TABLE 7-9. (Continued)

Analysis of Melanoma
(Upper Extremities)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)	p-Value
		Low	Medium	High		
e4) Minimal					--	--
(n=489)	≤18.6	0.0	0.0	0.0	--	--
		(65)	(121)	(54)		
	>18.6	0.0	0.0	0.0	--	--
		(54)	(121)	(74)		
f4) Maximal					--	--
(n=704)	≤18.6	0.0	0.0	0.0	--	--
		(102)	(179)	(81)		
	>18.6	0.0	0.0	0.0	--	--
		(78)	(166)	(98)		

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
g4) Minimal			--	--
(n=489)	≤18.6	--	--	
	>18.6	--	--	
h4) Maximal			--	--
(n=704)	≤18.6	--	--	
	>18.6	--	--	

--: Relative risk/confidence interval/p-value not given due to the absence of abnormalities; adjusted analysis not performed due to the absence of abnormalities.

Note: 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.

TABLE 7-9. (Continued)

Analysis of Melanoma
(Lower Extremities)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)	p-Value
		Low	Medium	High		
e5) Minimal (n=489)	≤18.6	0.0 (65)	0.0 (121)	0.0 (54)	--	--
	>18.6	0.0 (54)	0.0 (121)	0.0 (74)	--	--
f5) Maximal (n=704)	≤18.6	0.0 (102)	0.0 (179)	0.0 (81)	--	--
	>18.6	0.0 (78)	0.0 (166)	0.0 (98)	--	--

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
g5) Minimal (n=489)	≤18.6	--	--	--
	>18.6	--	--	
h5) Maximal (n=704)	≤18.6	--	--	--
	>18.6	--	--	

--: Relative risk/confidence interval/p-value not given due to the absence of abnormalities; adjusted analysis not performed due to the absence of abnormalities.

Note: 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.

TABLE 7-9. (Continued)

Analysis of Melanoma
(Other Sites and NOS)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)	p-Value
		Low	Medium	High		
e6) Minimal						--
(n=489)	≤18.6	0.0 (65)	0.0 (121)	0.0 (54)	--	--
	>18.6	0.0 (54)	0.0 (121)	0.0 (74)	--	--
f6) Maximal						--
(n=704)	≤18.6	0.0 (102)	0.0 (179)	0.0 (81)	--	--
	>18.6	0.0 (78)	0.0 (166)	0.0 (98)	--	--

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
g6) Minimal			--	--
(n=489)	≤18.6	--	--	
	>18.6	--	--	
h6) Maximal				
(n=704)	≤18.6	--	--	
	>18.6	--	--	

--: Relative risk/confidence interval/p-value not given due to the absence of abnormalities; adjusted analysis not performed due to the absence of abnormalities.

Note: 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.

i1) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	739	0.4	All Categories		--
Unknown	333	0.3	Unknown vs. Background	0.74 (0.08,7.13)	0.999
Low	184	0.0	Low vs. Background	--	0.999
High	179	0.0	High vs. Background	--	0.999
Total	1,435				

j1) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	738	All Categories		--	HAIR (p=0.076)
Unknown	333	Unknown vs. Background	0.64 (0.07,6.24)	0.702	
Low	184	Low vs. Background	--	--	
High	179	High vs. Background	--	--	
Total	1,434				

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities.
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 7-9. (Continued)

Analysis of Melanoma
(Ear, Face, Head, and Neck)
(Verified)

i2) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	739	0.0	All Categories	--	--
Unknown	333	0.3	Unknown vs. Background	--	0.622
Low	184	0.0	Low vs. Background	--	--
High	179	0.0	High vs. Background	--	--
Total	1,435				

j2) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	739	All Categories	--		--
Unknown	333	Unknown vs. Background	--	--	
Low	184	Low vs. Background	--	--	
High	179	High vs. Background	--	--	
Total	1,435				

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities; adjusted analysis not performed due to the sparse number of abnormalities.

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

TABLE 7-9. (Continued)

Analysis of Melanoma
(Trunk)
(Verified)

i3) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	739	0.4	All Categories	--	--
Unknown	333	0.0	Unknown vs. Background	--	0.654
Low	184	0.0	Low vs. Background	--	0.999
High	179	0.0	High vs. Background	--	0.999
Total	1,435				

j3) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	739	All Categories	--	--	--
Unknown	333	Unknown vs. Background	--	--	
Low	184	Low vs. Background	--	--	
High	179	High vs. Background	--	--	
Total	1,435				

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities; adjusted analysis not performed due to the sparse number of abnormalities.

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 7-9. (Continued)

**Analysis of Melanoma
(Upper Extremities)
(Verified)**

i4) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	739	0.0	All Categories	0.0	--
Unknown	333	0.0	Unknown vs. Background	--	--
Low	184	0.0	Low vs. Background	--	--
High	179	0.0	High vs. Background	--	--
Total	1,435				

j4) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	739	All Categories	--		--
Unknown	333	Unknown vs. Background	--	--	
Low	184	Low vs. Background	--	--	
High	179	High vs. Background	--	--	
Total	1,435				

--: Relative risk/confidence interval/p-value not given due to the absence of abnormalities; adjusted analysis not performed due to the absence of abnormalities.
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 7-9. (Continued)

Analysis of Melanoma
(Lower Extremities)
(Verified)

i5) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	739	0.0	All Categories		--
Unknown	333	0.0	Unknown vs. Background	--	--
Low	184	0.0	Low vs. Background	--	--
High	179	0.0	High vs. Background	--	--
Total	1,435				

j5) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	739	All Categories		--	--
Unknown	333	Unknown vs. Background	--	--	
Low	184	Low vs. Background	--	--	
High	179	High vs. Background	--	--	
Total	1,435				

--: Relative risk/confidence interval/p-value not given due to the absence of abnormalities; adjusted analysis not performed due to the absence of abnormalities.

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 7-9. (Continued)

Analysis of Melanoma
(Other Sites and NOS)
(Verified)

i6) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	739	0.0	All Categories		--
Unknown	333	0.0	Unknown vs. Background	--	--
Low	184	0.0	Low vs. Background	--	--
High	179	0.0	High vs. Background	--	--
Total	1,435				

j6) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	739	All Categories	--		--
Unknown	333	Unknown vs. Background	--	--	
Low	184	Low vs. Background	--	--	
High	179	High vs. Background	--	--	
Total	1,435				

--: Relative risk/confidence interval/p-value not given due to the absence of abnormalities; adjusted analysis not performed due to the absence of abnormalities.

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.

Ranch Hands with verified melanoma. Adjusted analyses were not performed due to the sparse number of Ranch Hands with melanoma.

Under the minimal assumption, no Ranch Hands had a verified melanoma on the ear, face, head, and neck (Table 7-9 [a2]). Under the maximal assumption, only one Ranch Hand had a verified melanoma on the ear, face, head, and neck (Table 7-9 [b2]). Because of the sparse number of Ranch Hands with melanoma on the ear, face, head, and neck, the relative risks, associated confidence intervals, and p-values of the unadjusted analyses were not presented and adjusted analyses were not performed.

Two Ranch Hands had verified melanoma on the trunk under both the minimal and the maximal assumptions. Under the minimal and maximal assumptions, different cutpoints were used to define the low, medium, and high initial categories (see the note at the bottom of Table 7-9 [a3-d3]). Therefore, the two Ranch Hands fell in the low initial dioxin category under the minimal assumption and fell in the medium initial dioxin category under the maximal assumption. Under the minimal assumption, the frequency of Ranch Hands with verified melanoma on the trunk was significant with a relative risk less than 1 (Table 7-9 [a3]: Est. RR=0.01, p=0.011) in the unadjusted analysis. Under the maximal assumption, the relative risk was nonsignificant (Table 7-9 [b3]: p=0.315). No adjusted analyses were performed due to the sparse number of participants with melanoma on the trunk.

