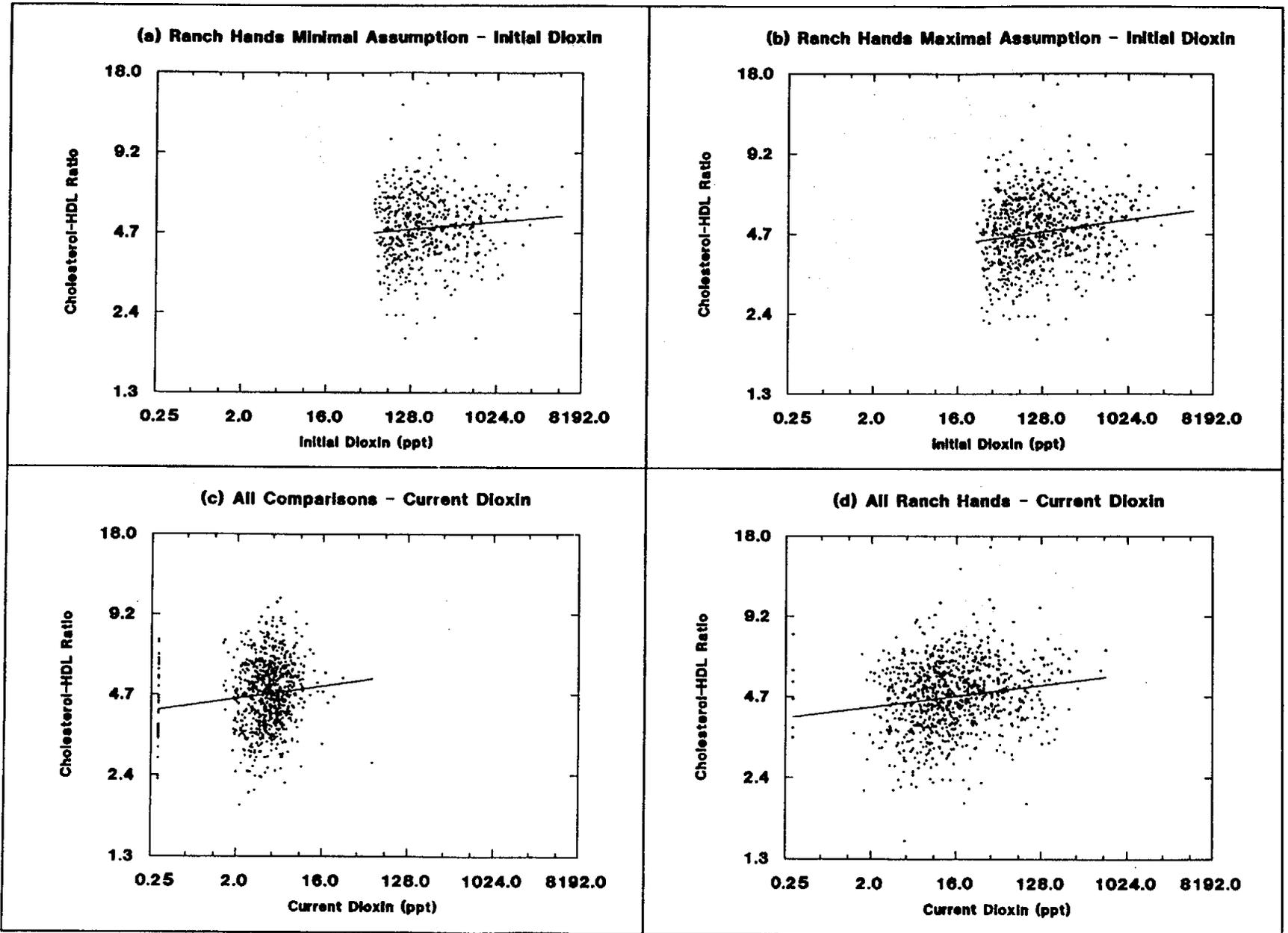


FIGURE I-1-30. Cholesterol-HDL Ratio (Continuous) versus Dioxin

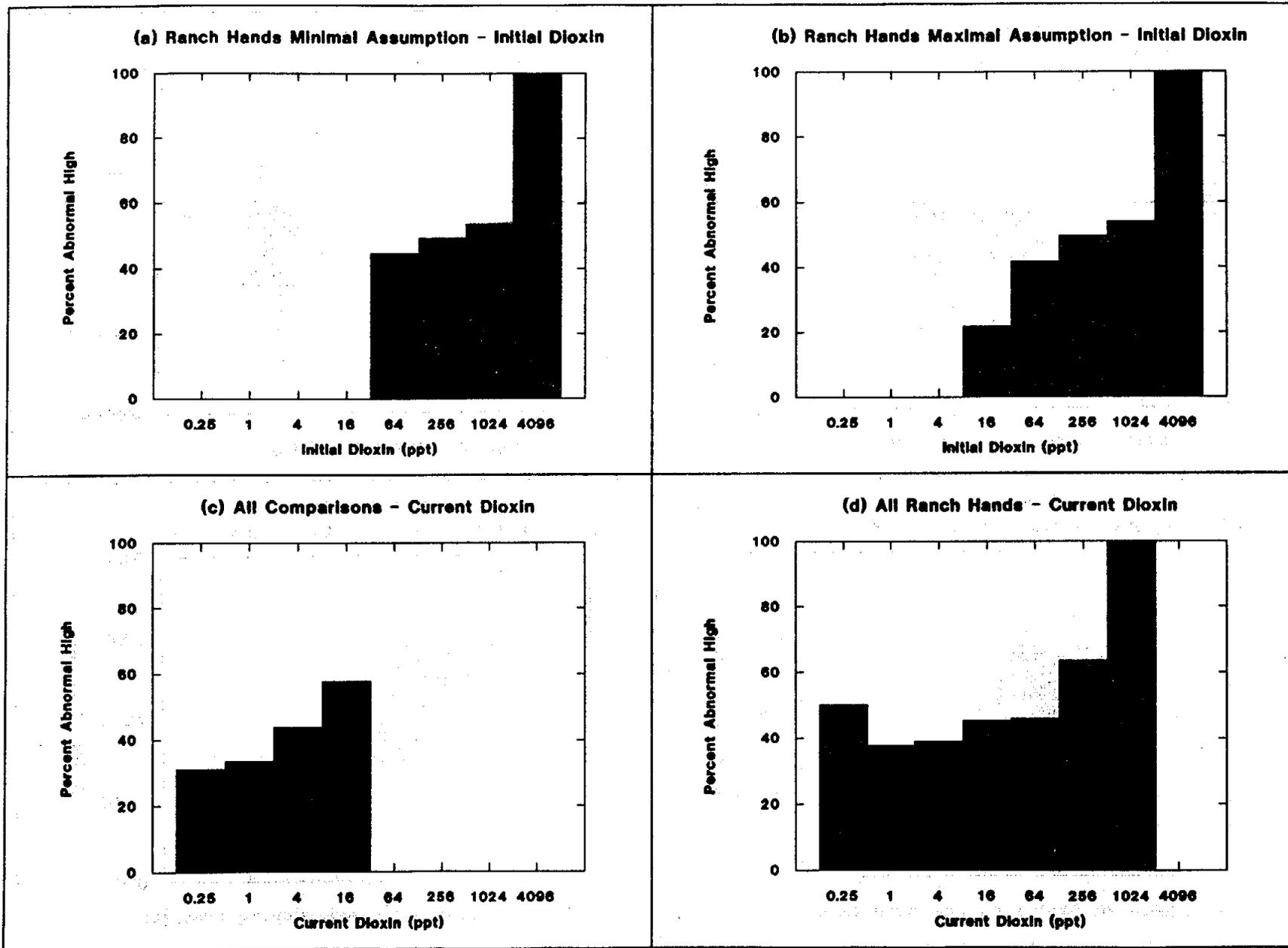


FIGURE I-1-31. Cholesterol-HDL Ratio (Discrete) versus Dioxin

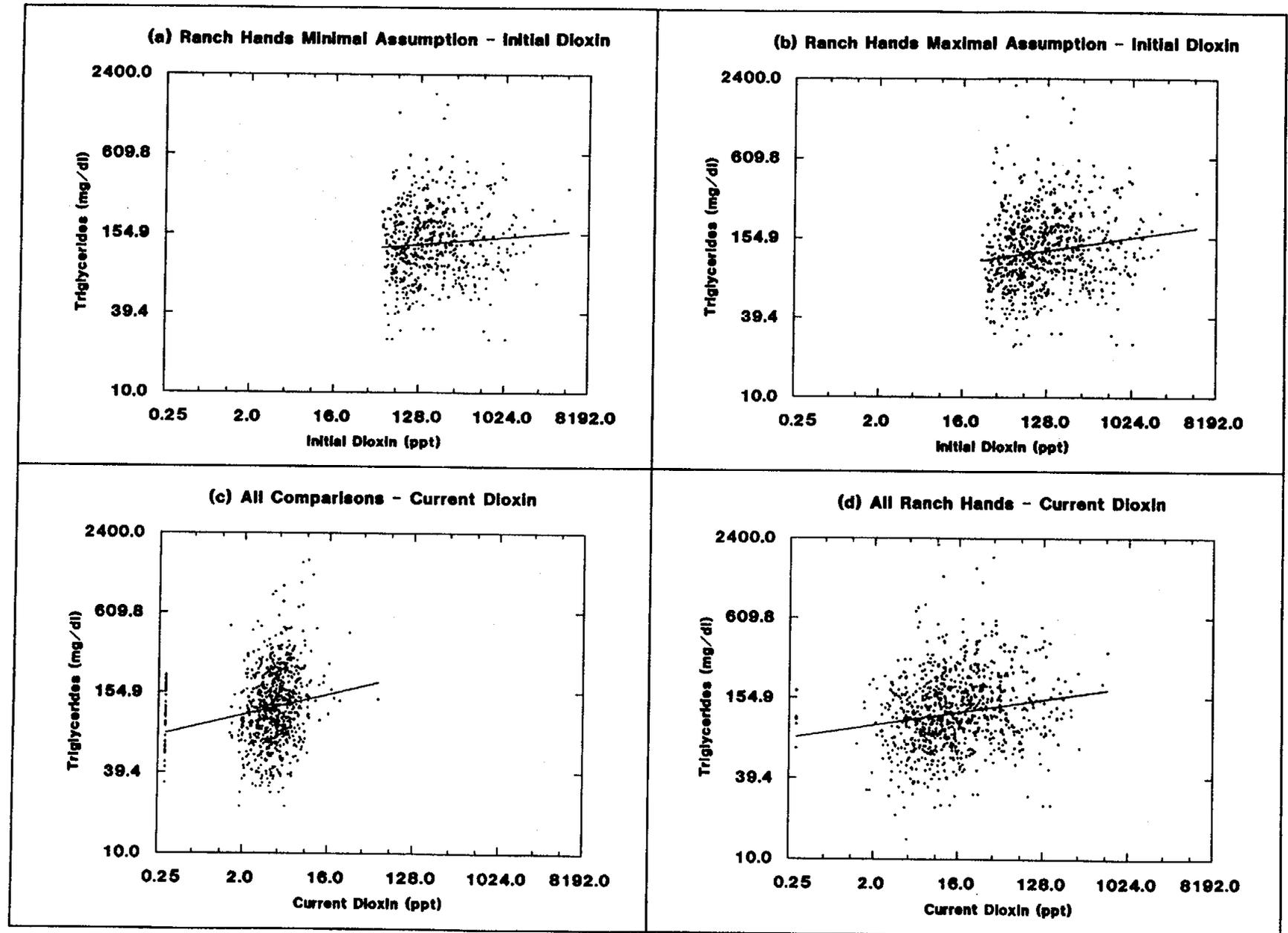


FIGURE I-1-32. Triglycerides (Continuous) versus Dioxin

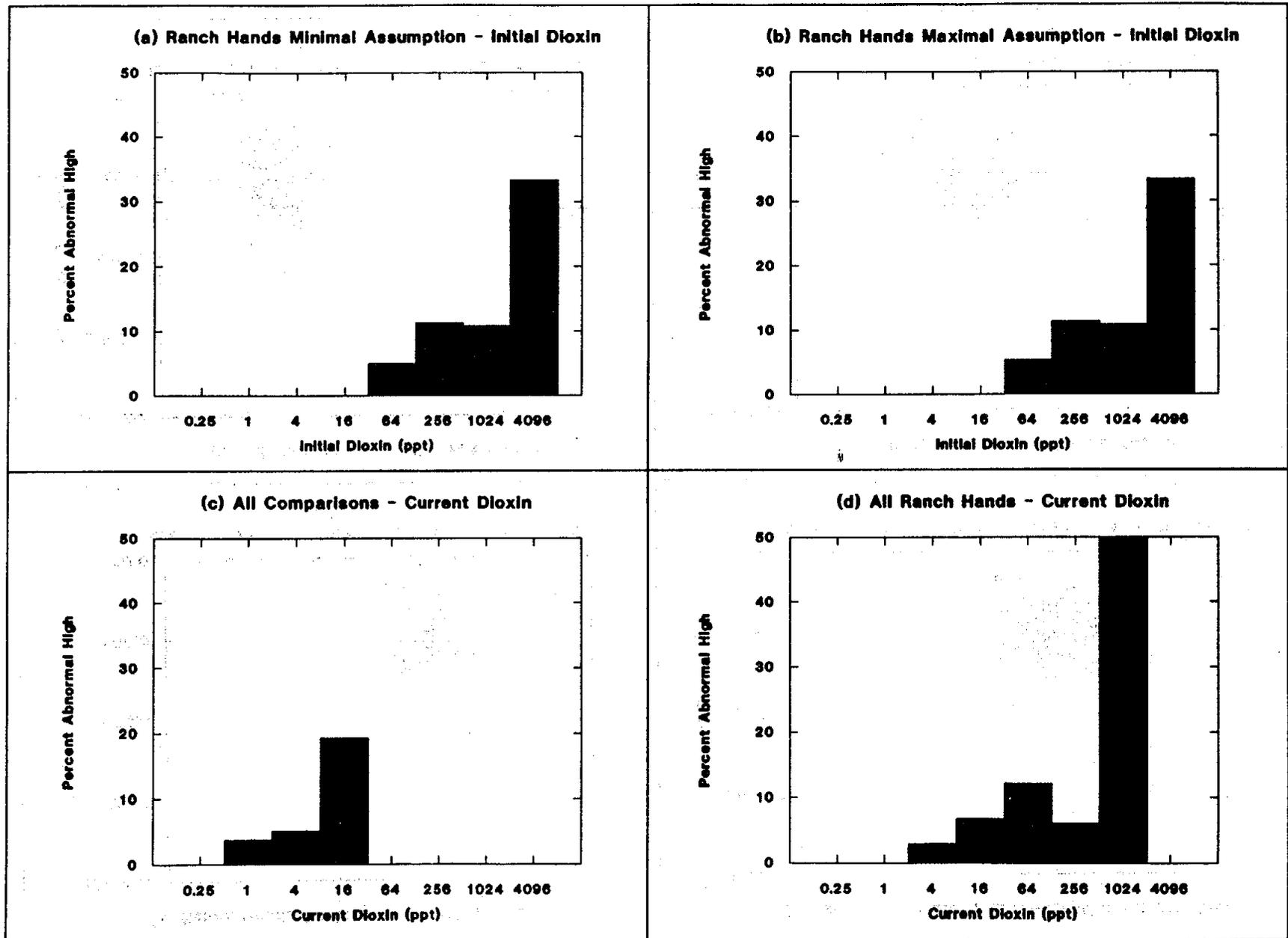


FIGURE I-1-33. Triglycerides (Discrete) versus Dioxin

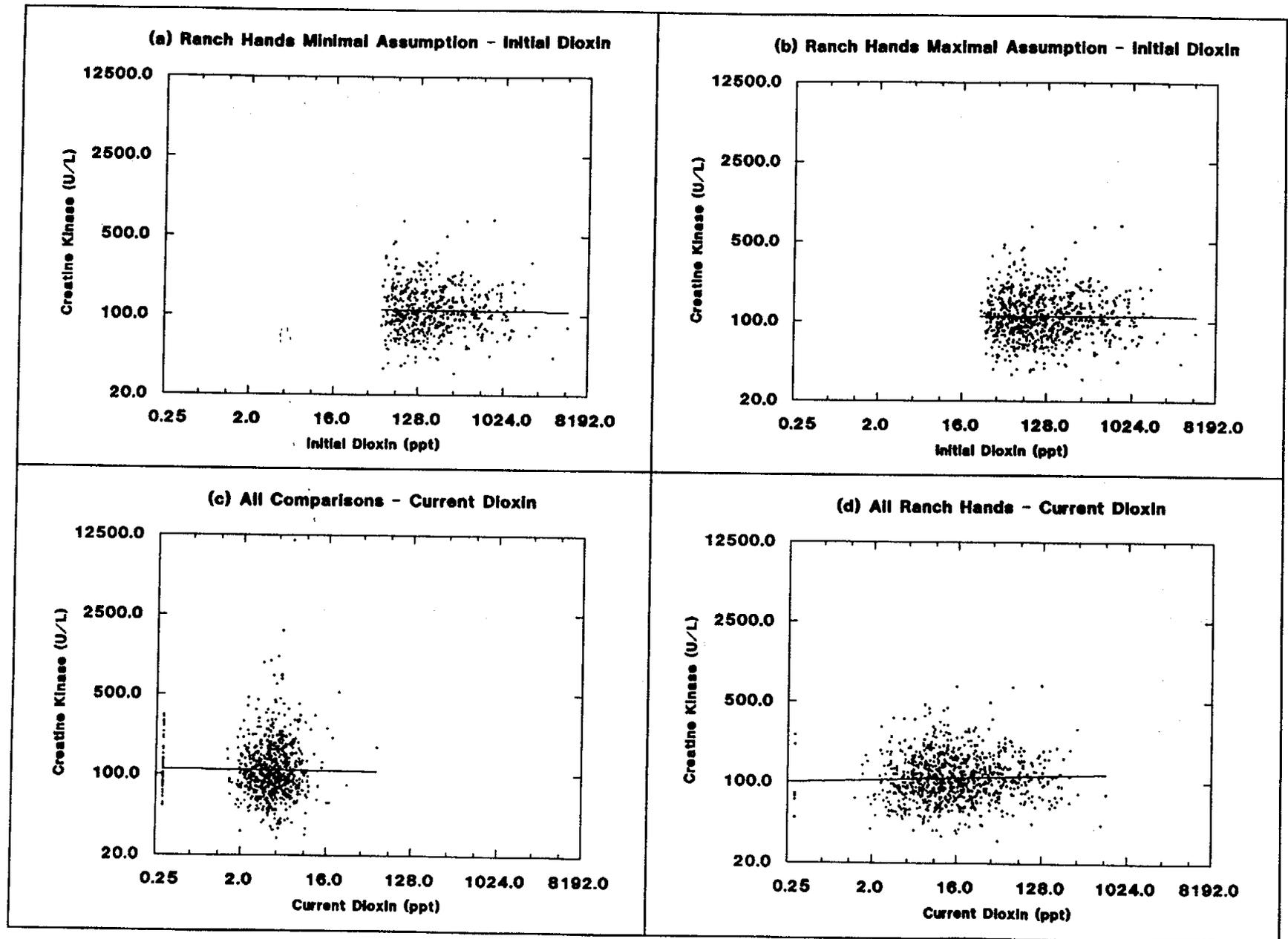


FIGURE I-1-34. Creatine Kinase (Continuous) versus Dioxin

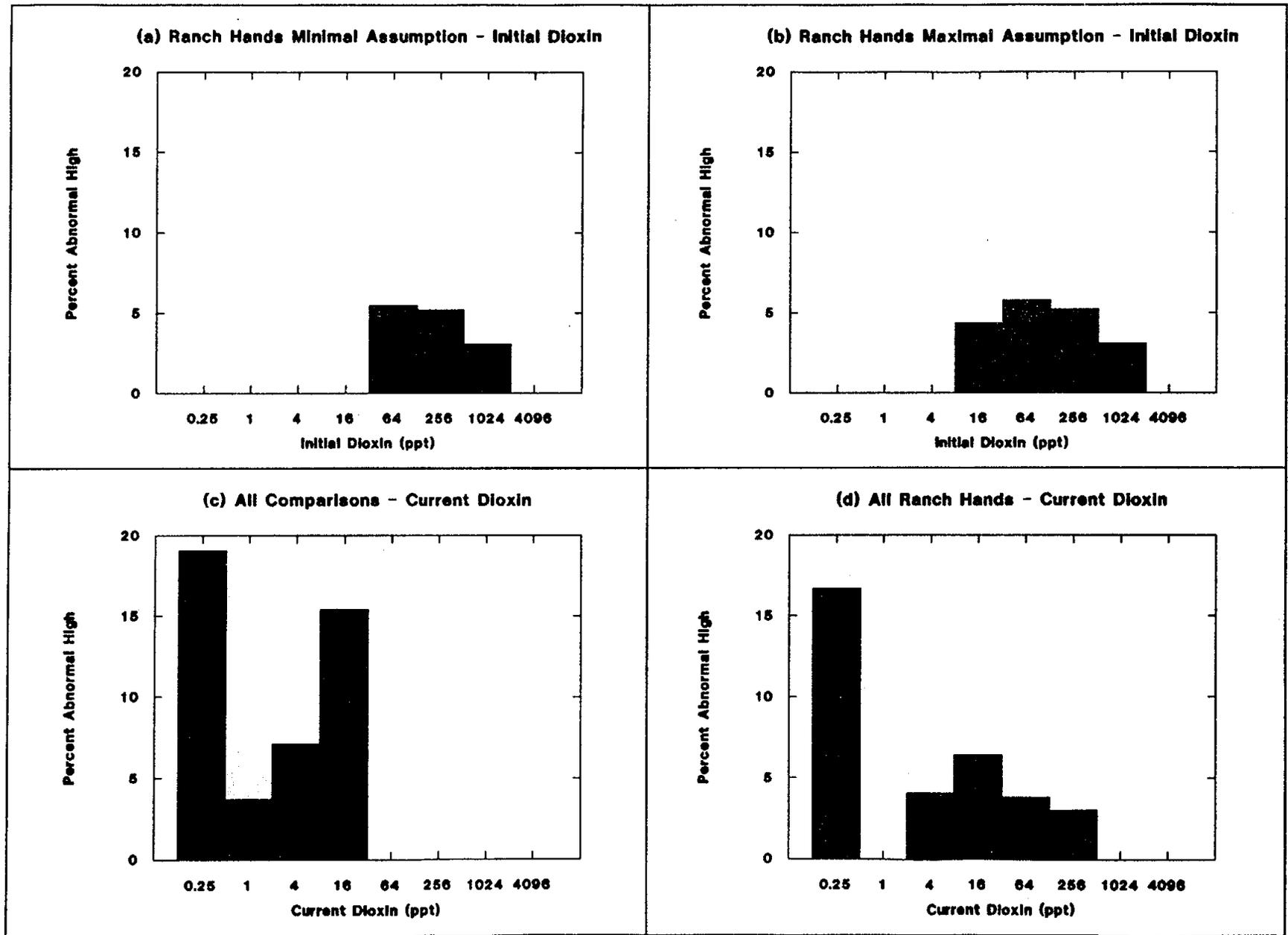


FIGURE I-1-35. Creatine Kinase (Discrete) versus Dioxin

APPENDIX I-2.

Interaction Displays for the Gastrointestinal Assessment

The following figures graphically display dioxin-by-covariate interactions found in the statistical analyses of the dependent variables in the gastrointestinal assessment. For interactions with initial dioxin in the Ranch Hands involving continuous dependent variables, bivariate plots are presented with observations in each stratum represented by different symbols. 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 (transform of the) dependent variable and \log_2 (initial dioxin). For each stratum, the lines span the range of 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 I, Table I-1), and each stratum is represented by a different design. Appendix Table I-1 also displays the sample sizes for each bar on the graph.

