DISSERTATION

EVALUATION OF A RISK REDUCTION PROGRAM AMONG MIGRANT AND SEASONAL FARMWORKERS IN COLORADO

Submitted by

Martha Soledad Vela Acosta

Department Environmental Health

In partial fulfillment of the requirements

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Bell & Howell Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY MARTHA SOLEDAD VELA ACOSTA ENTITLED EVALUATION OF A RISK REDUCTION PROGRAM AMONG MIGRANT AND SEASONAL FARM WORKERS IN COLORADO BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Committee on Graduate Work

Cathy Kennedy

Paul Ayers

Advisor

Co-Advisor

Department Head/Director

ABSTRACT

EVALUATION OF A RISK REDUCTION PROGRAM AMONG MIGRANT AND SEASONAL FARMWORKERS IN COLORADO

Migrant and seasonal farmworkers perform much of the hand labor required by growers in the United States. Although they perform essential work in producing food for the country, they are one of America's most underserved and understudied populations. This low socioeconomic population has limited access to health care, and suffers from numerous other conditions that increase their risk of developing work related injuries and illnesses. Of major concern is their exposure to agricultural chemicals. High Plains Intermountain Center for Agricultural Health and Safety (HI-CAHS) has implemented programs to reduce farmworkers' risks. A recently developed pesticide risk reduction program is in effect to reduce exposures among migrant and seasonal farmworkers. This program surpasses the Worker Protection Standard (WPS) criteria required by the Environmental Protection Agency (EPA).

The specific aim of this study was to evaluate the effectiveness of pesticide safety training/awareness provided by HI-CAHS to migrant and seasonal farmworkers. The criteria for the effectiveness of pesticide risk reduction program was (1) increase in pesticide

knowledge, (2) improvement in safety risk perception, and (3) observed behaviors (audits) related to pesticide safety ($p<0.05$).

This theory-based investigation was used to evaluate the effectiveness of the HI-CAHS program through a group interview process. This process measured the improvement in (1) pesticide knowledge, (2) pesticide safety risk perception, and (3) pesticide safety behavior (per safety audit). Migrant farmworkers' attitudes and beliefs associated with the risk reduction pesticide program were evaluated using the multidimensional health locus of control (MHLC) and the Stages of Change Model. Four pesticide safety behaviors were evaluated using the Stages of Change Model. An experimental study of 152 migrant and seasonal farmworkers employed in Adams and Weld County, Colorado was conducted. A nonequivalent pre-test-post-test control group design was used to evaluate the efficacy of the pesticide safety training provided.

Results indicated that the pesticide training provided by HI-CAHS led to greater migrant farmworker safety risk perception ($p<0.05$) and pesticide safety knowledge ($p<0.05$). Migrant workers tended to believe that control of their health status was in the hands of powerful others or chance. Of those migrant farmworkers, 67% scored with less than 25 for Internal Health Locus of Control (IHLC). Only 5% of the farmworkers scored less than 20 for Powerful Others Health Locus of Control (PHLC), and 15% had a score equal to or less than 16 for Chance Health Locus of Control (CHLC). Significant associations were found between the MHLC and the Stages of Change model ($p<0.05$). The Stages of Change model was instrumental in the evaluation of the safety behaviors in the pesticide risk reduction program. Safety audits reflected a high number of ergonomic hazards. The work environment, including field and housing conditions for the migrant and seasonal farmworkers, was in urgent need of improvement. Safe drinking water and compliance with housing and field regulations needed to be addressed.

Martha Soledad Vela Acosta
Department of Environmental Health
Colorado State University
Fort Collins, CO 80523-1681
Summer 1999

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DEDICATION

This research is dedicated to the memory of my father, Juan Javier Vela Fuerte, and my grandparents: Cosme Fuerte, Maria Orozco, Teódula Fuerte and Juana Torres Uribe who inspired me to achieved a higher education.

> *"Hay que hacer que el trabajo asuma el aspecto de descanso y hasta de juego, para recuperar su amor. Que sea una forma de conversación. Y que la conversación cobre intensidad, hondura, precisión y perfección de obra de arte para que sea trabajo"*
>
> *Gabriela Mistral*

TABLE OF CONTENTS

TABLE OF CONTENTS (Con't.)

Page

TABLE OF CONTENTS (Con't.)

TABLE OF CONTENTS (Con't.)

LIST OF TABLES

LIST OF TABLES (Con't.)

LIST OF TABLES (Con't.)

LIST OF TABLES (Con't.)

LIST OF TABLES (Con't.)

LIST OF TABLES (Con't.)

LIST OF FIGURES

LIST OF APPENDICES

Appendix II Page

1.0 INTRODUCTION

Agricultural production depends on the influx of seasonal labor at critical periods in crop development (National Advisory Council on Migrant Health, 1993). Migrant and seasonal farmworkers provide this labor. Over the last decade more than 85% of the fruits and vegetables produced in the US were hand harvested and/or cultivated (Oliveira et al., 1993) by these farmworkers. Eliminating the need for these farmworkers or switching to less labor intensive crops has been shown to have a negative impact on regions by reducing the number of jobs available to permanent local residents (Sills et al., 1993).

In describing where migrant farmworkers come from and where they move to, reference is made to three United States (US) "streams." In the Eastern Stream, farmworkers come primarily from Florida, Puerto Rico, and Haiti moving North into the Atlantic Seaboard. Hispanics dominate the Midwestern Stream where farmworkers migrate from the Texas and Mexico area into the states of Michigan, Ohio, Iowa, Nebraska, the Dakotas, Illinois, Indiana, Wisconsin, New Mexico, Arizona, Colorado, Wyoming, and Montana. The same Texas and Mexico area also feeds migrants into the Western Stream states of California, Idaho, Oregon and Washington (McMullen Jager, 1996 &Trotter, 1998).

Migrant farmworkers perform stoop labor, work with the soil, climb onto farm equipment, and carry heavy loads. Migrant farmworkers work long hours to accommodate the crops. They also have direct contact with the plants. The plants and the soil are frequently treated with pesticides and chemical fertilizers. Some plants, such as tobacco and strawberries, exude chemicals that are toxic to humans that can cause severe allergic reactions such as contact dermatitis. When safe water is not available for drinking and washing, farmworkers utilize irrigation ditches and runoff ponds. Such water is contaminated by pesticides, chemical fertilizers, and organic wastes. Drinking and bathing in such water exposes farmworkers to potentially harmful chemicals, and also to water borne parasites (Farmworker Health, 1998).

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) gave EPA the authority to develop the Worker Protection Standard (WPS). Since April 15, 1994, regulatory agencies enforce all the requirements of the 1992 Worker Protection Standard (Code of Federal Regulations, Environmental Protection Agency's 1992 Worker Protection Agency, Title 40, Part 170) when pesticide product labeling refers to the Worker Protection Standard (WPS). The WPS is a Federal regulation issued by the United States (US) Environmental Protection Agency (EPA). It is designed to protect agricultural workers (people involved in the production of agricultural plants) and pesticide handlers (people mixing, loading, applying pesticides, or doing other tasks involving direct contact with pesticides (EPA, 1993)). The WPS covers pesticides that are used in the production of agricultural plants on farms, forests, nurseries, and greenhouses. The WPS requires that the farmer take steps to reduce the risk of pesticide-related illness and injury if they use such pesticides, or employ workers or pesticide handlers who are exposed to such pesticides (EPA, 1993).

The High Plains Intermountain Center for Agricultural Health and Safety (HI-CAHS) provides WPS education to the migrant and seasonal farmworkers in Northern Colorado. Since 1996 a bi-cultural and bilingual approach has been taken. Migrant farmworkers are recipients of this education in small groups at their workplace or their homes. They receive instruction followed by a question-answer session that addresses the specific concerns of the participants. Until now, this innovative pesticide risk reduction program had not been evaluated.

The theoretical basis underlying the intervention has important implications for the evaluation. Linked to theory is the conceptualization and design of the program or intervention (Babbie, 1986). Overall goals and objectives are formulated based on program design, and specific goals are operationalized in the context of evaluation research in order to make them measurable. The High Plains Intermountain Center for Agricultural Health and Safety (HI-CAHS) pesticide risk reduction program was developed with both overall objectives and specific goals. The components of the evaluation use them as a testable hypotheses. Other investigators have stressed the importance of incorporating program conceptualization and design in evaluation research (Vojtecky et al., 1986). Also intertwined with the theoretical basis for the intervention, are the measurable outcomes used in the program evaluation. Using established theories to explain changes that are probably due to the program, it is possible to create operational definitions of concepts that lead to measurements that can be applied in the evaluation process.

In consultation with the EPA Region IX Office of Pesticides, HI-CAHS Agricultural and Occupational Health Specialists and various state and community service organizations, the study of migrant farmworkers in Colorado was assessed through farmworker interviews and safety audits relative to the effectiveness of the pesticide risk reduction program in Northern Colorado in the summer 1998 season. Specifically, this study investigated the effectiveness of the pesticide risk reduction program in raising pesticide knowledge and safety risk perception among migrant farmworkers served by HI-CAHS. Another purpose of this study included evaluation of the association between pesticide knowledge and safety risk perception and the Stages of Change Model and Health Locus of Control orientation among migrant and seasonal farmworkers. The effectiveness of the pesticide risk reduction program was measured in terms of the improvement in pesticide knowledge, safety risk perception (SRP) and pesticide safety behavior. Effectiveness was evaluated in the experimental and the control group on the basis of (1) pesticide knowledge, (2) perceived safety risk perception, and (3) farmworker behavior. The attitudes and beliefs on the migrant farmworkers' safety behavior were reevaluated after the pesticide risk reduction program in order to measure the effect of the pesticide risk reduction program by Health Locus of Control and Stages of Change Model.

2.0 LITERATURE REVIEW

Agriculture is among the three most dangerous occupations in the nation (U.S. General Accounting Office, 1992). Farm labor exposure to weather, pesticides, and dangerous equipment are all common. Falls, heat stress, dehydration and pesticide poisoning occur frequently. However, agriculture is not subject to the same safety legislation that protects workers in other industries (Wilk, 1986). It is estimated that each year three to five million of these workers leave homes with their families to follow the crops. Agricultural labor requirements vary greatly between phases of planting, cultivating, harvesting, and processing. These farmworkers are critical to the production of a extensive variety of crops in almost every state of the country. Agricultural production in the United States (US) in fruits and vegetables alone, is a multi-billion dollar industry.

Agriculture and mining are the two most dangerous occupations in the country (Farmworker Health, 1998). The occupational hazards and high rate of injury associated with the agricultural industry are well documented. Agricultural workers suffer disproportionately (in number of injuries, illnesses, and deaths) to labor in other occupations. There is increasing evidence to support that this population is at a higher risk for developing cancer, allergies, skin disorders, reproductive disorders, and stress-related mental disorders (Reif et al., 1989). Pesticides are a group of chemicals used predominantly in agriculture and against vectors in vector borne diseases such as malaria, etc. There are several definitions of a pesticide; the Food and Agriculture Organization of the United Nations (FAO) defines a pesticide as any substance or mixture of substances intended for preventing, destroying or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animals causing harm during otherwise interfering with the production, processing, storage or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs or which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies (Food and Agriculture Organization of the United Nations, 1986). It has been hypothesized that for an number of these diseases (especially cancer), pesticide exposure is the leading cause for these increased risks (Jeyaratnam, 1990).

2.1 Migrant and Seasonal Farmworkers, A Population at Risk

Agriculture is one of the most accident-prone industries in the United States. The occupational fatality rate in the agricultural industry is very high (23.9 per 100,000) compared to the private sector industry's (4.3 per 100,000 full-time employees). In 1991 there were estimated 4.2 million migrant and seasonal farmworkers. "Migrant farmworker" refers to agricultural labor as it travels from one location to another to harvest and process crops. Migrant seasonal farmworkers do not migrate but do agirucltural work on a seasonal basis (McMullen Jager, 1996).

The Migrant Health Branch, Division of Community and Migrant Health, Bureau of Primary health care has estimated that 85% percent of the migrant and seasonal farmworkers are composed of ethnic and racial minorities, with Latinos. The Latinos include Mexican-Americans as well as Mexicans, Puerto Ricans, Cubans, and workers from Central and South America. The Wall Street Journal reported in 1986 that there where two million migrants in the US, including 150,000 mostly (80%) Mexican Americans in Florida (June 26, 1986, p.1) (Martin, 1988). Nearly 80% of farmworkers in Colorado speak Spanish only (Colorado Migrant Program, 1986). Some parts of American agricultural industry rely heavily on undocumented workers, but most migrant farmworkers are either American citizens or are working in the country legally (Mines et al., 1991). The whole nation benefits from migrant and seasonal farmworkers' labor. They are hardworking people doing the best they can to make a better life for themselves and their children. They are proud of who they are and what they do.

Migrant farmworkers are persons who leave their home and stay away from their normal residence overnight to do farmwork for wages. Migrant farmworkers are a enormous national resource that are often taken for granted. Some studies show that immigrants generate more in tax revenue than they consume in public assistance. Farmworkers rarely have access to workers compensation, occupational rehabilitation, or disability benefits (National Advisory Council on Migrant Health, 1993). Although many migrant workers fit the eligibility profile for Medicaid and the Food Stamp Program, very few are able to secure these benefits. After a lifetime of work, many farmworkers are unable to claim Social Security benefits. As for illegal immigrants, they are simply not eligible to receive most forms of public assistance (National Advisory Council on Migrant Health, 1993).

2.1.1 Housing Conditions

Farmworker housing has often been substandard or non-existent. Over the last decade, much this housing was demolished but not replaced. Farmworkers must move frequently to seek employment. If labor camp housing is not available, they are often unable to find or afford housing. As a result, many farmworkers camp in the open or sleep in their vehicles (National Advisory Council on Migrant Health, 1993). A region's economic output has been shown to increase as a result of building farmworker housing. New jobs are created for the local residents. (Sills, 1993).

Farmworkers need decent, affordable housing in order to perform their seasonal work. The number of farmworkers that need housing exceeds the number of available housing units. According to the 1980 national data on housing for hired farmworkers only 30% were able to secure affordable housing (Farmworker Health, 1998). Hired farmworkers, particularly migrants, also face obstacles in securing housing on the local market. Small rural communities may not have enough units available, or these units may be unavailable to migrant farmworkers who cannot pay deposits, pass credit checks, or make long-term rental commitments.

Agricultural employers recognize that the lack of housing for their workers is a serious problem, but these growers have no incentive to provide such housing. Construction and maintenance of housing is expensive, especially if the housing is only occupied during the harvest season. Typically, employers have provided temporary housing (labor camps). The private housing that is available to migrant workers tends to be inexpensive and substandard (Farmworker Health, 1998). Private housing is not subject to federal regulation. Although some hired farmworkers live in well-maintained housing, much of the available housing is deficient, crowded, and unsanitary. In addition, farmworkers often lack safe drinking water, bathing or laundry facilities, and adequate sanitation (Farmworker Health, 1998).

A 1987 report described environmental conditions for farmworkers as poor. The report cites farmworker housing generally as (1) decayed or non-existent, (2) infested with insects and rodents, and (3) supplied inadequately with water or with water of poor quality. (Of this housing, 35% lacked inside running water in eight major agricultural labor states, California, Florida, Texas, Washington, Colorado, Michigan, New York, and Ohio). In the fields, inadequate wastewater disposal facilities were common (Report of Environmental Work Group,1987).

Other hazards contributed to work accidents. Environmentally-related illnesses are difficult to diagnose and under-reported (Farmworker Health, 1998). In 1988, 48% out of 100,000 agricultural workers died of work-related unintentional injuries, compared to the national industrial average of nine workers per 100,000 (Farmworker Health, 1998). Few employers provided minimal toilet facilities in the field for farmworkers.

2.1.2 Migrant Worker Health and Social Services

Migrant farmworkers have a Third World health status, although they live and work in one of the richest nations on earth (Dever, 1991). Generally, the public does not believe that the same unsanitary housing and working conditions that threaten the health of the farmworker are also a threat to society. These unsanitary housing and working conditions are a threat to the general public. Many factors preclude the migrant farmworker from public consideration, situating them on the margins of society through logistic barriers to access to social services and cost effective primary health care. Those factors are poverty, relocation, illiteracy, language barriers, and cultural and economic pressures. Combined, these factors make the farmworkers reluctant to miss work as they are not protected by sick leave, and they are unwilling to risk being fired for any reason. The farmworkers postpone health care unless their condition becomes so severe that they cannot work. At this point, many farmworkers must rely on expensive emergency room care. Migrant health centers provide accessible care for farmworkers, but existing centers have the capacity to serve fewer than 20% of the nation's farmworkers (National Advisory Council on Migrant Health, 1993).

Some health concerns are clearly attributable to the occupational hazards of farm work. Dermatitis and respiratory problems caused by natural fungi, dusts, and pesticides are common. Lack of safe drinking water contributes to dehydration and heat stroke. The absence of toilet facilities leads to urinary retention, which is in turn linked to urinary tract infection. Farmworkers suffer such infections more often than the general population. Conditions such as tuberculosis, diabetes, cancer, and immunodeficiency virus (HIV), which require careful monitoring and frequent treatment, pose a special problem for farmworkers who must relocate frequently. As a predominantly Hispanic population, farmworkers are particularly vulnerable to diabetes (McMullen Jager, 1996). The incidence of hypertension is significantly associated with occupational class and transition.