No Ranch Hands had verified melanoma on the upper extremities (Table 7-9 [a4] and [b4]), on the lower extremities (Table 7-9 [a5] and [b5]), or for other sites and sites NOS (Table 7-9 [a6] and [b6]).

Model 2: Ranch Hands - Log_2 (Current Dioxin) and Time

Under the minimal assumption, two Ranch Hands had a verified melanoma for all sites combined (one Ranch Hand in each time since tour stratum). Due to the sparse number of melanoma within each time stratum, only relative frequencies and sample sizes are presented. Under the maximal assumption, three Ranch Hands had a verified melanoma for all sites combined (one Ranch Hand for time of 18.6 years or less and two Ranch Hands for time over 18.6 years). Because of the sparse number of Ranch Hands with melanoma within the former time stratum, neither the interaction nor the relative risk associated with the later time stratum was evaluated for significance. The estimated relative risk for the two Ranch Hands with tours over 18.6 years was nonsignificant (Table 7-9 [f1]: p=0.282). Adjusted analyses were not performed due to the sparse number of Ranch Hands with melanoma.

No Ranch Hands had a verified melanoma on the ear, face, head, and neck under the minimal assumption (Table 7-9 [e2]), and only one Ranch Hand had a verified melanoma under the maximal assumption (Table 7-9 [f2]). Due to these sparse numbers, only relative frequencies and sample sizes were presented. No analyses were performed.

Under each assumption, two Ranch Hands had a verified melanoma on the trunk (one in each time stratum). Due to the sparse number within each stratum, only relative frequencies and sample sizes were presented and no analyses were performed (Table 7-9 [e3-h3]).

As noted in the analysis using initial dioxin, no Ranch Hands had verified melanoma on the upper extremities (Table 7-9 [e4] and [f4]), on the lower extremities (Table 7-9 [e5] and [f5]), or for other sites and sites NOS (Table 7-9 [e6] and [f6]).

Model 3: Ranch Hands and Comparisons by Current Dioxin Category

Only three Comparisons and one Ranch Hand in the unknown current dioxin category had a verified melanoma for all sites combined (Table 7-9 [i1]). In the unadjusted analysis, none of the Ranch Hand versus Comparison contrasts was significant (p=0.999 for each contrast). An adjusted model containing hair color produced a nonsignificant unknown versus background contrast (Table 7-9 [j1]: p=0.702). Both relative risks were less than 1. There were no suspected cases of melanoma.

One Ranch Hand in the unknown current dioxin category had a verified melanoma on the ear, face, head, and neck (Table 7-9 [i2]). The unknown versus background contrast was nonsignificant in the unadjusted analysis (p=0.622). Due to the sparse number of Ranch Hands with a melanoma for this site, an adjusted analysis was not performed.

Three Comparisons, but no Ranch Hands (Table 7-9 [i3]), had a verified melanoma on the trunk. In the unadjusted analysis, each of the Ranch Hand versus Comparison contrasts was nonsignificant (p>0.65 for each contrast). An adjusted analysis was not performed because of the sparse number of Ranch Hands with a melanoma on the trunk.

No participants had a verified melanoma on the upper extremities (Table 7-9 [i4]), on the lower extremities (Table 7-9 [i5]), or for other sites and sites NOS (Table 7-9 [i6].

Squamous Cell Carcinoma

Model 1: Ranch Hands - Log₂ (Initial Dioxin)

Three Ranch Hands had verified squamous cell carcinoma under each assumption. In the unadjusted analysis of the frequency of Ranch Hands with a squamous cell carcinoma, the relative risks for an association with initial dioxin were nonsignificant under both the minimal and maximal assumptions (Table 7-10 [a] and [b]: p=0.836 and p=0.573). Adjusted models containing only skin reaction after at least 2 hours of sun exposure produced nonsignificant results (Table 7-10 [c] and [d]: p=0.860 and p=0.560, respectively).

Model 2: Ranch Hands - Log₂ (Current Dioxin) and Time

Under each assumption, three Ranch Hands had a verified squamous cell carcinoma (two of the Ranch Hands had time since tour 18.6 years or less). Because only one Ranch Hand within the over 18.6 years time stratum had a squamous cell carcinoma, the relative risk for that time stratum and the interaction of current dioxin and time were not evaluated for significance. The estimated relative risk for the other time stratum was nonsignificant under the minimal and maximal assumptions (Table 7-10 [e] and [f]: p=0.303 and p=0.804). Because of the sparse nature of these data, no adjusted analyses were performed.

TABLE 7-10.

Analysis of Squamous Cell Carcinoma

Ranch Hands - Log$_2$ (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a) Minimal (n=489)	Low	118	0.8	0.90 (0.34,2.42)	0.836
	Medium	243	0.4		
	High	128	0.8		
b) Maximal (n=704)	Low	181	0.0	1.24 (0.60,2.60)	0.573
	Medium	344	0.6		
	High	179	0.6		

Ranch Hands - Log$_2$ (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c) Minimal (n=489)	0.92 (0.34,2.48)	0.860	SUN2HR (p=0.109)
d) Maximal (n=704)	1.26 (0.59,2.72)	0.560	SUN2HR (p=0.104)

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

Note: <u>Minimal</u>--   Low: 52-93 ppt; Medium: >93-292 ppt; High: >292 ppt.
            <u>Maximal</u>--   Low: 25-56.9 ppt; Medium: >56.9-218 ppt; High: >218 ppt.

TABLE 7-10. (Continued)

Analysis of Squamous Cell Carcinoma

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)[a]	p-Value
		Low	Medium	High		
e) Minimal						--
(n=489)	≤18.6	1.5 (65)	0.8 (121)	0.0 (54)	0.25 (0.02,3.48)	0.303[b]
	>18.6	0.0 (54)	0.0 (121)	1.4 (74)	--	--
f) Maximal						--
(n=704)	≤18.6	0.0 (102)	1.1 (179)	0.0 (81)	0.86 (0.26,2.86)	0.804[b]
	>18.6	0.0 (78)	0.0 (166)	1.0 (98)	--	--

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
g) Minimal		--		--
(n=489)	≤18.6	--		
	>18.6	--		
h) Maximal		--		--
(n=704)	≤18.6	--		
	>18.6	--		

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

[b]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities; adjusted analysis not performed due to the sparse number of abnormalities.

Note: 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.

TABLE 7-10. (Continued)

Analysis of Squamous Cell Carcinoma
(Verified)

i) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	739	0.1	All Categories		0.571
Unknown	333	0.6	Unknown vs. Background	4.46 (0.40,49.35)	0.458
Low	184	0.5	Low vs. Background	4.03 (0.25,64.78)	0.718
High	179	0.6	High vs. Background	4.15 (0.26,66.61)	0.704
Total	1,435				

j) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	739	All Categories		0.546	SUN2HR (p=0.083)
Unknown	333	Unknown vs. Background	4.35 (0.40,47.57)	0.228	
Low	184	Low vs. Background	4.39 (0.28,69.66)	0.294	
High	179	High vs. Background	4.06 (0.26,64.37)	0.320	
Total	1,435				

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.

Model 3: Ranch Hands and Comparisons by Current Dioxin Category

In the unadjusted analysis, there were only five participants with verified squamous cell carcinoma (one Comparison in the background category, two Ranch Hands in the unknown current dioxin category, one Ranch Hand in the low current dioxin category, and one Ranch Hand in the high current dioxin category). The overall contrast was nonsignificant (Table 7-10 [i]: p=0.571). An adjusted model containing only skin reaction after at least 2 hours of sun exposure also exhibited a nonsignificant overall contrast (Table 7-10 [j]: p=0.546).

Basal Cell Carcinoma on Specified Sites by Occupation

Analyses were performed by occupational stratum because the analyses were of special interest due to varying degrees of exposure resulting from different occupational duties. Occupation was not used routinely as a covariate for standard adjustment because of the known strong relationship between dioxin and occupation.