In the Ranch Hands, for current dioxin-by-time-by-covariate interactions with continuous dependent variables, separate bivariate plots (dependent variable versus current dioxin) are presented for each stratum of the covariate. Different symbols represent late tours (time since tour ≤ 18.6 years) and early tours (time since tour > 18.6 years) within each plot. The spacing for current dioxin and the dependent variable follows the same conventions as described above, as do the reference lines. 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 I-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 I-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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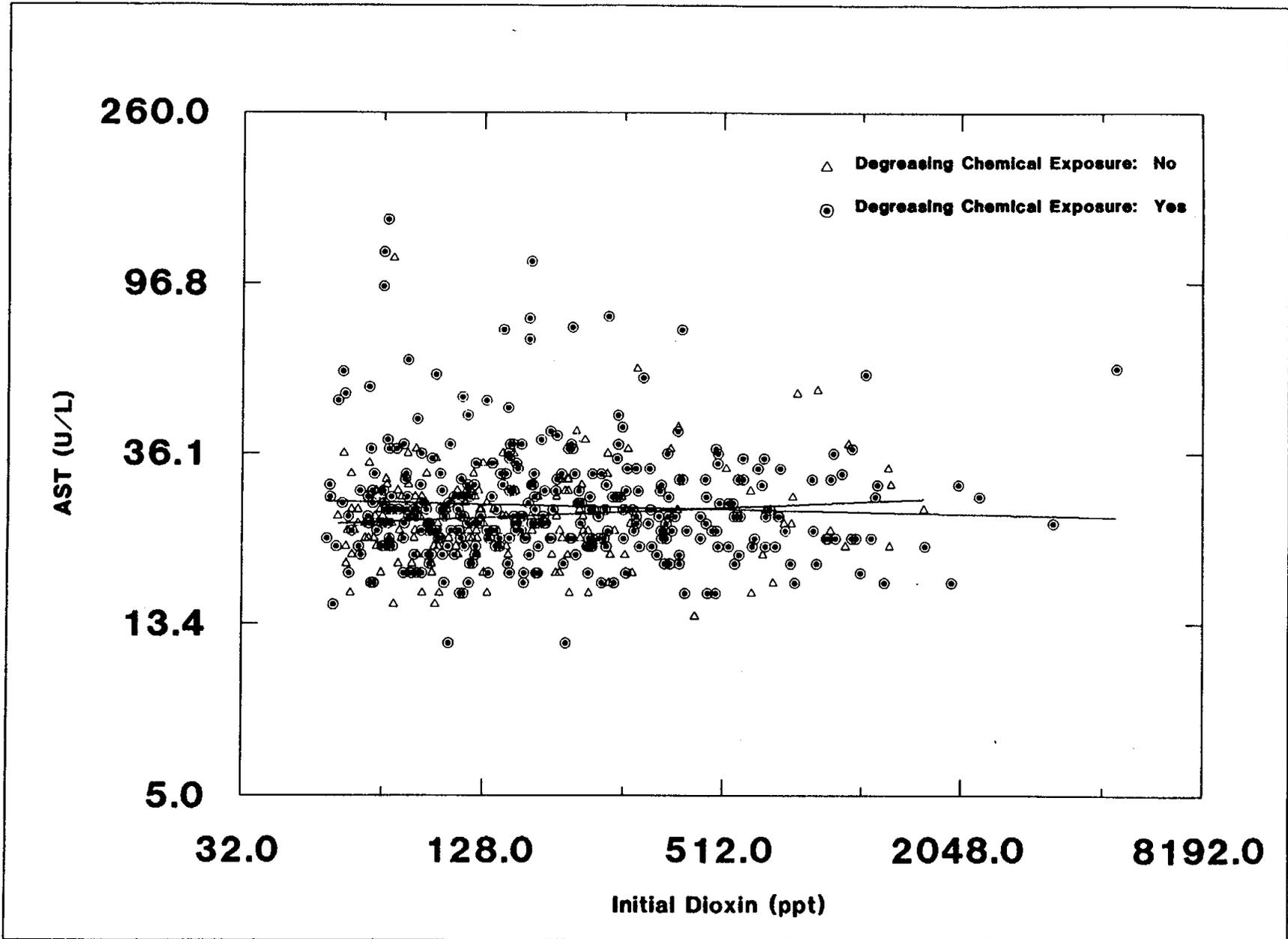


FIGURE I-2-1. Interaction of Initial Dioxin and Degreasing Chemical Exposure for AST (Continuous - Ranch Hands, Minimal Assumption)

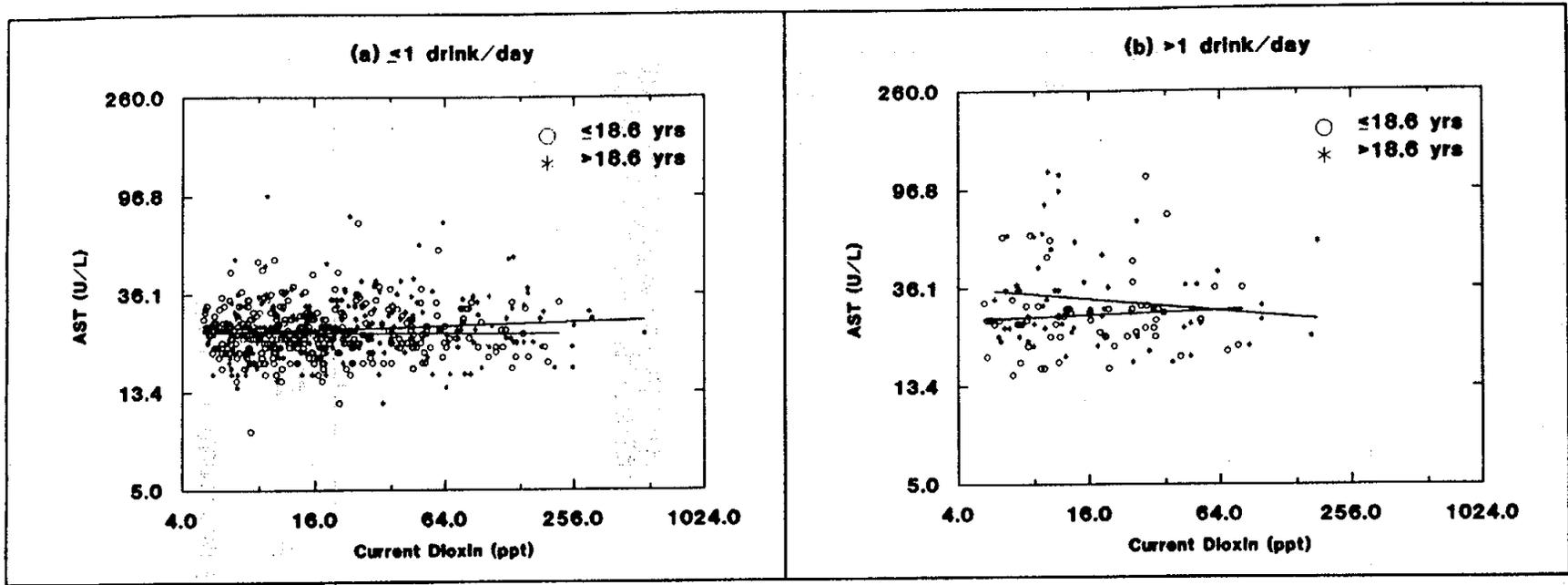


FIGURE I-2-2. Interaction of Current Dioxin, Time, and Current Alcohol Use for AST (Continuous - Ranch Hands, Maximal Assumption)

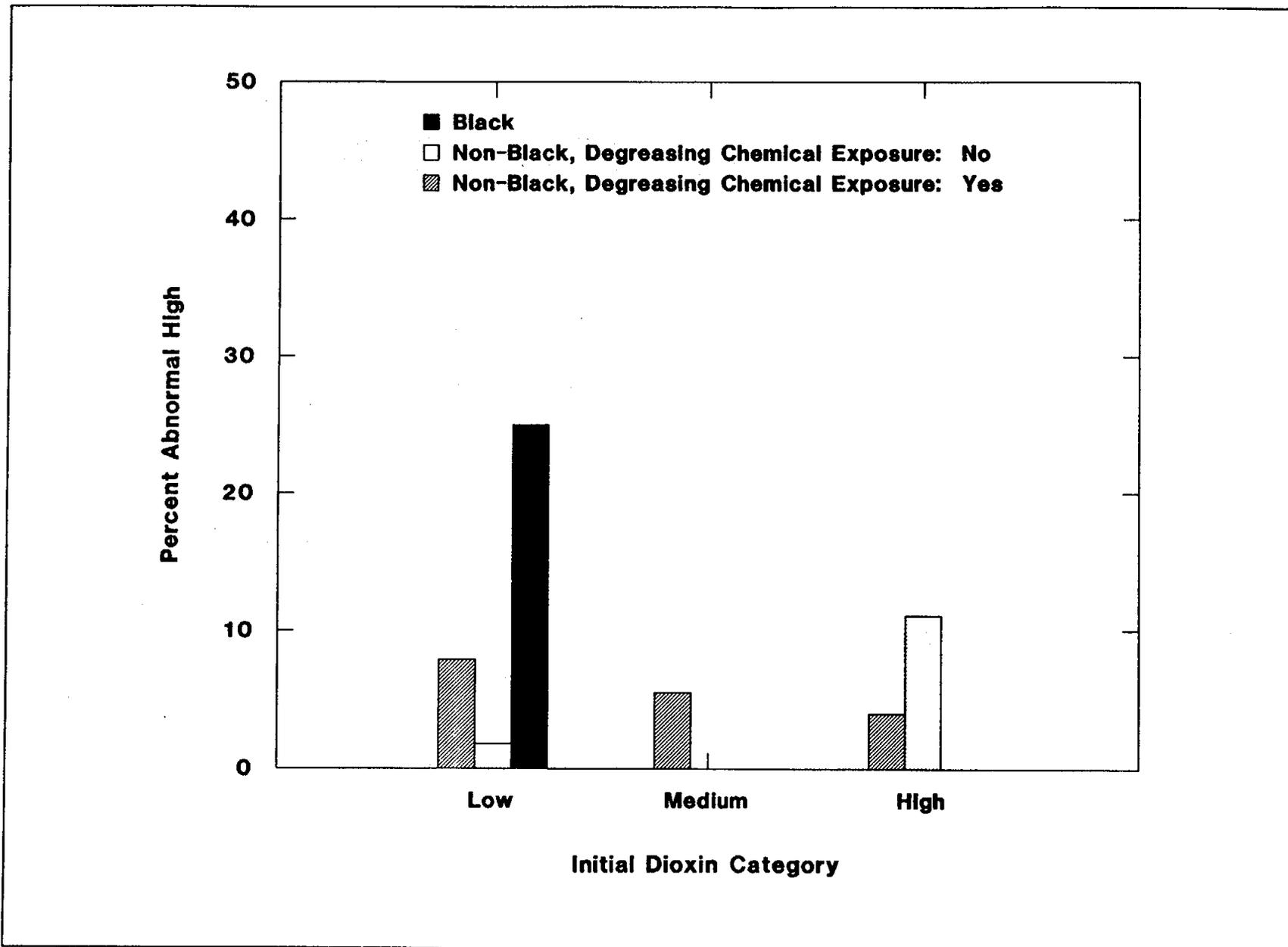


FIGURE I-2-3. Interactions of Initial Dioxin with Race and Degreasing Chemical Exposure for AST (Discrete - Ranch Hands, Minimal Assumption)

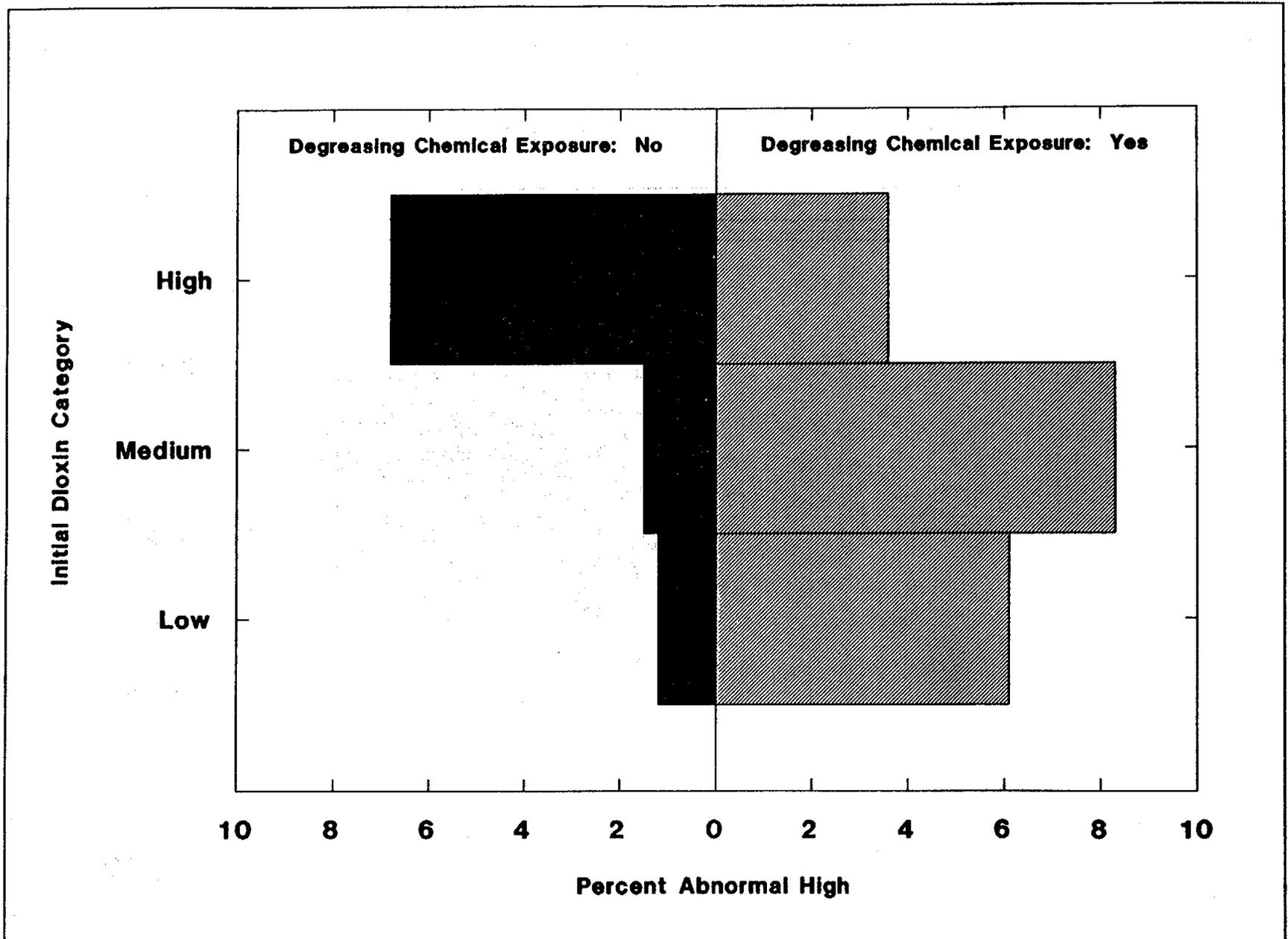
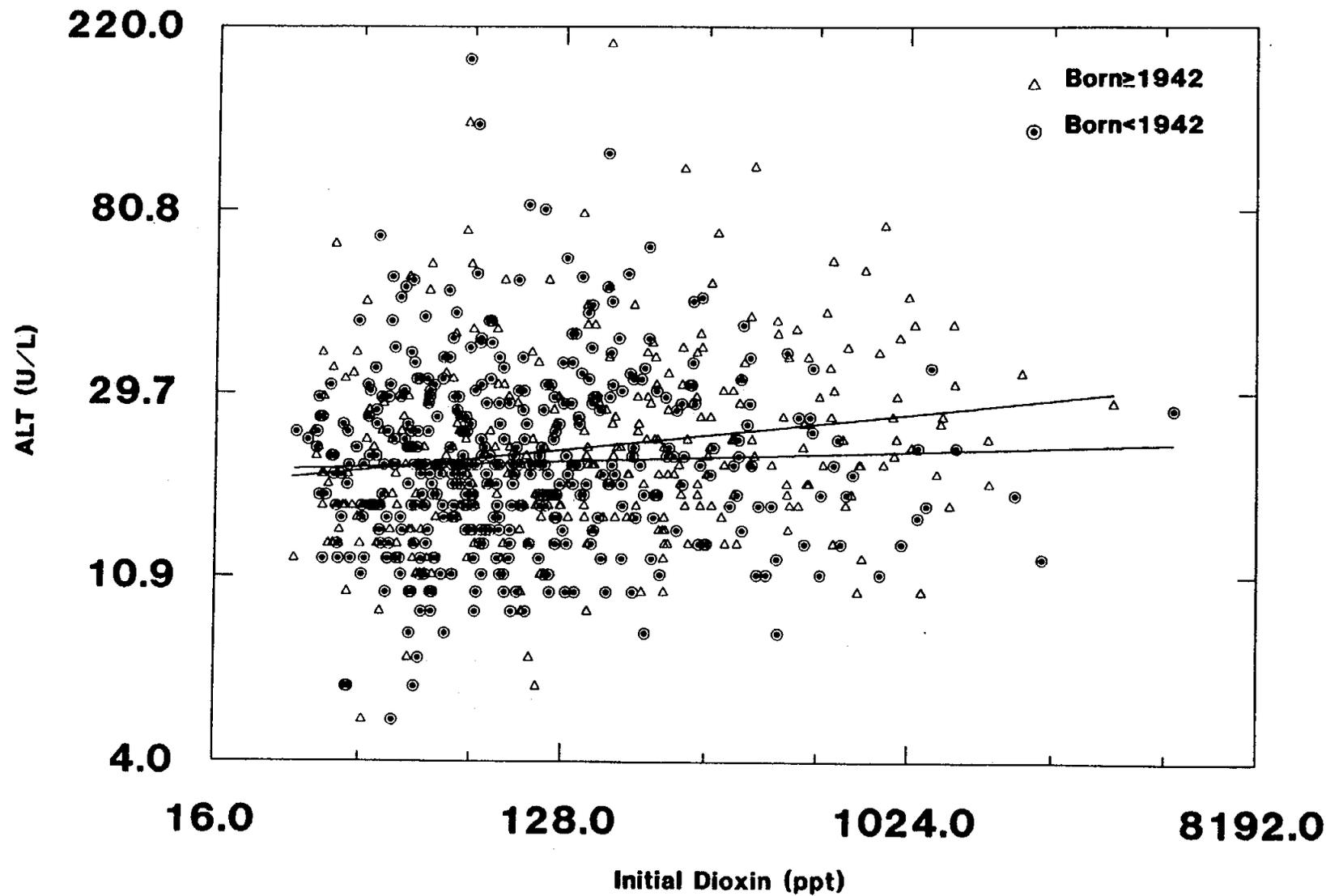