Epidemiological studies support the view that psychosocial stress contributes to differences in blood pressure. Employment security and other work conditions play a pivotal role. The absence of decision-making latitude on the job, as experienced by farmworkers, has been shown to be directly associated with the risk of cardiovascular disease and elevated blood pressure. Depression is common among farmworker adults. where it is often related to isolation, economic hardship, and weather conditions. In addition, poverty, stress, mobility, and lack of recreational opportunities make farmworkers especially vulnerable to substance abuse. Migrant workers do not generally earn enough to pay for health care, and they almost never have health insurance. They may also lack transportation to the clinic. Since they do not receive sick leave, they are afraid of losing wages or even losing their jobs if they take time off to seek health care. The U.S. Public Health Service funds some migrant health centers to help provide care to farmworkers, but not nearly enough to meet the need. Follow-up care and continuity of care for chronic conditions are serious problems. Mobile units are an effective means of reaching isolated clients, but too few health centers have the resources to establish mobile programs. Health care planners and providers, as well as migrant farmworkers themselves, have to be very creative in order to ensure good health options. (Farmworker Health, 1998).

The lack of information and awareness among health professionals and policy makers regarding the issue of migrant and seasonal farmworker health occurs for a number of reasons. First, the migratory nature of the population makes individuals and families less likely appear in vital statistics registries. Second, fear of the Immigration and Naturalization Service and the many other agencies regulating agricultural employers, along with possible adverse consequences from employers, leads to an under reporting of hazardous conditions in fields and in migrant camps. Cultural differences influence both the perception of risk and the consequences of changing behavior to reduce the risks of exposure to pesticides.

Programs that target reducing the occupational risks faced by migrant and seasonal farmworkers must consider the socioeconomic, cultural, and behavioral factors that are unique to this population. Although the EPA Worker Protection Standard regulations require that workers receive training in a language they understand, the cultural differences in learning, risk perception, and stages of behavior change have not been addressed. The goal of this research study is to consider a number of these important factors in their effect on behavior change in a group of migrant and seasonal farmworkers who receive pesticide risk reduction program.

2.1.3 Occupational Health and Safety

Farm labor is seasonal and intensive. Planting, thinning, and harvesting are not year-round activities. However, they are crucial to crop production, and the time frame in which they must occur is determined by the seasons and the weather. Failure to perform any of these activities at the appropriate time can result in a lost crop. The urgency to accomplish tasks according to nature's timetable compels farmworkers to work in the fields in all seasons and in all weather conditions, including extreme heat, cold, rain, intense sunlight, and dampness (Farmworker Health, 1998). Environmental Protection Agency's 1992 Worker Protection Agency and the Occupational Safety Health Administration (OSHA) regulations require that agricultural employers who have eleven or more workers to provide drinking water, hand washing facilities, and toilets for their employees (Code of Federal Regulations, Environmental Protection Agency's 1992

Worker Protection Agency, Title 40, Part 170). Farms with ten or fewer employees are exempt from penalties for their failure to comply with these requirements. This avoids placing an undue financial burden on small farms. As a result, basic needs are not required by law for many farmworkers, regardless of the conditions or hours they must work in the fields. (Farmworker Health, 1998).

Enforcement of these regulations is poor. In 1990 OSHA found field sanitation violations in 69 percent of its field inspections. The fact that OSHA can afford to inspect only a small portion of the establishments that are subject to the law raises questions as to the actual magnitude of non-compliance. A recent North Carolina survey found that only 4% of farmworkers surveyed had access to drinking water, hand washing facilities, and toilets (Farmworker Health, 1998).

The U.S. Office of Technology Assessment (OTA) estimated that 2.7 million migrant farmworkers are regularly exposed to doses of pesticides which could produce significant acute or chronic health problems (U.S. Office of Technology Assessment, 1990). Field conditions for migrant and seasonal farmworkers, provide them little opportunity to wash pesticides from their skin or clothing in order to minimize toxic absorption. This may intensify pesticide exposure. Additionally, many seasonal and migrant workers live in camps next to the fields where there is the potential for exposure from pesticides in the dust and soil. Despite the magnitude of the problem of pesticide exposure in this population, efforts have been limited to implementing programs that reduce pesticide related risks in this important population of workers.

The Environmental Protection Agency (EPA) estimates that 300,000 farmworkers suffer acute pesticide poisoning each year (U.S. General Accounting Office, 1992) .

Anecdotal reports from clinicians indicate that many cases of pesticide poisoning are unreported because patients do not seek treatment, or are mis-diagnosed because the symptoms of pesticide poisoning can resemble those of a viral infection. A 1988 study of 460 hired farmworkers in Washington state found that 89% did not know the name of a single pesticide to which they had been exposed, and 76% had never received any information on appropriate protection measures.

In regard to pesticides, both OSHA and the EPA have laws which apply to migrant and seasonal farmworkers. However, because of possible jurisdictional problems, and because of the overlap in the regulations, OSHA has deferred to the EPA Worker Protection Standard. In 1983 the EPA determined that the Worker Protection Standard provided insufficient protection to farmworkers and needed revision. The revised standard that was scheduled to go into effect in 1994 was deferred until 1995. The EPA has recognized the need to protect agricultural workers from pesticides, and has revised its Worker Protection Standard (Farmworker Health, 1998).

Pesticides must be registered for specific uses by the EPA. The agency considers the economic, social, environmental risks, along the benefits of specific pesticides before issuing the registration. Unfortunately, the vast majority of the data the EPA uses to make its determinations is provided by the pesticide manufacturers. Data on older pesticides is considered incomplete by modern scientific standards, and the health effects of these substances are not fully understood (Farmworker Health, 1998).

2.1.4 Migrant and Seasonal Farm Workers in Colorado

In 1992, the Dept of Agriculture reported that Colorado has 50% of its land in farms (27,152 acres). There are an estimated 20,000 migrant and 29,000 seasonal farmworkers in Colorado. Of these workers 98% are Hispanic with a very high percentage (85%) speaking Spanish only (Colorado Migrant Health Program, 1986). In 1985, the average migrant farmworker earned only $3,295 per year (Rust, 1990). Over 20% of the migrant farmworker's family income is $7,500 per year with 58% of all households in migrant home base areas having an income lower than the nationally defined poverty levels, compared with only 1.4% nationally (Oliveira, 1993). This low socioeconomic status indirectly contributes to prolonged exposure to agricultural chemicals as residential facilities for showering and clothes washing may not be readily available.

In addition, nearly one third of the migrant farmworkers surveyed in a 1989 study reported that they did not have enough to eat during the past year (Farmworker Health, 1998). Up to 78% of all farmworkers suffer from parasitic infection compared to 2-3% of the general population (Farmworker Health, 1998). These factors contribute to an increased risk of disease related to toxic chemical exposures for the migrant and seasonal workers and their families being at (Moses, 1993; Maizlish, 1990). For example, the infant death rate is 17% of the farmworker women compared to 9% in the general Colorado population (Horton, 1993), and child mortality in the United Sates (US) migrant population is 1.6 times higher than average (Slesinger, 1986). Many agricultural employees do not report the wages of farm labor. As a result, if the farmworder becomes disabled or reaches retirement age, they are often unable to draw Social Security benefits.

The Colorado Migrant Education Program estimated that 97 % of the migrant and seasonal farmworkers are Latinos living in a State with only 3% of Hispanic population (Anonymous, 1995). The report from the migrant schools in Colorado stated that the average age of the migrant farm workers was 31, with an average family size of 6.2 (38% having 7 or more members) and 74% of the workers were married (Anonymous, 1995). The average grade completed for the migrant farmworkers was 6th grade with a drop out rate for migrant students higher than 50%. Of the migrant farmworkers, 80% spoke Spanish only, 50% were not literate in Spanish.

Most of the migrant farmworkers are below the poverty level with 46% earning $5,000 or less annually. Of that population, 82% earn $9,000 or less annually, and 90% earn $11,000 or less annually. Of the females, 17% of the farmworkers older than 35 reported one infant death (Anonymous, 1995).

In 1994, the Migrant Health Program in Colorado conducted a self reported survey in 1,469 migrant and seasonal farmworkers who had been provided with health services (McMullen Jager, 1996). Of this population, 30% faced occupational risks that included hospitalizations and operations, some of which were due to occupational injuries. Pesticide exposures were reported in 10% of the sample with a statistical difference between the reported response of males and females. Of the migrant farm workers, 36% reported using alcohol and 27% reported smoking. Behavioral problems included domestic violence (5%), fights (4%), multiple sexual partners (5%) and stress (11%). Additional findings included poor housing and field conditions (McMullen Jager, 1996). There are a variety of factors involved in the health and safety of this population.

For example, high blood pressure was reported in 10% and diabetes in 5%. Overall. good health was deficient in areas such as preventive care.

Some of the factors to consider are education and cultural diversity, since differences in reporting were noticed not only by gender but also between migrant and seasonal workers. It is important to mention that the Colorado Migrant Health Program does not limit their services to immigration status (McMullen Jager, 1996). Migrant farmworkers were a young population from 20-50 years old. From the total of 43.8% of female farmworkers, about 20 % of the sample consisted of females migrant and 20 % migrant seasonal (Figure 2.1). Of the males in this sample, 46% reported their home to be Mexico, and 13 % of those were females. Of the males, 34% reported Colorado as their home, and 17.5% reported Texas as their home (McMullen Jager, 1996). In 1994 the Salud Clinic and HI-CAHS conducted a study among migrant and seasonal farmworkers and found positive Tuberculosis skin tests in 24% of the 213 migrant and seasonal farmworkers with two positive clinical Tuberculosis cases (HI-CAHS, 1998).

2.2 Preliminary Studies and Current Activities Colorado State University and the High Plains Intermountain Center for Agricultural Health and Safety (HI-CAHS)

Colorado State University (CSU) is uniquely positioned to carry out this research project. CSU has a long history of interaction with the agricultural community as the major Land Grant University in the Rocky Mountain region. CSU also has a well developed Cooperative Extension program. In addition, CSU has excelled in the development of research and scholarly activity designated as a Carnegie Class 1 Research Institution with an annual extramural research budget of more than $100 million . The

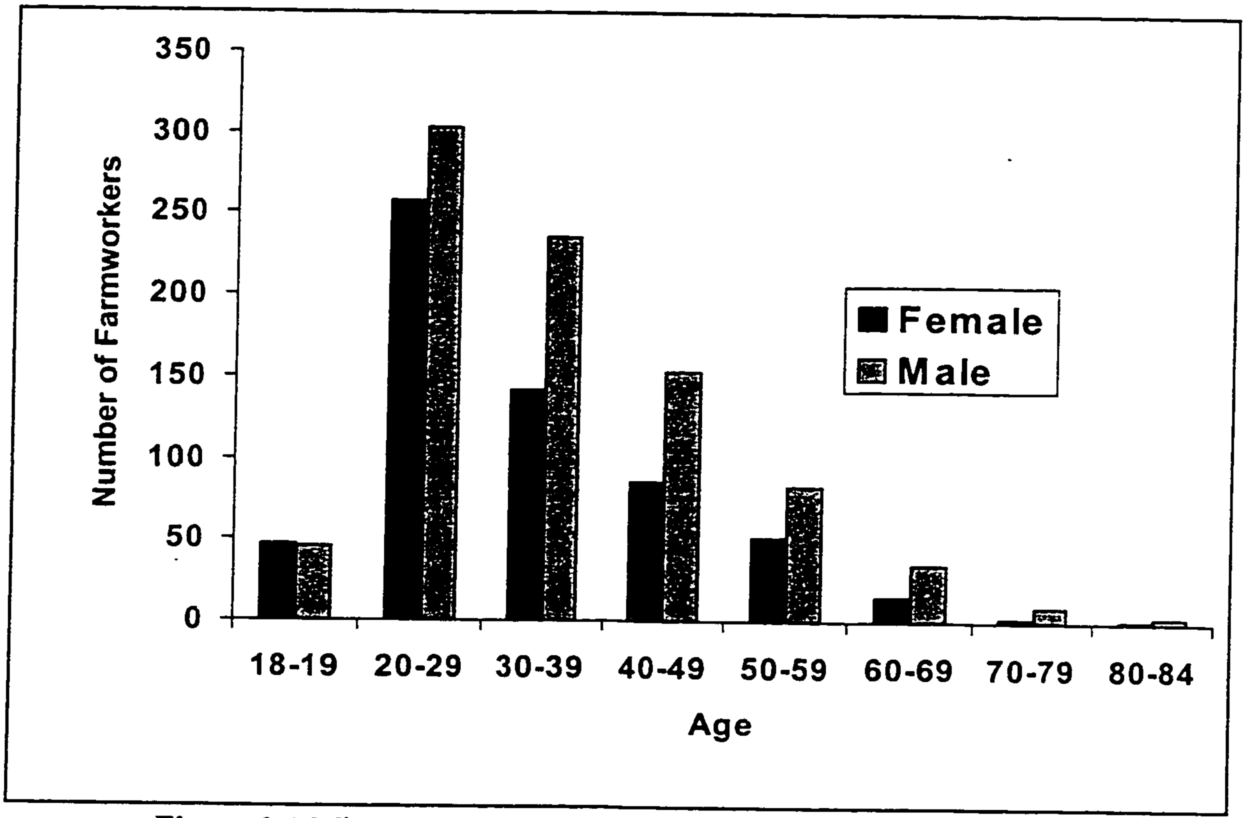

Figure 2.1 Migrant and Seasonal Farmworkers by Age and Gender (McMullen Jager, 1996).

Institute of Rural Environmental Health (IREH) has played a role in development of education, research, and public service targeting rural environmental health problems (Rottersman, 1997; Criswell, 1997; Catlett, 1998). The IREH was founded at Colorado State University with sponsorship from the W. K. Kellogg Foundation in 1969. The program quickly grew with the formation of the academic Department of Environmental Health in 1987 and the formation of the High Plains Inter-mountain Center for Agricultural Health and Safety (HI-CAHS) in 1991.

The HI-CAHS program is one of seven NIOSH national centers for agricultural health and safety. The cornerstone for HI-CAHS funding is NIOSH, however, support is also provided by the Occupational Safety and Health Administration (OSHA) and the

Environmental Protection Agency (EPA). This unique collaboration of three agencies has enabled HI-CAHS to have a tremendous impact on agricultural health and safety in the Rocky Mountain west and the high plains. One mission of HI-CAHS is to prevent disease, injury, disability, and death of agricultural workers due to work related hazards, and to promote the general well-being of those engaged in agriculture. This is accomplished through a growing network of farmers, ranchers, agribusinesses, and Colorado State University Cooperative Extension. The effort is multi-disciplinary including education, engineering, medicine, industrial hygiene, social work, safety, epidemiology, toxicology, general environmental health, and agricultural sciences.

Investigators at HI-CAHS conducted an extensive needs assessment survey in 1993 to identify health and safety concerns and to determine the most appropriate intervention methods to reduce the hazards of pesticide exposure among migrant workers. Service and outreach education programs were developed that included: (1) the production of instruction videos and written training materials; (2) the implementation of training programs on chemical safety and general agricultural safety, (3) training on the use of personal protective equipment, and (4) the provision of on-site health and safety services.

Expertise in the area of pesticide safety allowed HI-CAHS to form a collaborative arrangement with the EPA to develop and implement a train-the-trainer program in accordance with the Worker Protection Standard. In its first year, several train-the-trainer programs were conducted throughout Colorado and Wyoming. In the second year, in addition to providing on-site training, a six hour interactive satellite broadcast resulted in over 300 individuals receiving training, that then enabled them to become trainers under the Worker Protection Standard. Training sessions meeting the requirements of the Worker Protection Standard continue to be offered by HI-CAHS in many areas of the western United States.

The Program Assessment and Resource Development (PARD) Unit of HI-CAHS provides a range of evaluation services both to programs within HI-CAHS and to organizations outside of HI-CAHS committed to the prevention of agricultural injury and disease. A summary of a major evaluation study conducted in 1995-1996 is summarized below (HI-CAHS, 1998).

HI-CAHS provided numerous "Train the Trainer" education sessions in 1994 and 1995 to help inform the agricultural communities in Colorado and Wyoming about the requirements of the EPA's Worker Protection Standards for Agricultural Chemicals (WPS). PARD staff contacted a sample of course participants one to two years later and asked them to evaluate the training based upon the usefulness of the presented information and resource materials, and on the extent of any additional training by the EPA designated trainers. More than three-quarters of the respondents had used the information presented in the training within their agricultural professions, and all of the EPA prepared resource materials were judged useful by the respondents. Almost 50% of the participants had provided training to others in their work sites or communities, with a median of 10 additional persons trained per trainer. Workshops, newsletters, and media releases by Cooperative Extension, agricultural chemical dealers, and HI-CAHS were identified as preferred sources of information concerning agricultural chemical safety. Participants also provided feedback as to what chemical safety issues are emerging as the most challenging for the agricultural community. Continued and targeted advice on how to best comply with the WPS and a growing need for culturally appropriate training materials for Spanish-language field workers were identified as areas of concern among the respondents.

2.2.1 Current HI-CAHS Training Efforts Affecting Migrant and Seasonal Workers

Migrant and seasonal farmworkers work throughout the country. Very often, they receive inadequate training. Consequently, they may not be able to avoid hazards on the job. This workforce is racially and culturally diverse. Many of them do not speak English, and any training they do receive may be ineffective because of the language and cultural difference between the trainer and the trainees.

The WPS protect workers in various ways. Agricultural employers must give their workers pesticide safety training, provide them with notice of when fields where they work will be sprayed, instruct workers on when entry into freshly treated fields is restricted, and provide farmworkers with protective equipment and decontamination supplies (EPA, 1993).

