borns "require further evaluation," particularly because the data have not yet been objectively verified.

The incidence of two illnesses frequently associated—one uncertainly, the other less ambiguously—with workplace exposure to dioxin was not elevated among the Ranch Hand veterans. They are, respectively, soft tissue sarcoma, a rare form of cancer, and chloracne, a skin rash. The absence of chloracne can be interpreted as meaning that exposure to dioxin in the Ranch Hand group was relatively low compared to chemical workers who have been exposed to large amounts of dioxin, for example, after industrial accidents, the report notes.

The absence of soft tissue sarcomas in the Ranch Hand group may not be particularly illuminating for anyone's case. Arguments about dioxin's role in causing such cancers have seesawed, with the strongest evidence for the connection coming from two epidemiologic studies done in Sweden. In the United States, the National Institute of Occupational Safety and Health (NIOSH) is undertaking a large study of this question. But meanwhile, there is growing doubt about the available data connecting dioxin exposure with the incidence of this cancer. For example, NIOSH epidemiologist Marilyn Fingerhut and her collaborators recently concluded that several reported cases of the disease, previously attributed to workplace exposure to dioxin, do not fit that picture. Thus, it may be no surprise that the Ranch Hand group has had no incidence of soft tissue sarcoma to date—and also does not fit that possibly spurious picture. Moreover, the size of the Ranch Hand group, the rarity of this type of cancer, and the time it takes to develop could help explain why it has not been observed in the group.

If an unelevated incidence of particular cancers in the Ranch Hand group is possibly irrelevant to the dioxin debate and therefore not wholly reassuring, the group's assortment of "statistically significant" physical and psychological "irregularities" is more worrisome. For example, Representative Thomas A. Daschle (D–S.D.), who is sponsoring legislation on behalf of veterans who were exposed to herbicides in Vietnam, calls the evidence for disorders in fertility (that is, neonatal deaths and minor birth defects), skin cancer, and liver function "disconcerting." He is planning to request that the Congressional Office of Technology Assessment review the Ranch Hand findings and prepare an independent interpretation of them.

Ellen Silbergeld, a scientist with the Environmental Defense Fund, is more sharply critical of the Ranch Hand findings, calling them "extraordinary and alarming." She, too, points to the unusually high incidence of infant mortality and of minor birth defects among the children of the Ranch Hand group, but also notes that the neuropsychiatric profiles of the men in the Ranch Hand group show an "abnormal pattern." These are "not new things, but a number of the effects are consistent with the animal toxicity and occupational data."

"It's no secret the Air Force has a vested interest in giving these guys [the Ranch Handers] a clean bill of health," says one congressional critic who follows this issue closely but requested anonymity. "I'm not saying the study is biased, but the framing of conclusions is subjective in epidemiology. Whenever they [the study's authors] found bad health effects—especially the birth defects—they did not do a good job of following up. But when they found none, they made sure that was verified. . . . We deserve more answers."

Judging from the many studies of dioxin that are either under way or planned, there will be many more answers, or partial answers, to sift through in the years ahead. Some of them will be coming from the Ranch Hand group, which is slated to undergo additional tests next year and then in 5-year intervals over the next two decades.

—JEFFREY L. FOX

VA to Study Twins

The Veterans Administration (VA) is planning a study of twin veterans in the first in-depth attempt to characterize the psychological, psychosocial, and health effects of service in the Vietnam War.

According to a VA official, the plan, designed by the VA Medical Center in St. Louis, should offer a "powerful tool" for looking at the overall effects of the war experience, as well as a contribution to future attempts to quantify hereditary and environmental contributions to disease.

According to investigators the study, conducted with the Hines VA Hospital in Chicago, will set up a register of about 10,000 pairs of identical and fraternal twins, two-thirds of whom served in Vietnam. Six hundred pairs will be brought to St. Louis for extensive examination. They will be divided into three groups—one in which both twins saw combat, one in which neither did, and one in which one did. The core focus will be on pairs of monozygotic twins in which one saw combat. Whether to add dizygotic twins to the group has not yet been decided.

Psychologist John Leavitt points out that other psychological studies of vets have been in clinical settings but the twins provide a "god-given random sample" of veterans, many of whom have never sought medical or psychiatric help for possible service-related problems.

Of particular interest is the prevalence of "post-traumatic stress disorder," characterized by flashbacks, emotional numbness, and various other disturbances. Some people claim this is especially prevalent among veterans of Vietnam. There are no data from other wars to test the assertion, although there is anecdotal evidence that some World War II veterans suffer from the syndrome to this day.

Although the numbers are relatively small, investigators say they also expect to be able to gain meaningful information on the effects of exposure to the herbicide Agent Orange because of the statistical advantage conferred by comparing twins. However, the design of the study is currently being reassessed in light of the latest findings of the Air Force Agent Orange project (see story on page 1156).

Vietnam is probably the most studied war in human history, epidemiologically speaking. The Australians have done an Agent Orange study on birth defects among children of vets (they found no increased risk); a similar investigation of Americans is under way at the Centers for Disease Control. The CDC is also doing a study of the long-term health effects of military service, including Agent Orange exposure, on 30,000 veterans. At the VA, a survey on posttraumatic stress disorder is being conducted by the Readjustment Counselling Program. Finally, the agency is completing a study of 60,000 Vietnam veterans who have died from noncombat-related causes to see if vets are dying at a higher rate than the general population.

—CONSTANCE HOLDEN