FIGURE I-2-4. Interaction of Initial Dioxin and Degreasing Chemical Exposure for AST (Discrete - Ranch Hands, Maximal Assumption)



**FIGURE I-2-5. Interaction of Initial Dioxin and Age for ALT
(Continuous - Ranch Hands, Maximal Assumption)**

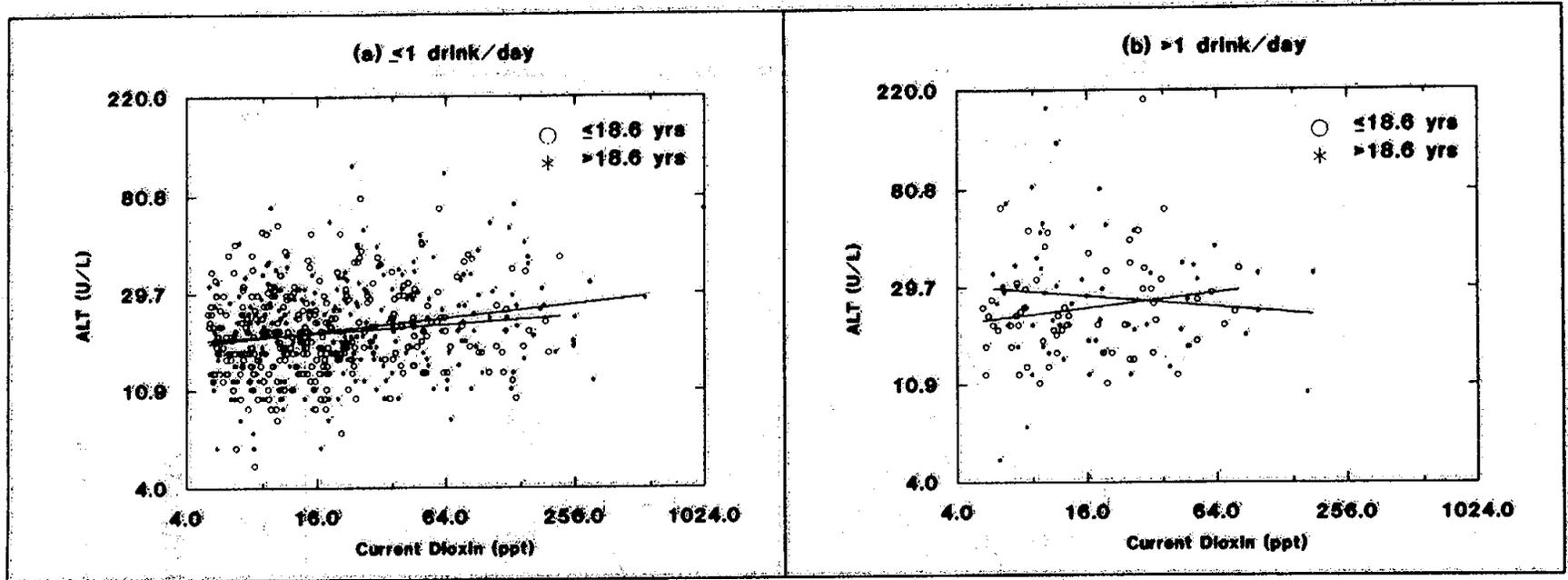


FIGURE I-2-6. Interaction of Current Dioxin, Time, and Current Alcohol Use for ALT (Continuous - Ranch Hands, Maximal Assumption)

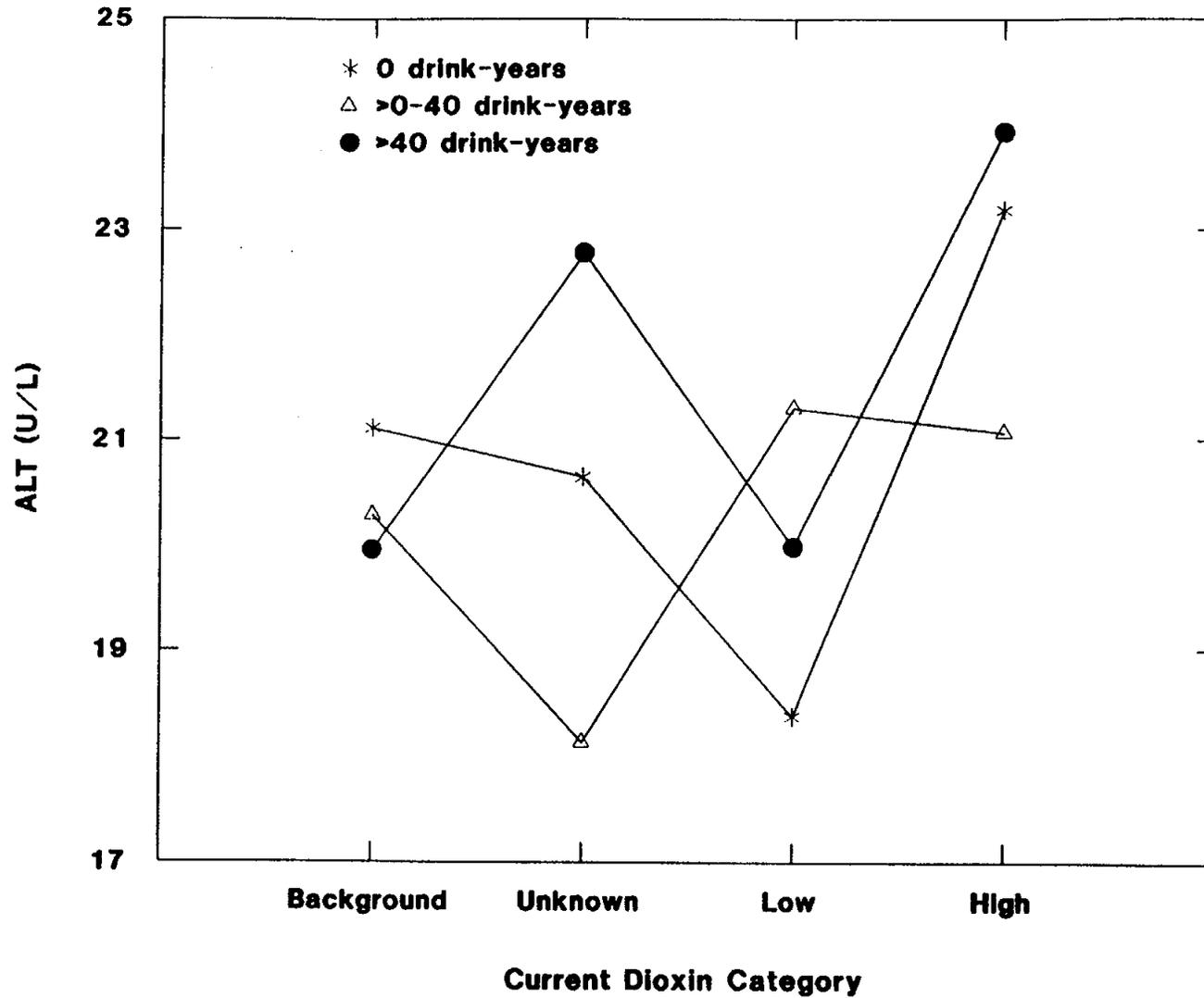


FIGURE I-2-7. Interaction of Categorized Current Dioxin and Lifetime Alcohol History for ALT (Continuous)

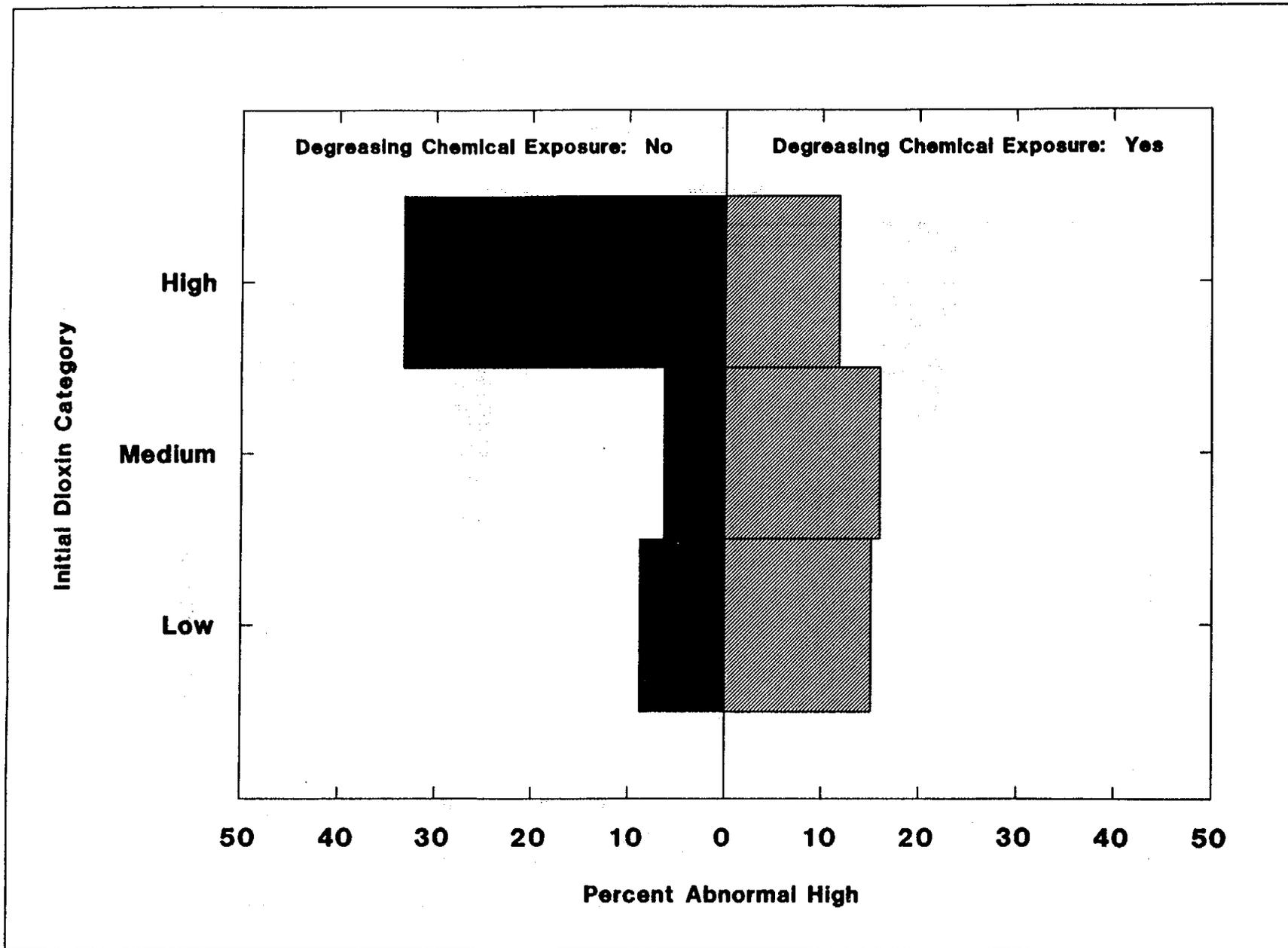


FIGURE I-2-8. Interaction of Initial Dioxin and Degreasing Chemical Exposure for ALT (Discrete - Ranch Hands, Minimal Assumption)

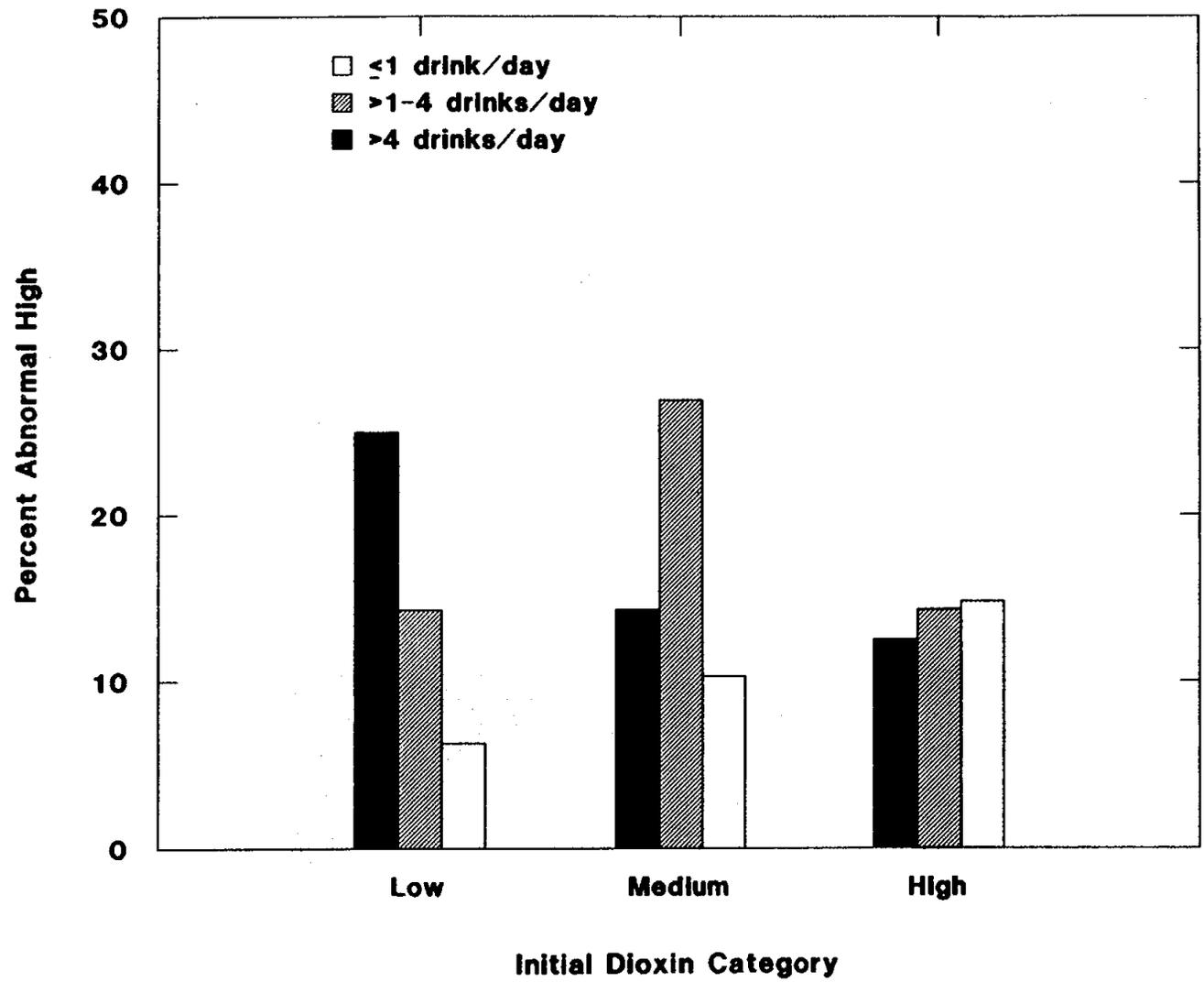


FIGURE I-2-9. Interaction of Initial Dioxin and Current Alcohol Use for ALT (Discrete - Ranch Hands, Maximal Assumption)

