

Chapter I

BACKGROUND

In January 1962, President John F. Kennedy approved a program to aeri-ally disseminate herbicides in the Republic of Vietnam (RVN). This program, code named Ranch Hand, was conducted in support of tactical military operations and had 2 missions: defoliation and crop destruction. During the 9-year duration of the operation, approximately 19 million gallons of herbicides were sprayed on an estimated 10-20% of South Vietnam (Young, 1978; Buckingham, 1982). Of the 6 herbicides used, Herbicide Orange was the primary defoliant, and approxi-mately 11 million gallons were dispersed. Because of the controversial nature of the mission and enemy propaganda which raised political sensitivity to chemical warfare charges, the Ranch Hand operation was subjected to intense scrutiny from the start. Initial concerns were focused on the military, polit-ical, and ecological ramifications of the spray operations (Buckingham, 1982). Since 1977, the issue has shifted to a health concern. Numerous U.S. military personnel from all services have claimed exposure to herbicides, particularly Herbicide Orange and its dioxin contaminant, during their duty in the RVN. These possible exposures, coupled with claims of attributable adverse health, have resulted in class action litigation and substantial controversy within the Government, Veterans' groups, the scientific community, and the public.

The U.S. Air Force Medical Service expressed its concern for the health of Air Force personnel exposed to herbicides in October 1978, when the Deputy Surgeon General, Major General Garth M. Dettinger, told the U.S. House of Rep-resentatives' Veterans Affairs Committee that the USAF would evaluate the health of Ranch Hand personnel. An epidemiologic study design was prepared by the USAF School of Aerospace Medicine to meet this commitment. Following extensive peer review, a final study protocol was published, (Lathrop, Wolfe, Albanese, Moynahan, 1982) and the epidemiologic study was initiated.

Since 1978, numerous governmental agencies, universities, and industrial firms have planned or launched additional animal and human studies. An immedi-ate scientific issue was identified in these studies, specifically, the charac-teristics of the RVN exposure. Succinctly, these questions are: (1) Who was exposed to which herbicide? (2) By what means can these individuals be accurately identified for study? (3) How much, or to what degree, were they exposed (route of administration, influence of personal hygiene measure, etc.)? These areas merit careful consideration because the process of population or exposure estimation may generate substantial misclassification errors that would call for inordinate sample sizes in a contemplated study. Government and civilian scientists and the Congress have recently inquired of the Air Force Health Study as to whether it might clarify the exposure controversy in ground personnel. The answer is a qualified yes.

The dose-response principle suggests that if the Ranch Hand population was more exposed to herbicides and dioxin than ground personnel, then the Ranch Handers should manifest stronger and/or earlier indications of adverse health, if they have occurred or will occur in the future. This principle is con-strained by statistical power but, as noted in Chapter VII, the Ranch Hand

morbidity study has substantial power in some clinical areas. The fact is that the average Ranch Hand was substantially exposed to the herbicides and dioxin (relative to other military personnel in RVN) on almost a daily occupational basis. Exposure calculations have estimated that an average Ranch Hand in his tour received, at a minimum, 1000 times more exposure to Herbicide Orange than would an average unclothed man, standing in an open field directly beneath a spraying aircraft. Unfortunately, the relative degree of Ranch Hand exposure vis-a-vis ground personnel has been consistently undervalued, and even reversed by various advocacy groups and the media.

It is our firm belief that the Ranch Hand population is the most herbicide-exposed military cohort to have served in the RVN. The fact of the unequivocal exposure in a totally ascertained population, when matched to an equally clear-cut nonexposed cohort, provides as ideal an epidemiologic setting as possible from a wartime environment. Findings of adverse health, or lack thereof, in the Ranch Hand group should serve as a significant epidemiologic pointer to the health effects issue in exposed ground personnel.

STUDY DESIGN

This study uses a matched cohort design in a nonconcurrent prospective setting, incorporating mortality, morbidity, and follow-up studies. A detailed population ascertainment process has identified 1269 Ranch Hand personnel who served in the RVN during the period 1962-1971. A comparison group was formed by identifying all individuals assigned to selected Air Force organizational units with a mission of flying cargo to, from, and in the RVN during the same period. Complete details on the selection of the comparison population are cited in the study protocol. By a computerized nearest neighbor selection process, up to 10 comparison individuals were matched to each Ranch Hand by job category, race, and age to the closest month of birth. An average of 8.2 comparison individuals for each Ranch Hand were determined by record review to be fully suitable for study. From each matched comparison set, 5 individuals were randomly selected for the mortality study (1:5 design). Results of the Mortality Study were released to the public on 30 June 1983. Each living Ranch Hand and the first living member of his comparison set were selected to participate in a morbidity study consisting of an in-home interview and a comprehensive physical examination. Data collection for both the questionnaire and physical examination was accomplished by contract. The follow-up study consists of mortality and morbidity components. Every Ranch Hand and his set of comparisons will be the subjects of annual mortality updates for the next 20 years, so that any emerging mortality patterns or disease clusters may be detected with maximal sensitivity. In addition, follow-up questionnaires and physical examinations will be offered to all participants in subsequent years 3, 5, 10, 15, and 20, in order to bracket the latency periods associated with possible attributable disease.