For these occupation-specific analyses of basal cell carcinoma, occupation and the interaction of occupation and dioxin were also included in the adjusted logistic regression model. These terms were added to the model to increase the sample size used to generate estimates and evaluate covariates. Common sets of covariates were reported (e.g., see Table 7-11 panels [c1], [c3], [c5]) because only one model was used to summarize results of each occupation for a specific analysis (e.g., basal cell carcinoma on the ear, face, head, and neck versus no basal cell carcinoma).

Model 1: Ranch Hands - Log$_2$ (Initial Dioxin)

With respect to initial dioxin, under the minimal and the maximal assumptions, the unadjusted and the adjusted analyses of the frequency of Ranch Hand officers with a basal cell carcinoma on the ear, face, head, and neck versus Ranch Hand officers without basal cell carcinoma produced relative risks greater than 1; however, each of the risks was nonsignificant (Table 7-11 [a1-d1]: p>0.35 for all analyses).

Under the minimal assumption, there was only one Ranch Hand officer with a basal cell carcinoma of other sites; therefore, unadjusted and adjusted analyses were not performed. Under the maximal assumption, the unadjusted and the adjusted analyses of the frequency of Ranch Hand officers with a basal cell carcinoma for other sites versus Ranch Hand officers without basal cell carcinoma were nonsignificant with relative risks less than 1 (Table 7-11 [b2] and [d2]: p=0.814 and p=0.783, respectively).

Under the minimal and the maximal assumptions, the unadjusted and the adjusted analyses of the frequency of Ranch Hand enlisted flyers with a basal cell carcinoma on the ear, face, head, and neck versus Ranch Hand enlisted flyers without basal cell carcinoma produced nonsignificant relative risks that were less than 1 (Table 7-11 [a3-d3]: p>0.10 for all analyses).

Under both assumptions, the unadjusted analyses of the frequency of Ranch Hand enlisted flyers with a basal cell carcinoma for other sites versus Ranch Hand enlisted flyers without basal cell carcinoma were significant with relative risks greater than 2 (Table 7-11 [a4] and [b4]: Est. RR=2.28, p=0.050 and Est. RR=2.48, p=0.015). Under the minimal assumption, the relative frequency of Ranch Hand enlisted flyers with a basal cell carcinoma

TABLE 7-11.

Analysis of Basal Cell Carcinoma by Occupation
(Officer—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log$_2$ (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a1) Minimal	Low	61	8.2	1.15 (0.25,5.26)	0.860
(n=105)	Medium	44	6.8		
	High	0	--		
b1) Maximal	Low	113	6.2	1.41 (0.67,2.97)	0.372
(n=237)	Medium	122	7.4		
	High	2	0.0		

Ranch Hands - Log$_2$ (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c1) Minimal (n=102)	1.31 (0.27,6.47)	0.740	AGE (p=0.052) ETHBACK (p=0.113) SUN2HR (p=0.003)
d1) Maximal (n=232)	1.25 (0.56,2.81)	0.581	AGE (p=0.032) ETHBACK (p=0.095) SUN2HR (p=0.001) HAIR (p=0.149)

[a]Relative risk for a twofold increase in dioxin.
Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Officer—Other Sites versus None)

Ranch Hands - Log$_2$ (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a2) Minimal (n=98)	Low	56	0.0	--	--
	Medium	42	2.4		
	High	0	--		
b2) Maximal (n=228)	Low	111	4.5	0.87 (0.27,2.78)	0.814
	Medium	115	1.7		
	High	2	0.0		

Ranch Hands - Log$_2$ (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c2) Minimal (n=98)	--	--	--
d2) Maximal (n=228)	0.85 (0.26,2.76)	0.783	SUNRPT (p=0.010)

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

--: Relative risk, confidence interval, and p-value not given due to the sparse number of abnormalities; adjusted analysis not performed due to the sparse number of abnormalities.

Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Flyer—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log$_2$ (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a3) Minimal (n=98)	Low	20	15.0	0.55 (0.17,1.82)	0.290
	Medium	59	1.7		
	High	19	5.3		
b3) Maximal (n=122)	Low	20	10.0	0.58 (0.27,1.24)	0.138
	Medium	71	5.6		
	High	31	3.2		

Ranch Hands - Log$_2$ (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c3) Minimal (n=94)	0.62 (0.19,2.01)	0.426	AGE (p=0.052) ETHBACK (p=0.113) SUN2HR (p=0.003)
d3) Maximal (n=116)	0.52 (0.23,1.16)	0.112	AGE (p=0.032) ETHBACK (p=0.095) SUN2HR (p=0.001) HAIR (p=0.149)

[a]Relative risk for a twofold increase in dioxin.
Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Flyer—Other Sites versus None)

Ranch Hands - Log_2 (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a4) Minimal (n=99)	Low	18	5.6	2.28 (0.98,5.33)	0.050
	Medium	59	1.7		
	High	22	18.2		
b4) Maximal (n=121)	Low	18	0.0	2.48 (1.13,5.44)	0.015
	Medium	69	2.9		
	High	34	11.8		

Ranch Hands - Log_2 (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c4) Minimal (n=99)	1.97 (0.86,4.49)	0.108	SUNRPT (p=0.003)
d4) Maximal (n=121)	2.22 (1.04,4.74)	0.039	SUNRPT (p=0.010)

[a]Relative risk for a twofold increase in dioxin.
Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Groundcrew—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log$_2$ (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a5) Minimal	Low	34	5.9	0.43 (0.22,0.84)	0.005
(n=272)	Medium	134	6.0		
	High	104	1.0		
b5) Maximal	Low	43	2.3	0.65 (0.41,1.03)	0.051
(n=325)	Medium	142	6.3		
	High	140	1.4		

Ranch Hands - Log$_2$ (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c5) Minimal	0.43 (0.21,0.88)	0.021	AGE (p=0.052)
(n=266)			ETHBACK (p=0.113)
			SUN2HR (p=0.003)
d5) Maximal	0.67 (0.41,1.09)	0.104	AGE (p=0.032)
(n=319)			ETHBACK (p=0.095)
			SUN2HR (p=0.001)
			HAIR (p=0.149)

[a]Relative risk for a twofold increase in dioxin.
Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Groundcrew—Other Sites versus None)

Ranch Hands - Log$_2$ (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a6) Minimal	Low	34	5.9	0.56 (0.27,1.18)	0.096
(n=268)	Medium	130	3.1		
	High	104	1.0		
b6) Maximal	Low	42	0.0	0.83 (0.49,1.43)	0.501
(n=320)	Medium	138	3.6		
	High	140	1.4		

Ranch Hands - Log$_2$ (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c6) Minimal (n=268)	0.56 (0.25,1.29)	0.175	SUNRPT (p=0.003)
d6) Maximal (n=320)	0.83 (0.49,1.42)	0.498	SUNRPT (p=0.010)

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

Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Officer—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)[a]	p-Value
		Low	Medium	High		
e1) Minimal						0.787[b]
(n=105)	≤18.6	6.1 (33)	0.0 (14)	-- (0)	0.33 (0.00,39.39)	0.649[c]
	>18.6	12.5 (32)	7.7 (26)	-- (0)	0.66 (0.08,5.86)	0.712[c]
f1) Maximal						0.889[b]
(n=237)	≤18.6	4.5 (66)	6.9 (58)	0.0 (1)	1.27 (0.35,4.57)	0.719[c]
	>18.6	4.3 (46)	10.8 (65)	0.0 (1)	1.43 (0.48,4.26)	0.524[c]

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g1) Minimal			0.767[b]	AGE (p=0.088)
(n=102)	≤18.6	0.32 (0.00,43.41)	0.647[c]	ETHBACK (p=0.088)
	>18.6	0.69 (0.07,6.71)	0.751[c]	SUN2HR (p=0.003)
h1) Maximal			0.947[b]	AGE (p=0.008)
(n=232)	≤18.6	1.20 (0.31,4.65)	0.796[c]	ETHBACK (p=0.065)
	>18.6	1.27 (0.37,4.42)	0.705[c]	SUN2HR (p=0.008)
				SUNRPT (p=0.103)

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

[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).