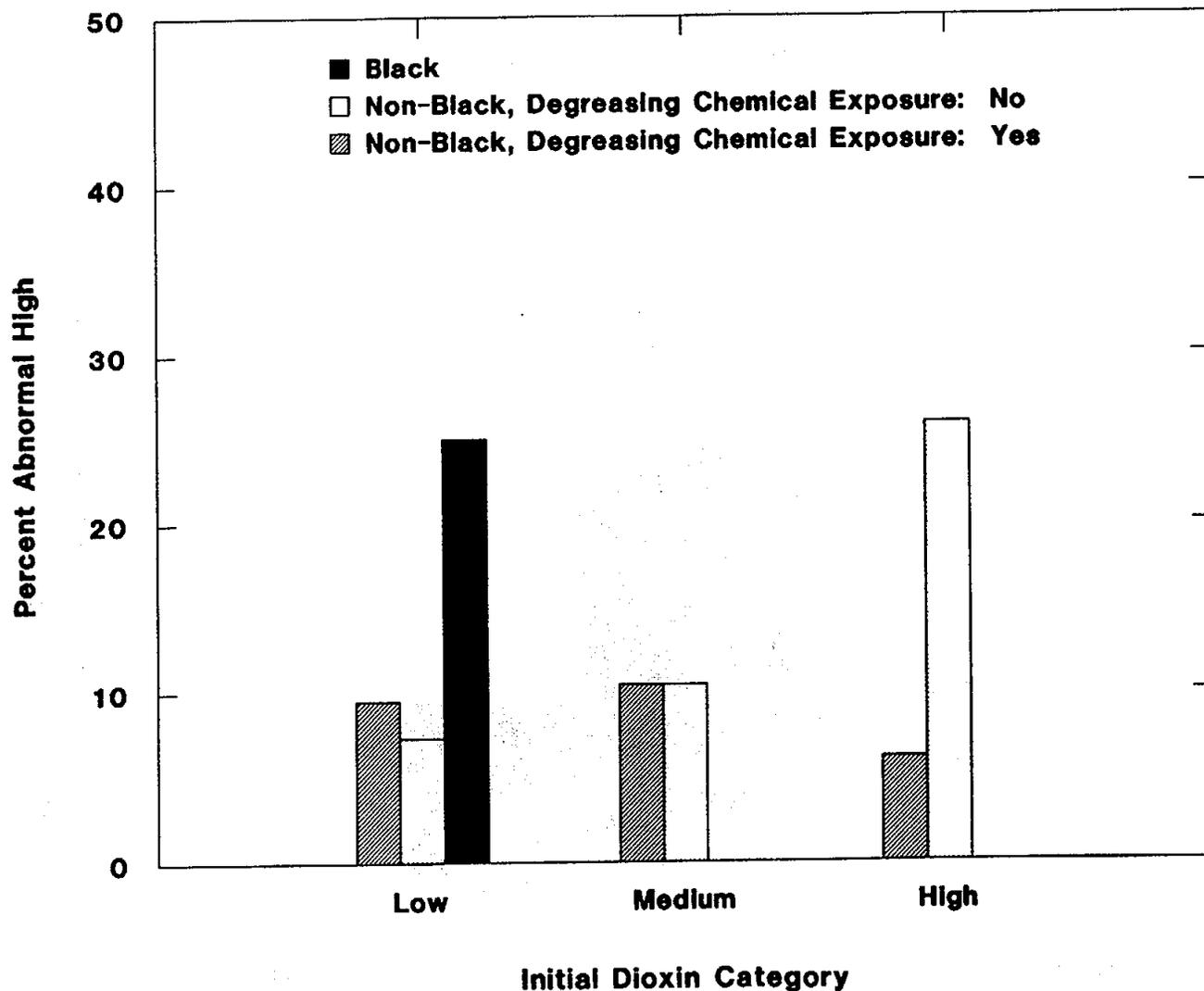


FIGURE I-2-10. Interactions of Initial Dioxin with Race and Degreasing Chemical Exposure for GGT (Discrete - Ranch Hands, Minimal Assumption)

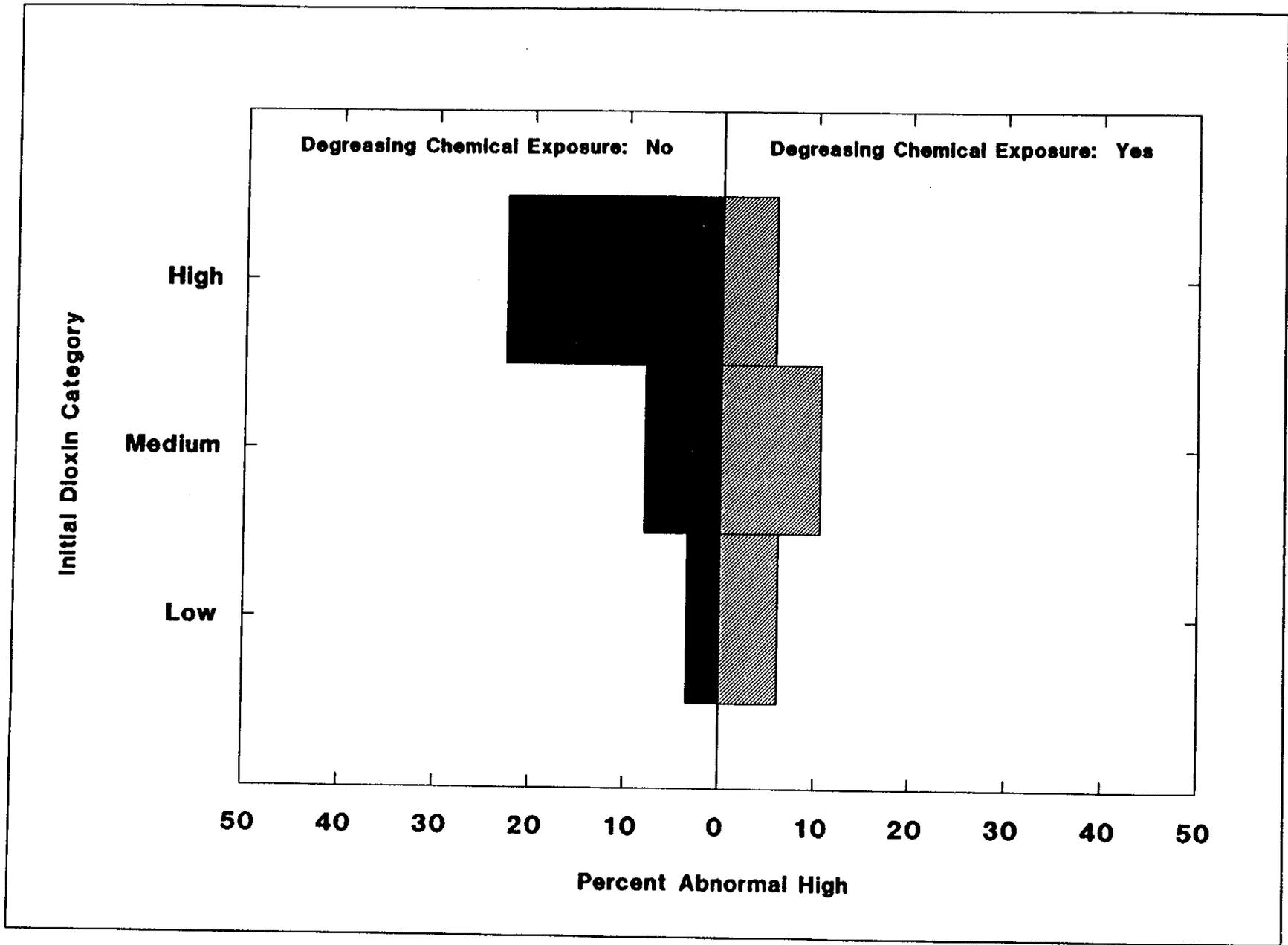


FIGURE I-2-11. Interaction of Initial Dioxin and Degreasing Chemical Exposure for GGT (Discrete - Ranch Hands, Maximal Assumption)

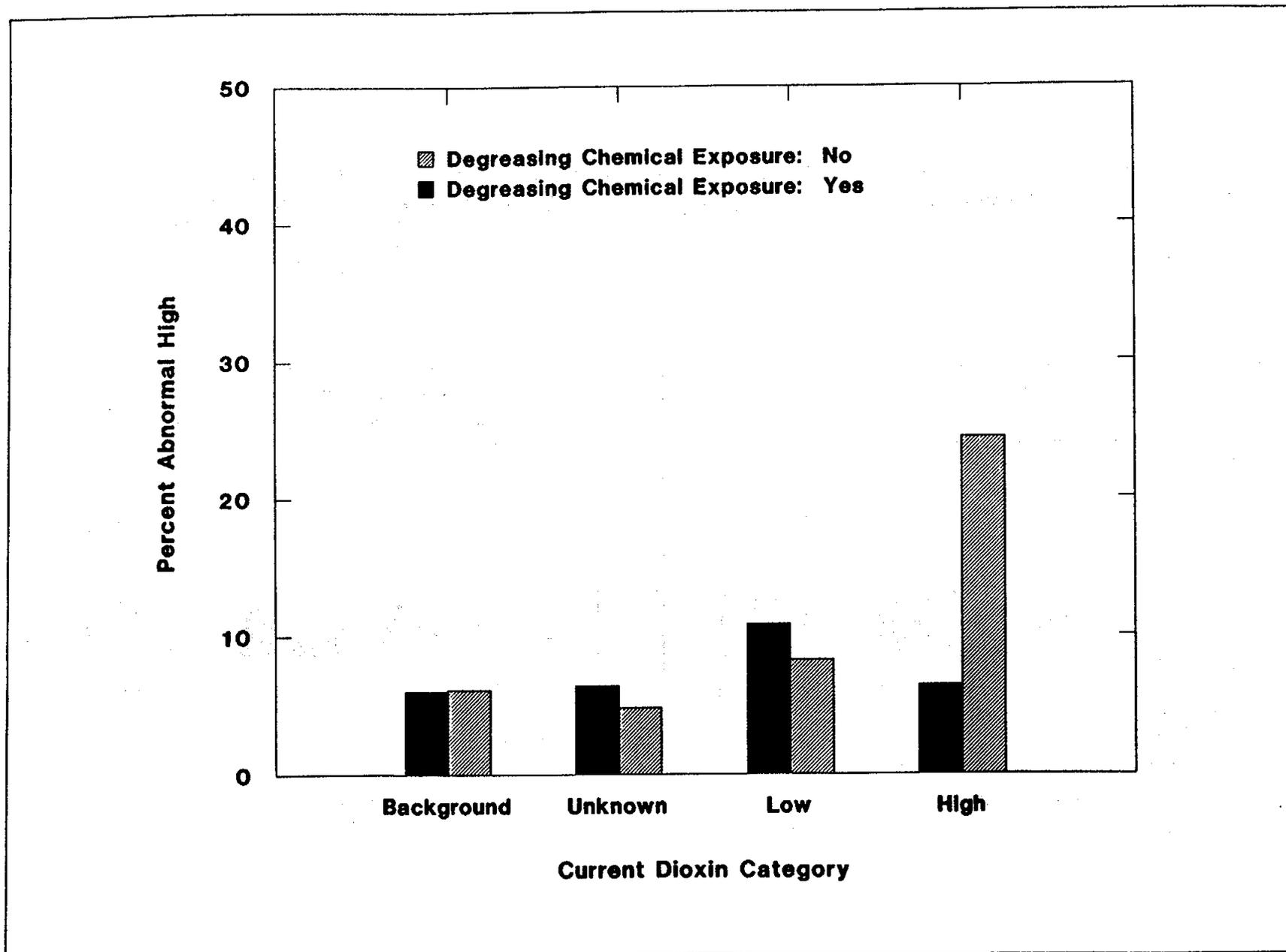


FIGURE I-2-12. Interaction of Categorized Current Dioxin and Degreasing Chemical Exposure for GGT (Discrete)

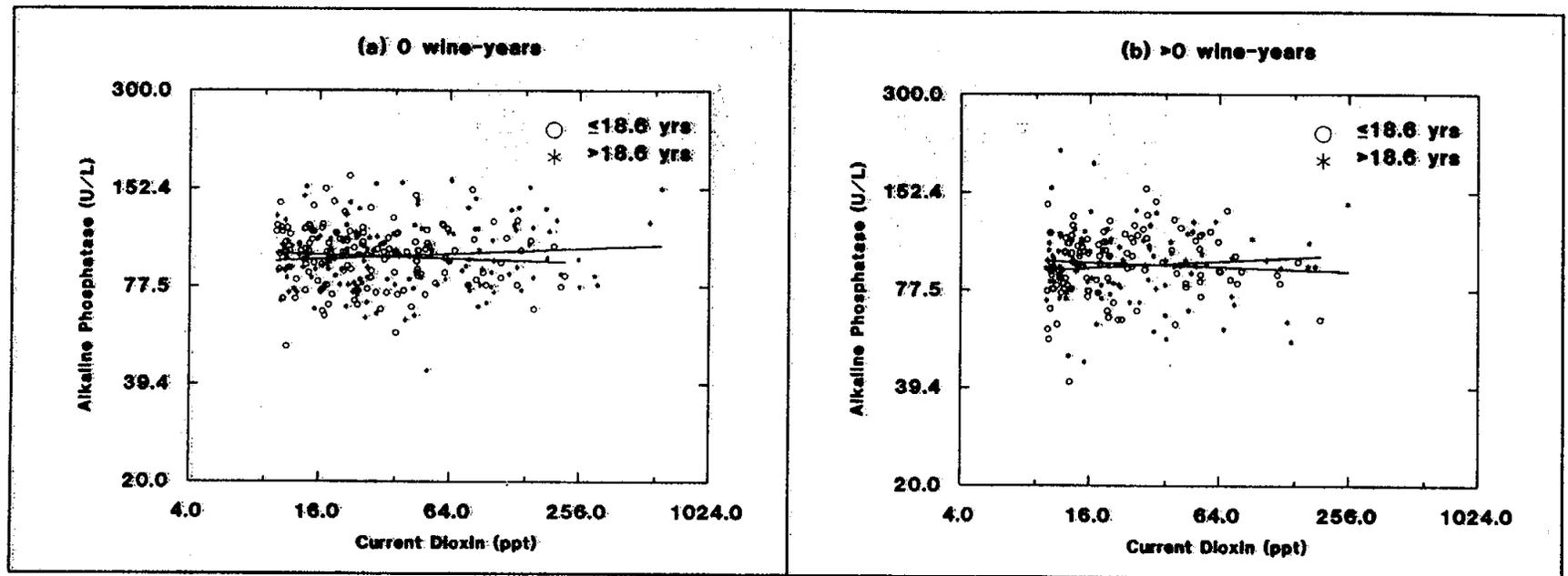


FIGURE I-2-13. Interaction of Current Dioxin, Time, and Lifetime Wine History for Alkaline Phosphatase (Continuous - Ranch Hands, Minimal Assumption)

I-2-17

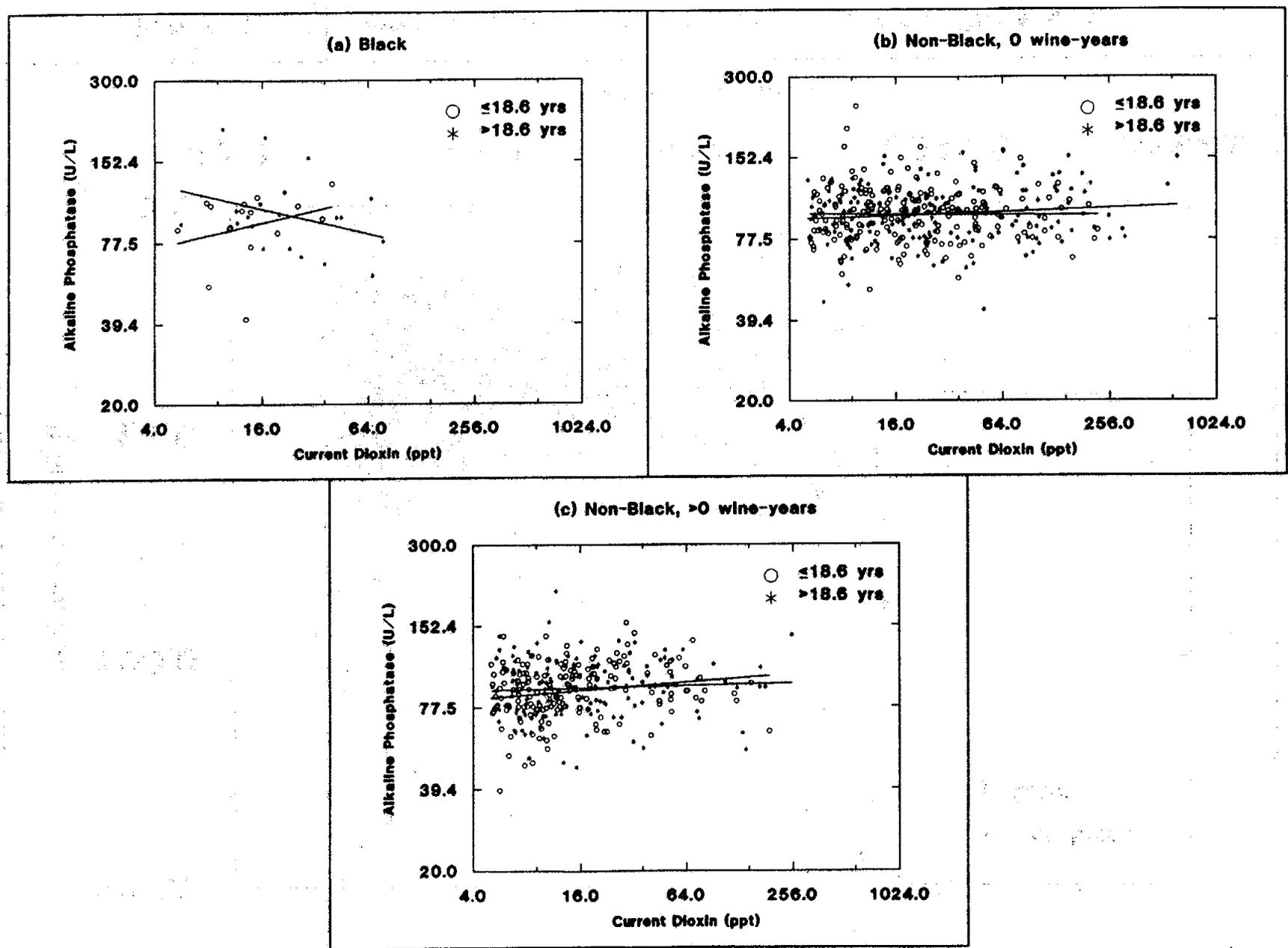


FIGURE I-2-14. Interaction of Current Dioxin, Time, Race, and Lifetime Wine History for Alkaline Phosphatase (Continuous - Ranch Hands, Maximal Assumption)

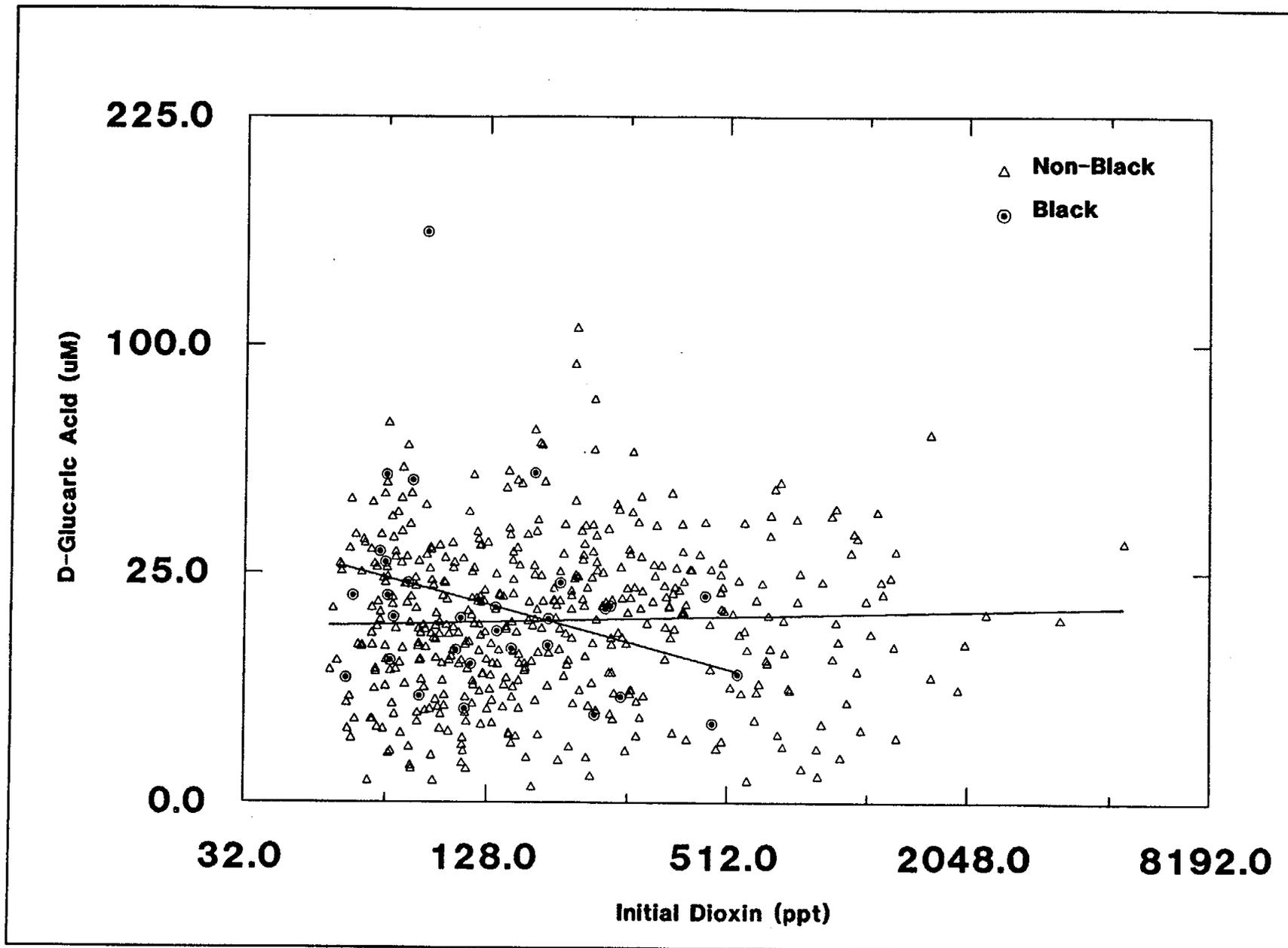


FIGURE I-2-15. Interaction of Initial Dioxin and Race for D-Glucaric Acid (Continuous - Ranch Hands, Minimal Assumption)

