Dioxin correlate to % body fat

Dioxin (related) — word "related" — not necessary caused mean "association"

being systemic relate to % body fat

— correlated

Cholesterol ↑

HDL decrease ↓

10,000 ppt to cause chloracne at least.

All models increase in diabetics —

consistant with % body fat

Didn't you expect fat people to be higher in diabetics cholesterol, etc.

Assumpt that men with more fat absorbed more dioxin — doesn't seem physiologically valid

Don't blame high Dioxin on High fat

why blame diabetes on high dioxin rather than high fat

AIR FORCE HEALTH STUDY UPDATE

The Air Force released the fourth morbidity report in its Air Force Health Study, an investigation of the possible association between occupational exposure to Herbicide Orange (and its dioxin contaminant) and adverse health effects. This study examines the health of Air Force personnel who served in Operation Ranch Hand units in Vietnam from 1962 to 1971, and a comparison group who flew or maintained C-130 aircraft during the same time period. Previous reports on this epidemiological study focused on group contrasts between the Ranch Hand group and the comparisons. This report uses actual measures of dioxin present in the blood of study participants and is the first large-scale study to use accurate, individual dioxin measures. This is an important enhancement of the Air Force Health Study and supplements previous reports.

Of all the military personnel who served in the Republic of Vietnam, the Ranch Hand group is clearly the most highly exposed to herbicides and dioxin yet identified. The results of a collaborative study with the Centers for Disease Control (CDC) to measure the blood dioxin levels (serum assay) in the study participants found substantially elevated dioxin levels in many Ranch Hands as compared to low levels generally found in the comparisons and ground troops.

This report presents conclusions from statistical analyses of approximately 300 health-related indicators from 12 clinical areas: general health, malignancy, neurology, psychology, dermatology, hematology,

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endocrinology, immunology and the gastrointestinal, cardiovascular, renal and respiratory systems. The analyses focused on the health status and dioxin levels from 1,670 participants (880 Ranch Hands and 880 comparisons).

The analyses in this report detected significant associations between dioxin levels and lipid-related health indicators. In particular, diabetes and body fat were associated with dioxin levels. Cholesterol and other related serum lipid levels also were significantly associated with dioxin. Serum dioxin levels in the study participants were not related to systemic or skin cancers. There were no significant associations between dioxin and neurological disease, verified psychological problems, verified liver disease, heart disease, renal health and skin tests for immunity. There was a dioxin-related increase in the average blood pressure reading, but the percentage of participants with abnormally high blood pressure was not related to dioxin. The erythrocyte sedimentation rate, white blood cell count, platelet count and immunoglobulin A were associated with dioxin, suggesting the presence of a chronic, subtle reaction of the body to dioxin. Other health indicators such as the pulmonary function measurements and benign systemic neoplasms showed significant associations with dioxin that may be related to body fat. Approximately 75 percent of the benign systemic neoplasms were lipomas (fatty cysts under the skin).

The serum dioxin analyses also revealed a significant association between dioxin and decreased testicular size, but the importance of this observation is unclear since testosterone levels were normal or slightly elevated. Fertility and other reproductive outcomes will be assessed in a separate report later this year. Results of other health indicators revealed no consistent patterns within or across clinical areas indicative of a health detriment due to dioxin exposure.

These findings and their relationship to dioxin will be explored more fully in future examinations scheduled to take place in 1992, 1997 and 2002.

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exceeded 5 ppt for 742 of the Ranch Hands, and exceeded 10 ppt for 521 Ranch Hands. These two Ranch Hand groups are the maximal and minimal cohorts, described later in this chapter.

Of the 1,299 Comparisons who completed the 1987 physical examination, 1,198 had serum specimens analyzed by the CDC. Dioxin assay information on a randomly selected subset of 888 Comparisons was received from CDC by January 1990, at which time statistical analyses involving Comparison data began. Eighty-three of 887 Comparisons who completed the physical examination had a current dioxin level reported by CDC as not quantifiable. Therefore, 804 Comparisons were candidates for use in the statistical analyses.

An additional 314 Comparison dioxin assay results were subsequently received. Of these results, 311 were based on Comparisons who had completed the physical examination and 3 were reanalyses of specimens of 3 Comparisons who completed the examination but whose dioxin was indeterminant.

In general, higher serum dioxin levels showed no consistent evidence to indicated that dioxin was associated with following diseases: skin cancer, systemic cancer, liver diseases, cardiovascular diseases, renal disease, immunologic disorders, psychological conditions or neurological diseases.

The serum dioxin analyses in this report detected significant associations with lipid related health indices. In particular, diabetes and body fat were associated positively with dioxin. However, ~~almost all other dioxin scientific~~ studies have not shown a relationship between dioxin exposure ~~and diabetes~~. Cholesterol, high-density lipoprotein (HDL), cholesterol-HDL ration, and 2-hour postprandial glucose also were associated significantly with dioxin. Erythrocyte sedimentation rate, white blood cell count, platelet count, and IgA were positively associated with dioxin, suggesting the presence of a chronic dose-related inflammatory response. Other variables, such as the

spirometric indices in the pulmonary assessment and benign systemic neoplasms in the malignancy assessment showed significant associations with dioxin that may be related to body fat (approximately 75% of the benign neoplasms (non-cancerous growths) in Ranch Hands and 70% in Comparisons were lipomas). The serum dioxin analyses also revealed a significant positive association between dioxin and decreased testicular size, but the importance of this finding is unclear (fertility and other reproductive outcomes will be assessed in a separate report). Results for other variables revealed no consistent pattern within or across clinical areas, indicative of a health detriment due to dioxin exposure.

In summary, many of the findings in this report reveal a consistent relationship between dioxin and lipid related disorders (e.g. body fat, diabetes, glucose intolerance). Whether dioxin causes these observed effects directly or is a step in an extended causal pathway cannot be determined from this study. Additional analyses following the next physical examination scheduled for 1992 may help resolve this question.

Draft Jack, Dr Lathrop

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During the conduct of the 1987 physical examination, the Air Force initiated a collaborative study with the Centers for Disease control (CDC) to measure dioxin levels in the serum of Ranch Hands and comparisons. The purpose of this report is to perform a thorough statistical evaluation to assess dose-response relationships between various measures of dioxin and approximately 300 health-related endpoints in 12 clinical areas. The statistical analyses associated with the serum data will evaluate the association between a specified health endpoint and dioxin among the Ranch Hands, as well as contrast the health of various categories of Ranch Hands having differing serum dioxin levels with the health of Comparisons having background levels of dioxin in their blood. The analysis of dose-response relationships based on serum assays provides an important enhancement over the previous AFHS investigations. This research is the first large-scale study of dose-response effects based on an accurate measurement of current dioxin. The results of this study supplement the findings of previous AFHS reports, which have focused on group contrasts between exposed and unexposed cohorts, rather than on the dose-response relationships in this report.

Of the 995 Ranch Hands who were fully compliant to the 1987 physical examination, 932 had serum specimens analyzed by the CDC; 64 of these 932 specimens were reported by CDC as not quantifiable by the analytical method. Two of the 932 participants provided blood but were not part of the 1987 examination. The Ranch Hand participants used for the statistical analyses of the serum data excluded the 66 Ranch Hands specified above. Thus, the serum levels of the remaining 866 Ranch Hands were candidates for evaluating the association between health status and level of dioxin. Current dioxin levels