HI-CAHS has implemented a pesticide risk reduction program delivered by a bi-cultural and bilingual health and safety professional. The HI-CAHS pesticide risk reduction program consists of showing the 20 minute video entitled "Pesticide Worker Protection" designed by the National Migrant Resource Program. This video is followed by a thirty minute interactive session using a flip-chart, designed by the EPA for the WPS. This part of the pesticide risk reduction program, provided by a bi-cultural and bilingual trainer, includes a question-answer session that addresses any incidents related to pesticide safety experienced by the participants. To facilitate transfer of learning, the instructor asks individuals how the ideas discussed in the session may be applied to the work they do. In addition, each participant receives a booklet (English or Spanish) designed by the EPA for the WPS. This is a self explanatory handbook reviewing the main topics of the pesticide safety education. This program offers a innovative way of reaching workers by incorporating cultural factors and sensitivity to the language barriers into the pesticide risk reduction program.

Some of the important messages of the pesticide risk reduction program based in the WPS training criteria are:

- Where and in what forms pesticides may be encountered during work activities.
- Routes through which pesticides can enter the body.
- Signs and symptoms of common pesticide poisoning.
- Emergency first aid for pesticide injuries or poisonings.
- How to obtain emergency medical care.
- Routine and emergency decontamination procedures, including emergency eye flushing techniques.
- Warnings from pesticide residues on clothing.
- Wearing work clothing that protect the body from pesticide residues.
- Washing/Showering with soap and water, shampooing hair and putting on clean clothes after work
- Warning about taking pesticides or pesticide containers home.
- Warnings about how pesticides help to control pests but cause injury and illness in workers.

- Warnings about how pesticides may harm workers in many ways, sometimes after many months or years following initial exposure.
- Warnings about how pesticides may be on or in plants, soil, irrigation water, or drifting from nearby applications (all plants and soils should be considered as contaminated with pesticides)
- Warnings about following directions and/or signs to keep out of treated or restricted areas.
- Warnings about washing before eating, drinking, using chewing gum or tobacco, or using the toilet
- Warnings about washing immediately with the nearest clean water if pesticides are spilled or sprayed on the body.
- An explanation of the WPS requirements designed to protect workers, including application and entry restrictions, posting of warning signs, oral warnings, and availability of specific information about applications.

Bilingual and bi-cultural pesticide safety pesticide risk reduction program sessions have been provided since 1996. The current HI-CAHS activities targeted toward migrant and seasonal farmworkers has had an impact based on formative evaluations. HI-CAHS identification with migrant workers likely improves learning outcomes as one investigation comparing professional safety trainers with peer trainers found peer trainers were most effective in eliciting behavior change (Kurtz et al., 1997). Additionally, the results of studies conducted in Latin America indicated that a highly successful pesticide risk reduction program model for farmworkers combined audio or audio visual material with facilitator discussion (Greishop et al., 1988). The HI-CAHS pesticide risk reduction program is based upon this model.

2.3 Theoretical Basis of the Evaluation

It is desirable to evaluate any educational program using scientific data. Program evaluation has two principle purposes: 1) to improve organizational operation relative to its organizational operation, planning process, structure, decision-making procedures, personnel, physical facilities, finances, recruitment, training, public relations, and administrative management; and 2) to improve the program relative to its objectives, clientele, methods and techniques (Knowles, 1980).

Easterby-Smith & Mackness (1994) suggested that evaluations should be more than just a reaction sheet; the instructor needs to close the loop on learning. Evaluations are not a good investment of time unless the issue of whose purposes are being served is clarified. Many health and safety programs are introduced with inadequate attention to evaluation (Vojtecky et al., 1986). Given limited funding for health and injury prevention programs, rigorous evaluation is needed to find out what works and how it works (Stone, 1996). In order to conduct a scientifically rigorous program evaluation, a number of methodological issues must be addressed. The primary issue is related to the underlying theoretical basis of the intervention (Grasso, 1996), as theory based evaluation research has the greatest potential to support inferences regarding the overall efficacy of a program (Schulte et al., 1996).

The HI-CAHS pesticide risk reduction program was developed using sound principles of education theory (Beaudin et al., 1997), but its effectiveness has not been evaluated. Although, the pesticide risk reduction program offers a unique and innovative way to train migrant farm workers, the population of workers is difficult to access for pesticide risk reduction program, more specifically for purposes of conducting research. Pesticide safety training, when it is provided, is usually conducted by the grower or foreman. The farmworers watch a video during working hours, when weather is not optimal for working in the fields (i.e., when it is raining). The HI-CAHS pesticide risk reduction program used a bi-cultural approach. If a video was used, the session was followed by presentation of safety key points by a dynamic interaction between the instructor and the participants. This educational approach reveals the importance of the bilingual and bi-cultural factor in pesticide risk reduction program migrant farm workers.

In order to effectively evaluate the HI-CAHS program, it is important to establish a theoretical basis for both the intervention and methods of evaluation. Like many interventions, the HI-CAHS pesticide risk reduction program has its ultimate goal to not only "teach" workers to be safe, but also "persuade" them to be safe. These ultimate goals were examined in this investigation, in terms of underlying theories related to attitudes and beliefs, risk perception, and an individual's stage in the behavior change process.

Attitudes and beliefs are perhaps the most crucial impediment to safety, and may hold the key to improving safe working behaviors. The farm working population has long believed that their lifestyle is wholesome and healthy–a belief that has lead to a feeling of invincibility, discouraging the use of protective equipment and measures (Ehlers et al., 1993). Risk perception plays an important role especially for pesticides, as the risk is removed from exposure in time, and the magnitude of the risk is unknown.

Traditional safety training, which relies on passive methods such as didactic lectures, may result in increased knowledge but have little effect on attitudes, beliefs, and individuals' perception of risk. Whereas, increased knowledge does not correlate with improved safety, attitude, and behavior found to be related to safety outcomes (Dedobbeleer et al., 1987). That is, in addition to encouraging farmworkers' to identify their attitudes and risk perceptions that are not conducive to safety, attempts to educate alone are misdirected. In a review of the theoretical models related to workplace self-protective behavior, the Trans-theoretical and Stages of Change models are presented as exemplary of those that focus on the process of behavior change (DeJoy, 1996). Further, it has been suggested that program education and other interventions must be tailored to an individual's stage in the behavior change process to be truly effective (Prochaska, 1995; Prochaska et al., 1993).

2.4 Stages of Change Model

Stage-state models are relatively common in many areas of program study (Rog et al., 1997). The mass education campaign using public-service posters, buses, or television spots, have been used to promote some desirable behavior, such as safe sex, low-fat diet, saying no to drugs (Rog et al., 1997). The stages of change assumed to be induced by such programs are so well known that the model has given a name the KAB (knowledge, attitude, behavior) or KAP (knowledge, attitude, practice) model (Figure 2.2).

In the KAB model, the media campaign is presumed to increase knowledge, which in turn affects attitude, behavioral intentions and finally actual behavior (Rog et al.,

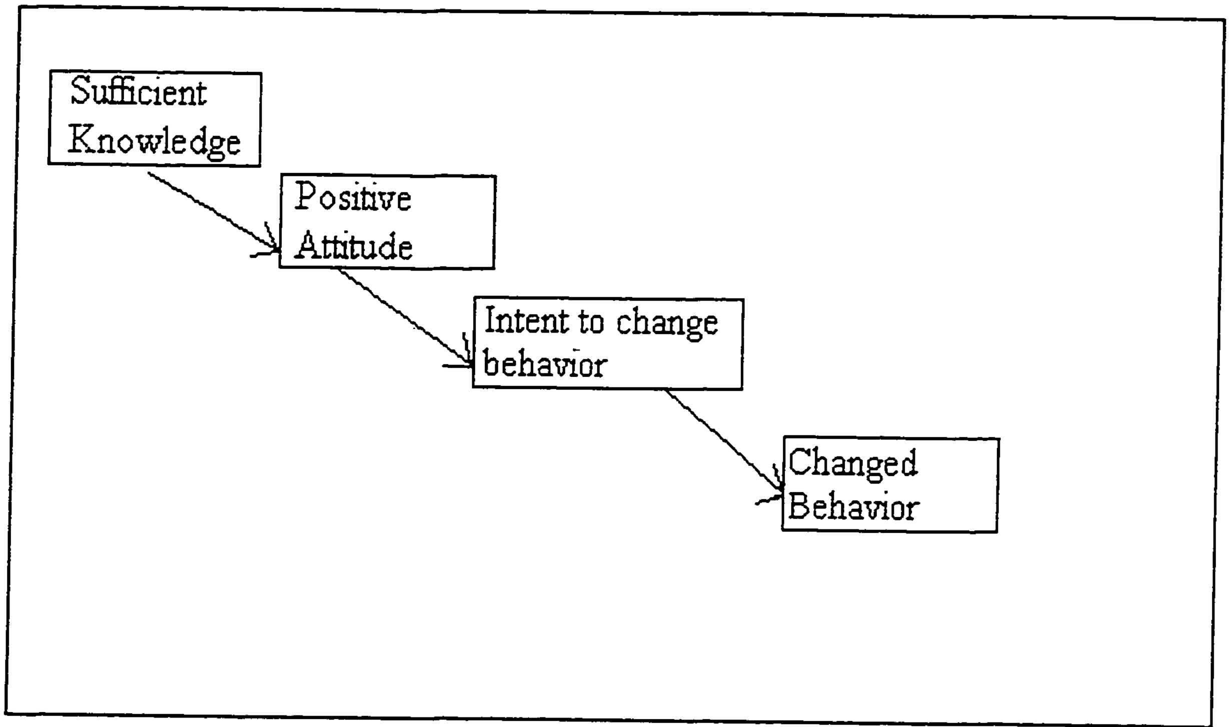

Figure 2.2 The Knowledge Attitude Behavior (KAB) Model

1997). At each stage, we have two simple stages, that is an individual either has or does not have minimally sufficient knowledge, has or doesn't have sufficiently positive attitudes. Because the KAB model has some generality as a model for a variety of distinct programs, it provides a small example of what intervention theory might look like (Rog et al., 1997). Unfortunately, it is not an encouraging model because ample evidence indicates that rather little change in behavior results from this particular intervention approach (Rog et al., 1997).

Recently, research involving health behavior change and health promotion has taken a turn. Health promotion is an art and a science directed at improving lifestyles that foster optimal health, which is balanced across the physical, social, emotional, spiritual and intellectual dimensions of life (Herrick et al., 1997). Optimal health is comprised of multiple lifestyle behaviors. Examining the interactions of these behaviors, healthy and unhealthy, is a crucial step in broadening the knowledge base for designing effective health and safety programs. The Trans-theoretical Model of Change presented by Prochaska and DiClemente (Prochaska et al., 1983; Prochaska et al., 1985) offers a comprehensive framework with which to view health related behaviors (Herrick et al., 1997). The Stage of Change Model has been derived from the Trans-theoretical Model of Change and has become widely adopted as the accepted model for understanding the process of change. By studying individuals attempting to change a health behavior, Prochaska and DiClemente (Prochaska et al., 1985) identified six stages most commonly endured: precontemplation, contemplation, preparation, action, maintenance and termination (Figure 2.3).

These stages were developed in part by examining self-changers, as this has been the majority group of those successful in behavior change. Additionally, the independent variables of change process can be applied by trainers and educators attempting to modify health behaviors through the development and implementation of programs that focus on the adoption of safe behaviors. Learning how to motivate people to change a health or safety-related behavior is becoming an important area of research.

2.4.1 Description of Stages of Change

<u>Precontemplation</u>

Individuals who have no interest in information about change are in the Precontemplation Stage (Conn,1994). Their attitude is that benefits to changing do not outweigh the costs. There is no contemplation about changing the behavior in question.

Often, people in this stage feel they have no control over whether or not a behavior change will take place (Conn, 1994; Prochaska et al., 1992; Prochaska, 1995).

Contemplation

This stage consist of considering seriously changing a health behavior, typically within the next six months (Prochaska, 1995). Active gathering of information is seen here (Conn, 1994). These individuals are more aware than pre-contemplators of the advantages of changing. People in this stage typically express an interest in changing within the next few months (Prochaska, 1995).

Preparation

The individuals begin activities to prepare them for change. These individuals are seriously considering a change within the next month and typically have a plan, in addition to a high anxiety about failure (Prochaska, 1995). At this stage, individuals may initiate small steps toward the overall desired behavior change.

Action

This stage is the most demanding of the six (Prochaska, 1995). Individuals are aware that it is a stage where relapse tends to be the rule, not the exception (Prochaska, 1995). During this time, active methods are employed to accomplish change. Behavioral and cognitive strategies are key to this stage to interrupt previous habits and facilitate new behaviors (Conn, 1994). Active use of these strategies takes place for weeks to months to prevent relapse. Prochaska (1995) concluded that the action stage can last six months or more.

Maintenance

After approximately six months, a person enters the maintenance phase of this model. Though actively changing behavior, thoughts about changing are not in the forefront of the individual's awareness. However, effort must still be put forth to maintain the change and avoid relapse. The individual remains in this stage until there is no temptation to return to the undesired behavior. It is here that the new health behavior is integrated into their lifestyle. At this point, the individual feels a high level of confidence in their health behavior change.

Termination

This stage is the ultimate goal for all behavior changers. The former undesired behavior no longer presents any threat or temptation. One has complete confidence that he/she can cope without fear of relapse (Prochaska et al., 1994). This holds true without continuing effort on the individual's part. A permanent health behavior has been made.

Relapse

The Relapse Stage occurs when the individual completes the Stages of Change Model and then returns to it. Behavior change cannot be addressed without addressing relapse. Relapse is more common than a linear progression through the first stages (Prochaska et al., 1992). Stages of Change Model can be characterized as cyclical.

Individuals may relapse from any stage. Relapse, however, does not place a person at square one. It is important not to view relapse as a failure as is often done. Relapse is a learning experience which aids the process of change. Prochaska & Diclemente (1992) have documented situations where relapse occurs at least once before the desired change is achieved. Individuals experiencing relapse provide valuable information about effective and ineffective intervention strategies for handling relapse. Figure 2.3 displays the connection between the first five stages of change and how they relate to relapse.

The Stages of Change Model was originally presented by Prochaska and DiClemente (Prochaska et al., 1983) as a general model of intentional behavior change. An important attribute of this model is that it encompasses both behavior and behavioral intention (Marcus et al., 1994). These stages can provide structure for understanding chronic behavioral risk factors. Another strength of the Stages of Change Model is its dynamic nature. This suggests that health behavior change is not an all-or-nothing phenomenon; that those who lapse can get a fresh start. The model has utility in both the design of intervention programs and the prediction of who will succeed in achieving and maintaining the desired behavior.

Application of the Stages of Change Model has been rare outside of the field of health promotion. However, since workers must endure such a change process to adopt safe work practices, the model is applicable to the field of occupational health and safety (DeJoy, 1996). The health professional's goal is that the safety health behaviors become permanently achieved by the workers. This goal is similar to the goal in health promotion. The programs in health promotion (i.e., exercise) are ongoing (or long term) similar to the traditional safety training program. There is no specific safety behavior evaluation model for the safety training programs. The model provides adequate means by which to measure health behavior change, and these were utilized in this investigation. Although it is premature to develop new pesticide safety intervention based on the Stages of Change Model, the evaluation of workers' stages of change before and after the pesticide risk reduction program provided valuable data for the future design of such an intervention. The Stages of Change Model, along with the processes and interventions applicable to each stage reveal the complexity of health behavior change. Understanding these stages and processes of change leads to the development of effective interventions. The time and effort spent on examining the Stages of Change Model, processes of health behavior change and appropriate interventions is justified by the vast potential for improvement in health.

The Prochaska model has been used in behavioral change in a long term program (versus one time intervention). The WPS is required for farmworkers once every five years (EPA, 1993). The application of this model in a one-time exposure of the migrant farmworkers to the pesticide educational program is the first step towards evaluating the one-time intervention programs in the adoption of changes in of safety behavior of the workers. The effect of the WPS should be evaluated, since it is assumed to provide continuous improvement, for at least five years to the migrant farmworker. Continuous improvement demands proper evaluation that will need to include: a) the level of performance targeted by the pesticide risk reduction program (intervention); b) use measures for the three dimensions of safety improvement — environment, behavior, and worker factors; c) apply the process measures periodically over the long term, especially checks on environmental conditions and work practices (Geller, 1996). On the other hand, continuous evaluation will provide information supporting that long-term program may be a better option to be effective for the WPS for migrant and seasonal farmworkers.

2.4.2 Determining Stage of Change

Prochaska and DiClemente (Prochaska et al., 1992) conclude that stage assessment is fairly straight-forward. As a general guideline, it is possible to determine one's position by asking several short questions:

1. Are you thinking of changing this behavior in the next six months?

   Yes: go on to next question   No: **Precontemplation**

2. Are you planning to change this behavior in the next month?

   Yes: go on to next question   No: **Contemplation**

3. Have you taken any steps to initiate the change?

   Yes: go on to next question   No: **Preparation**

4. How long have you been keeping up with this change?

   0-6 months: **Action**   >6 months: **Maintenance**

   (>5 years: **Termination**, Permanent Change)

Once the stage has been identified, the appropriate process of change can be applied. From this point, interventions can be constructed and employed.The purpose of the inclusion of Stages of Change in this study was to investigate the effectiveness of applying the Stages of Change Model in pesticide knowledge and safety risk perception to the changes in pesticide safety behavior among migrant and seasonal farmworkers.