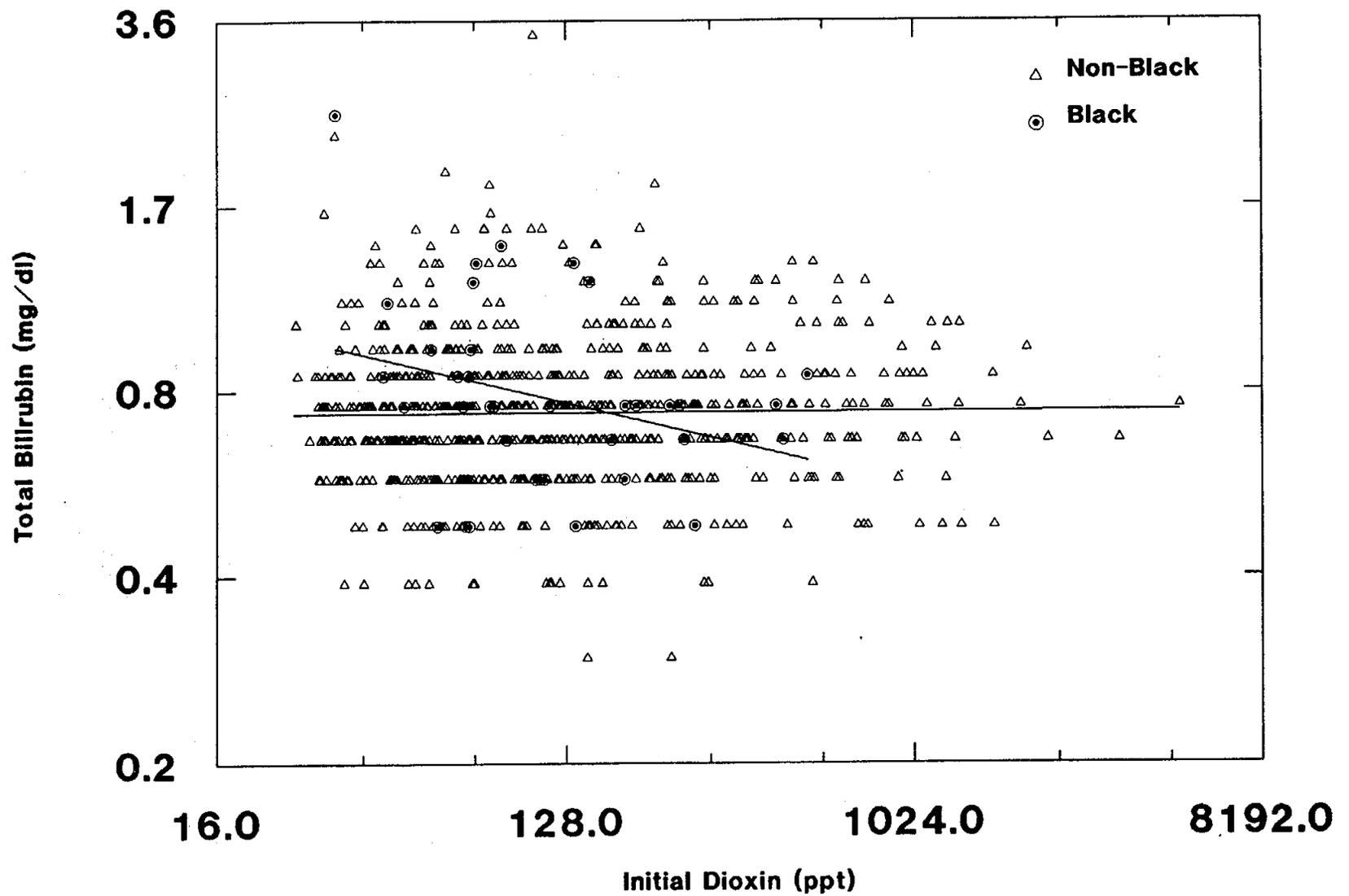


FIGURE I-2-16. Interaction of Initial Dioxin and Race for Total Billirubin (Continuous - Ranch Hands, Maximal Assumption)

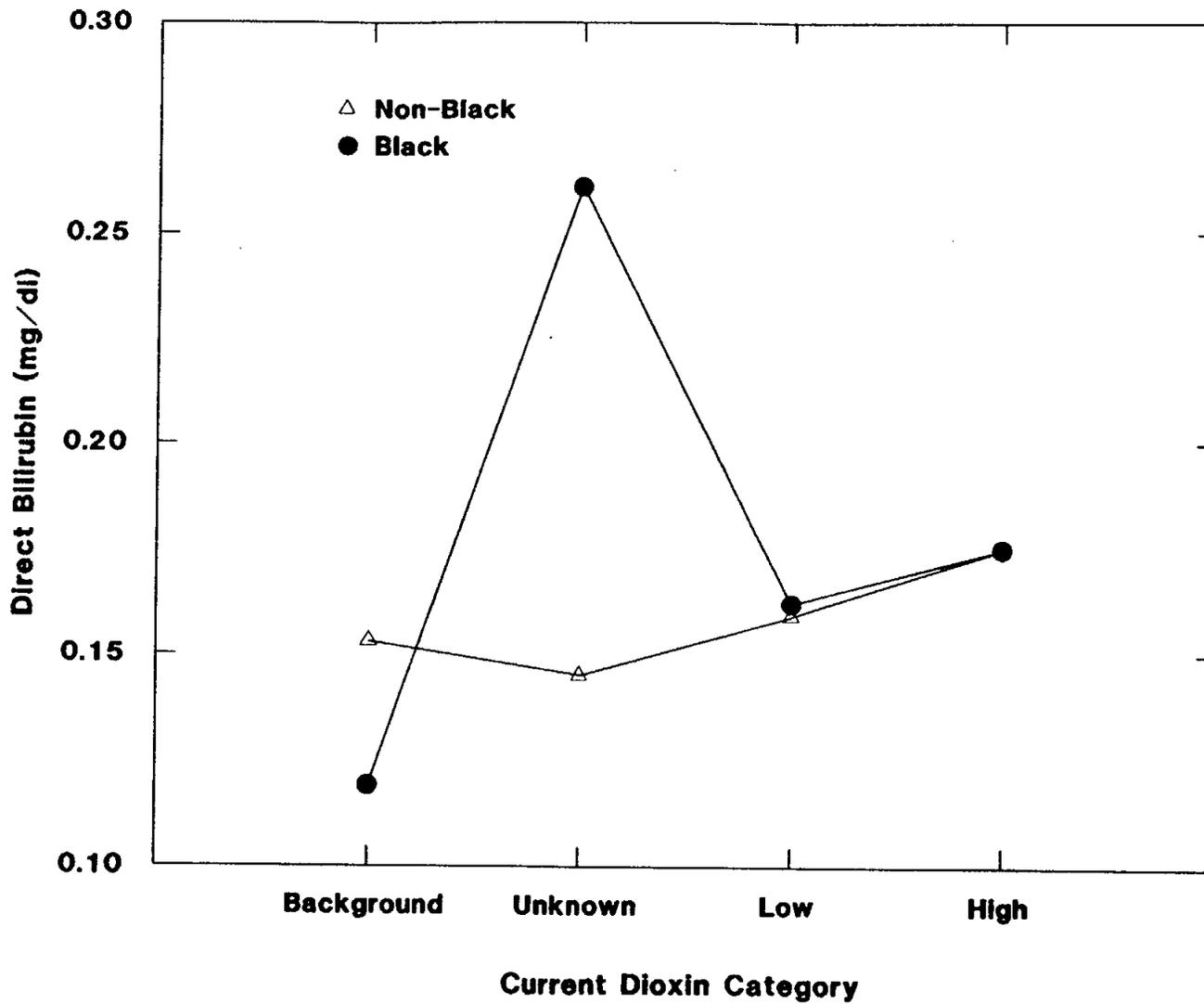


FIGURE I-2-17. Interaction of Categorized Current Dioxin and Race for Direct Bilirubin (Continuous)

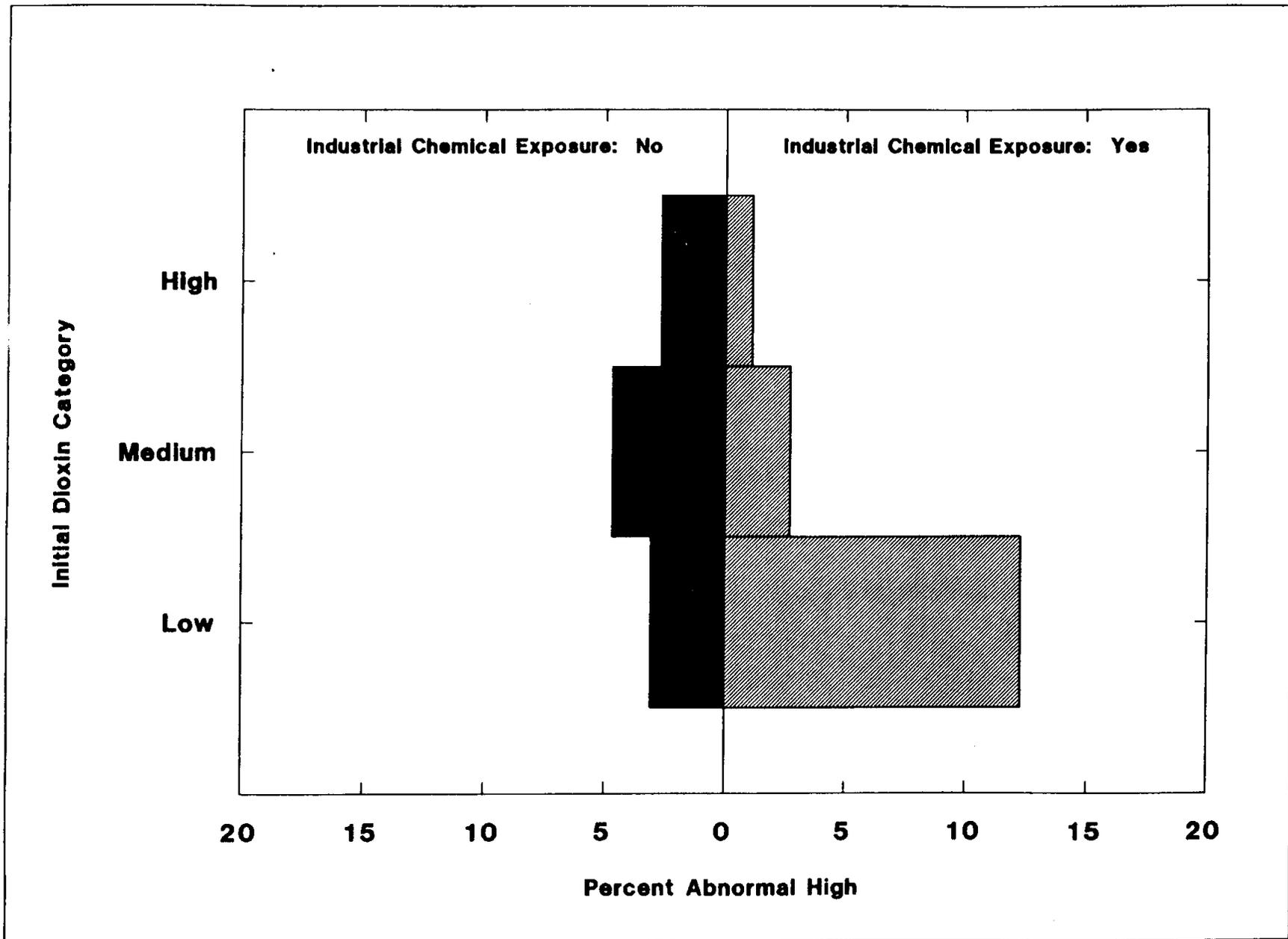


FIGURE I-2-18. Interaction of Initial Dioxin and Industrial Chemical Exposure for Direct Bilirubin (Discrete - Ranch Hands, Minimal Assumption)

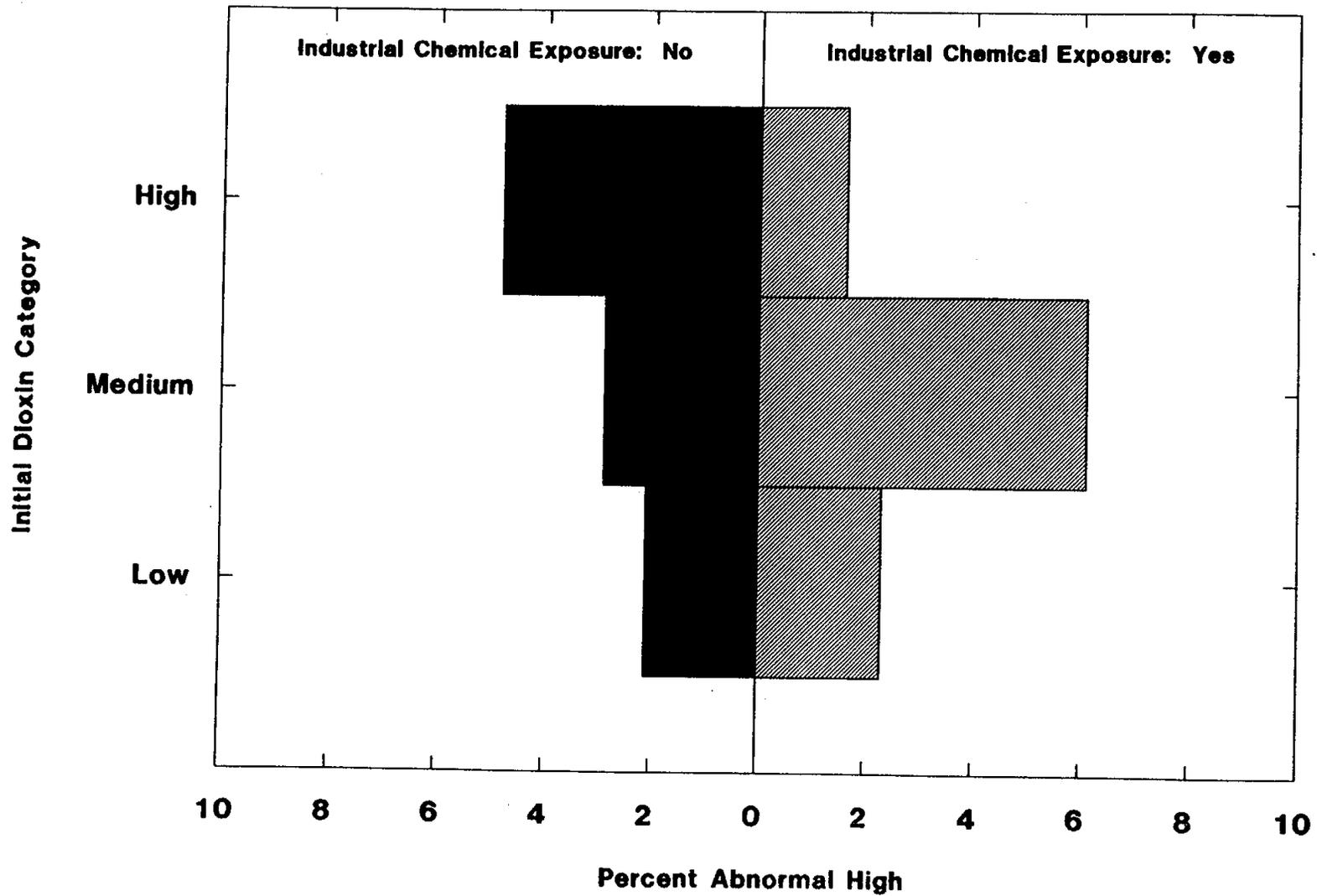


FIGURE I-2-19. Interaction of Initial Dioxin and Industrial Chemical Exposure for Direct Bilirubin (Discrete - Ranch Hands, Maximal Assumption)

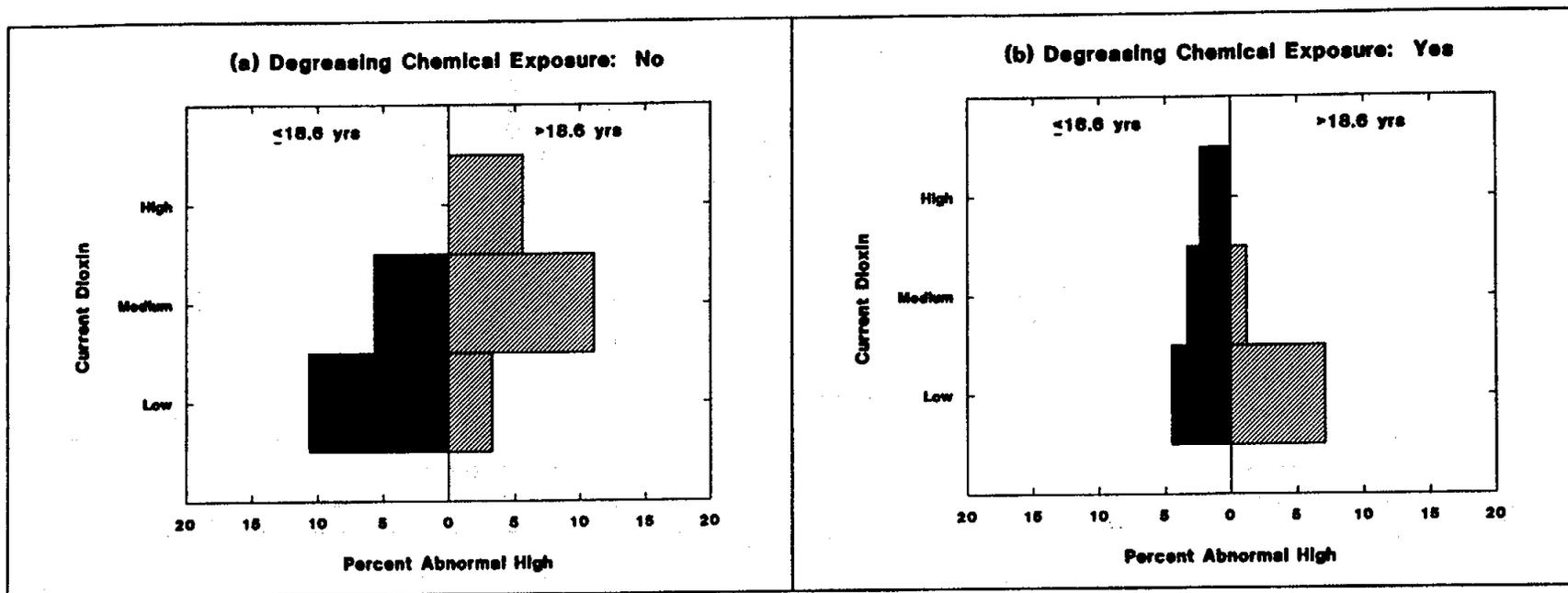


FIGURE I-2-20. Interaction of Current Dioxin, Time, and Degreasing Chemical Exposure for Direct Bilirubin (Discrete - Ranch Hands, Minimal Assumption)