[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).

Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Officer—Other Sites versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)[a]	p-Value
		Low	Medium	High		
e2) Minimal						--
(n=98)	≤18.6	0.0 (31)	0.0 (14)	-- (0)	--	--
	>18.6	0.0 (28)	4.0 (25)	-- (0)	--	--
f2) Maximal						0.623[b]
(n=228)	≤18.6	4.5 (66)	0.0 (54)	0.0 (1)	0.31 (0.02,4.26)	0.380[c]
	>18.6	6.4 (47)	1.7 (59)	0.0 (1)	0.67 (0.12,3.77)	0.648[c]

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g2) Minimal			--	--
(n=98)	≤18.6	--	--	
	>18.6	--	--	
h2) Maximal			0.542[b]	SUNRPT (p=0.011)
(n=228)	≤18.6	0.26 (0.02,4.10)	0.337[c]	
	>18.6	0.69 (0.12,3.89)	0.676[c]	

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

[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).

[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities; adjusted analysis not performed due to the sparse number of abnormalities.

Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Flyer—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)[a]	p-Value
		Low	Medium	High		
e3) Minimal						--
(n=98)	≤18.6	12.5 (8)	5.9 (34)	20.0 (5)	1.08 (0.34,3.42)	0.891[c]
	>18.6	12.5 (8)	0.0 (33)	0.0 (10)	--	--
f3) Maximal						--
(n=122)	≤18.6	14.3 (14)	8.6 (35)	7.1 (14)	0.82 (0.36,1.85)	0.630[c]
	>18.6	0.0 (7)	2.7 (37)	0.0 (15)	--	--

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g3) Minimal			--	AGE (p=0.088)
(n=94)	≤18.6	1.35 (0.41,4.46)	0.624[c]	ETHBACK (p=0.088)
	>18.6	--	--	SUN2HR (p=0.003)
h3) Maximal			--	AGE (p=0.008)
(n=116)	≤18.6	0.63 (0.24,1.65)	0.352[c]	ETHBACK (p=0.065)
	>18.6	--	--	SUN2HR (p=0.008)
				SUNRPT (p=0.103)

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

[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities.

Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Flyer—Other Sites versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin Low	Medium	High	Est. Relative Risk (95% C.I.)[a]	p-Value
e4) Minimal						0.011[b]
(n=99)	≤18.6	12.5 (8)	3.0 (33)	20.0 (5)	1.05 (0.26,4.25)	0.944[c]
	>18.6	0.0 (7)	0.0 (33)	23.1 (13)	29.35 (1.23,702.4)	0.037[c]
f4) Maximal						0.017[b]
(n=121)	≤18.6	0.0 (12)	5.9 (34)	7.1 (14)	1.49 (0.52,4.26)	0.457[c]
	>18.6	0.0 (7)	0.0 (36)	16.7 (18)	29.37 (1.22,708.2)	0.037[c]

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g4) Minimal			0.017[b]	SUNRPT (p=0.005)
(n=99)	≤18.6	1.19 (0.34,4.20)	0.781[c]	
	>18.6	37.64 (0.92, 1,541.9)	0.055[c]	
h4) Maximal			0.027[b]	SUNRPT (p=0.011)
(n=121)	≤18.6	1.60 (0.60,4.27)	0.348[c]	
	>18.6	37.64 (0.92, 1,543.3)	0.056[c]	

[a]Relative risk for a twofold increase in dioxin.
[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).
[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).
Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Groundcrew—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)[a]	p-Value
		Low	Medium	High		
e5) Minimal						0.901[b]
(n=272)	≤18.6	4.5 (22)	7.2 (69)	0.0 (47)	0.30 (0.09,1.01)	0.051[c]
	>18.6	14.3 (14)	3.4 (59)	1.6 (61)	0.33 (0.11,0.98)	0.047[c]
f5) Maximal						0.581[b]
(n=325)	≤18.6	5.3 (19)	7.5 (80)	0.0 (64)	0.53 (0.26,1.09)	0.086[c]
	>18.6	0.0 (22)	6.6 (61)	1.3 (79)	0.70 (0.37,1.31)	0.265[c]

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g5) Minimal			0.714[b]	AGE (p=0.088)
(n=266)	≤18.6	0.31 (0.09,1.10)	0.069[c]	ETHBACK (p=0.088)
	>18.6	0.42 (0.15,1.20)	0.107[c]	SUN2HR (p=0.003)
h5) Maximal			0.385[b]	AGE (p=0.008)
(n=319)	≤18.6	0.51 (0.23,1.12)	0.092[c]	ETHBACK (p=0.065)
	>18.6	0.80 (0.42,1.53)	0.492[c]	SUN2HR (p=0.008)
				SUNRPT (p=0.103)

[a]Relative risk for a twofold increase in dioxin.
[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).
[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).
Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Groundcrew—Other Sites versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin Low	Medium	High	Est. Relative Risk (95% C.I.)[a]	p-Value
e6) Minimal						0.980[b]
(n=268)	≤18.6	4.5 (22)	4.5 (67)	2.1 (48)	0.61 (0.24,1.58)	0.313[c]
	>18.6	0.0 (12)	3.4 (59)	0.0 (60)	0.60 (0.17,2.17)	0.438[c]
f6) Maximal						0.989[b]
(n=320)	≤18.6	0.0 (18)	5.1 (78)	1.5 (65)	0.90 (0.44,1.82)	0.759[c]
	>18.6	0.0 (22)	3.4 (59)	0.0 (78)	0.90 (0.37,2.21)	0.823[c]

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g6) Minimal			0.976[b]	SUNRPT (p=0.005)
(n=268)	≤18.6	0.61 (0.23,1.58)	0.305[c]	
	>18.6	0.62 (0.18,2.13)	0.448[c]	
h6) Maximal			0.874[b]	SUNRPT (p=0.011)
(n=320)	≤18.6	0.85 (0.42,1.74)	0.666[c]	
	>18.6	0.94 (0.39,2.25)	0.883[c]	

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

[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).

[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).

Note: 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.

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Officer—Ear, Face, Head, and Neck versus None)
(Verified)

i1) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	275	6.2	All Categories		0.912
Unknown	202	7.4	Unknown vs. Background	1.22 (0.59,2.50)	0.720
Low	37	5.4	Low vs. Background	0.87 (0.19,3.93)	0.999
High	2	0.0	High vs. Background	--	0.999
Total	516				

j1) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	268	All Categories		0.865	AGE (p=0.032) ETHBACK (p=0.026)
Unknown	199	Unknown vs. Background	1.13 (0.52,2.44)	0.757	SUN2HR (p=0.028)
Low	36	Low vs. Background	0.75 (0.15,3.66)	0.719	SUNRPT (p=0.039)
High	2	High vs. Background	--	--	LAT (p=0.036) HAIR (p=0.085)
Total	505				

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities.

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 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Officer—Other Sites versus None)
(Verified)

i2) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	262	1.5	All Categories		0.398
Unknown	195	4.1	Unknown vs. Background	2.76 (0.82,9.33)	0.161
Low	36	2.8	Low vs. Background	1.84 (0.20,16.96)	0.954
High	2	0.0	High vs. Background	--	0.999
Total	495				

j2) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	261	All Categories		0.356	SUNRPT (p=0.003)
Unknown	195	Unknown vs. Background	2.89 (0.85,9.81)	0.087	
Low	36	Low vs. Background	1.91 (0.21,17.70)	0.569	
High	2	High vs. Background	--	--	
Total	494				

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities.