2.4.3 The Stages of Change Applied to Health and Safety

The stages of change along with change processes involve motivation. Motivation has been described as, "that which is within" (Bass, 1991). There must be an initiative to stimulate action. The health professional's goal is to influence but not control this initiative. This initiative may start when personal needs are threatened. For example, the migrant farmworkers who experienced symptoms of exposure to a pesticide(s) might believed that they needed to protect themselves (and their families) from further pesticide exposure. The pesticide symptoms represent the threat which induces action. If there is no threat or perceived threat, it is difficult to see an incentive to change. The health professional's job is to inspire motivation, attempting to change the mental processes that lead to action, not so much focusing on the action itself (Turjanica, 1996). In order to achieve that change, a full understanding of each stage and process is imperative. It is important to evaluate if the model of stages of change originally designed for addictive behaviors, then adapted to healthy behaviors can be instrumental in changing health and safety behaviors.

The current focus of the Worker Protection Standard (WPS) training is to insure farmworker protection from pesticides. The first step in worker protection is to encourage the workers to take action in the interest of their own safety. The WPS presents specific safety behaviors to the farmworker. Some of the safety behaviors include personal hygiene and wearing adequate clothing. Personal protection includes wearing adequate clothing while working in the fields. The farmworker 'model' used for illustrative purposes in the video, flipchart, and pamphlets is wearing a long sleeve shirt, long pants, hat, shoes, and gloves. Four behaviors were chosen to evaluate the stages of change in this study: wearing a long sleeve shirt, wearing long pants, washing hands before eating and before using the portable potty, and separating working clothes before washing them while the migrant farmworkers were working in the fields (Appendix I, Questionnaires).

2.5 Multidimensional Health Locus of Control

Preventive medicine has become a prominent health model, since preventive health behaviors have proven to reduce risk of disease (Kist-Kline et al., 1989). Improved health is evidenced when individuals take responsibility for their own health. Many theories have been developed that explain what will influence an individual to change health behavior (Kist-Kline et al., 1989). Health Locus of Control (HLC) has been used to predict the potential for adopting healthy habits. Health Locus of Control (HLC) is a personality model demonstrated to be successful in predicting individual behavior in an variety of life conditions (Kennedy et. al., 1999). The theoretical perspective of HLC is based on Rotter's social learning theory (Wallston et al., 1978). According to this theory, persons with an orientation toward an external control believe that they depend in their environment. They are less likely to use available resources to avoid problems (Wallston et al., 1978). Persons with an orientation toward an internal locus of control believe they can master or alter their environment, assuming an active approach to avoiding problems (Wallston et al., 1978).

Wallston et al., (1976) developed a scale to predict specific health behaviors from health beliefs. This scale incorporated a Likert-type format with eleven items: six externally and five internally-oriented items yield only a generalized measure of

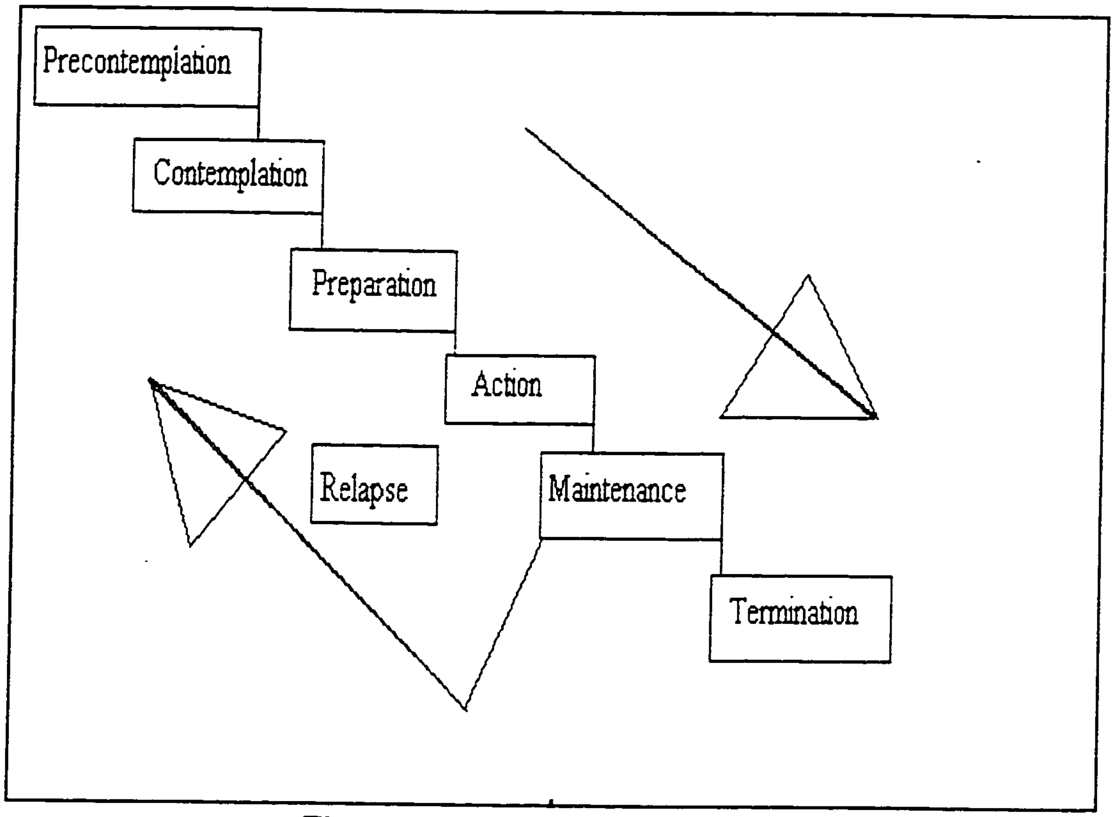

Figure 2.3 Stages of Change Model

expectancy or beliefs about behavior (Wallston et al., 1976). Wallston et al., then reviewed this scale to provide a more specific measure of expectancy and adjusted the original HLC to be multidimensional in nature (Wallston et al., 1978).

The Multidimensional Health Locus of Control (MHLC) scale consists of three components. Internal: An individual's capacity to influence her/his own health (IHCL); Powerful Others: The extent to which doctors and nurses and others affect health (PHLC); and Chance: The idea that health is merely an effect of luck or fate (CHLC). Each of these dimensions has six items and is scored separately (Wallston et al., 1978). Zindler-Wernet et. al. (1987) discussed the concepts of 'pure internals' as possibly contributing to positive changes. Pure Internals were defined as those individuals scoring not only high on an internality scale, but also possessing minimal beliefs in powerful others or chance. The purity of internality appears to be a factor regarding behavior just as scoring high on internality using the single measure scales provides better predictions of behavior (Zindler-Wernet et. al.,1987). Pure or high internals are more likely to take steps to better themselves and engage in healthier lifestyles (Wallston et al., 1978). This also is evident in the fact that weight loss, smoking cessation, use of birth control, and adoption of other preventive behaviors is more prevalent in individuals perceiving themselves as being in control and possessing minimal beliefs in powerful others and chance (Kist-Kline et al., 1989). Research has indicated that individuals with internal control orientation demonstrated health promoting behaviors because they feel responsible for their health outcomes, while individuals with external control orientation attribute their health status to luck, chance fate or powerful others and do not take an active role in controlling their health (Ansbaugh et. al., 1994; Zindler-Wernett et al., 1987).

Research in health promotion has focused mostly in white middle-class male professionals (Duffy et al., 1996). Limited studies have been given to agricultural populations, and to migrant and seasonal farm workers in particular. Nevertheless, Mexican-Americans represent almost 20 million of the population, making them the second largest racial/ethnic group in the United States (U.S. Bureau of the Census, 1989). In the past 5 years, several health promotion studies have been conducted in Spanish-speaking subjects (Duffy et al., 1996). Kerr and Ritchey (1990) reported that the concept of health-promoting lifestyle, as measured by the Spanish version of the Health-Promoting Lifestyle Profile (HPLP), appeared to be culturally relevant to a sample of 62 Mexican American migrant farmworkers (Walker et al., 1990).

A study among English-speaking workers was performed in the self-actualization. exercise, and stress management subscales of the HPLP. Spanish speaking and English-speaking migrant workers' total and subscale HPLP scores were compared to those of a group of 438 non-Hispanic, middle-class Midwesterners (Walker et al., 1988) and found to be lower. Kuster and Fong (1993) found that age, education, income, length of residence in the United States and perceived health status correlated significantly and positively with the Spanish HPLP total and subscale orientations, with age most highly correlated with the total score. Older respondents reported engaging in a greater number of health promoting self actualizing, health responsible, stress management, and nutrition behaviors.

The Health Belief Model predicts that an individual will be more likely to get involved in protective behavior if that person believes the following:

(a) the problem is serious, noxious, or entails a significant amount of loss (either through pain, loss of life, physical impairment or other debilitating conditions)

(b) the person feels susceptible or likely to encounter the problem

(c) the recommend course of action or protective response is effective in enabling him to protect himself from these problems (Beck, 1983).

Self-efficacy or one's perceived ability to perform the protective course of action correctly has been described as an important factor in determining the individual's performance in the protective response (Bandura, 1977; Becker et al., 1974). Individuals with low expectations of self-efficacy (personal competence) are prone to believe that they are inadequate or unable to perform the protective action, regardless of their beliefs in the benefits of such actions, the seriousness of the situation, or their susceptibility to the problem (Beck, 1983)

There is an interest in the health behaviors of the ethnic minorities in the United States. A population of almost 4 million migrant and seasonal farm workers mainly of Hispanic origin participate in agricultural activities every year (Dever, 1991). The rates of ill-health and death among the minority ethnic groups are different from those of the white population for diseases such as cancer, heart disease and diabetes. There is a need to address the health requirements of the ethnic minority groups, and to address health education in a culturally sensitive fashion (Writhtson et al., 1997). Minority workers are not empty receptacles waiting to be filled with health and safety information. They have their own values and beliefs, and these may have important implications for occupational health and safety policies (Writhtson et al., 1997).

One prominent aspect of Latino cultures is a belief in predestination or fate. Fatalism has been noted as a barrier to behavior change (Writhtson et al., 1997). Accidents are perceived by the population as acts of fate, as something predestined by God and thus unavoidable. When we examined the Spanish language, catching a cold is expresses as 'to me a cold has come' that is the cold has caught me. This is similar for Hindu cultures. This belief implies that the person with the cold has no control over their health status (Sissons et al., 1991).

The multidimensional health locus of control (MHLC) scale developed from Rotter's social learning theory, is a measure of the perceptions in how an individual's health is controlled by their own behavior (internally), by powerful others or by chance, that is, external factors over which they have little or no control (Rotter, 1966; Wallston et al., 1978). The concept of the health locus of control (HLC) has implications for health education and promotion, in that people who perceive their health as internally controlled are more likely to take action to influence their health status. That is, they are more likely to take part in preventative health behaviors (Writhtson et al., 1997).

Health behavior is defined as behavior undertaken to promote or protect health (Brown et al., 1986). What do we know about health behavior among the Latino population? There is information that specific habits are linked to specific health problems, as smoking is linked to lung cancer, and we have some understanding of why individuals undertake specific health behaviors (Brown et al., 1986). However, what determines if a worker to adopts a safer behavior learned from a pesticide risk reduction program? Are the workers who believe they are in charge of their own health (HLC internal) more likely to adopt a new safe behavior than the workers who believe others have control over their health? The health locus of control has not been evaluated with migrant farm worker populations. There has been no assessment in exploring the relationship between the health locus of control and safety behavior.

Some research has been carried out in the United States among Latinos using the locus of control scale. The findings in these studies have been inconclusive. Some finds have suggested that Latinos are more external than other (American) populations, while others have suggested that they are more internal. Studies investigating the relationship of health locus of control and self-efficacy to health practices have mixed findings. Brown, Muhlenkamp, Fox and Osborn (1983), Duffy (1988), and Pender et al., (1990) found that health, as internally controlled rather than controlled by luck or chance, was significantly related to practicing more health-promotion behaviors. Weitzel (1989) and

Weitzel and Waller (1990) found that high internal locus of control was significantly related to engaging in health-promotion behaviors. Noland et al., (1985) found internal HLC positively related to health knowledge.

Limited research has examined the effects of HLC in the Mexican-American population. Mirowsky and Ross (1984) and Sugarek, Deyo and Holmes (1988) found an orientation toward external control among Hispanic populations. However, Bundek, Marks and Richardson (1993) found just the opposite. The Hispanic women in their investigation were unique from other Hispanic populations in that they demonstrated a sophisticated use of social services, carried insurance coverage, and used public health facilities regularly.

The purpose of this study was to evaluate the association between attitudes and beliefs as measured by the MHLC and pesticide knowledge or safety risk perception. The MHLC measure was evaluated through 18 questions translated from the Form A of MHLC (Wallston, 1978, Appendix I, Questionnaires). Migrant and seasonal farmworkers were asked to respond to each one of the subscales of the HLC. Responses were then recorded before and after HI-CAHS pesticide reduction program for both the experimental and the control group.

2.6 Risk Perception and Safety Culture

Environmental and behavioral changes can be measured directly using systematic observation, but changes in knowledge, perceptions, beliefs, attitudes, and intentions can only be assessed indirectly through survey techniques, usually questionnaires. A wide range of specific person factors has been measured in targeted populations from children to adults. Some of these factors are presumed to be "traits," others are considered "states." Geller (Geller et al., 1996) outlines these two types of person factors as follows:

2.6.1 Person Traits

Theoretically, traits are relatively permanent characteristics of people; they don't vary much over time or across situations. Since traits are relatively permanent, questionnaires that measure them cannot gauge the impact or progress of a culture-change intervention. Trait measures serve as a tool to teach individual differences, but in safety management their application is limited to selecting people for certain job assignments.

2.6.2 Person States

Person states are characteristics that can change from moment to moment, depending on situations and personal circumstances. When our goals are thwarted we can be in a state of frustration. When experiences lead us to believe we have little control over events around us, we can be in a state of apathy or helplessness. Person states can influence behaviors. Frustration, often provokes aggressive behavior, and perceptions of helplessness inhibit constructive behavior or facilitate inactivity.

Such measures of person states can be used to evaluate perceptions of cultural change. The Safety Culture Survey developed by Geller, asks participants to answer questions on a five-point continuum (from highly disagree to highly agree) about their perceptions of a company's safety culture. Issues include the perceived amount of management support for safety, the willingness of employees to correct at-risk situations and look out for the safety of coworkers, the perceived risk level of the participant's job, and the nature of interpersonal consequences following an injury (Geller et al., 1996).

The Safety Culture Survey also measures factors that increase one's willingness to actively care for another person's safety. These include self-esteem, belonging, and empowerment. The Safety Risk Perception (SRP) measure was assessed through thirteen items selected (adapted to the needs of the migrant and seasonal farmworker) from the safety perception and attitude portion of the Safety Culture Survey (Bigelow, 1998; Geller, 1996.) Migrant and seasonal farmworkers who were asked to respond to straightforward statements about safety management and improvement. Workers' responses were recorded before and after the HI-CAHS pesticide risk reduction program for both the experimental and the control group. The findings were statistically evaluated to reveal any systematic changes in risk perception and associated personal factors.

Thus, in addition to safety-related behaviors, program evaluation required an assessment of changes in person states such as perceptions, attitudes, beliefs, and intentions (Geller et al., 1996). Several researchers and educators have suggested that we cannot expect to see any improvement in safety until people increase their perception of risk, and reduce their overall tolerance to unsafe conditions and behaviors (Geller et al., 1996; Howarth, 1987; Leather et al., 1987). Therefore, as part of the present intervention evaluation process, we want to explore the relationship between migrant farmworkers' risk perception before and after the pesticide risk reduction program to see what, if any, changes have occurred.

2.7 Assessing Behavior Change

The ultimate goal of a health and safety risk reduction program is to reduce injury and illnesses and their associated costs. In the migrant and seasonal farmworker population collecting data on injuries and illnesses related to pesticide exposure is difficult, and such data has limitations. However, since changes in behavior are on the etiologic pathway from implementation of the intervention to a reduction in pesticide exposure and the resulting adverse health effects, behaviors can be used as a surrogate measure. For example, if workers wear protective equipment more regularly after the pesticide risk reduction program, observation of such behavior is a reasonable surrogate for a reduction in exposure and potential adverse health effects.

The measurement of behaviors likely to be affected by the intervention can also be used as an indicator of program effectiveness. A number of investigators have focused upon observed behaviors to assess safety and health programs (Chhokar et al., 1984; Bigelow et al., In press, 1999). It has been found that if a small number of employees were present on a work site, the use of all-or-none scoring (yes or no) of the targeted behaviors was effective in detecting improvements due to an intervention (Bigelow et al.,, 1998). Where many workers were on a single site, counting the number of individuals exhibiting the desired behavior may be more appropriate. Cooper argued that the dichotomous classification of behaviors using an all-or-none scale does not detect slight improvements in safety behaviors and characteristics that do not meet 100% compliance (i.e., if a respirator is worn by an employed but is incorrectly used) (Cooper et al., 1993). The Proportional Rating Scale (PRS), as described by Cooper, attempted to detect improvement in safety by noting the proportion of unsafe situations and behaviors for any given topic in an on-site audit.

2.8 Theory Based Program Evaluation

Theoretically based research has the greatest potential for supporting inferences regarding the effectiveness of the HI-CAHS pesticide risk reduction program. Instruments focus upon the collection of data appropriate in determing changes in risk perception, knowledge of pesticide hazards, and an individual's stage of change. Other variables related to culture are likely to influence a farmworker's risk perception/safety culture, attitudes, and stage of change in behavior.

In a study comparing Hispanic/Latino farmworkers with farmers on the basis of two loci of control scales adopted for farm safety, farmers scored higher on internal beliefs, thus emphasizing personal control over safety (Grieshop et al., 1996). In our investigation, cultural factors were to be collected during a structured interview. Little research has been published on the influence of cultural beliefs or backgrounds upon the effectiveness of pesticide risk reduction program. The study will provide important information that will improve the development of future health and safety programs for migrant farmworkers.