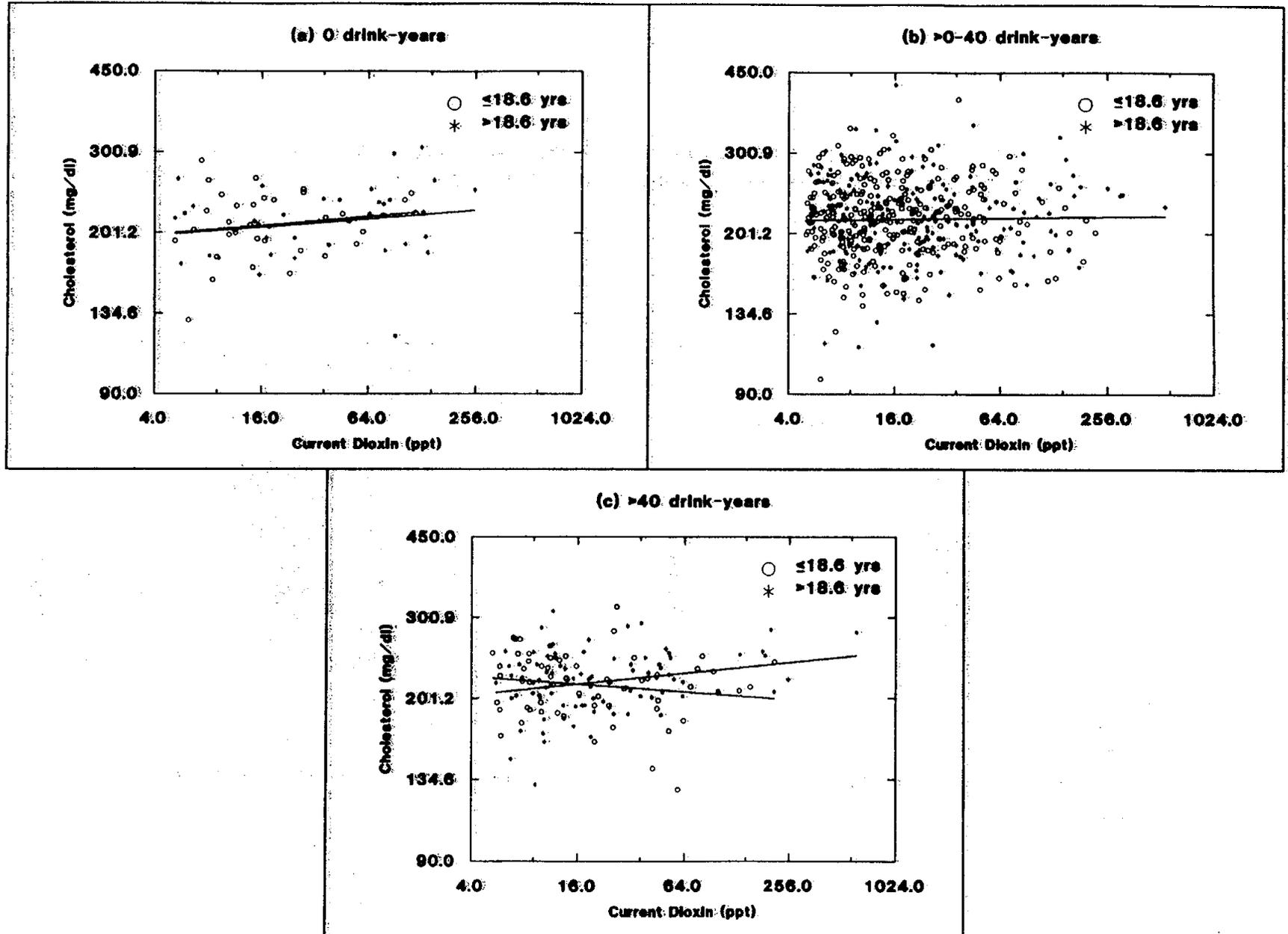


FIGURE I-2-21. Interaction of Current Dioxin, Time, and Lifetime Alcohol History for Cholesterol (Continuous - Ranch Hands, Maximal Assumption)

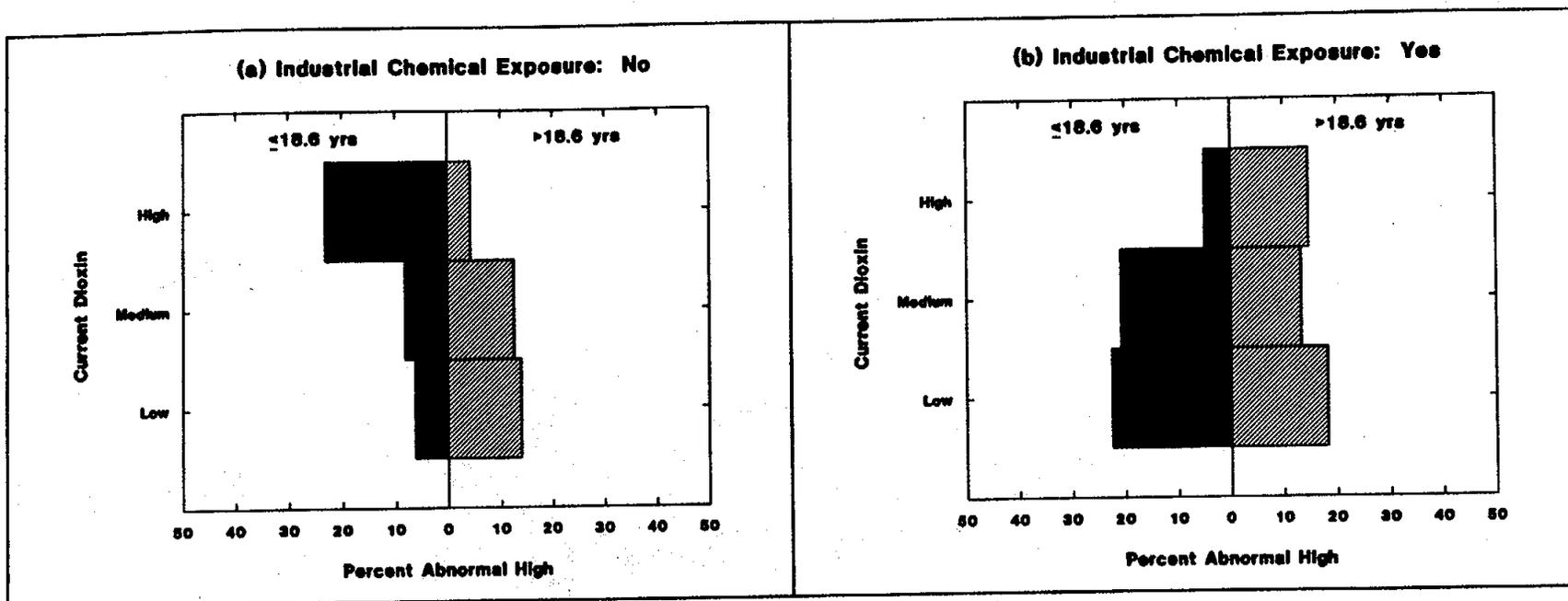


FIGURE I-2-22. Interaction of Current Dioxin, Time, and Industrial Chemical Exposure for Cholesterol (Discrete - Ranch Hands, Minimal Assumption)

I-2-26

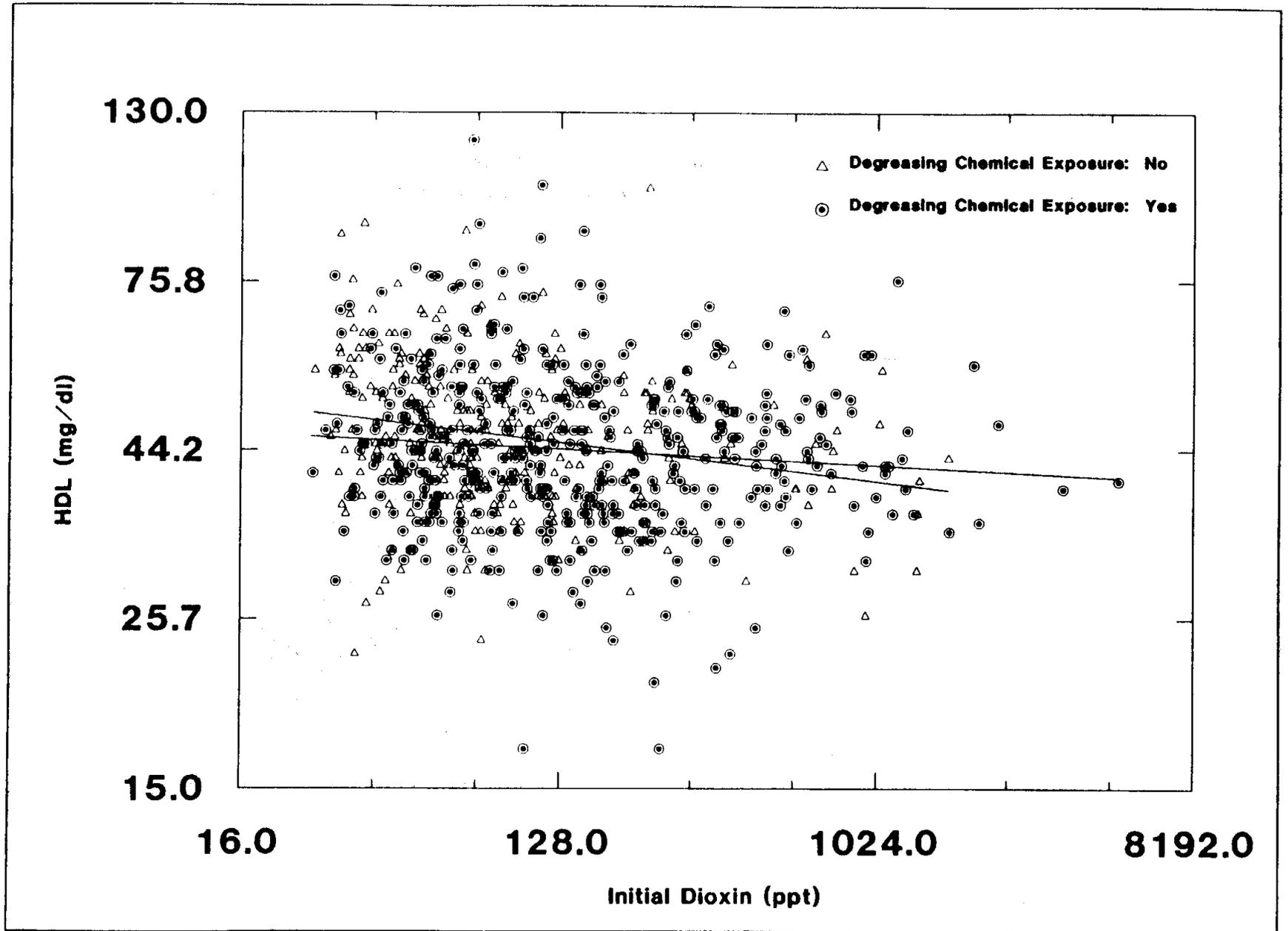


FIGURE I-2-23. Interaction of Initial Dioxin and Degreasing Chemical Exposure for HDL (Continuous - Ranch Hands, Maximal Assumption)

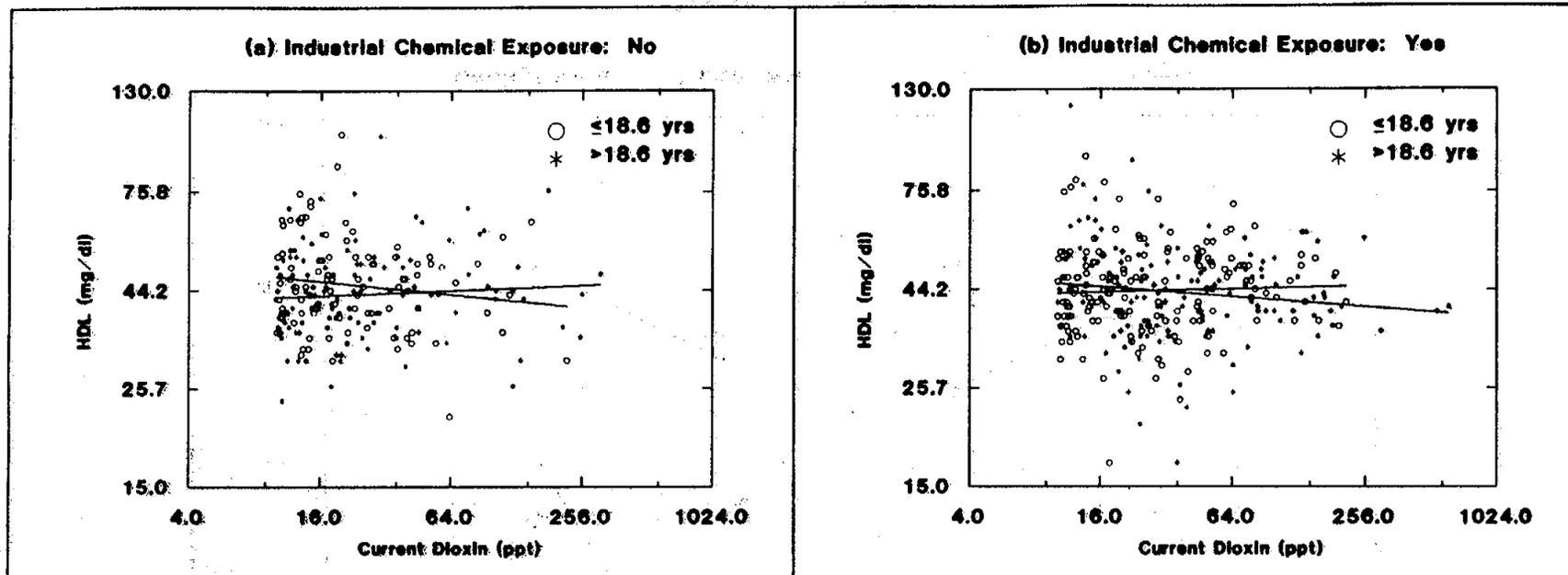


FIGURE I-2-24. Interaction of Current Dioxin, Time, and Industrial Chemical Exposure for HDL (Continuous - Ranch Hands, Minimal Assumption)

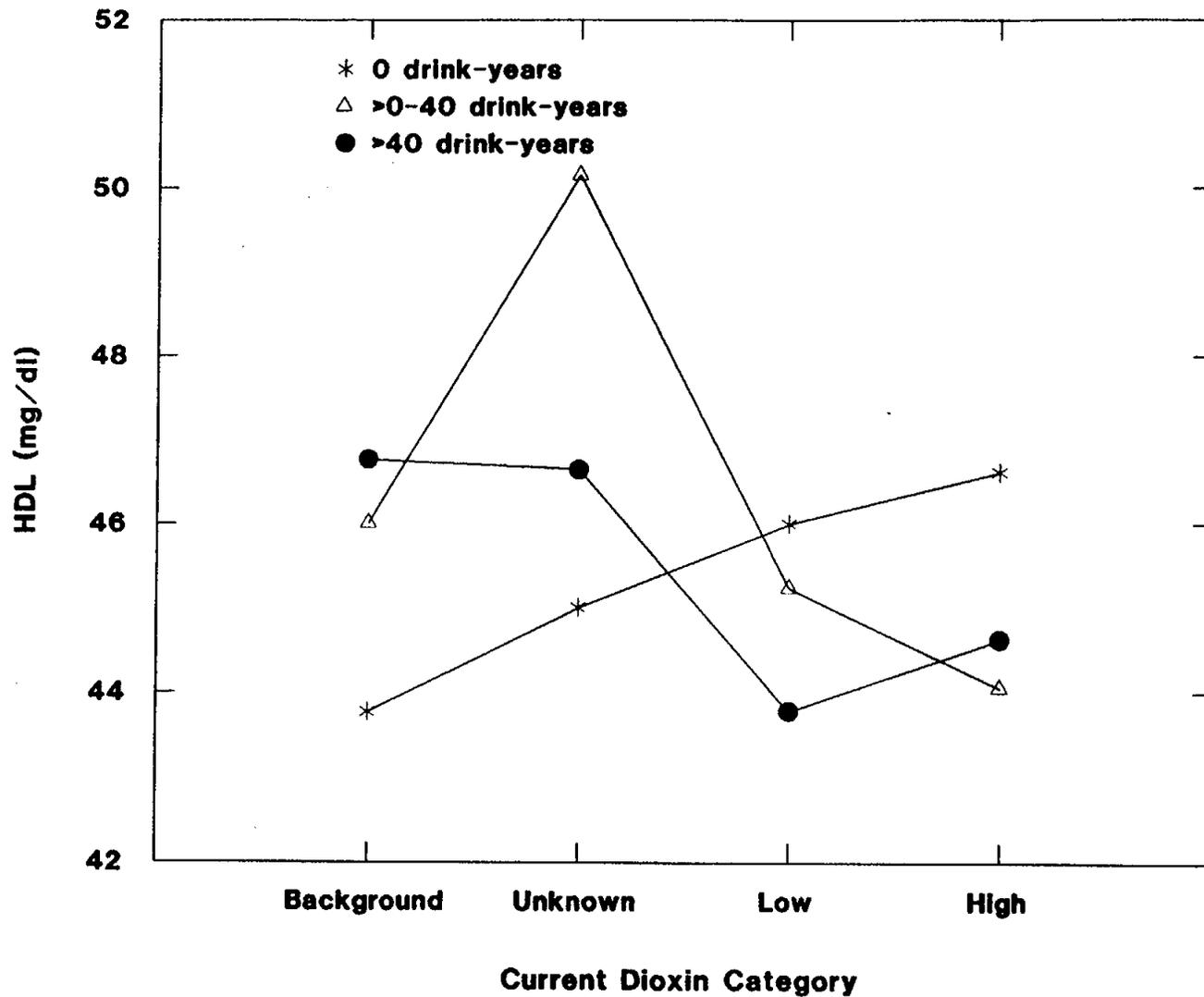


FIGURE I-2-25. Interaction of Categorized Current Dioxin and Lifetime Alcohol History for HDL (Continuous)