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

TABLE 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Flyer—Ear, Face, Head, and Neck versus None)
(Verified)

i3) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	115	7.0	All Categories		0.530
Unknown	39	7.7	Unknown vs. Background	1.11 (0.28,4.46)	0.999
Low	50	2.0	Low vs. Background	0.27 (0.03,2.27)	0.366
High	29	3.4	High vs. Background	0.48 (0.06,4.03)	0.850
Total	233				

j3) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	110	All Categories		0.481	AGE (p=0.032)
					ETHBACK (p=0.026)
Unknown	36	Unknown vs. Background	1.72 (0.39,7.65)	0.472	SUN2HR (p=0.028)
Low	49	Low vs. Background	0.37 (0.04,3.19)	0.358	SUNRPT (p=0.039)
High	28	High vs. Background	0.45 (0.05,4.09)	0.472	LAT (p=0.036)
					HAIR (p=0.085)
Total	223				

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 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Flyer—Other Sites versus None)
(Verified)

i4) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	108	0.9	All Categories		0.003
Unknown	36	0.0	Unknown vs. Background	--	0.999
Low	50	2.0	Low vs. Background	2.18 (0.13,36.20)	0.999
High	32	12.5	High vs. Background	15.29 (1.62,144.2)	0.020
Total	226				

j4) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	108	All Categories		0.028	SUNRPT (p=0.003)
Unknown	36	Unknown vs. Background	--	--	
Low	50	Low vs. Background	2.56 (0.15,42.6)	0.511	
High	32	High vs. Background	15.44 (1.59,147.1)	0.017	
Total	226				

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities.
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 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Groundcrew—Ear, Face, Head, and Neck versus None)
(Verified)

i5) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	338	3.8	All Categories		0.052
Unknown	84	4.8	Unknown vs. Background	1.25 (0.40,3.94)	0.703
Low	91	7.7	Low vs. Background	2.08 (0.81,5.39)	0.131
High	143	0.7	High vs. Background	0.18 (0.02,1.36)	0.095
Total	656				

j5) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	329	All Categories		0.048	AGE (p=0.032)
Unknown	81	Unknown vs. Background	1.23 (0.38,4.04)	0.734	ETHBACK (p=0.026) SUN2HR (p=0.028)
Low	89	Low vs. Background	2.22 (0.84,5.91)	0.110	SUNRPT (p=0.039)
High	140	High vs. Background	0.20 (0.03,1.55)	0.121	LAT (p=0.036)
Total	639				HAIR (p=0.085)

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 7-11. (Continued)

Analysis of Basal Cell Carcinoma by Occupation
(Enlisted Groundcrew—Other Sites versus None)
(Verified)

i6) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	331	1.8	All Categories		0.091
Unknown	80	0.0	Unknown vs. Background	--	0.540
Low	88	4.5	Low vs. Background	2.58 (0.71,9.37)	0.274
High	143	0.7	High vs. Background	0.38 (0.05,3.21)	0.648
Total	642				

j6) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	331	All Categories		0.081	SUNRPT (p=0.003)
Unknown	80	Unknown vs. Background	--	--	
Low	88	Low vs. Background	2.47 (0.67,9.08)	0.171	
High	143	High vs. Background	0.37 (0.04,3.09)	0.354	
Total	642				

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities.

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.

on other sites were 5.6, 1.7 and 18.2 percent for low, medium, and high initial dioxin. Under the maximal assumption, the corresponding frequencies were 0.0, 2.9, and 11.8 percent. Under the minimal assumption, an adjusted model containing skin reaction after repeated sun exposure produced an adjusted relative risk for Ranch Hand enlisted flyers that was nonsignificant (Table 7-11 [c4]: p=0.108). Under the maximal assumption, the adjusted relative risk was significant and remained greater than 2 (Table 7-11 [d4]: Adj. RR=2.22, p=0.039). These results contrast with the nonsignificant relative risks less than 1 in the other occupational strata.

Under the minimal assumption, the unadjusted analysis of the frequency of Ranch Hand enlisted groundcrew with a basal cell carcinoma on the ear, face, head, and neck versus Ranch Hand enlisted groundcrew without basal cell carcinoma produced a relative risk that was significant but less than 1 (Table 7-11 [a5]: Est. RR=0.43, p=0.005). The relative frequencies of Ranch Hands within the low, medium, and high initial dioxin categories were 5.9, 6.0, and 1.0 percent. Under the maximal assumption, the unadjusted analysis produced a marginally significant relative risk that also was less than 1 (Table 7-11 [b5]: Est. RR=0.65, p=0.051). The corresponding relative frequencies for this analysis were 2.3, 6.3, and 1.4 percent for low, medium, and high initial dioxin. After adjusting for covariates, the relative risk under the minimal assumption remained significant and less than 1 (Table 7-11 [c5]: Adj. RR=0.43, p=0.021). Under the maximal assumption after adjusting for age, ethnic background, skin reaction after at least 2 hours of sun exposure, and hair color, the relative risk became nonsignificant (Table 7-11 [d5]: p=0.104) but remained less than 1.

Under the minimal assumption, the unadjusted analysis of the frequency of Ranch Hand enlisted groundcrew with a basal cell carcinoma for other sites versus Ranch Hand enlisted groundcrew without basal cell carcinoma were marginally significant with a relative risk less than 1 (Table 7-11 [a6]: Est. RR=0.56, p=0.096) with relative frequencies of Ranch Hand enlisted groundcrew being 5.9, 3.1, and 1.0 percent for low, medium, and high initial dioxin. Under the maximal assumption, the relative risk was less than 1 and nonsignificant (Table 7-11 [b6]: p=0.501). After adjusting for skin reaction to repeated sun exposure, the relative risks for Ranch Hand enlisted groundcrew with a basal cell carcinoma for other sites were also nonsignificant (Table 7-11 [c6] and [d6]: p=0.175 and p=0.498) under each assumption.

Model 2: Ranch Hands - Log$_2$ (Current Dioxin) and Time

Under both assumptions, the unadjusted and the adjusted analyses of the frequency of Ranch Hand officers with a basal cell carcinoma on the ear, face, head, and neck versus Ranch Hand officers without basal cell carcinoma exhibited nonsignificant interactions between current dioxin and time since tour (Table 7-11 [e1-h1]: p>0.75 for each interaction). Although nonsignificant, the relative risks for the individual time stratum were less than 1 under the minimal assumption and greater than 1 under the maximal assumption.

Under the minimal assumption, neither the unadjusted nor the adjusted analysis of the frequency of Ranch Hand officers with a basal cell carcinoma for other sites versus Ranch Hand officers without basal cell carcinoma was performed because only one Ranch Hand officer had the neoplasm of interest. Under the maximal assumption, the unadjusted and the adjusted analyses contained nonsignificant current dioxin-by-time interactions (Table 7-11 [f2] and [h2]: p=0.623 and p=0.542, respectively) and nonsignificant relative risks less than 1 within each time stratum.

Under both assumptions, the unadjusted and the adjusted analyses of the frequency of Ranch Hand enlisted flyers with a basal cell carcinoma on the ear, face, head, and neck versus Ranch Hand enlisted flyers without basal cell carcinoma were limited to the later tour stratum (18.6 years or less) because of the sparse number of Ranch Hands with the neoplasm of interest who served in Vietnam in the earlier time period. Under each assumption and for each analysis, the relative risks were nonsignificant (Table 7-11 [e3-h3]: p>0.35 for each analysis). The unadjusted and adjusted relative risks were greater than 1 under the minimal assumption and less than 1 under the maximal assumption.