2.8.1 Evaluation Methodology

The *evaluation methodology* applied in this study consisted of:

1. Identification of objectives for the pesticide risk reduction program among migrant and seasonal farmworkers.

2. Selection of instruments for measuring the improvement in the objectives.
3. Modification of selected instruments for targeted population. This included translation into Spanish and modifying the instruments after testing incorporating back translation from Spanish to English.
4. The method for collecting the evaluation was pre-test/post-test (questionnaires and audits).
5. The evaluation was based upon providing a pesticide risk reduction program to the experimental group, and to the control group after all data for the evaluation was collected between the two tests.
6. In this model, the evaluation of pesticide risk reduction program was reproduced to subsequently enhance other areas of migrant workers health and safety concerns.
7. Documentation of this evaluation presented the decisions made at each stage and provided administrative controls for the management in this evaluation research. All decisions were recorded and were useful to monitor the study's progress.
8. The goal in all of the data collection was to produce a document that included data required by agricultural health and safety professionals.

Test Re-test Method

Sometimes is appropriate to make the same measurement more than once. In this research it was expected that the information will not change in both tests. If answers vary, the measurement method may, to the extent of that variation, be unreliable (Babbie, 1998). Although reliability does not ensure accuracy, sometimes it is appropriate to make the same measurement more than once (Babbie, 1998). Yet, the more variation and richness allowed for a concept, the more opportunity there was for disagreement on how an answer applied to a particular situation, thus reducing reliability.

Likert Scaling

Likert Scale is a method by which the question's format could be used to determine the relative intensity of different items (Babbie, 1998). This is one of the most commonly used methods in contemporary questionnaire design (Babbie, 1998). Typically, this method is used in the creation of simple indexes with, five response categories, such as a score of 1 to 5 (from "strongly agree" for positive items and to "strongly disagree" for negative items). In our study, each worker was assigned an overall score representing the summation of the scores she or he received for responses to the individual items.

Experimental Design

The pre-experimental design which some authors called pre-test-post-test design is subject to the possibility that some factor, other than the independent variable causes a change between the pre-test and post-test results (Babbie, 1998). To round out the possibilities for pre-experimental designs, it has been pointed out that some research methodology is based on experimental and control groups, but without a pre-test (Babbie, 1998). This design was called static-group comparison. In this study, were not able to determine if the two groups had no difference in the level pesticide knowledge or safety risk perception. Perhaps the experimental group started out with less. Therefore, the pre-test-post-test design offered better evidence that the pesticide education program produced improvement in pesticide knowledge and safety risk perception.

Internal Validity

People are continually growing and changing, whether or not they are participating in an experiment. Such changes can affect the results of an experiment. In a short-term experiment, subjects may become tired or change in other way that may affect their behavior in the experiment (Babbie, 1998). The process of testing will influence worker's behavior, thereby confounding the experimental results. By the time of post-test, they may have figured out what the investigator was trying to determine. Workers could have been on their best behavior and given answers that they thought we wanted or that would make them look good.

If different measures of the dependent variable were used (say different questionnaires about safety risk perception) how could the investigator be sure they're comparable to one another? Experimental mortality refers to experimental subjects that will drop out of the research before it is completed and this can affect statistical comparisons and conclusions. Experimental mortality in this study was not considered to affect the results as the lost workers were not present (one case declined to participate). In the event that the control group was contaminated by the experimental group (missclassification), and the overall effect of this pesticide training program diluted, the results were still statistically significant. That is, the workers in the control group were not deprived of the pesticide education program, and no compensation (extra care) was provided since there was no contact with the investigator between measurements. Workers did not know if they were in the control or experimental group at the time of the study, suppressing the risk for compensatory rivalry (Babbie, 1998). Among the advantages of this study design was the fact that experimental and control subjects were kept separate, reducing the possibility of diffusion (Babbie, 1998).

Group Interview Process

The group interview was an alternative method of collecting survey data. Rather than asking workers to read questionnaires the investigator asked the questions orally and let the workers to enter their own answers. There were several advantages to having a questionnaire administered by an interviewer rather than the worker. Typically, interview surveys attain a higher response rate than mail surveys (Babbie, 1998). That would not be possible for this target population. A properly designed and executed interview survey ought to achieve a completion rate of at least 80% to 85%. Workers would have been more reluctant to turn down an interviewer standing in front of them than to throw away a mailed (written) questionnaire. The presence of the interviewer generally decreased the numbers of missing responses. The investigator's presence helped to clarify questions, thereby obtaining relevant responses. When workers were not writing out a response to a question, the interviewer repeated the question slowly or clarified the question.

During the group interview, every effort was made to insure that the interviewer's presence would not bias the worker's perception of a 'correct' answer. In all the questionnaires and audits the investigator dressed in a fashion similar to the migrant and seasonal farmworkers. Dressing (cleanliness and neatness) are typically regarded as signs of a personal attitudes and orientations. Since the interviewer was prying into the worker's personal life and attitudes, an effort was made to be pleasant. The interviewer also made an effort to be the kind of person that the workers would feel comfortable with, the kind of person that the workers would enjoy talking to. If migrant workers were asked to volunteer a portion of their time and to divulge personal information, they deserved the most enjoyable experience this study could provide (Babbie, 1998). The questionnaire was read like a natural conversation, following the exact language set down in the questionnaire. The interviewer had the specifications prepared in conjunction with the questionnaire (Appendix I, Specifications for the Interviewer). Additional advantages of the group interview were that it made the goal of obtaining a higher number of participation from the migrant workers feasible in a short period of time with limited cost.

Quasi-experimental designs are distinguished from 'true' experiments primarily in their lack of random assignment of subjects to an experimental and control group (Babbie, 1998). In this type of evaluative research, it would be almost impossible to achieve such an assignment of migrant farmworkers. Using this design, it was possible to use the same field (for experimental group) where those workers were normally assigned. The non-equivalent group was selected, given the similarity in the migrant farmworker's population, in to provide a point of comparison.

2.8.2 Evaluation Assessment

The impact of an intervention can be evaluated in three stages. First the behavior to be influenced was systematically assessed through direct observation. Often questionnaires are given to those who were being observed, and as well as those doing the observing to obtain opinions, perceptions, and attitudes regarding the targeted problem and relevant environmental factors (Geller, 1996). Then the targeted behavior was carefully monitored, sometimes by those responsible for the behavior throughout the intervention process. Desired change often occurs as a result of feedback. Observing progress in changing behavior was a powerful reward for all parties involved–those whose behavior was being changed, and those who were helping to facilitate that change. Such rewards motivated continuous efforts from all involved (Geller, 1996). Intermittent follow-up evaluations checked for evidence of this support and indicated whether or not additional intervention was needed (Geller, 1996).

In designing an ideal evaluation assessment, a profound understanding of the problem's context is desired, such as the environment and the workers in it (Geller, 1996). The learning process is relevant for understanding safety-related behavior and attitudes (Geller, 1996). Most of our safe and at-risk behaviors were performed to gain positive consequences or avoid negative consequences. Defining critical behaviors to target for observation and intervention was not easy (Geller, 1996). The behaviors that were to be selected in relationship with other behavior was targeted in the education program provided.

3.0 PURPOSE AND SCOPE

3.1 Rationale

Clearly, the migrant population is at greater risk than the general population of the US. Migrant farmworkers are exposed to pesticides and extreme field working conditions relative to heat, toxic elements, exhaustion and they minimal access to health care and educational resources. Migrant and seasonal farmworkers perform much of the hand labor required by growers in the United States to produce their products. Although they perform essential work in producing food for the country, they are one of America's most under served and understudied populations. This population is faced with low socioeconomic status, limited access to health care, as well as numerous other conditions that increase their risk of developing work related injuries and illnesses. Language and cultural barriers, combined with a low perception of risk, hamper the education of these workers. Of major concern are the risks related to exposure to agricultural chemicals. The High Plains Intermountain Center for Agricultural Health and Safety (HI-CAHS) has implemented programs to reduce these risks. It is hoped that the current pesticide risk reduction program (in this study) will have an impact on reducing exposures. Like many intervention programs in occupational health and safety this program was introduced without a comprehensive evaluation of its effectiveness.

Understanding the beliefs, values, and concerns of a population is one of the most important steps in assessing its health requirements. This is one of the fundamental precursors in planning health and safety programs (Wadud et al., 1998). If migrant farmworkers do not believe that occupational diseases are preventable, they are not likely to take precautions to reduce their risks. Another precursor in the migrant worker safety behavior outcome is the environmental conditions in the fields. Environmental field conditions — i.e., decontamination site — are critical to evaluate the effectiveness of the pesticide risk reduction program. Any migrant farmworker with good safety risk perception will need to have adequate field conditions — i.e., decontamination site— to practice a desired safety behavior (i.e., washing hands before eating). In this study, a population of migrant and seasonal farmworkers was interviewed to identify their beliefs and safety health behaviors related to the pesticide knowledge and safety risk perception as a result of the pesticide risk reduction program during the Summer of 1998 in Northern Colorado. In addition, safety audits were conducted to observe the migrant worker behaviors and field conditions (i.e., decontamination sites). In this way it was possible to determine the effectiveness of a culturally relevant pesticide risk reduction program among the migrant and seasonal farm workers.

3.2 Hypothesis

1. The pesticide risk perception program is effective in terms of (1) pesticide knowledge, (2) safety risk perception, and (3) observed behaviors related to pesticide safety among migrant and seasonal farm workers served by HI-CAHS in the State of Colorado during the growing season 1998.

2. There is an association between pesticide knowledge and safety risk perception and stages of change and health locus of control among migrant and seasonal farm workers served by HI-CAHS in the State of Colorado during the growing season 1998.

3.3 Research Objectives

The purpose of this study was to evaluate a new pesticide risk reduction program to encourage migrant and seasonal farmworkers to adopt safe work behaviors that reduce pesticide exposure. Findings from this study provides information to the agricultural community, extension specialists, health and safety trainers, state health officials, and health care providers about the migrant farmworkers occupational and demographic profile including environmental working conditions, and the effect of previous Worker Protection Standard (WPS) training. This research will result in recommendations for the protection of migrant and seasonal farmworkers emphasizing development and implementation of programs that consider stages of behavior change and risk perception. The specific objectives are:

1. Develop instruments to assess the effectiveness of pesticide risk reduction program in terms of (1) increase in pesticide knowledge, (2) improvement in safety risk perception, and (3) observed behaviors (audits) related to pesticide safety.

2. Evaluate the association between attitudes/beliefs as measured by (1) health locus of control, and (2) stages of change and pesticide knowledge or safety risk perception.

3.4 Scope

The specific aim of this study was to evaluate the effectiveness of pesticide risk reduction program provided by HI-CAHS to migrant and seasonal farmworkers. Using a quasi-experimental design, this theory-based investigation was designed to measure the effectiveness of the HI-CAHS program by an interview process, (1) measure knowledge retention, (2) measure safety risk perception, (3) measure behavior modification (audit), and (4) assess health locus of control and stage of behavior change. Findings of this study describe the relationship between the migrant farmworkers beliefs and safety behaviors, and have implications for the development of safety health programs. In addition to pesticide knowledge and safety risk perception, attitudes and values measured by health locus of control and stage of behavior change in this study are part of the foundation to support the safety process (Geller, 1996).

The agricultural environment for migrant and seasonal farmworkers has unique needs in terms of health and safety, some of which are addressed in the HI-CAHS pesticide risk reduction program. The agricultural environment for the workers fluctuates. This environment is highly mobile and composed of a mostly male workforce. This population represents a preponderance of individuals who value independence and are reluctant to respond to safety regulations. They endure a high degree of exposure to the elements, and their work sites are not well monitored or controlled. These characteristics hamper the adoption of safe work practices and the development of a safety culture.

Risk behaviors contribute to most if not all injuries, and the ultimate goal is to decrease in at-risk behaviors (Geller, 1996). The path in decreasing those behaviors is improving worker's knowledge, attitudes and values, and safety risk perception. Two very important components of this program evaluation target the (1) adoption of safe work practices, and (2) improvement of each individual's perception of risk. The safety environmental audit provided a valid and reliable measure of behaviors that had been recommended for other safety training programs and field conditions for the migrant and seasonal farmworkers. Environmental audits allowed to define and observe targeted behaviors in the process of increasing safe behavior by testing the impact of the risk reduction program. Safety audits provided relevant information evaluating the field worker's environment among the participating grower's in compliance with the EPA regulations. Preliminary results indicated that companies who provide some health and safety training to workers have higher scores on the audits compared to those who provide no training (Bigelow et al., 1998).

Safety should be internally driven. Ownership, commitment, and proactive behaviors are more likely when individuals work toward their own goals. The way any risk reduction program is defined can influence attitudes that shape the environment. The risk reduction program needs to include not only training, getting in the specifics of how to turn principles into practical procedures, but also education focusing in teaching the principles or theory behind a process or set of procedures (Geller, 1996).

4.0 RESEARCH DESIGN AND METHODS

4.1 Study Design

The migrant and seasonal farmworkers in this study were contacted by the Colorado region's High Plains Inter-mountain Center for Agricultural Health and Safety (HI-CAHS). Both the workers and growers received occupational health services from HI-CAHS. Four out of six of the growers made 404 migrant workers available for the study, and all of the four growers were located in the North Central part of the State. Adams and Weld Counties were the sites of the fieldwork. Ethnic minorities and females were included in this study. The aim of the investigation was to evaluate the pesticide risk reduction program in order to measure the impact of the program's intervention in the overall safety status in knowledge, behaviors, and attitudes among the migrant and seasonal farmworkers. The analysis was conducted using three different methodologies to assess the data.

The first methodology included descriptive statistics to determine the profile of migrant and seasonal farmworkers served by HI-CAHS. This preliminary analysis also identified factors that were unrelated to occupational or environmental exposure, but that might have an impact upon the pesticide knowledge and safety risk perception (SRP) of the migrant farmworkers. Demographic and occupational conditions were evaluated by descriptive statistical methods to find statistically significant differences between the experimental and the control group. First comparing the mean frequencies in both groups by t-test. Mean differences were assessed in continuous variables such as age, agricultural work experience, etc. Differences in frequency between the experimental and the control group were assessed in categorical variables such as gender, previous Worker Protection Standard training, etc. The variables in the primary analysis, such as age and agricultural work experience, were controlled in a later analysis through statistical methods that adjusted for the differences between the experimental and control group. Previous Worker Protection Standard (WPS) training improved pesticide knowledge and SRP, significantly ($p<0.05$). There were no differences in the workers in the experimental and control group who had already possessed the WPS card or who had received pesticide education training.

The second part of the analysis assessed the improvement in the pesticide knowledge and SRP among the migrant and seasonal farmworkers by controlling for the differences in groups. These analyses were needed to evaluate the effectiveness of the pesticide education program. The results of these analyses appears in Chapter 5, *Results of the Preliminary Analysis*.

In the third part, (see Chapter 5-Section II) analytical methodologies were used that were conducive to a multi-variate analysis of continuous dependent variables. General linear model analysis of variance (ANCOVA) and least squares multiple regression, were used to examine the relationships between specific categories, such as demographic and occupational background (independent variables) and the pesticide knowledge and SRP (dependent variables), while controlling for the factors identified in the preliminary analysis. These two models were very effective (when used with continuous dependent variables) in detecting the discriminative effects of background characteristics on changes in the pesticide knowledge and SRP. Modeling based upon using continuous dependent variables provides more statistical power than techniques requiring the dichotomization or grouping of variables, because variation is lost when continuous variables are categorized.

Section II presents the final model, using all the independent variables to predict pesticide knowledge and SRP. This final model analyzed the association of the attitudes of migrant and seasonal farmworkers, measured by health locus of control and stages of change, with pesticide knowledge and SRP. A description of the association of health locus of control and stages of change is presented in this section.

The results of the descriptive analysis of the safety audit appear in Chapter 5, Section III. This analysis evaluated potential changes of behavior in migrant farmworkers with regard to pesticide knowledge and SRP. The total number of migrant farmworkers in the field was recorded in the audits. This descriptive analysis required the assignment of the workers to experimental and control groups. The safety audits were assigned to experimental and control groups according to the status of the grower by group classification. For example, the migrant workers' assignment to the experimental group was considered part of the experimental group audit.

Since classification errors were not likely to be related to the independent variables, classification bias was considered non-differential or random. The effect of classification error probably diluted estimates of any true association between the educational program and the observed behaviors. In addition to a classification bias in the experimental and control group, any characterization of continuous variables in dichotomous terms produces a loss of information about that data. This loss of information then reduces the statistical power to detect true associations. Given these limitations on experimental/control group analyses, fewer significant findings were expected when compared to those obtained through the analysis of continuous dependent variables in the questionnaires.

As mentioned earlier in Chapter 2, safety audits might have been of limited value as tools for evaluating the change of behaviors, after the migrant workers in the experimental group were exposed to the pesticide risk reduction program, but these audits were useful in detecting field working conditions among the migrant and seasonal farmworkers. Group questionnaires might have been of limited value, as these responses were inadvertently 'grouped.' Accurate information was necessary to evaluate the effectiveness of the pesticide education program. This study was designed to avoid such problems in pre-testing the questionnaires where the workers were 'willing to please the investigator with a desired response.' This investigation used the results of the group questionnaires for the experimental and control group, along with observed behavioral changes in the safety audits. The results generated insights into the effectiveness of the pesticide education program.