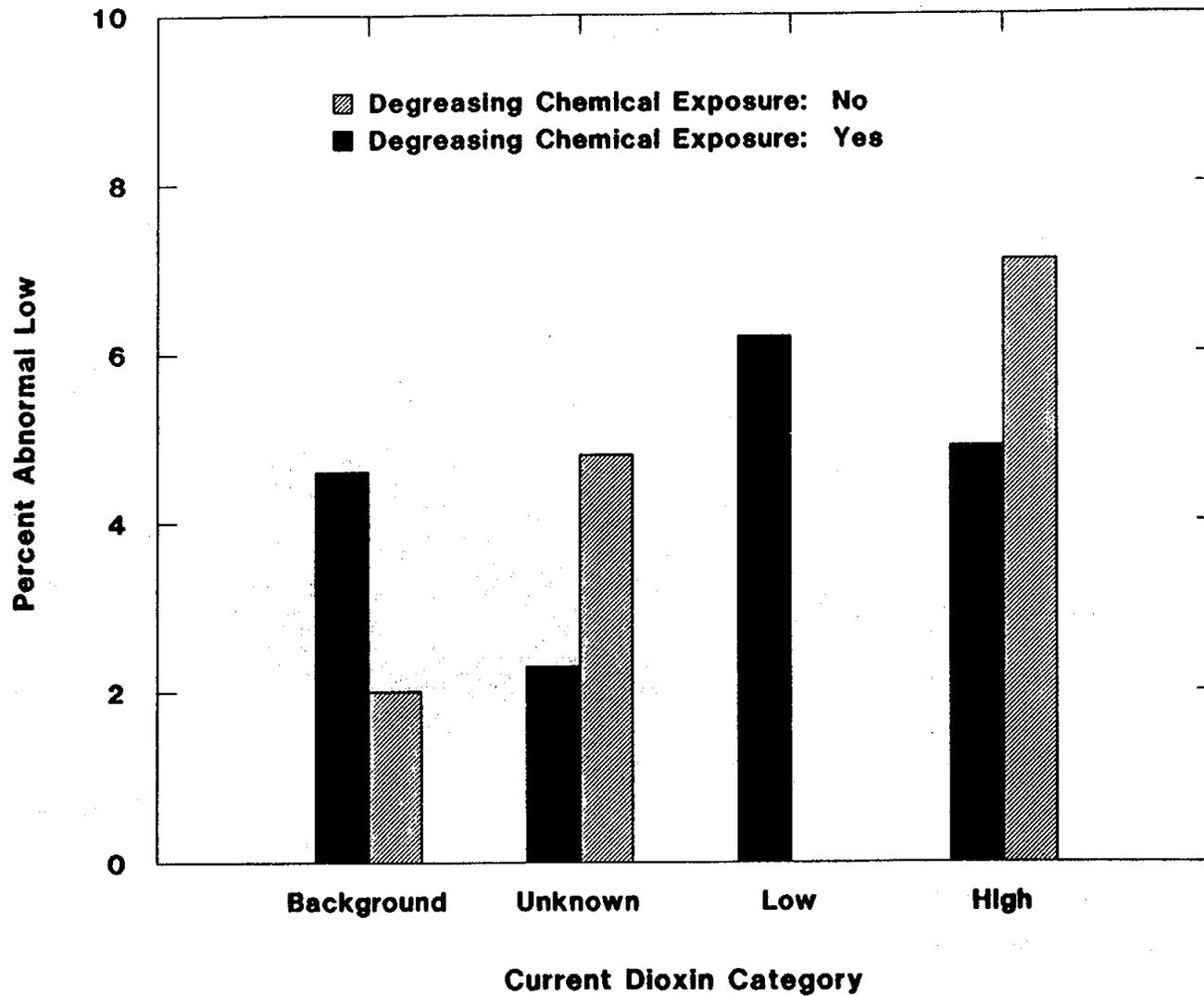


FIGURE I-2-26. Interaction of Categorized Current Dioxin and Degreasing Chemical Exposure for HDL (Discrete)

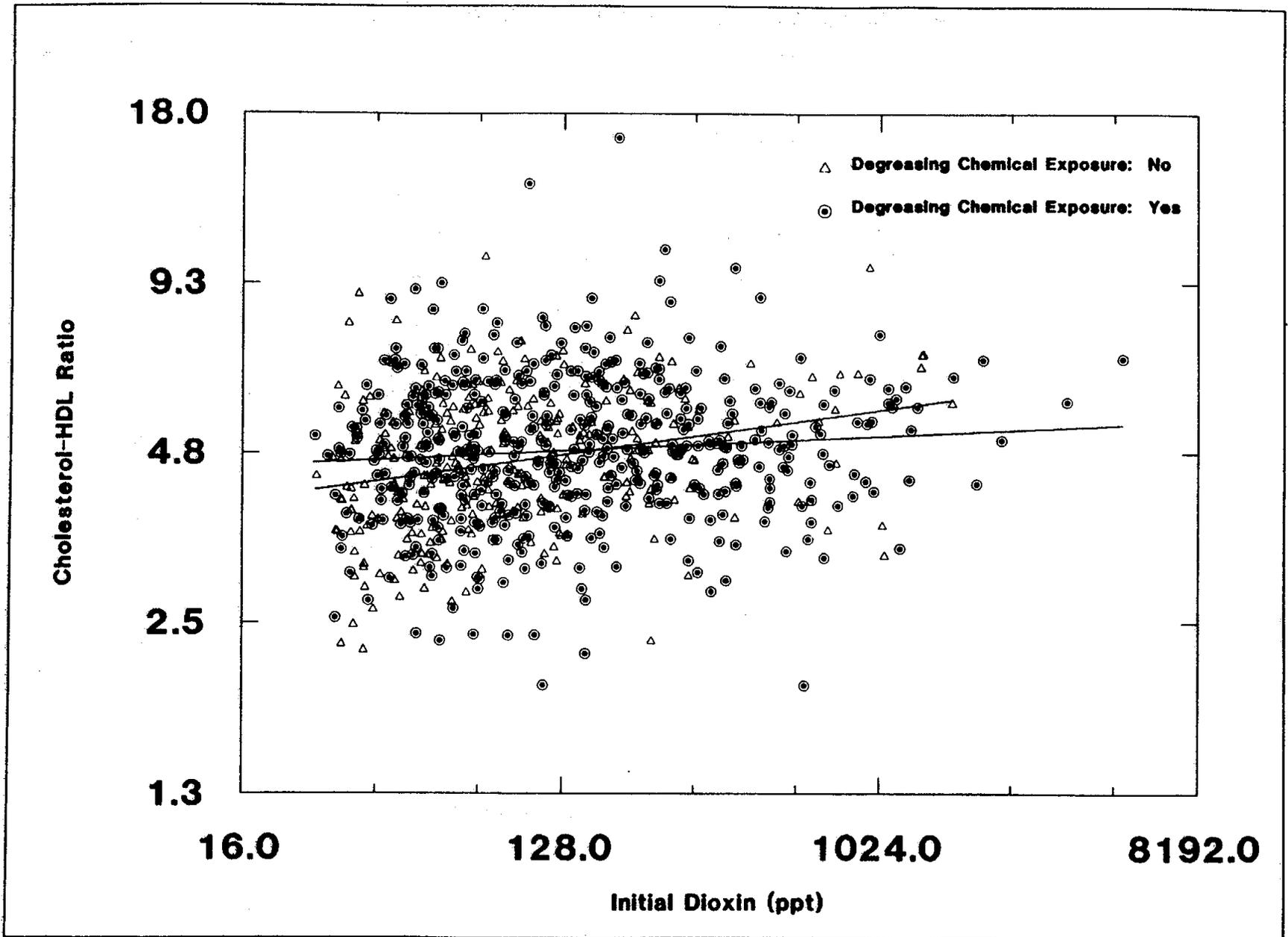


FIGURE I-2-27. Interaction of Initial Dioxin and Degreasing Chemical Exposure for Cholesterol-HDL Ratio (Continuous - Ranch Hands, Maximal Assumption)

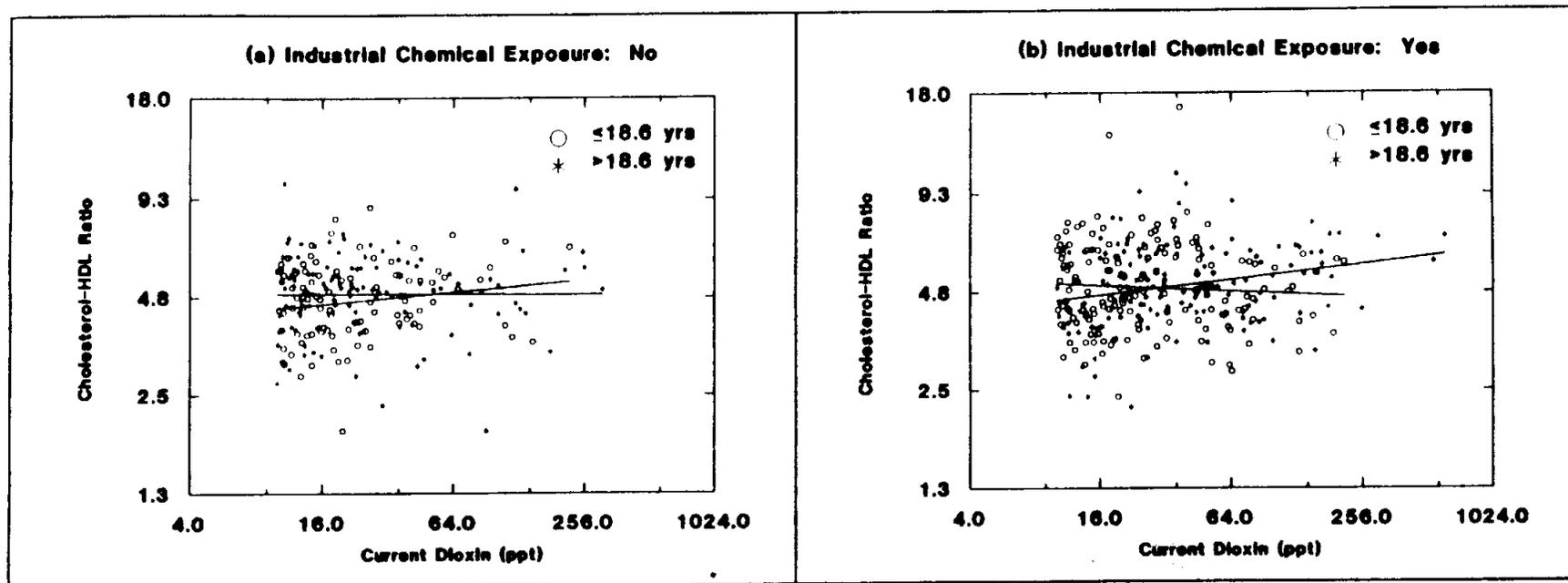


FIGURE I-2-28. Interaction of Current Dioxin, Time, and Industrial Chemical Exposure for Cholesterol-HDL Ratio (Continuous - Ranch Hands, Minimal Assumption)

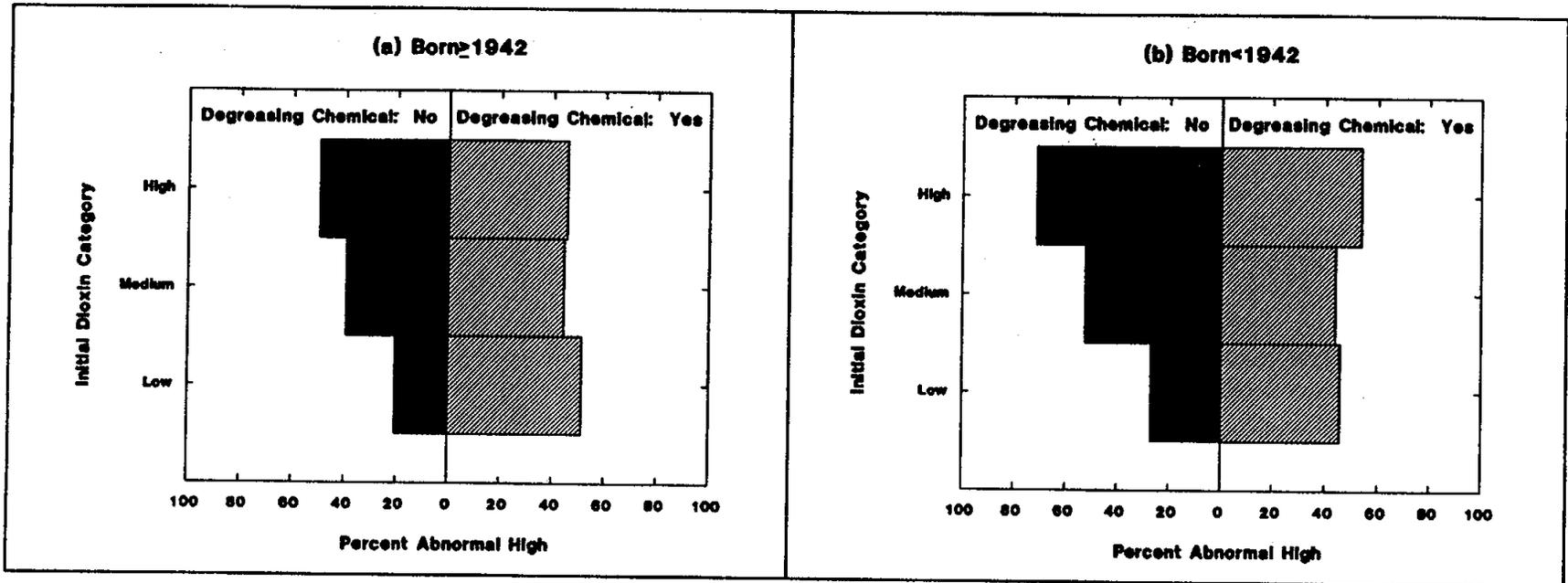


FIGURE I-2-29. Interactions of Initial Dioxin with Age and Degreasing Chemical Exposure for Cholesterol-HDL Ratio (Discrete - Ranch Hands, Maximal Assumption)

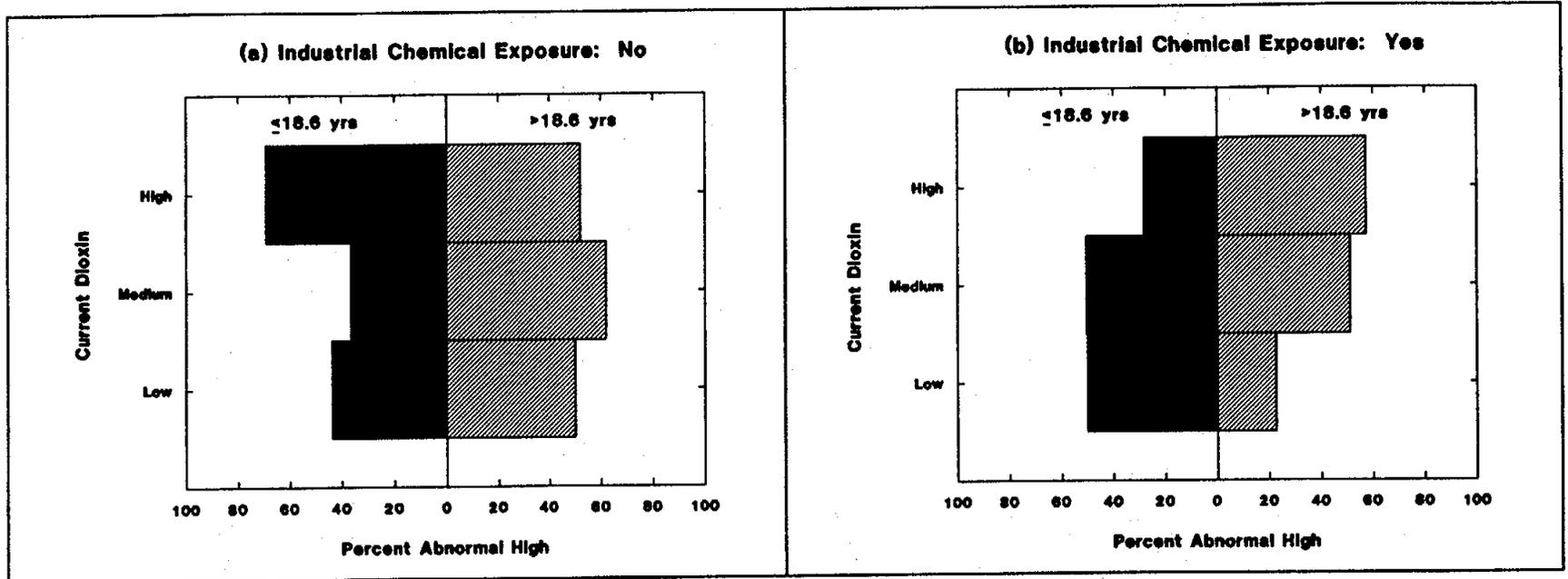


FIGURE I-2-30. Interaction of Current Dioxin, Time, and Industrial Chemical Exposure for Cholesterol-HDL Ratio (Discrete - Ranch Hands, Minimal Assumption)

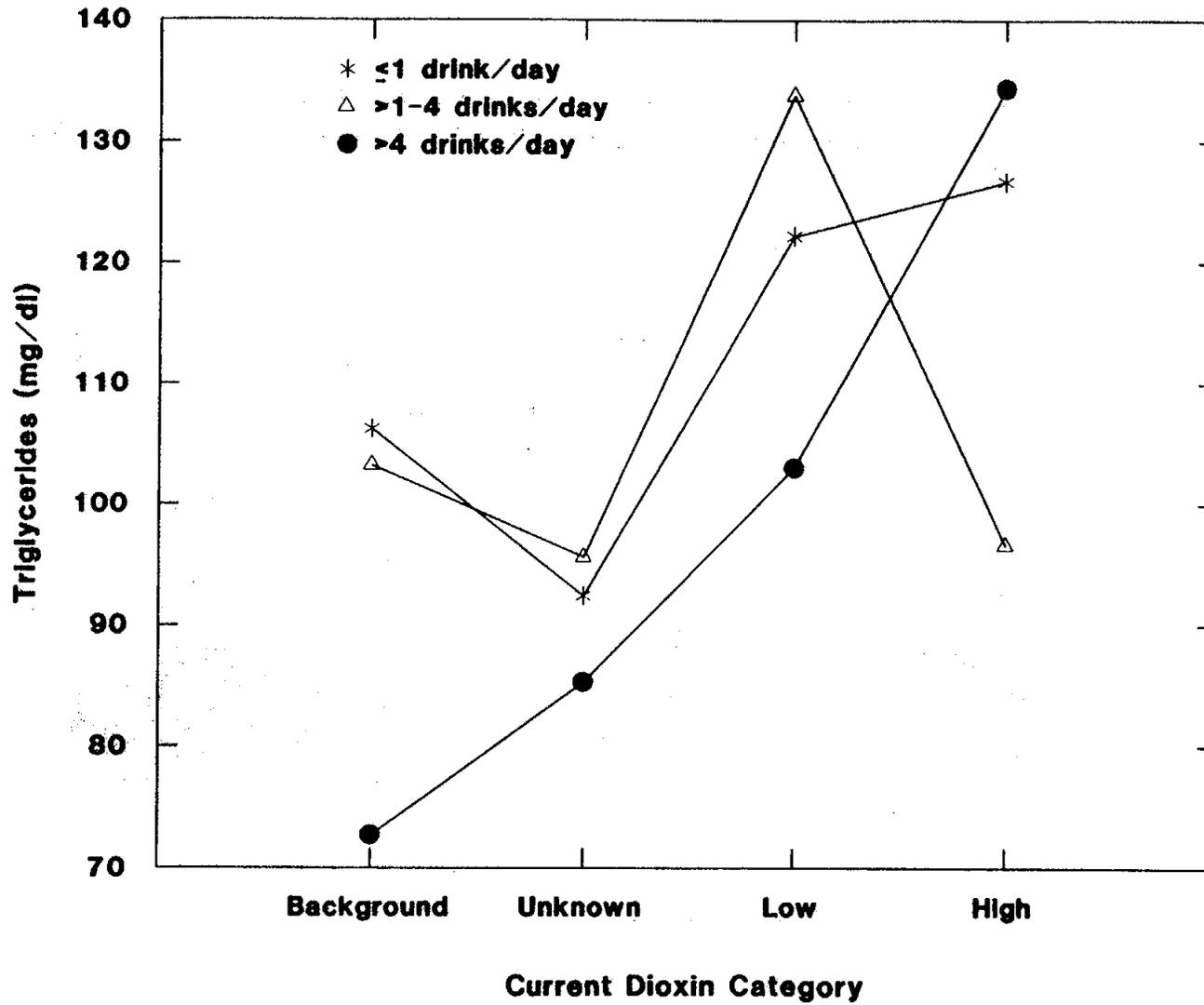


FIGURE I-2-31. Interaction of Categorized Current Dioxin and Current Alcohol Use for Triglycerides (Continuous)

