Under both the minimal and maximal assumptions of the longitudinal analyses of self-perception of health, a significant positive association was found between initial dioxin and the percentage of Ranch Hands having an abnormal self-perception of health in 1987 (p=0.047 and p=0.002, respectively). That is, the prevalence of a fair or poor self-perception of health in 1987, conditioned on excellent or good health in 1982, increased with an increase in initial dioxin for both cohorts. However, the percentage of participants who reported their health as fair or poor in 1987 decreased by over 50 percent since 1982. No significant associations with initial dioxin were observed in the longitudinal analyses of sedimentation rate.

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

For the unadjusted analysis of relative age, there was a significant interaction between current dioxin and time since tour under the minimal assumption and the maximal assumption (Table 6-13: p=0.039 and p=0.024, respectively). Under both assumptions, the estimated relative risks were significant and exceeded 1 for men with 18.6 years or less since tour (minimal, p=0.027; maximal, p=0.028). For those with more than 18.6 years since tour, the associations with current dioxin were negative but nonsignificant under both assumptions.

In the unadjusted analysis under the minimal assumption of self-perception of health, the interaction of current dioxin and time was marginally significant. For those men with 18.6 years or less, there was a nonsignificant negative association between self-perception of health and current dioxin and for those with more than 18.6 years there was a nonsignificant positive association with current dioxin. Under the maximal assumption, the unadjusted analysis of self-perception of health displayed a nonsignificant current dioxin-by-time interaction with a marginally significant positive association with current dioxin for those men with greater than 18.6 years since tour.

For both continuous and discrete measures of percent body fat, the unadjusted analyses contained nonsignificant current dioxin-by-time interactions under both assumptions. However, for these analyses both time strata exhibited positive associations with current dioxin that generally were significant.

For appearance of illness or distress at the physical examination, and also for both measures of sedimentation rate, the unadjusted analyses exhibited nonsignificant current dioxin-by-time interactions under both assumptions.

For continuous and discrete sedimentation rate, the unadjusted analyses under the maximal assumption contained positive associations with current dioxin that were at least marginally significant for those men with greater than 18.6 years since tour.

In the adjusted analysis of relative age, the current dioxin-by-time interaction was significant under both assumptions (minimal, p=0.039; maximal, p=0.026). The minimal analysis exhibited a significant positive association with current dioxin (p=0.027) and the maximal analysis exhibited a marginally significant positive association among those more recently exposed (≤18.6 years). Under both assumptions, the association for those men exposed more than 18.6 years was negative but nonsignificant.
For self-perception of health, the adjusted analyses under both assumptions exhibited significant current dioxin-by-time-by-personality type interactions (minimal, \( p=0.007 \); maximal, \( p=0.005 \)). Exploration of the interactions showed that under both assumptions, the current dioxin-by-time interactions were significant for Ranch Hands classified as type A, and for these same individuals there was a nonsignificant negative association with current dioxin for the more recently exposed men (\( \leq 18.6 \) years) and a significant positive association with current dioxin for those with earlier tours (\( > 18.6 \) years). Analyses for Ranch Hands classified as type B exhibited nonsignificant results.

In the adjusted analyses of both measures of percent body fat, the interactions of current dioxin and time were not significant under both assumptions. However, under the minimal assumption, there were significant positive associations with current dioxin for time since tour more than 18.6 years (continuous, \( p=0.008 \); discrete, \( p=0.029 \)), and for the maximal assumption both time strata displayed significant positive associations with current dioxin (continuous, \( p<0.001 \) and \( p=0.001 \); discrete, \( p<0.001 \) and \( p=0.003 \), for time\( \leq 18.6 \) years and time\( > 18.6 \) years).

For both forms of sedimentation rate, the adjusted analyses exhibited nonsignificant current dioxin-by-time interactions. For continuous sedimentation rate, the association with current dioxin was positive and significant (\( p=0.026 \)) under the minimal assumption for men exposed more than 18.6 years. For continuous sedimentation rate, the association with current dioxin was positive and significant under the maximal assumption for men with 18.6 years or less since tour (\( p=0.031 \)) and for men with more than 18.6 years since tour (\( p<0.001 \)). For the discrete version of sedimentation rate, there was a significant positive association with current dioxin for more than 18.6 years (\( p=0.007 \)) under the maximal assumption.

In the adjusted analysis of illness or distress at the physical examination, no covariates had a significant effect, hence the unadjusted nonsignificant interactions between current dioxin and time under both assumptions were the same as in the adjusted analysis.

In the longitudinal analyses of self-perception of health, the current dioxin-by-time interactions were nonsignificant. However, significant positive associations between current dioxin and the percentage of Ranch Hands having an abnormal self-perception of health in 1987 were present for both the minimal and maximal assumptions (\( p=0.036 \) and \( p=0.003 \)). No significant results were detected in the longitudinal analyses of sedimentation rate.

Model 3: Ranch Hands and Comparisons by Current Dioxin Category

In the unadjusted analysis of percent body fat using the four current dioxin categories, the overall contrasts were significant (Table 6-14, continuous and discrete, \( p<0.001 \)). For percent body fat, the unknown versus background contrast was significant with background being higher than unknown (\( p<0.001 \)). In addition, the high category exceeded background significantly for continuous percent body fat (\( p<0.001 \)) and marginally for discrete percent body fat.