4.2 Data Collection and Handling

4.2.1 Recruitment

All migrant and seasonal farmworkers employed by the four growers were eligible for the study. After obtaining the grower's approval and the information on the location of the migrant farmworkers, the workers were informed of the study, its purposes, and assured of confidentiality. At that time, those who were willing to participate were given two consent forms (Appendix I Consent Form) to read and sign. Those who agreed to participate were also asked for permission to allow the investigator to contact them for the post-test questionnaire in 2 to 3 weeks. After their signatures were obtained, a questionnaire, pencils, and clipboards were distributed. Then, the investigator read each question and allowed time for the workers to write their responses. For the migrant farmworkers who either did not desire to, or were unable to write their responses, these responses were recorded by the investigators or a coworker. The post-test questionnaires served two purposes: (1) to provide information and to answer any questions that potential respondents had about the study, and, (2) to allow for a follow-up in order to improve the overall response rate for the investigation.

This quasi-experimental study, composed of experimental and control group workers that was selected from eligible migrant and seasonal farmworkers, was conducted in Northern Colorado. The study groups consisted of migrant workers who were working at least 30 hours per week on agricultural chores. The activities observed were harvesting, weeding, watering the fields, and applying pesticides.

To avoid threats to internal validity related to diffusion (worker's communication), the study design required the migrant workers from each field within any grower to be assigned to one specific study group (experimental versus control). Because HI-CAHS had given the pesticide education program to all of the growers as a part of their regular activities, the timing of the pesticide education program was modified to ensure that all testing for this study was completed in the control group before they received the pesticide educational program (see Figure 3.1). All the testing (pre-test and post-test for both groups) were conducted after work and during lunch time, and the participating workers received compensation ($10 upon completion of pre-test interview; $10 upon completion of post-test interview).

A 'work group' was characterized as a group of migrants working in the same field. The participating work group scheduled to receive the pesticide education program, was randomly assigned to the experimental or control group (by flipping a coin). On-site audits were conducted to obtain information on pesticide related work practices prior to engaging the growers in the pesticide education program. The migrant farmworkers in the experimental group were administered the structured group interview prior to receiving the pesticide education program at a time that was convenient for them as well as the grower.

In most cases, the group interview was conducted in the fields during the lunch break, or at the individual's residence (i.e., at the migrant workers' camp).

A nonequivalent pre-test/post-test control group design was used to evaluate the efficacy of the pesticide education program. In order to avoid diffusion (contamination of the pesticide education program) between the two groups, workers were assigned either to an experimental or a control group (Table 3.1). There were no restrictions on the growers' providing any alternative pesticide education programs to workers. According to the Worker Protection Standards set by the EPA, migrant farmworkers needed to be trained during the first five days of beginning fieldwork (Code of Federal Regulations, Environmental Protection Agency's 1992 Worker Protection Agency, Title 40, Part 170) .

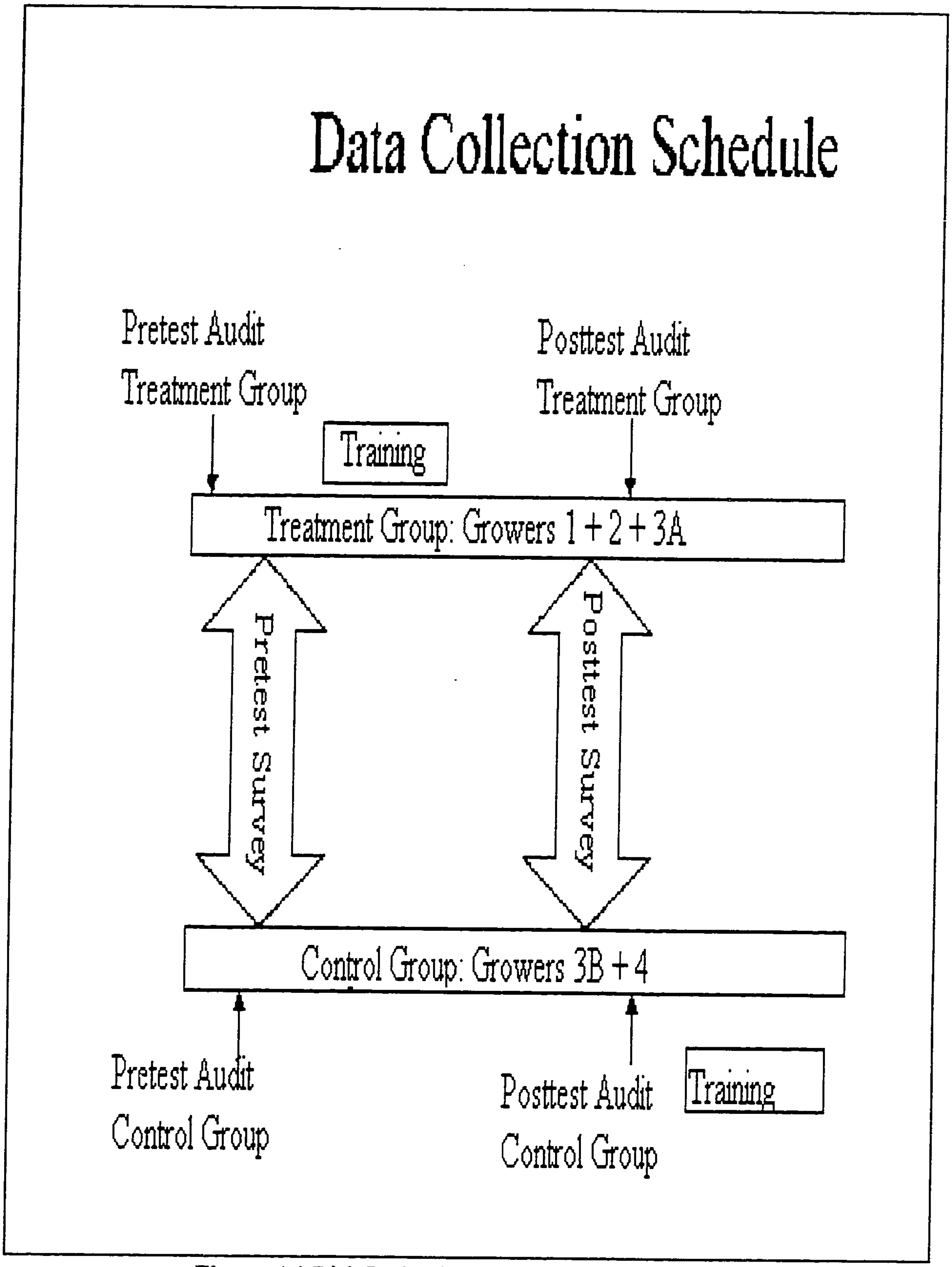

Figure 4.1 Risk Reduction Program Data Collection

Table 4.1 Number of Migrant Workers Participating in the Pesticide Evaluation Program by Grower and Group Status (n=152).			
Grower ID	*Treatment Group*	*Control Group*	*Total (Percentage)*
1	17		17 (11)
2	42		42 (28)
3.A	31		31 (20)
3.B		19	19 (13)
4		43	43 (28)
Total	77	75	100

4.2.2 Self-administered Questionnaire

A group interview was used for pre- and post-testing. To ensure reliability, all the components, except for demographics, were included in the pre- and post-test. The post-test included migration patterns and the farmworker's concerns. This replaced the demographic section that was originally included in the pre-test. Group interviews were conducted in Spanish. The group self-response interview was found to be more reliable than the personal interview (described below). The assessment of the interview versus a group interview was conducted in the pilot study prior to data collection. Reading and writing skills, important factors in migrant farmworker studies, did not limit the interview method because the interviewer identified the workers who needed help from coworkers or interviewer assistance in responding to the questionnaires. In those workers who were assisted by the interviewers, the response rate was high and selection bias due to non-response was minimal (Armstrong, 1992).

The content validity of the interview was ensured by having agricultural health and safety specialists review all the items. The pilot assessment of the questionnaires was designed specifically for the study and initially pre-tested as a personal interview on two graduate students. Migrant farmworkers who were not included in this study participated in the pilot study (n=6) and interviewed in order to assess the quality of the questionnaires. Although the questionnaires were well-received during the personal interviews, they were modified to address concerns about the way some of the questions were worded. The time required for the personal interview was excessive (approximately 80 minutes per worker), and the information gathered added little to the questionnaire responses. In comparison, the time required to complete the group interview, from pre-testing to post-testing, ranged from 45 to 60 minutes. During the personal interview, the migrant farmworkers were more likely to give answers meant to "please" the interviewer, as opposed to their own responses. Therefore, group self-response questionnaires were chosen because of the advantage to this method of data collection. The English translation of the questionnaire is presented in Appendix III. This translation includes the investigator's pre-test and post-test instructions in Spanish.

Each questionnaire had a unique identification number (assigned by the investigator) on the first page. This number linked the migrant worker and the grower with the location. Each of the forms were printed in a different color so that they could be traced easily by the investigator. The items in the questionnaire were divided into six categories: Agricultural Experience, Demographic Characteristics, Pesticide Knowledge, SRP, Stages of Change, and Health Locus of Control. The questionnaire format was adapted from similar to the Ameri-Corps WPS Pesticide Safety Training Evaluation

Project for obtaining pesticide knowledge information in WPS studies and the safety audits (Deeny, 1999).

The safety risk perception (SRP) was taken from the Safety Culture Survey developed by Safety Performance Solutions (Geller, 1996). The stages of behavior were based on the General Model of Intentional Behavior Change adapted from Prochaska & Diclemente 1992 (Prochaska & Diclemente, 1992). The perceived health status was measured as the Multi-dimensional Health Locus of Control Scale-form A–a five-point Likert format (Wallston, Wallston & DeVellis, 1978). Additional questions were related to the behavior of migrant farmworkers, their demographic characteristics, the migrant farmworker's travel patterns, and main concerns. Information on migrant travel patterns and lifestyle characteristics was obtained from the responses to a series of questions that focused upon home country, home state, country of origin, number of years working as a migrant farmworker, number of states worked as migrant farmworker, and whether or not the migrant farmworker was planning to return. Questions on lifestyle concentrated on health behavior, such as alcohol use and smoking.

The purpose of including demographic information was to describe the population of migrant workers and to insure that the results and conclusions were generalizable. Information pertaining to agricultural experience and WPS was comprehensive in order to determine how the pesticide education intervention would be influenced by the worker's occupational background. Questions on present employment emphasized the occupational tasks and behaviors that were needed to reduce the danger of pesticide exposure and agricultural hazard. By targeting specific agricultural tasks, the study aimed to reduce occupational data to a manageable level.

A number of questions focused upon the worker's account of the field decontamination site conditions, including the presence of washing water (1 gallon per worker), single-use towels, and soap. The decontamination site conditions were used to compare the safety audit information with the decontamination site responses of the workers. Similarly, the data about decontamination sites and safety audits could be used in future comparisons of the Ameri-Corps WPS Pesticide Safety Training Evaluation Project in the 19 states that participating in 1998 (Deeny, 1999).

4.2.3 Data Handling - Questionnaires

Pre-test and post-test questionnaires were translated to Spanish and backtranslated to English by a different professional to insure validity. The difference in content was small (3 out of 172 questions). After the workers were informed on-site by the grower, the workers' consent (translated) forms and questionnaires were completed and filed. The completed questionnaires were collected by the investigator, and a corresponding identification number was entered into a data file to identify the worker's information relative to grower, date, and group status. Information on each questionnaire was coded either by a research assistant or the investigator. Rules for coding were developed by the investigator and modified to address the variation in the responses. Lists of codes are presented in Appendix II (Coding Instructions in the pre-test and post-test questionnaires). To ensure reliability in coding the questionnaires, regular meetings were held between the principal investigator and the research assistant.

After all of the pre-test questionnaires were administered, each group of migrant workers (group was designated by the grower), was assigned to the experimental or control group by flipping a coin. In the experimental group, the pesticide education program (training) was planned according to the grower's schedule. The pesticide education program was not limited to the migrant workers participating in this study. All of the migrant workers present in the fields were encouraged to attend. Upon completion of the pesticide education program, a minimum of two days were required to conduct the post-test questionnaire or the training.

Many of the independent variables used in the analysis were obtained directly from the responses on the questionnaires. Some variables required either recoding prior to their use in statistical models. For example, the questionnaire obtained information on the intake of numerous types of alcoholic beverages in addition to consumption of beer per week. Using the reported weekly consumption of beer, wine, and strong alcoholic beverages, each worker's mean alcohol consumption was calculated in terms of equivalent number of drinks per week. Since the most frequently reported alcoholic beverage was beer, the recalculated value for overall alcohol drinking intake was expressed in terms of the number of beers per week.

Those migrant farmworkers who indicated that they were not working in agriculture all year were asked to give other occupational information. That information was then included as job descriptions/titles. The workers did not provide enough information about their employment in a particular industry to enable us to assign the appropriate Standard Industry Classification codes, as the information they gave was non-specific. It was impossible to match the job title with the classification codes even according to the *Standard Occupational Classification 1980 (*Executive Office of the President Office of Management and Budget, 1987).

The workers were asked in the questionnaire to specify dates of previous WPS training as well as to give a description of the training, place (i.e., work, migrant camp), and method of training. The farmworker was asked if a flip-chart was used and if the training was in Spanish or translated. In some instances, only years or States were specified and recorded. When the place of training was not reported, the location of the training was assumed to be the workplace.

All data was entered into a microcomputer using Microsoft Access data entry software (Microsoft® Corporation, 1996). Data was exported using the Statistical Analysis System software and Minitab® (SAS® version 6.12 Institute, 1985; Minitab® Inc. 1994). Migrant farmworker's names were not used. Data entry was reviewed regularly to ensure that the probability of error in entering the data was low. Inconsistencies observed during data entry were corrected by referring to the questionnaires.

Pre-test and post-test scores for pesticide knowledge and SRP were calculated for each individual. Pre-test post-test differences in health locus of control and levels of stage of change were also calculated for each individual. Pre-test/post-test differences in experimental group scores, compared to the differences in scores in the control group, were statistically evaluated through a multi-factorial analysis of variance to determine the overall effect of the HI-CAHS pesticide education program on pesticide knowledge, SRP, health locus of control, and stages of change.

4.2.4 Data Handling - Safety Audits

All safety audits were conducted by trained personnel in the Department of Environmental Health at Colorado State University. Pilot audits were conducted by the investigator and the safety auditor trainee (n=3). In the pilot stage, safety audits included the Farm Place Checklist, Worker, Applicator, and Central Location Forms. Those audits were not included in this study data.

At the beginning of the safety audit, the investigator and the trained safety auditor recorded all the information for each one of the forms. Then the investigator and safety auditor reviewed and modified the original forms to facilitate a speedy recording of information and to assure coding was equivalent. Pre-test audits were conducted before or at the time of the pre-test questionnaire for all migrant workers. Each audit was based upon the Ameri-Corps WPS Pesticide Safety Training Evaluation Project that included a Farm Place Checklist, Worker, Migrant Camp, Applicator, and Central Location. The Migrant Camp audit included a test of the drinking water for each camp and a safety walk-through to record any immediate health and safety hazards. The Weld County Health Department Laboratory, Greeley, Colorado tested the water using standard methods for drinking water analysis and chemical analysis of nitrate ratio. After the Migrant Camp audits were conducted, a written report of each inspection was mailed to the Camp's owner.

The period of time for the pre-test audits ranged from two to thirty days. These audits required post-test audits. Each audit lasted from 40 to 60 minutes, and had a different location, crop, and number of workers. Reliability of the safety audits was insured. At the beginning of each safety audit, the investigator and the trained safety auditor positioned themselves on opposite sides of each field where migrant farmworkers were working and recorded all of the information, observing workers for a period of 60 minutes per field.

As part of the audit, work site conditions not related to individual behavior were also observed and recorded. The presence or absence of water (for drinking and washing), toilet facilities, first aid, eyewash equipment, pesticide warning signs, and pesticide information posters was noted. More detailed information about work site conditions for those workers who were mixing or applying pesticides, including the availability of personal protective equipment, was obtained. Additionally, data on the use of mechanized equipment was recorded. A supervisor working for the grower was contacted and asked about the locations and times of pesticide applications if such pesticide information was not posted.

The unit of analysis for assessing safety behaviors was the "work group" as it was not possible to identify individual workers on the site. Performance on the audit was reflected in the scores obtained from the data collection instrument. Since audits were conducted before and after workers were subjected to the HI-CAHS pesticide education program, differences in scores reflected the impact of the program on specific safety behaviors.

Descriptive statistics were used to calculate the summarized data obtained from the audits. Pre-test/post-test differences in scores on the on-site audit were used to determine the effect of the HI-CAHS pesticide education program on observed behaviors. The unit of analysis for these comparisons was "work group" because it was not possible to identify individual workers during the audit.

4.3 Data Analysis

Data was entered into a computerized database using Microsoft Office 97, Access and Excel (Microsoft® Corporation, 1996). Detailed statistical analyses were conducted using the Statistical Analysis Software Program (SAS®, 1996), and Minitab® (SAS® version 6.12 Institute, 1985; Minitab® Inc., 1994; Schlotzhauer & Littel, 1997; Cody & Smith, 1997). The data analysis was performed using two distinct methodologies–one using dependent variables, and the other using descriptive analysis. Some of the dependent variables (such as wearing a hat) were dichotomous.

In the first stage of the preliminary analysis, continuous dependent variables were used to identify conditions and exposures that had an impact on the migrant worker's pesticide safety behavior, but this was unlikely to be related to either occupational or agricultural experience. In the second stage of the preliminary analysis, the primary analysis used both statistical methodologies in order to address the research question. That is, the primary analysis addressed whether the pesticide education program was effective in terms of knowledge of pesticides and SRP. Numerous statistical methods, including analysis of covariance, correlation, multiple regression, and logistic regression, were applied in the primary analysis. Results from the preliminary analysis were used to decide which subjects were excluded from analysis and which other independent variables were to be included in the statistical modeling.