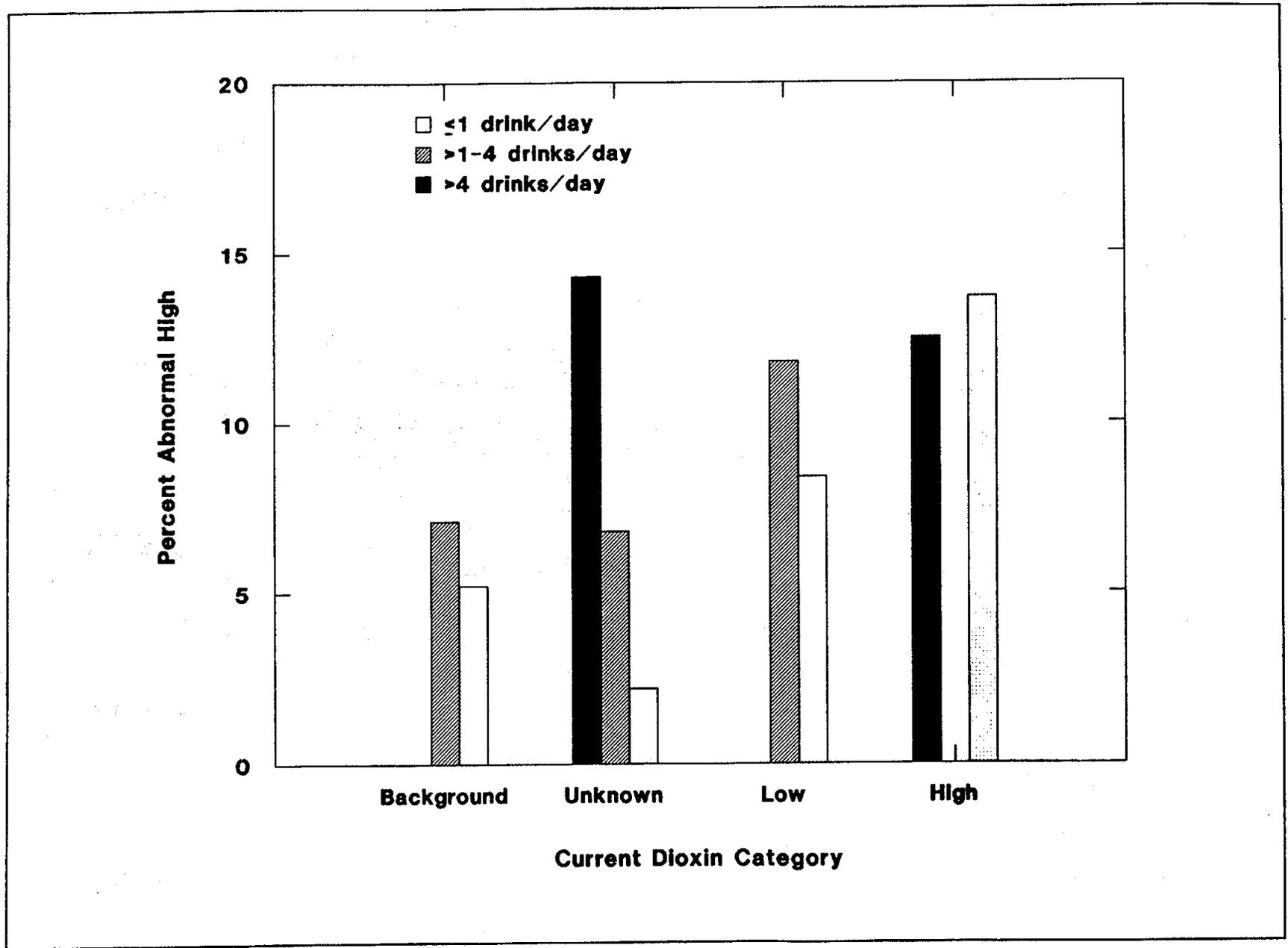


FIGURE I-2-32. Interaction of Categorized Current Dioxin and Current Alcohol Use for Triglycerides (Discrete)

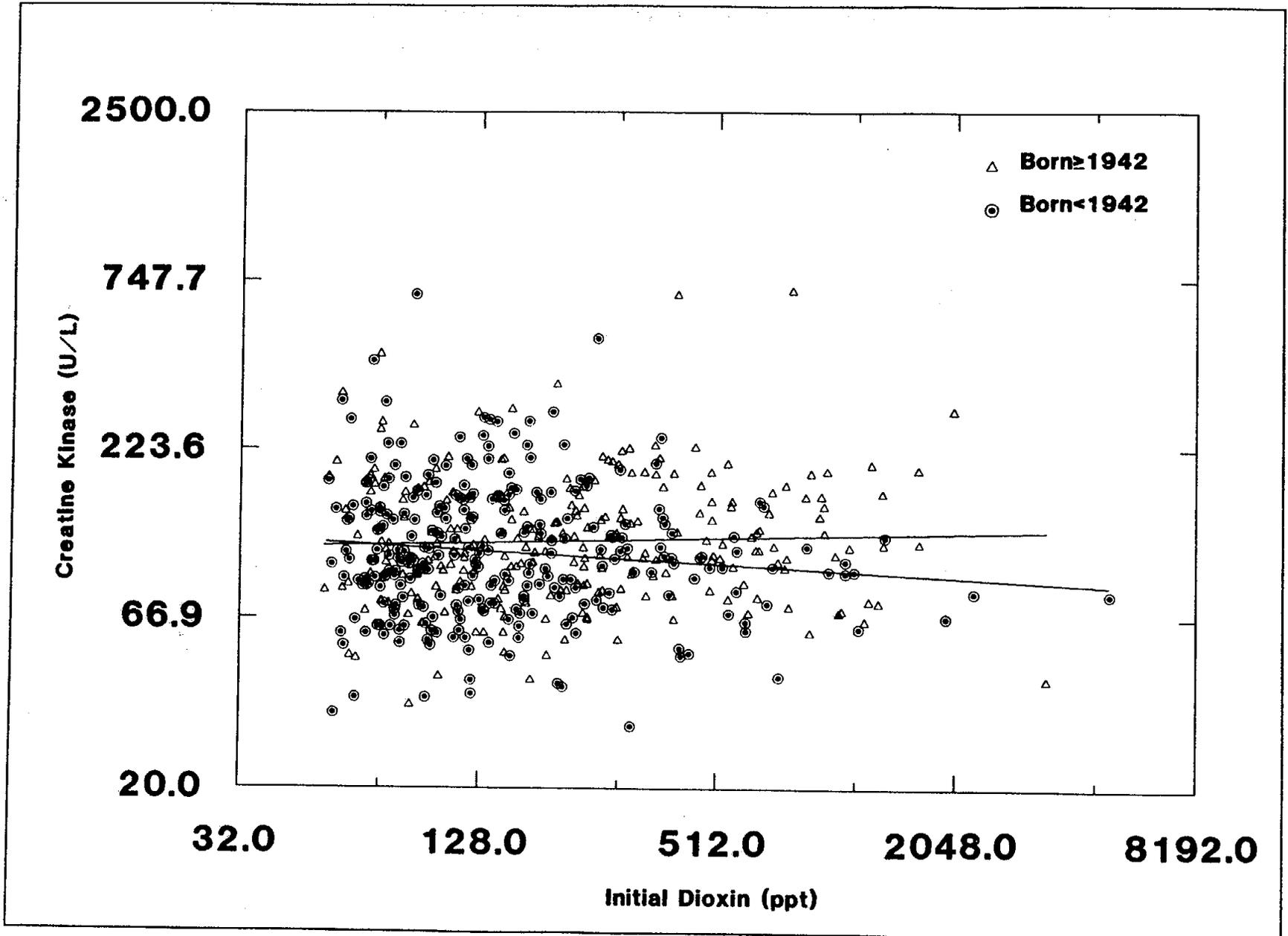


FIGURE I-2-33. Interaction of Initial Dioxin and Age for Creatine Kinase (Continuous - Ranch Hands, Minimal Assumption)

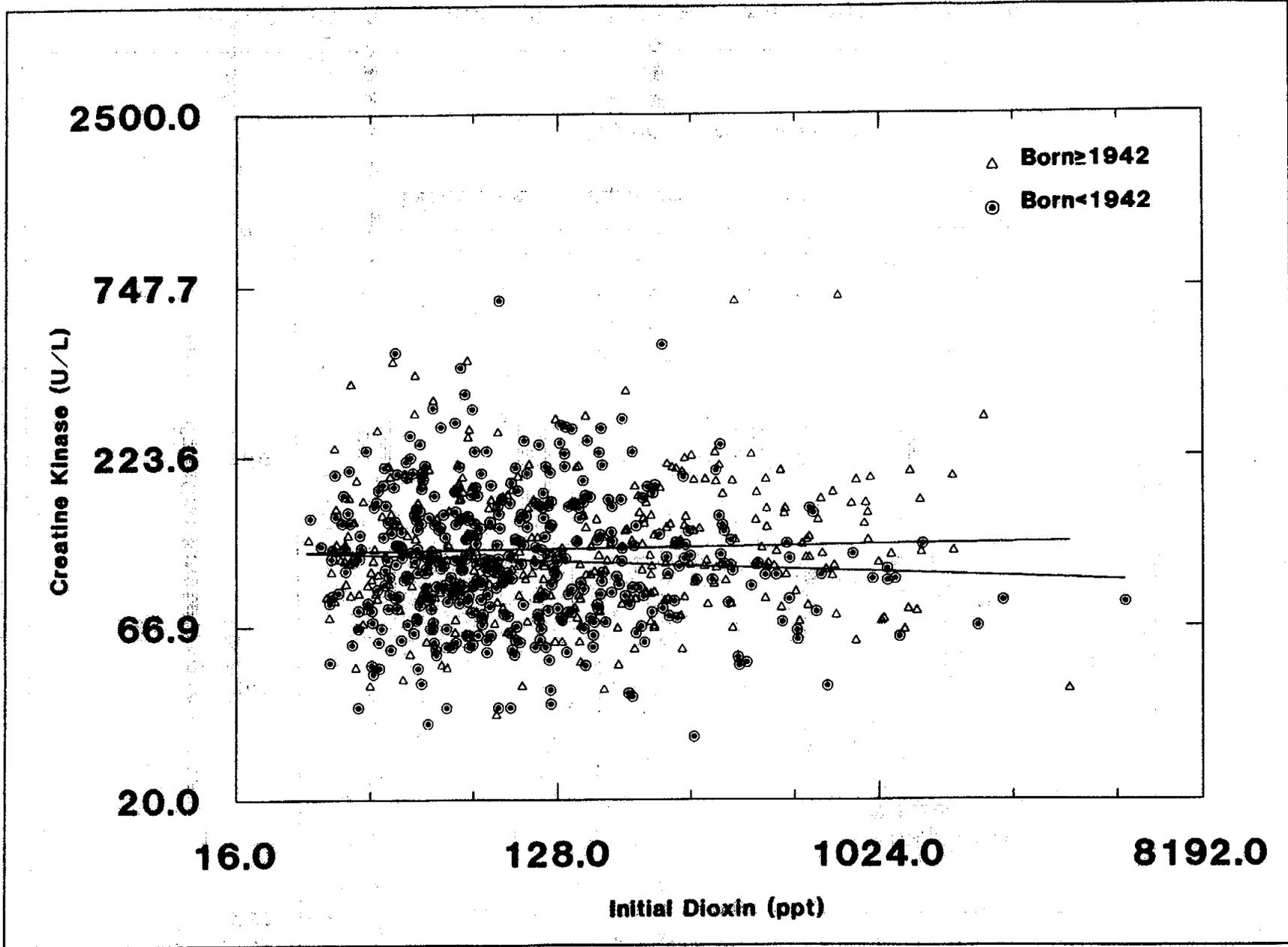


FIGURE I-2-34. Interaction of Initial Dioxin and Age for Creatine Kinase (Continuous - Ranch Hands, Maximal Assumption)

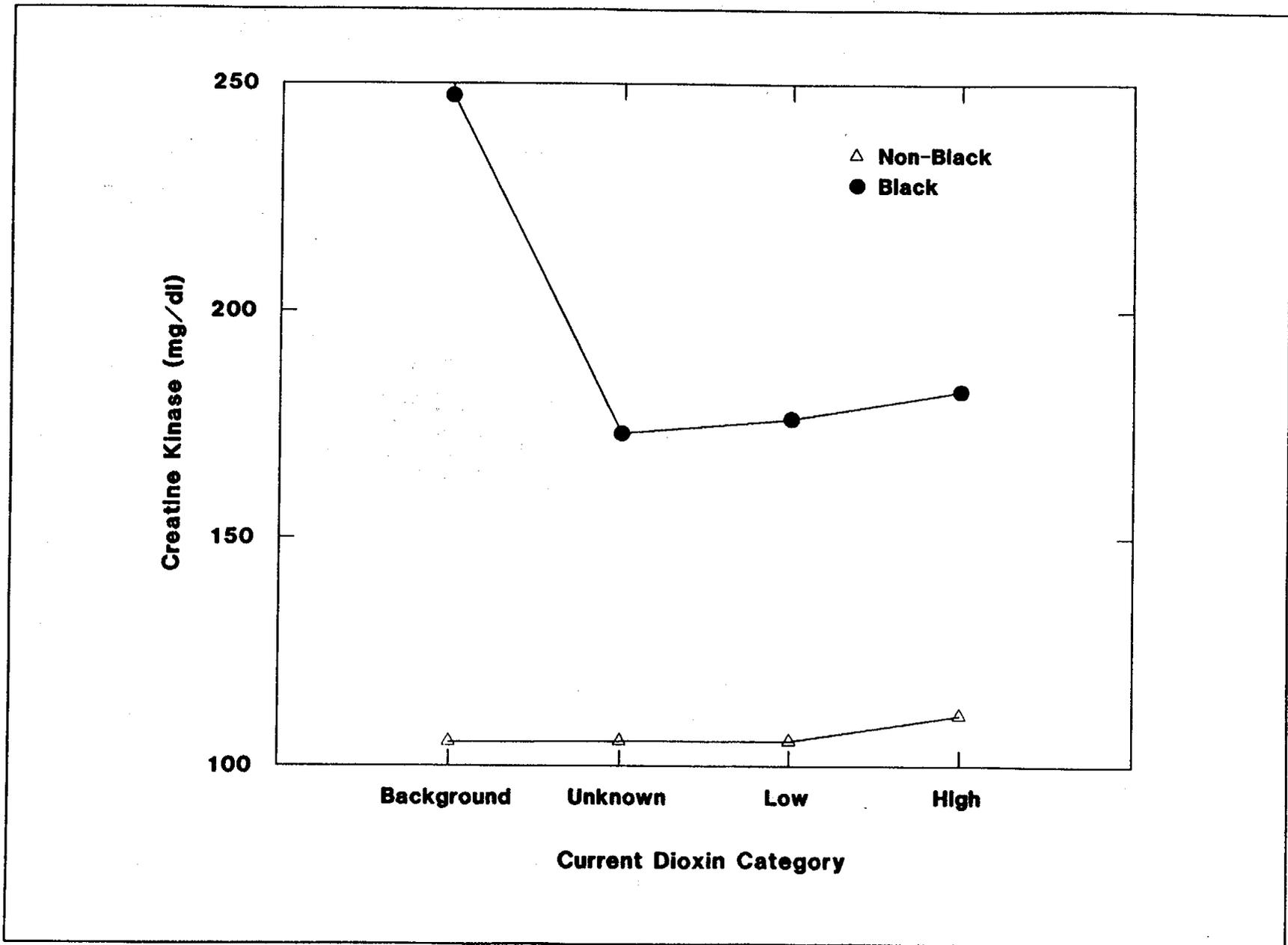


FIGURE I-2-35. Interaction of Categorized Current Dioxin and Race for Creatine Kinase (Continuous)

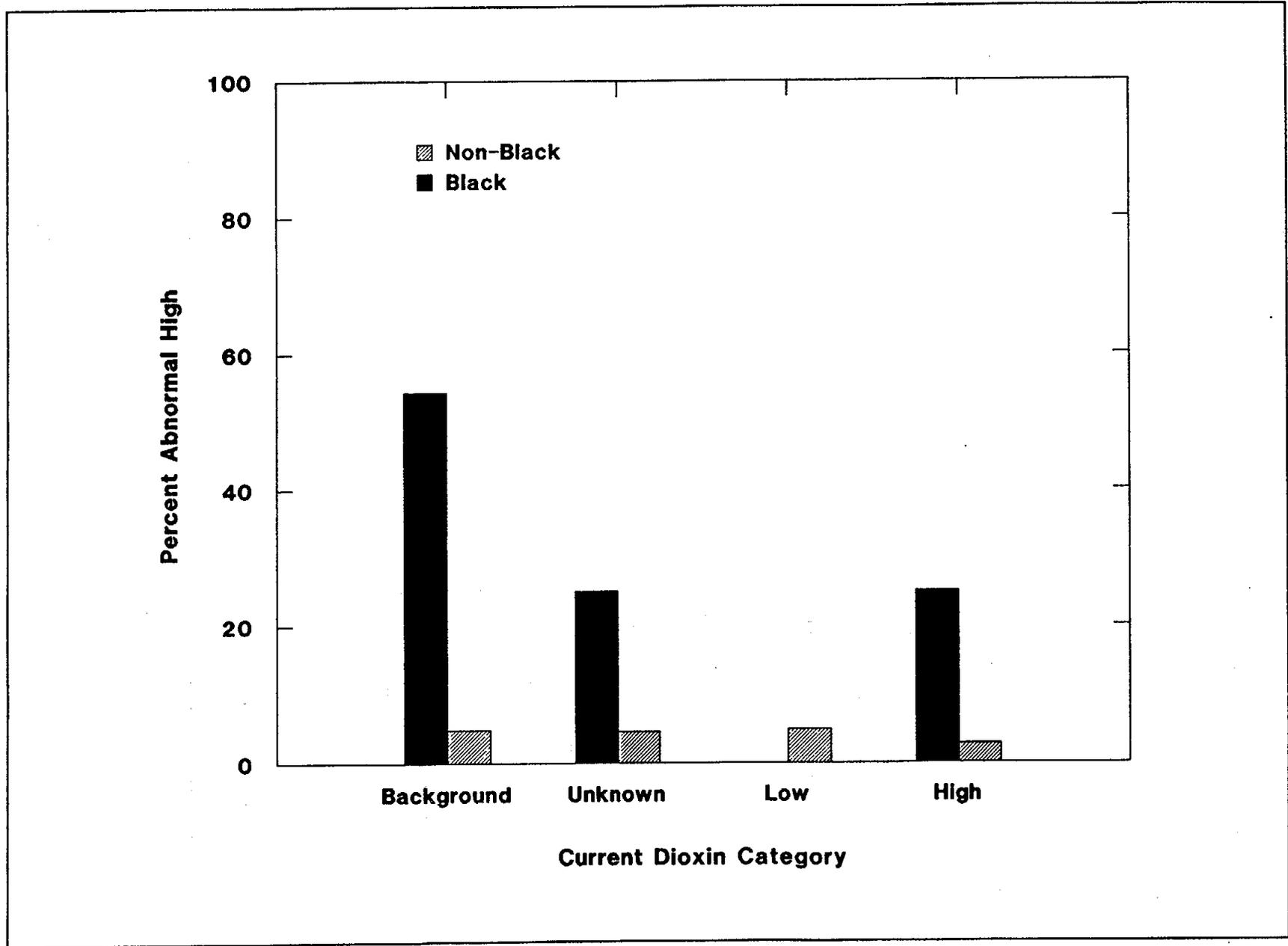


FIGURE I-2-36. Interaction of Categorized Current Dioxin and Race for Creatine Kinase (Discrete)