For both continuous and discrete sedimentation rate, the overall unadjusted contrast was significant (\( p=0.002 \) and \( p=0.003 \), respectively). For the contrasts using continuous
sedimentation rate, the unknown versus background contrast was significant \( p=0.025 \) with the background category exceeding the unknown category. Both the low versus background contrast and the high versus background contrast were marginally significant with the high and low categories having higher mean sedimentation rates than background. For the discrete form of sedimentation rate, the low versus background and high versus background contrasts were significant \( p=0.018 \) and \( p=0.001 \), respectively) with both contrasts having estimated relative risks above 2.

The unadjusted analyses of self-perception of health, appearance of illness or distress at the physical examination, and relative age exhibited nonsignificant differences among the four current dioxin categories.

In the adjusted analysis of percent body fat, the overall contrast of the four current dioxin categories was significant \( p<0.001 \) for both the continuous and the discrete measure. The contrast for Ranch Hands of the unknown current dioxin category versus Comparisons of the background current dioxin category was significant with the Comparisons being higher \( p<0.001 \) for both continuous and discrete). In the analysis of percent body fat as a continuous variable, Ranch Hands in the high category significantly exceeded the background category of Comparisons \( p<0.001 \). The corresponding adjusted relative risk for discrete percent body fat was positive and marginally significant.

For sedimentation rate in continuous form, the adjusted analysis contained a significant interaction between categorized current dioxin and age. The interaction was investigated for study participants born in or after 1942 and those born prior to 1942. The younger and older groups displayed significant overall contrasts \( p=0.009 \) and \( p<0.001 \), respectively). For the younger participants, the unknown versus background contrast was marginally significant with the background category having the higher adjusted mean sedimentation rate, and the low versus background contrast was significant with the Ranch Hands in the low category having the higher adjusted mean sedimentation rate. For the older participants, the unknown versus background contrast was significant with background having the higher adjusted mean sedimentation rate, and the high versus background contrast was also significant with the Ranch Hands in the high category having the higher adjusted mean. A followup adjusted analysis of sedimentation rate without the interaction was performed. The analysis displayed a significant overall contrast \( p<0.001 \), a significant unknown versus background contrast \( p=0.007 \), a marginally significant low versus background contrast, and a significant high versus background contrast \( p=0.004 \). For the last two contrasts, the adjusted sedimentation rate means of the Ranch Hands exceeded the background Comparison group. For the unknown versus background contrast, Ranch Hands in the unknown category had a lower adjusted mean sedimentation rate. For the adjusted analysis of sedimentation rate as a discrete variable, the overall contrast of the four current dioxin categories was significant \( p<0.001 \), as was the low versus background contrast \( p=0.015 \), and the high versus background contrast \( p<0.001 \). These contrasts had adjusted relative risks above 2 and 3, respectively.

For relative age and self-perception of health, the adjusted analyses were not significant. For the appearance of illness or distress at the physical examination, there was a significant interaction between categorized current dioxin and age. Investigation of the interaction for younger and older study participants failed to display a significant overall
contrast. A followup adjusted model without the interaction with age exhibited no significant differences.

In the longitudinal analysis of self-perception of health, the percentages of participants who reported fair or poor health in 1987 differed significantly among the current dioxin categories (p=0.022), specifically between the high and background categories (p=0.070). The longitudinal analysis of sedimentation rate also demonstrated a significant difference in the percentages of abnormal rates in 1987 among the current dioxin categories (p=0.010). The low and high current dioxin categories had higher percentages than the background category (p=0.033 and p=0.002, respectively).

CONCLUSION

In general, percent body fat and sedimentation rate exhibited significant positive associations with initial dioxin. The other variables exhibited positive but nonsignificant associations with initial dioxin. The unadjusted and adjusted analyses of relative age exhibited significant interactions between current dioxin and time since tour. For Ranch Hands with 18.6 years or less since tour, the associations between relative age and current dioxin were positive and at least marginally significant for each analysis type and assumption. For the other variables, the current dioxin-by-time analyses generally displayed nonsignificant but positive associations with current dioxin. In general, the unadjusted and adjusted analyses for the four current dioxin categories exhibited overall significant contrasts for percent body fat and sedimentation rate and the high versus background contrast and the low versus background contrast were significant with the Ranch Hands exceeding Comparisons. The percent body fat results for the four current dioxin categories appear to display an increasing association with dioxin within the Ranch Hands (i.e., unknown, low, and high categories); however, the background category for Comparisons exceeds the unknown category for Ranch Hands.

The longitudinal analyses of self-perception of health demonstrated significant positive associations with initial dioxin and current dioxin. However, the percentage of participants who reported fair or poor health decreased by more than 50 percent from 1982 to 1987. In the longitudinal analyses of sedimentation rate, the percentages of abnormalities in 1987 differed significantly among the current dioxin categories.

In summary, with the exception of the sedimentation rate, the data analyzed in the current section failed to reveal any health detriment consequent to herbicide exposure or to the current body burden of dioxin.
CHAPTER 6

REFERENCES