Under the minimal assumption, the unadjusted analysis of the frequency of Ranch Hand enlisted flyers with a basal cell carcinoma for other sites versus Ranch Hand enlisted flyers without a basal cell carcinoma contained a significant interaction between current dioxin and time (Table 7-11 [e4]: p=0.011). Ranch Hand enlisted flyers with the later tours (18.6 years or less) displayed a nonsignificant relative risk greater than 1 (p=0.944) and a significant relative risk greater than 1 was found for Ranch Hands within the other time stratum (Est. RR=29.35, p=0.037). The relative frequencies of Ranch Hand enlisted flyers for the earlier tour stratum were 0.0, 0.0, and 23.1 percent for low, medium, and high current dioxin. Under the maximal assumption, the current dioxin-by-time interaction of the unadjusted analysis was also significant (Table 7-11 [f4]: p=0.017) with a nonsignificant relative risk greater than 1 for Ranch Hands with later tours (p=0.457) and a significant relative risk greater than 1 for Ranch Hands with earlier tours (Est. RR=29.37, p=0.037). The corresponding relative frequencies of Ranch Hand enlisted flyers within the earlier tour stratum were 0.0, 0.0, and 16.7 percent. After adjusting for skin reaction after repeated sun exposure, significant interactions between current dioxin and time (Table 7-11 [g4] and [h4]: p=0.017 and p=0.027) and marginally significant relative risks greater than 1 for the enlisted flyers with earlier tours (minimal, Adj. RR=37.64, p=0.055; maximal, Adj. RR=37.64, p=0.056) were found in the adjusted analyses. Ranch Hands with later tours displayed nonsignificant relative risks. In the unadjusted and adjusted analyses, the significant or marginally significant associations found for Ranch Hands with early tours were based on three Ranch Hands in the high current dioxin category.

Under the minimal assumption, the unadjusted analysis of the frequency of Ranch Hand enlisted groundcrew with a basal cell carcinoma on the ear, face, head, and neck versus Ranch Hand enlisted groundcrew without a basal cell carcinoma contained a nonsignificant interaction between current dioxin and time (Table 7-11 [e5]: p=0.901). However, for time of 18.6 years or less, the relative risk was marginally significant (Est. RR=0.30, p=0.051) but less than 1; for time over 18.6 years the relative risk was significant (Est. RR=0.33, p=0.047) but also less than 1. Relative frequencies of Ranch Hand enlisted groundcrew within the low, medium, and high current dioxin categories were 4.5, 7.2, and 0.0 percent for the later tour stratum and 14.3, 3.4, and 1.6 percent for the earlier tour stratum. Under the maximal assumption, the unadjusted analysis also contained a nonsignificant interaction between current dioxin and time (Table 7-11 [f5]: p=0.581). Within the later tour stratum, the relative risk was marginally significant but less than 1 (Est. RR=0.53, p=0.086) with associated relative frequencies of Ranch Hand enlisted groundcrew being 5.3, 7.5, and 0.0 percent for low, medium, and high current dioxin. Under both assumptions, the adjusted analyses displayed nonsignificant interactions (Table 7-11 [g5] and [h5]: p=0.714 and p=0.385). For both assumptions, however, the later time stratum contained marginally significant relative risks that were less than 1 (minimal, Adj. RR=0.31, p=0.069; maximal, Adj. RR=0.51, p=0.092).

Under each assumption, the unadjusted and adjusted analyses of the frequency of Ranch Hand enlisted groundcrew with a basal cell carcinoma for other sites versus Ranch Hand enlisted groundcrew without a basal cell carcinoma contained nonsignificant interactions between current dioxin and time (Table 7-11 [e6-h6]: p>0.85 for each interaction).

Model 3: Ranch Hands and Comparisons by Current Dioxin Category

The frequencies of study participants with a basal cell carcinoma on the ear, face, head, and neck versus the frequencies of study participants without a basal cell carcinoma were compared for Ranch Hand officers in the unknown, low, and high current dioxin categories and Comparison officers in the background category. The sample sizes and frequencies for Ranch Hands in the low and high categories were small. The unadjusted analysis contained a nonsignificant overall contrast (Table 7-11 [i1]: p=0.912). The corresponding adjusted analysis also resulted in a nonsignificant overall contrast (Table 7-11 [j1]: p=0.865). All Ranch Hand versus Comparison contrasts that were performed were also nonsignificant.

Study participants with a basal cell carcinoma for other sites versus study participants without a basal cell carcinoma were compared for Ranch Hand officers in the unknown, low, and high current dioxin categories and Comparison officers in the background category. The unadjusted analysis contained a nonsignificant overall contrast (Table 7-11 [i2]: p=0.398). Individual Ranch Hand versus Comparison contrasts were nonsignificant. The adjusted analysis also exhibited a nonsignificant overall contrast (Table 7-11 [j2]: p=0.356); however, after adjusting for skin reaction after repeated sun exposure, the low versus background contrast became marginally significant (Est. RR=2.89, 95% C.I.: [0.85, 9.81], p=0.087).

The frequencies of study participants with a basal cell carcinoma on the ear, face, head, and neck versus the frequencies of study participants without a basal cell carcinoma were compared for Ranch Hand enlisted flyers in the unknown, low, and high current dioxin categories and Comparison enlisted flyers in the background category. The unadjusted and adjusted analyses contained nonsignificant overall contrasts (Table 7-11 [i3] and [j3]: p=0.530 and p=0.481, respectively). None of the Ranch Hand versus Comparison contrasts was significant.

Study participants with a basal cell carcinoma for other sites versus study participants without a basal cell carcinoma were compared for Ranch Hand enlisted flyers in the unknown, low, and high current dioxin categories and Comparison enlisted flyers in the background category. The unadjusted analysis contained a significant overall contrast (Table 7-11 [i4]: p=0.003). The relative frequencies for the background, unknown, low, and high current dioxin categories were 0.9, 0.0, 2.0, and 12.5 percent. The high versus background contrast was significant (Est. RR=15.29, 95% C.I.: [1.62,144.2], p=0.020). The unknown versus background and the low versus background contrasts were nonsignificant (p=0.999 for both contrasts). The adjusted analysis also displayed a significant overall contrast (Table 7-11 [j4]: p=0.028) with the high versus background contrast being significant (Adj. RR=15.44, 95% C.I.: [1.59, 147.1], p=0.017). The low versus background contrast was nonsignificant (p=0.511).

The frequencies of study participants with a basal cell carcinoma on the ear, face, head, and neck versus the frequencies of study participants without a basal cell carcinoma were

compared for Ranch Hand enlisted groundcrew in the unknown, low, and high current dioxin categories and for Comparison enlisted groundcrew in the background category. The unadjusted analysis contained a marginally significant overall contrast (Table 7-11 [i5]: p=0.052). The relative frequencies for the background, unknown, low, and high current dioxin categories were 3.8, 4.8, 7.7, and 0.7 percent. The high versus background contrast was also marginally significant but the relative risk was less than 1 (Est. RR=0.18, 95% C.I.: [0.02,1.36], p=0.095). The unknown versus background and the low versus background contrasts were nonsignificant (p=0.703 and p=0.131, respectively). After adjustment for age, ethnic background, the two skin reaction covariates, average lifetime residential latitude, and hair color, the overall contrast became significant (Table 7-11 [j5]: p=0.048); however, each of the individual contrasts of interest was nonsignificant (p>0.10 for each contrast).

Study participants with a basal cell carcinoma for other sites versus study participants without a basal cell carcinoma were compared for Ranch Hand enlisted groundcrew in the unknown, low, and high current dioxin categories and for Comparison enlisted groundcrew in the background category. The unadjusted analysis contained a marginally significant overall contrast (Table 7-11 [i6]: p=0.091). The relative frequencies for the background, unknown, low, and high current dioxin categories were 1.8, 0.0, 4.5, and 0.7 percent. None of the individual contrasts of interest was significant (p>0.25 for all contrasts). The adjusted analysis also contained a marginally significant overall contrast (Table 7-11 [j6]: p=0.081) accompanied by nonsignificant individual contrasts.

Sun Exposure-Related Malignant Skin Neoplasms on Specified Sites by Occupation

Similar to the analyses of basal cell carcinoma by occupation, the logistic regression model was expanded to contain occupation and a dioxin-by-occupation interaction for the adjusted analyses of sun exposure-related malignant skin neoplasms by occupation. As stated earlier, the additional terms were placed in the model to increase the sample size used to generate parameter estimates and to evaluate covariates. Because only one model was used for determining parameter estimates for each occupation, the same covariates and their associated p-values were reported for each occupation.