In Chapter 5, *Description of the Sample*, the sample is described in terms of demographic variables as well as other important dependent and independent variables. The data analysis was conducted in two distinct stages, with all the samples used in each analysis. Chapter 5 provides a description of both samples. In Chapter 5, *Results of the*

Preliminary Analysis, Section I presents the results of numerous analyses that were conducted to assess the effect of potential modifying and confounding factors. In Section II, *Result of Primary Analysis* presents the results of the confirming analysis that tested the hypotheses that pesticide education program improved the pesticide knowledge and SRP among migrant and seasonal farmworkers.

4.3.1 Preliminary Analysis

The preliminary analysis was conducted without classifying or differentiating the sample into experimental and control group. The dependent variables were tested for normality using the NORMAL option (PROC UNIVARIATE, SAS software). Those variables normally distributed the selection of the appropriate transformations was not required (Schlotzhauer & Littel, 1997; Cody & Smith, 1997). In the preliminary analysis, most of the relationships between pesticide knowledge and SRP with the independent variables were categorical. Graphs were used to examine the relationships between the variables. Frequency distribution was used for each variable for description of the demographic profile (i.e., mean age for the study migrant farmworkers participating in this research), and latter the frequency of each variable by group status (i.e., mean age for the study migrant farmworkers according to experimental or control group status). Pearson correlations were calculated for pre and post-test in pesticide knowledge, SRP, and health locus of control categories with independent variables (i.e., age, agricultural work experience, education). When appropriate, linear regression lines were fit using the SAS software. Histograms and box plots of the values of the dependent variables for each of the groups were compared. Outlying values were checked to ensure that errors in data coding or entry were not made. Visual methods that identified differences were subjected to tests of their statistical significance.

An analysis of covariance was used to test the hypothesis that the group means of the dependent variables (groups being defined by categories of independent variables) were equal. The SAS procedures (Proc GLM, Proc REG) were used to performed a variety of types of analysis of variance on dependent variables that were normally distributed. Continuous independent variables were recorded as to their categories, and these categories were used to define the groups in the analysis. Most of the dependent variables of interest were continuous, except for Stages of Change, while independent variables were categorical and continuous.

The purpose of this first set of analyses was to identify demographic and occupational conditions that would affect pesticide knowledge or SRP. The first series of analyses described the population of Migrant and seasonal farmworkers' served by HI-CAHS in the State of Colorado. That series included the demographic and occupational factors not related to pesticide knowledge or SRP. The first set of results appearing in Chapter 5-Section 1, was strictly univariate. A graph of the data was used to visually identify potential relationships between the effect of the pesticide education program and the factors were found to affect educational programs in other studies. Those relationships were visually identified, and then analyzed using analysis of variance to determine if the differences in mean values among the groups were statistically significant. The factors that were found to have a statistically significant difference (i.e., age, agricultural work experience) were controlled for potential confounders when the difference occurred between the experimental and control group.

In Chapter 5-Section II, more refined statistical techniques detected differences that may have resulted from agricultural experience, such as the worker's receiving WPS training, working in agriculture all year, and working in other states as migrant farmworker. Those differences may have effected the pesticide education program in the area of pesticide knowledge and SRP. The purpose of these statistical analyses was to identify personal occupational background associated with pesticide knowledge and SRP improvement (change) so that such factors could be accounted for in the primary analysis. The independent variables found to have significant effect upon specific pesticide knowledge and SRP scores were included as covariates or control variables in latter analyses. The assessment of the association of an independent variables with differences in the means of the independent variables, required that the independent variables be categorized. For significant independent variables originally continuous or interval measures, the original measures (not the recoded categorical measures) were included as covariates in later analyses to control for their effects.

Independent variables were not considered in the analysis if the frequency was less than 10% of the total number of samples ($n<15$). Since there will be no statistical reliable information when variable frequencies were low. Some of the independent variables found to be highly correlated were Age and Agricultural Work Experience ($r=60$ $p<0.001$), Years of Education, Reading and Writing in English and Spanish ($r\sim48$ $p<0.001$), and Health Locus of Control (HLC) scores ($p<0.05$). Principal Component analysis was used to classify those variables (detecting the structure in the relationships between variables).

Another advantage of using the principal component analysis was to decrease the number of variables for measuring the independent variables. For example, instead of five variables used to measure literacy through the principal component analysis, two variables were used that 'explained' 84% of the variance in the original values. These new variables maintained the orthogonal (uncorrelated) nature of the factors making possible their inclusion in the multiple regression models. The uncorrelated nature of the variables was particularly advantageous in the case of HLC subscores, which were highly correlated in the multiple regression analysis.

4.3.2 Primary Analysis

The objective of the primary analysis was to investigate the effectiveness of the pesticide education program, and to assess the relationship between the attitudes and beliefs of the migrant farmworkers relative to health and safety risk. The first stage involved the analysis of variance with the two selected continuous dependent variables–pesticide knowledge and SRP. The age, agricultural experience, and other demographic and occupational characteristics that were found to be potential sources of variation in the analysis of variance, were controlled by statistical methods. The statistical procedures included both one-way and two-way analysis of variance, Kruskal-Wallis One-Way Analysis of Variance, principal component analysis and the least squares multiple regression.

The use of analysis of variance and multiple regression allowed for the selection and testing of mathematical models to explain the relationships between exposures and the continuous dependent variables. The variables found to have a significant effect on pesticide knowledge and/or SRP from the results of the preliminary analysis, were used as potential candidates for control in regression and analysis of variance models.

Since numerous models were set up to assess the relationships between dependent and independent variables, there was the potential for bias due to the correlation of dependent and control variables. In order to reduce this source of bias, only control variables that had statistically significant differences between the experimental and the control group were entered into the models. Also, bias could have been introduced if the variables were not included in the model when they were confounders.

Analysis of covariance (ANCOVA) were conducted with the independent variables when first entered into the regression equation, using the pre-test score as a covariate for the dependent variable and experimental group indicator. The independent variables, were then entered into each model (one-by-one) with the nominal level of significance of 15%. From those analyses, independent variables that were found to be statistically significant for each of the dependent variables that were later included in the final multiple regression analyses.

Backward multiple regression with the nominal level of significance was set at 15% ($p<0.15$) to select appropriate control variables for each model. Variables were taken out of the model (one-by-one) based in the largest *p-value*. This procedure was done 'manually' because it was necessary to maintain the pre-test score, while controlling for the group status and variables that were different between groups (i.e., age). Using multiple regression (ANCOVA), the hypothesis was tested to determine which independent variables were significant predictors of pesticide knowledge or SRP. The least square estimators of the regression parameters for each analysis were recorded so that the regression equations could be set up. Standardized regression coefficients (β) were evaluated to make comparisons of the predictive value of independent variables. The regression coefficients provided estimates of the slopes associated with specific independent variables in the regression equations that were based upon models in which the error associated with the dependent variables was normally distributed with a constant variance.

In addition to the least square estimates of regression parameters used to develop regression equations, summary estimates of the goodness of fit for each regression model was obtained. The R^2 value was defined as (Rosner, 1986):

$$R^2 = \frac{\text{Sum of Squares due to Regression}}{\text{Total Sum Squares}}$$

After each variable was taken out of the model, the R^2 value was recorded as it represented the proportion of variance in the dependent variable that was explained by the independent variable.

There were numerous assumptions underlying the linear regression modeling procedures. It was known that the standard error estimates for the regression parameters would be biased if an incorrect model was used (White, 1989). The adequacy of the models was first determined by performing a number of analyses using different statistical methodologies. As an example, a majority of the analysis of covariance were repeated using multiple linear regressions to confirm previous results and to provide additional information on the relationships being assessed. In addition to histograms of the distributions of dependent and independent variables, plots of independent variables against dependent variables were employed to spot outlying values and to assess any overall trends.

For each regression model, the raw standardized residuals were plotted against the predicted (fitted) values. Histograms of the standardized residuals and normal probability plots of the standardized expected residuals were also obtained. The statistical software also identified outliers, and these values were checked to determine if errors were made during coding or data entry. The critical values accounting for sample size for the outlier test were checked according to the layout of the table suggested by Christopher Bingham, using a critical value of α=0.05 (Weisberg, 1980).

The final analysis required categorization of independent variables into one dichotomous variable (i.e., Improvement in Stages of Change). Many of the independent variables were obtained originally from the Likert Scale (1 to 5), so if no trend of the responses was detected then that variable was recoded as *yes/no*. For example, originally in *Wearing Gloves* the options were from *Always* (5) to *Never* (1). *Wearing Gloves* after recoding was *Yes* that included: *Sometimes* (3), *Frequently* (4) and *Always* (5), and *No* included *Rarely* (2) and *Never* (1). Cross tabulation and logistic regression were employed to elucidate the relationships between occupational/demographic background and pesticide knowledge/SRP scores.

Results from the analysis of covariance were used to identify variables that were included in the multiple regression analysis . With a choice of over 200 variables, only those variables for which significance was achieved in previous analyses were selected for consideration. Univariate analysis using cross tabulations and the Chi-square test of association were conducted to evaluate the relationships between demographic and occupational factors and other potential confounders with group status. Potential confounding factors that were significant through the analysis of 2 X 2 tables (i.e., age) were selected for inclusion in the multiple regression models. The results from the analysis of dependent variables were reviewed in order to identify other potential confounders included in the models.

For estimating the improvement in the stages of behavior, the modeling process involved the logistic regression. The modeling process involved fitting combinations of independent variables to analyze the changes. The significance of improvement in the stages of behavior was evaluated using the likelihood ratio which follows the χ^2 distribution. Final models were fitted with all potential confounding factors, in addition to group status and independent variables under consideration. The factors determining the probability for being in Termination Stage for each of the four behaviors, for the experimental as opposed to the control group, was estimated using the odds ratio. Independent variables were first dichotomized as present or absent, and then numerous models were constructed to estimate the effects of the pesticide educational program.

4.4 Ethical Considerations

Human subjects protocol was approved by the Human Research Committee. The study population consisted of seasonal employees of growers in the State of Colorado. These workers were primarily Hispanic with permanent residence mostly in Mexico. Workers were 18 years or older. All migrant and seasonal farmworkers were selected without regard to gender, race, religion, or ethnic origin.

4.4.1 Confidentiality

All data was anonymous and confidential. Growers in the region were invited to participate and personally notified of the objectives, and the goals of this study by an individual meeting with HI-CAHS personnel. In addition, a written copy of the study objectives and procedures was given to each grower, and an informed consent was given to each of the participating workers. Farmworkers who agree to participate were assigned an identification number for this study that did not have any relationship with the name of the individual (only aggregate statistics were published). The identification number was recorded in a separate file, and the sheet of paper detached from each survey and kept locked in a file cabinet at Room 135 of the Department of Environmental Health, Colorado State University. Only the investigator had access to that file cabinet.

Questionnaires were administered to workers through a group interview that took approximately one hour to complete. Group interviews were conducted at a time and place convenient for the workers. Most group interviews took place at the workplace and at the migrant camps. Field audits required observing workers in the fields and no communication with the migrant farmworkers. The post-test interview was administered in the same manner as the pre-test interview, but it contained fewer items. The post-test was completed more quickly. All data was obtained for study purposes.

Recruitment took place in person. The purpose of the study was explained to the workers. Potential migrant farmworkers who were willing to participate received a consent form that provided the purpose of the study, the description of the methods, the workers' role in the project, and the option to refuse to participate or withdraw at any time (Appendix I Consent Form). Potential participant migrant farmworkers were informed of the $10 compensation for completing each group interview. Upon agreeing to participate, the worker was asked about time availability for a pre-test interview. Before the pre-test interview began, the investigator obtained two signed consent forms. One consent form was given to the investigator at the time of the interview, and the other retained by the migrant farmworker.

There was a possibility that the respondents might find some of the interview questions objectionable, although most of the questions were not considered to be such. The interviewer was trained to recognize this sort of response and to move on to the next question quickly. Observation of workers in the field did not involve contact with them. The participating workers may have felt uncomfortable under constant scrutiny. Some of the control group workers did not receive HI-CAHS training at the time the training was conducted for the experimental group. The workers in the control group were trained approximately one week after the completion of data collection. Although training was delayed, this was typical for HI-CAHS in providing its services to the growers (all the farmworkers for one grower may receive training which may take a number of weeks before training can begin for employees of another grower).

Migrant farmworkers were informed that they were not required to participate in the study, and that they may withdraw at any time without consequence. During interviews, workers were informed that they were not required to answer any questions they found objectionable, and that they may terminate the interview at any time. Migrant and seasonal farmworkers were at risk from exposure to pesticides. This study should improve the training programs that are designed to reduce that risk. Findings from the study identified critical factors that impede the development of safe work practices so that future programs can be designed to address these impediments. Migrant farmworkers improved their pesticide knowledge and SRP relative to their possibility of exposure to pesticides. This study provided them a better understanding of the risks and the ways to reduce their exposure to pesticides. Workers in the group interview were compensated $20.

4.5 Sample Description

The sample was obtained from the population of migrant and seasonal farmworkers in Northern Colorado (Weld and Adams county). During the 1998 growing season, growers who received HI-CAHS services agreed to participate in this study. Data collection, including the time to invite the growers to participate, took place from May 25 to September 10, 1998.

There were a total of 229 Migrant workers and four growers participating in this study. Each grower was assigned to experimental or control group by flipping a coin. In the case of those growers who had four subgroups, each group was assigned two workers to the experimental group, and two workers to the control group, using the same procedure.

After all of the migrant farmworkers had been recruited, the total number of workers in the experimental or control group was determined by the number of workers needed in each group (experimental or control). This was done in order to keep the number of workers in the experimental or control group equilibrated. The pesticide education program was scheduled according to the grower's schedule and assignment.

Experimental groups received the pesticide education program after the audit and pre-test, and the data collection took place in the 1998 growing season.

Through communication with the grower, farmworkers within work groups were invited to attend the HI-CAHS pesticide safety pesticide education program sessions. The pesticide education program provided training for small groups of workers (based upon the size of the work group of usually 10 to 20) employed by an individual grower. The workers were required to attend a number of sessions. The pesticide education program was conducted for all of the workers regardless of their participation in this study. The pesticide risk reduction program was conducted after working hours at the migrant camps or usually the fields during lunch.

Approximately from 1 to 3 weeks after completion of pesticide education program, investigators arranged post-test audits (of the work groups who had received pesticide education training) from the grower. Just after completion of the audit, the workers were asked to participate in a structured interview that included SRP, pesticide knowledge, Health Locus of Control, and Stages of Behavior components of the pre-test interview. Again, the post-test interview was conducted after working hours at the worker's convenience or at lunch. The time required to administer the post-test structured interview was less than 45 minutes. The post-test included information about agricultural activities and the opinions of participating migrant workers concerning problems in their work environment.

Control group workers (n=75) in a separate work group were administered the pre-test and the post-test and structured interviews that paralleled those conducted in the experimental group. On-site audits were conducted at similar times in the experimental group. The control group received the pesticide education program after the post-test audit (Figure 3.1).

4.5.1 Response Rates

A total of 229 migrant and seasonal farmworkers met the eligibility requirements and participated in the pre-test. They were given consent forms to sign. From the initial sample at the time of the post-test, 152 migrant farmworkers who had taken the pre-test were also available to participate in the post-test. The reason for the loss of 76 migrant farmworkers was that they were not present in the fields at the time the post-test group interview was conducted. Only one migrant farmworker refused to do the post-test after the pre-test was completed. One worker did the post-test who did not have the pre-test. Information on those workers who did not follow-up indicated that there were no statistically significant differences between the sample group and the group lost to the follow-up procedure. None of those workers were included in the statistical analyses.

Even if the migrant farmworker worked for only one grower, there was a possibility that worker would be moved from field to field. When the pesticide education program was conducted, not all the migrant farmworkers assigned to the experimental group were present. Workers who were in the experimental group and were not present when the pesticide education program was conducted, were considered part of the control group in the data analysis (Refer to Table 4.1 and Table 5.2). In that data analysis those workers were compared to the control group workers to ensure that there were no statistically significant differences.

4.6 Study Objectives and Components

In assessing the overall objective and testing the hypothesis, a number of instruments were developed.

Objective 1: To develop instruments to assess the effectiveness of a pesticide education program in terms of knowledge in pesticide safety, modification of SRP, and observed behaviors related to pesticide safety among migrant and seasonal farmworkers.

A structured group interview had a total of six components (Appendix 1): (1) Demographic, (2) Pesticide Knowledge Evaluation, (3) SRP Evaluation, (4) Health Locus of Control, (5) Stages of Behavioral Change, and (6) Safety Audit instruments to record behaviors related to pesticide safety. A description of the preceding components along with some of the important study variables follows.

4.6.1 Demographic and Social Factors

Individuals perceive risks and move through stages of behavior change through complex processes for which cultural factors and beliefs play an important role. Culture provides socially-constructed myths about nature. That is, a system of beliefs is reshaped and then internalized by the individual. This component of the instrument contained items that measured racial, ethnic, and social attributes (i.e., personal control and group cohesion) that may influence risk perception and the adoption of safety behaviors. Some simple demographic characteristics, such as country and state of origin, may serve as surrogates for selected social and ethnic attributes (This item was on the interview). Additionally, information on camp conditions, previous pesticide safety training, previous exposure to agricultural chemicals or adverse health effects of exposure was collected. A limited number of items pertaining to work history and personal habits (smoking and alcohol consumption) was included as they may affect both exposure and health effects.