Model 1: Ranch Hands - Log2 (Initial Dioxin)

With respect to initial dioxin under the minimal and the maximal assumptions, the unadjusted and the adjusted analyses of the frequency of Ranch Hand officers with a sun exposure-related malignant skin neoplasm on the ear, face, head, and neck versus Ranch Hand officers without a sun exposure-related malignant skin neoplasm produced nonsignificant relative risks (Table 7-12 [a1-d1]: p>0.35 for all analyses).

Under both assumptions, the unadjusted and the adjusted analyses of the frequency of Ranch Hand officers with a sun exposure-related malignant skin neoplasm on other sites versus Ranch Hand officers without a sun exposure-related malignant skin neoplasm produced nonsignificant relative risks that were less than 1 (Table 7-12 [a2-d2]: p≥0.70 for all analyses).

Under the minimal and the maximal assumptions, the unadjusted and the adjusted analyses of the frequency of Ranch Hand enlisted flyers with a sun exposure-related malignant skin neoplasm on the ear, face, head, and neck versus Ranch Hand enlisted flyers

TABLE 7-12.

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Officer—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log$_2$ (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a1) Minimal (n=103)	Low	59	10.2	0.83 (0.18,3.80)	0.804
	Medium	44	6.8		
	High	0	--		
b1) Maximal (n=235)	Low	113	6.2	1.40 (0.69,2.83)	0.355
	Medium	120	9.2		
	High	2	0.0		

Ranch Hands - Log$_2$ (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c1) Minimal (n=100)	0.82 (0.16,4.26)	0.813	AGE (p=0.030) ETHBACK (p=0.082) SUN2HR (p<0.001)
d1) Maximal (n=230)	1.20 (0.56,2.57)	0.631	AGE (p=0.019) ETHBACK (p=0.075) SUN2HR (p<0.001) LAT (p=0.085) HAIR (p=0.063)

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

Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Officer—Other Sites versus None)

Ranch Hands - Log_2 (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a2) Minimal (n=97)	Low	55	3.6	0.61 (0.04,8.63)	0.700
	Medium	42	2.4		
	High	0	--		
b2) Maximal (n=226)	Low	111	4.5	0.90 (0.32,2.49)	0.833
	Medium	113	3.5		
	High	2	0.0		

Ranch Hands - Log_2 (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c2) Minimal (n=97)	0.65 (0.05,9.10)	0.746	SUNRPT (p<0.001)
d2) Maximal (n=226)	0.89 (0.32,2.52)	0.830	SUNRPT (p=0.002)

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

Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Enlisted Flyer—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log_2 (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a3) Minimal (n=98)	Low	20	15.0	0.54 (0.18,1.63)	0.233
	Medium	59	3.4		
	High	19	5.3		
b3) Maximal (n=122)	Low	20	10.0	0.62 (0.30,1.25)	0.157
	Medium	71	7.0		
	High	31	3.2		

Ranch Hands - Log_2 (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c3) Minimal (n=94)	0.61 (0.21,1.77)	0.364	AGE (p=0.030) ETHBACK (p=0.082) SUN2HR (p<0.001)
d3) Maximal (n=116)	0.54 (0.26,1.13)	0.101	AGE (p=0.019) ETHBACK (p=0.075) SUN2HR (p<0.001) LAT (p=0.085) HAIR (p=0.063)

[a]Relative risk for a twofold increase in dioxin.
Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation (Enlisted Flyer—Other Sites versus None)

Ranch Hands - Log$_2$ (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a4) Minimal (n=98)	Low	18	5.6	2.27 (0.97,5.30)	0.052
	Medium	58	1.7		
	High	22	18.2		
b4) Maximal (n=120)	Low	18	0.0	2.47 (1.13,5.42)	0.015
	Medium	68	2.9		
	High	34	11.8		

Ranch Hands - Log$_2$ (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c4) Minimal (n=98)	1.89 (0.83,4.30)	0.128	SUNRPT (p<0.001)
d4) Maximal (n=120)	2.14 (1.00,4.54)	0.049	SUNRPT (p=0.002)

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

Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation (Enlisted Groundcrew—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log_2 (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a5) Minimal (n=272)	Low	34	5.9	0.54 (0.30,0.97)	0.022
	Medium	134	6.0		
	High	104	1.9		
b5) Maximal (n=325)	Low	43	2.3	0.73 (0.48,1.12)	0.133
	Medium	142	6.3		
	High	140	2.1		

Ranch Hands - Log_2 (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c5) Minimal (n=266)	0.56 (0.30,1.03)	0.063	AGE (p=0.030) ETHBACK (p=0.082) SUN2HR (p<0.001)
d5) Maximal (n=319)	0.77 (0.49,1.22)	0.265	AGE (p=0.019) ETHBACK (p=0.075) SUN2HR (p<0.001) LAT (p=0.085) HAIR (p=0.063)

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

Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Enlisted Groundcrew—Other Sites versus None)

Ranch Hands - Log$_2$ (Initial Dioxin) - Unadjusted

Assumption	Initial Dioxin	n	Percent Yes	Est. Relative Risk (95% C.I.)[a]	p-Value
a6) Minimal	Low	34	5.9	0.57 (0.27,1.18)	0.098
(n=267)	Medium	130	3.1		
	High	103	1.0		
b6) Maximal	Low	42	0.0	0.84 (0.49,1.44)	0.507
(n=319)	Medium	138	3.6		
	High	139	1.4		

Ranch Hands - Log$_2$ (Initial Dioxin) - Adjusted

Assumption	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
c6) Minimal (n=267)	0.56 (0.28,1.13)	0.104	SUNRPT (p<0.001)
d6) Maximal (n=319)	0.83 (0.49,1.41)	0.485	SUNRPT (p=0.002)

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

Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Officer—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin Low	Medium	High	Est. Relative Risk (95% C.I.)[a]	p-Value
e1) Minimal						0.698[b]
(n=103)	≤18.6	9.4 (32)	0.0 (14)	-- (0)	0.25 (0.00,16.43)	0.514[c]
	>18.6	12.9 (31)	7.7 (26)	-- (0)	0.61 (0.07,5.56)	0.662[c]
f1) Maximal						0.886[b]
(n=235)	≤18.6	4.5 (66)	8.8 (57)	0.0 (1)	1.45 (0.45,4.69)	0.538[c]
	>18.6	6.5 (46)	10.9 (64)	0.0 (1)	1.29 (0.45,3.67)	0.633[c]

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g1) Minimal			0.660[b]	AGE (p=0.044)
(n=100)	≤18.6	0.15 (0.00,22.45)	0.454[c]	ETHBACK (p=0.053)
	>18.6	0.48 (0.04,5.50)	0.553[c]	SUN2HR (p<0.001)
h1) Maximal			0.580[b]	AGE (p=0.010)
(n=230)	≤18.6	1.55 (0.40,6.01)	0.522[c]	ETHBACK (p=0.057)
	>18.6	0.93 (0.28,3.12)	0.907[c]	SUN2HR (p=0.009)
				SUNRPT (p=0.099)
				LAT (p=0.087)
				HAIR (p=0.115)

[a]Relative risk for a twofold increase in dioxin.
[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).
[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).
Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Officer—Other Sites versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)[a]	p-Value
		Low	Medium	High		
e2) Minimal						--
(n=97)	≤18.6	3.3 (30)	0.0 (14)	-- (0)	--	--
	>18.6	4.0 (28)	4.0 (25)	-- (0)	0.58 (0.01,25.05)	0.777[c]
f2) Maximal						0.861[b]
(n=226)	≤18.6	4.5 (66)	1.9 (53)	0.0 (1)	0.56 (0.08,4.12)	0.568[c]
	>18.6	6.5 (46)	3.4 (59)	0.0 (1)	0.70 (0.15,3.31)	0.651[c]

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g2) Minimal			--	--
(n=97)	≤18.6	--	--	
	>18.6	--	--	
h2) Maximal			0.811[b]	SUNRPT (p=0.002)
(n=226)	≤18.6	0.52 (0.07,3.87)	0.527[c]	
	>18.6	0.71 (0.15,3.49)	0.677[c]	

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

[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).

[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities; adjusted analysis not performed due to the sparse number of abnormalities.

Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Enlisted Flyer—Ear, Face, Head, and Neck versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin Low	Medium	High	Est. Relative Risk (95% C.I.)[a]	p-Value
e3) Minimal						--
(n=98)	≤18.6	12.5 (8)	8.8 (34)	20.0 (5)	0.98 (0.33,2.89)	0.972[c]
	>18.6	12.5 (8)	0.0 (33)	0.0 (10)	--	--
f3) Maximal						--
(n=122)	≤18.6	14.3 (14)	11.4 (35)	7.1 (14)	0.86 (0.41,1.82)	0.696[c]
	>18.6	0.0 (7)	2.7 (37)	0.0 (15)	--	--

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g3) Minimal			--	AGE (p=0.044)
(n=94)	≤18.6	1.19 (0.39,3.63)	0.764[c]	ETHBACK (p=0.053)
	>18.6	--	--	SUN2HR (p<0.001)
h3) Maximal			--	AGE (p=0.010)
(n=116)	≤18.6	0.62 (0.24,1.59)	0.318[c]	ETHBACK (p=0.057)
	>18.6	--	--	SUN2HR (p=0.009)
				SUNRPT (p=0.099)
				LAT (p=0.087)
				HAIR (p=0.115)

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

[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities.

Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Enlisted Flyer—Other Sites versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin Low	Medium	High	Est. Relative Risk (95% C.I.)[a]	p-Value
e4) Minimal						0.010[b]
(n=98)	≤18.6	12.5 (8)	3.1 (32)	20.0 (5)	1.04 (0.26,4.18)	0.955[c]
	>18.6	0.0 (7)	0.0 (33)	23.1 (13)	29.36 (1.22,705.1)	0.037[c]
f4) Maximal						0.017[b]
(n=120)	≤18.6	0.0 (12)	6.1 (33)	7.1 (14)	1.48 (0.52,4.22)	0.459[c]
	>18.6	0.0 (7)	0.0 (36)	16.7 (18)	29.37 (1.22,709.9)	0.038[c]

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g4) Minimal			0.017[b]	SUNRPT (p<0.001)
(n=98)	≤18.6	1.18 (0.34,4.12)	0.794[c]	
	>18.6	37.63 (0.92, 1,545.8)	0.056[c]	
h4) Maximal			0.026[b]	SUNRPT (p=0.002)
(n=120)	≤18.6	1.59 (0.60,4.22)	0.349[c]	
	>18.6	37.63 (0.92, 1,546.2)	0.056[c]	

[a]Relative risk for a twofold increase in dioxin.
[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).
[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).
Note: 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.

TABLE 7-12. (Continued)

**Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Enlisted Groundcrew—Ear, Face, Head, and Neck versus None)**

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

| Assumption | Time (Yrs.) | Percent Yes/(n) Current Dioxin | | | Est. Relative Risk (95% C.I.)[a] | p-Value |
		Low	Medium	High		
e5) Minimal						0.430[b]
(n=272)	≤18.6	4.5 (22)	7.2 (69)	0.0 (47)	0.30 (0.09,1.01)	0.051[c]
	>18.6	14.3 (14)	3.4 (59)	3.3 (61)	0.53 (0.24,1.16)	0.112[c]
f5) Maximal						0.314[b]
(n=325)	≤18.6	5.3 (19)	7.5 (80)	0.0 (64)	0.53 (0.26,1.09)	0.086[c]
	>18.6	0.0 (22)	6.6 (61)	2.5 (79)	0.84 (0.49,1.43)	0.523[c]

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g5) Minimal			0.336[b]	AGE (p=0.044)
(n=266)	≤18.6	0.32 (0.09,1.08)	0.066[c]	ETHBACK (p=0.053)
	>18.6	0.63 (0.29,1.37)	0.242[c]	SUN2HR (p<0.001)
h5) Maximal			0.221[b]	AGE (p=0.010)
(n=319)	≤18.6	0.54 (0.25,1.18)	0.123[c]	ETHBACK (p=0.057)
	>18.6	0.97 (0.55,1.70)	0.913[c]	SUN2HR (p=0.009)
				SUNRPT (p=0.099)
				LAT (p=0.087)
				HAIR (p=0.115)

[a]Relative risk for a twofold increase in dioxin.
[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).
[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).
Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Enlisted Groundcrew—Other Sites versus None)

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Unadjusted

Assumption	Time (Yrs.)	Percent Yes/(n) Current Dioxin			Est. Relative Risk (95% C.I.)[a]	p-Value
		Low	Medium	High		
e6) Minimal						0.986[b]
(n=267)	≤18.6	4.5	4.5	2.1	0.61 (0.24,1.58)	0.313[c]
		(22)	(67)	(48)		
	>18.6	0.0	3.4	0.0	0.61 (0.17,2.19)	0.444[c]
		(12)	(59)	(59)		
f6) Maximal						0.983[b]
(n=319)	≤18.6	0.0	5.1	1.5	0.90 (0.44,1.82)	0.759[c]
		(18)	(78)	(65)		
	>18.6	0.0	3.4	0.0	0.91 (0.37,2.22)	0.830[c]
		(22)	(59)	(77)		

Ranch Hands - Log$_2$ (Current Dioxin) and Time - Adjusted

Assumption	Time (Yrs.)	Adj. Relative Risk (95% C.I.)[a]	p-Value	Covariate Remarks
g6) Minimal			0.967[b]	SUNRPT (p<0.001)
(n=267)	≤18.6	0.61 (0.23,1.58)	0.305[c]	
	>18.6	0.63 (0.18,2.15)	0.458[c]	
h6) Maximal			0.866[b]	SUNRPT (p=0.002)
(n=319)	≤18.6	0.85 (0.42,1.74)	0.666[c]	
	>18.6	0.94 (0.39,2.26)	0.893[c]	

[a]Relative risk for a twofold increase in dioxin.
[b]Test of significance for homogeneity of relative risks (current dioxin continuous, time categorized).
[c]Test of significance for relative risk equal to 1 (current dioxin continuous, time categorized).
Note: 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.

TABLE 7-12. (Continued)

Analysis of Sun Exposure-Related Malignant Skin Neoplasm by Occupation
(Officer—Ear, Face, Head, and Neck versus None)
(Verified)

i1) Ranch Hands and Comparisons by Current Dioxin Category - Unadjusted

Current Dioxin Category	n	Percent Yes	Contrast	Est. Relative Risk (95% C.I.)	p-Value
Background	274	6.6	All Categories		0.723
Unknown	202	8.9	Unknown vs. Background	1.39 (0.70,2.75)	0.434
Low	37	5.4	Low vs. Background	0.81 (0.18,3.67)	0.999
High	2	0.0	High vs. Background	--	0.999
Total	515				

j1) Ranch Hands and Comparisons by Current Dioxin Category - Adjusted

Current Dioxin Category	n	Contrast	Adj. Relative Risk (95% C.I.)	p-Value	Covariate Remarks
Background	267	All Categories		0.686	AGE (p=0.019)
Unknown	199	Unknown vs. Background	1.32 (0.64,2.74)	0.449	ETHBACK (p=0.020) SUN2HR (p=0.016)
Low	36	Low vs. Background	0.71 (0.15,3.45)	0.671	SUNRPT (p=0.049)
High	2	High vs. Background	--	--	LAT (p=0.020)
Total	504				HAIR (p=0.035)

--: Relative risk/confidence interval/p-value not given due to the sparse number of abnormalities.

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.