4.6.2 Pesticide Knowledge Evaluation

The HI-CAHS Pesticide Safety Education and Awareness Program has a number of specific learning objectives. This component of the instruments measured each individual's progress toward them. Many of these items focused upon knowledge, however, a number of questions also assessed attitudes toward pesticide safety.

4.6.3 Safety Risk Perception (SRP) Evaluation

Modern safety interventions, including behavior-based programs, have as their ultimate goal the attainment and maintenance of a safety culture. Risk perception, as well as risk homeostasis, are part of the framework that defines a safety culture. If safety interventions do not change SRP, then safety and health gains are limited (Simonet, 1997). Items from the risk perception and safety culture assessment instrument developed by Geller (1996) have been modified for use in our population of migrant and seasonal workers.

4.6.4 Audit Instrument

An audit was conducted before and after the pesticide education program in the field among study participants to develop and test a field observation instrument that measured pesticide-related safety behaviors. The overall objective of the HI-CAHS

Pesticide Education Program was to modify individual behaviors in a way that reduced the risk of injury and illness. Behaviors that are critical to preventing injury and illness have been identified and are the focus of the pesticide education program. An audit of pesticide-related work activities was conducted by a trained observer. The audit documented, through observation, the clothing and personal protective equipment used by the workers, as well as their personal hygiene practices. Data also included pesticide education program documentation, emergency phone number postings, and posted pesticide safety information. Information about the duties performed at the time of the audit was recorded as the personal protective equipment requirement varied by task.

Objective 2: Evaluate the consequences of the health locus of control and stages of behavior change in the pesticide and safety education program among migrant and seasonal farmworkers served by HI-CAHS in the State of Colorado during the 1998 growing season.

The group interview included two additional components (Appendix 1): (5) a component which contained items related to Stages of Change/Self-reported Safe Behavior, and (6) Health Locus of Control. A description of these components along with some of the important study variables follows.

4.6.5 Stages of Change

The Stages of Change Model was used to assess the workers as they attempted to change specific safety behaviors. Behaviors that were desirable outcomes of the HI-CAHS pesticide safety education program included wearing appropriate clothing, washing work clothes separately, wearing safety glasses, and washing hands prior to eating, drinking, and going to the toilet. Four specific behaviors were examined using the Stages of Change Model: wearing long sleeve shirts, wearing long pants, washing hands before eating, using the portable potty, and separating clothes before washing them after working in the field. A comprehensive framework was obtained by isolating the stages of behavior as they occurred. Following the Stages of Behavior Change Model, the workers were asked a number of questions pertaining to actual workplace behavior. Since safety behavior was contingent upon field conditions at the time, the Stages of Behavior Model was modified adding the option " Only when available."

4.6.6 Multi-dimensional Health Locus of Control

Multi-dimensional Health Locus of Control (MHLC) scale -form A. The MHLC measured the Health Locus of Control, which was the extent to which individuals believed their health outcomes were under their own control, under the control of powerful others, or the results of chance occurrences (Wallston, Wallston & DeVellis, 1978). Three sub-scales measured (A) Internal Health Locus of Control (IHLC), (B) External Chance Locus of Control (CHLC), and (C) External Locus of Control by Powerful Others (PHLC). Each form had 18 items with each of the three sub-scales having 5 items. A 5-point Likert format included responses ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Normative means have been established for adults on each sub-scale. The IHLC was negatively correlated, $r = .30$; $p < 0.01$, with the PHLC, and positively correlated with its counterpart in Levenson's Internal, Powerful others and Chance scales, $r = .57$; $p < 0.001$ (Wallston & Wallston, 1981).

5.0 RESULTS

The purpose of this study was to evaluate the effectiveness of a culturally relevant pesticide risk reduction program in improving the knowledge in pesticides and the safety risk perception (SRP). In order to evaluate the relationship between attitudes and beliefs, pesticide knowledge, and SRP of the migrant and seasonal farmworkers, the association between the attitudes and beliefs and the pesticide knowledge or SRP was measured by the multiple health locus of control (MLHC) and the stages of change models.

This chapter describes the results obtained from using graphical and statistical methods which include Chi Square, Kruskal-Wallis, T-test, linear and logistic regression, correlation analysis, and analysis of covariance. These tests evaluated the between pesticide knowledge and SRP (dependent variables) and the demographic and occupational factors (independent variables) included in this study relationship between pesticide knowledge and SRP (dependent variables) and the demographic and occupational factors (independent variables) included in this study. Frequency distributions and the means of the values of specific dependent variables among the experimental and control groups were also compared. The null hypothesis was that the experimental and control groups were not different from one another in terms of the distribution of values of the outcome variables. Statistical significance was based on differences in the mean values of the dependent variables between the groups.

The association in pesticide knowledge and SRP with stages of change and health locus of control (HLC) was measured to evaluate the application of these health models in health and safety education programs. The effects of the risk reduction program in the migrant farmworker behavior was measured by the use of the HLC and stages of change models.

The independent variables chosen for analysis in this section were factors related to the demographic and occupational background of the farmworkers, that might affect their knowledge of pesticides and SRP. The results of this analysis determined which factors and conditions were included in the later confirming analysis. This analysis was also pertinent to deciding which independent variables were included in the multi-variable analysis when differences between the experimental and control group were found. Those results are presented in Section II.

The results of the preliminary analysis are divided into two sections. First, Section I describes the demographic factors among the migrant and seasonal farm workers participating in this study. Section I also identifies the factors that had an impact upon pesticide knowledge pretest and SRP pretest among migrant and seasonal farm workers. Those factors were entered as covariates or as factor variables to assess their impact, and to control for their effects in a later analysis, while exploring the relationship between demographic and occupational factors, pesticide knowledge, and SRP. The results in Section I were based on purely univariate data analysis, while methods of stratification and statistical control for potential confounding factors were used to obtain the results presented in Section II.

In Section II, the results were presented in the order in which the analysis was conducted. However, the findings that had a significant impact upon pesticide knowledge and SRP were based upon the results in Section I, and adjusted to account for the effects of the dependent variables. For example, the effects of age on the post-test pesticide knowledge and post-test SRP were determined as a function of experimental group indicator using pre-test score as a covariate. Then, when other potential confounders were identified, an analysis was performed that would adjust for these confounding factors. Using this logic, (in sequencing of the analysis) the factors requiring control were identified, and their effects accurately quantified. Thus, potential confounding factors that needed to be controlled were identified.

In addition to evaluating the effect of the independent variables in their relationship to pesticide knowledge and SRP, tests were conducted to assess the presence or absence of an interaction between potential demographic and occupational factors. The selection of independent variables in the preliminary analysis, was based upon the value of each of these independent variables to explain the components of pesticide knowledge and SRP (dependent variables). Analysis of covariance (ANCOVA) was used to construct multiple regression analysis models in order to elucidate the relationship between demographic and occupational independent variables, pesticide knowledge, and SRP components. This modeling methodology allowed for the assessment of the overall fit of each model along with other checks included in the modeling assumptions. The statistical software provided diagnostic tests for detecting the effects of outliers. A manual check for residuals plotted against predicted values, as well as the residuals against each independent variable was conducted to detect important violations of model assumptions. Computations of critical values were performed by using tables of the extreme tails of the t-distribution with the appropriate number of degrees of freedom. The Table for Critical Values for the Outlier Test was used entering in the row the corresponding to the sample size (n~150), and the column corresponding to the number of parameters (α=0.05) (Weisberg, 1980).

5.1. Section I

5.1.1 Description of the Sample

Study Population

The study sample was drawn from a population of Northern Colorado migrant farm workers in Weld and Adams Counties. Six growers were contacted to participate in this study. Of those growers, four permitted the researchers to invite their farmworkers to participate in the program. The four growers hired approximately 404 migrant farm workers for the 1998 season, who were then contacted to participate in the study. Of the 404 migrant farm workers, 229 consented to participate. This resulted in a participation rate of 57%. Of the 229 migrant workers participating in the study, 77 dropped out (34%). Those seventy seven workers were not present in the fields at the time the post-test group interview was conducted.

A summary of the frequency data for the remaining 152 migrant farm workers (n=152) is described below. There were a total of 77 migrant farm workers (51%) in the experimental group, and 75 migrant farm workers (49%) in the control group in the final data set. The distribution of migrant workers by gender and age is presented in Table 5.1. The study population was comprised of 123 males (85%) and 23 females (15%). Of the females, 61% were in the experimental group. The mean age (± the standard error of the mean [SEM]) of the migrant farm workers in the experimental group (33.34 ± 1.36) was higher than in the control group (27.59 ± 1.28) ($p < 0.002$). There was no difference in the average age of the groups by gender. The ethnic composition of the study population was Hispanic for all migrant farm workers. The distribution and assignment of growers to experimental or control groups is represented in Table 5.2. This table provides a description of the two study groups classified by grower, and the crops in which the migrant workers labored when this study was conducted.

Literacy information is presented in Table 5.3. Literacy factors were evaluated by number of years of formal education, and reading and writing skills in Spanish and English. Of the majority of migrant workers, 40% (46 out of 115 migrant farm workers) reported to have less than an elementary education. In addition, the self reported level for literacy in Spanish and English did not indicate differences between the experimental and control groups.

English literacy was reported to be low for both groups. Literacy in Spanish reported as 'good' to 'very well' for experimental and control groups (Table 5.3 and Table 5.4). There were no significant statistical differences in literacy factors between experimental and control groups. Although the majority of the group (84%) reported to have an education up to Elementary School level, (Table 5.3) the higher levels of education were reported among workers who were less than 30 years old (Figure 5.1).

The agricultural activities during the 1998 Season among the migrant and seasonal farm workers classified according to experimental or control groups are displayed in Table 5.6. This table reflects the differences between treatment and control groups that were recorded at the time of the pre-test. The control group had a higher number of migrant workers compared to the experimental group, relative to harvesting, weeding, and working as flagger in the fields (<0.05). However, those differences did not persist throughout the data collection. By the end of the study, the activities of the control and experimental groups had become so similar that their earlier statistically significant differences, as reflected in the post-test results, no longer existed.

The agricultural activities reported by all participating migrant and seasonal farm workers are presented in Figure 5.2. The agricultural activities were mainly harvesting (86%) and weeding (80%). The description of demographic factors reported are presented in Table 5.7 and classified according to experimental and control groups. Slightly over half of the respondents (55%) reported that they were currently alcohol consumption Frequency of drinks per week ranged from 1 to 48. The mean frequency of alcohol consumption was 6.45 per week. Of the migrant farmworkers who were smoking cigarettes, 30% smoked 1 to 20 times per day. The mean frequency of cigarette smoking was 5.7 per day.

There were no differences in the distribution by groups according to Country of Origin and Home Country. Differences between experimental and control groups occurred only when home states were grouped according to the United States (as a Home State) versus the Mexican states (as Home State). The experimental group had a higher number of migrant farmworkers with a Home State within the United States when compared to the control group ($p<0.05$). The Home State reported by the migrant and seasonal farmworkers (Figure 5.3). Forty five percent of the sample reported Guanajuato as their Home State; 16% reported Mexico State; 13% Zacatecas; and 9% Texas. The rest of the reports were less than 5% for each state.

Relevant agricultural experience factors among the migrant and seasonal farmworkers are presented in Table 5.6 (Con't.). Sixty-five respondents reported that they had been working in agriculture in states other than Colorado. Figure 5.4 presents each of the states within the United States that the respondent mentioned when asked if there were other states they had worked in agriculture. The five states that were reported most frequently were Florida (24%), California (21%), Arizona (15%), New Mexico (12%), and Texas (10%). Each migrant worker mentioned all of the states in which they had ever performed agricultural work. In Figure 5.5, the number of states per each migrant worker is represented. From a total of forty seven responses, 57% have worked in agriculture in another state in addition to the State of Colorado. Those who had worked in two states in addition to the State of Colorado represented 30% of the respondents. Nine percent of the respondents had worked in three other states, other than Colorado.

There was statistically significant difference in experimental and control groups in 'being the first time coming to work as migrant farm worker' ($p< 0.05$). In addition, agricultural experience factors were different between experimental and control groups, such as the duration in months of agricultural work experience and length of time in months working with the same grower ($p< 0.05$).

The percent of jobs or occupations that were reported by the migrant and seasonal farmworkers when they were asked what type of work they performed when not working in agriculture are represented in Figure 5.6. The percentage of responses for jobs or occupations included unemployment (26%). This status was reported as a two-month rest, or as looking for employment. General industry (17%), construction jobs (15%), and florist (15%) were among the jobs and occupations more frequently described by the migrant farmworkers.

Nine percent of the study participants (n=13) reported experiencing pesticide symptoms. Table 5.7, presents the group of workers who reported experiencing pesticide intoxication symptoms. The activities reported previous to the time the symptoms occurred were: applying pesticides, harvesting, weeding, and unspecified. Only four migrant farmworkers reported consulting a doctor due to pesticide symptoms (31% of those who experienced pesticide symptoms).

The Environmental Protection Agency (EPA) and the Occupational Health and Safety Administration (OSHA) require that agricultural employers of eleven or more workers provide drinking water, hand washing facilities, and toilets for their employees. Table 5.8 describes the field conditions reported by the migrant farmworkers. Some of the respondents reported significantly different field conditions between experimental and control groups. The experimental group reported more soap and towels available in the fields, as compared to the control group($p < 0.05$). This difference persisted at the time of the post-test only for towels in the field ($p < 0.05$). The self reported safety behavior during agricultural activities reported by migrant workers is represented in Table 5.9

Statistical significant differences in behavior occurred in the experimental group that reported wearing gloves more than the control group ($p < 0.05$).

To evaluate what were the main concerns reported by migrant and seasonal farmworker this survey asked: In your opinion what are the main problems that the migrant farmworkers are facing today? This was a open question with examples (Appendix I, Post-Test). The responses are presented in Figure 5.7. Salary was reported as a concern in 33% of the respondents, followed by housing (23%), worker safety (18%) and immigration (16%).

5.2 Section II

5.2.1 Results of the Preliminary Analysis

Age of the respondents was negatively correlated with the number of years of education (Pearson Correlation Coefficient: -0.387; $p < 0.001$). The number of years of education, according to the linear regression model, was found to be inversely reciprocal to the number of years in age migrant farmworkers (Appendix II). According to the results of the linear regression model, the age of the migrant farmworker can be used to predict the number of years of education:

$$\text{Education (years)} = 8.46 + (-0.093 * \text{Age}).$$

In addition, age at the time of the study, was a good predictor ($R^2 = 0.15$, $p < 0.001$) for agricultural experience with the grower in the U.S. and in Mexico. The predictive models for total time worked in agriculture in the United States (U.S.) and in Mexico are as follows:

Time in months working in Agriculture in U.S. = -54.18 + 3.84*Age;

Time in months working in Agriculture in Mexico = -53.75 + 6.37*Age;

Time in months working with same grower = -24.25 + 2.20*Age.

All variables of agricultural experience had a proportional relationship to age. The linear regression models of the predicted values for each variable are shown at Appendix II.

5.2.2 Pesticide Knowledge Component

The initial pesticide knowledge pretest included 21 questions. One of these questions in the safety component was excluded from the analysis because it was confusing.[1] There were two analysis; one with 21 questions and another with 20 questions. The confusing question was eliminated in the interest of accuracy. This safety section was evaluated on the basis of six points.

Pearson correlation analysis was conducted to assess the association between pre and post test pesticide knowledge (r^2=.20, p<0.001). The pretest pesticide knowledge component was evaluated by a t-test that compared means for continuous variables, the Kruskal-Wallis test for categorical variables, and the general linear model to control variables. Table 5.10 represents unadjusted score means for the pesticide knowledge components in the pre-test. There was no statistically significant difference between groups in this score for pretest pesticide knowledge between the experimental and the

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Question # 94 in the pretest said I should always wash my clothes separately from my other clothes (Appendix I Pretest). And question # 89 in the Post-test I should separate my work clothes from my non-work clothes when doing laundry, only if pesticides have been applied.

control groups (Table 5.10). In addition, no differences were detected between the experimental and control groups in the unadjusted pre-test knowledge scores when the sub-scores were computed for the sections in pesticide absorption, first aid, safety, sources of pesticides, and toxicity (Table 5.10). Unadjusted score means in the pre-test pesticide knowledge score by demographic characteristics and occupational background showed no difference between the experimental and control group. The null hypothesis that the experimental and control groups were not significantly different from one another in the pre-test pesticide knowledge score means cannot be rejected ($p > 0.813$). Selected demographic and occupational independent variables are represented in Table 5.11. The rest of the demographic and occupational variables are not shown. There were no statistically significant differences between the experimental and the control group in the pre-test knowledge score.

Unadjusted scores means for post-test by sections in pesticide knowledge and overall knowledge pesticide score are summarized in Table 5.12. When considered by sections, the differences were from 3% to 14%. The experimental group score in the post-test was higher when compared to the control group for absorption, first aid safety and toxicity ($p<0.05$). Statistically significant differences ($p<0.05$) were found in the overall unadjusted means of post-test knowledge score when the experimental group was compared to the control group. The null hypothesis that the experimental and control groups were not different in the post-test pesticide knowledge score means from one another can be rejected ($p < 0.001$).

Table 5.13 presents the correlations of pre-test pesticide knowledge and literacy: years of education, reading and writing ability in English and Spanish. Data from the five items measuring literacy were subjected to principal component analysis. Principal component analysis was used to reduce the number of variables in subsequent data analysis. The number of meaningful factors was two. Therefore, the reduction of literacy variables went from five to two, keeping the uncorrelated nature of those literacy factors. As a result, the new variables called 'Liter 1' and 'Liter 2' were used when adjusting for education, reading and writing in English and Spanish in the analysis of the effect of training in the pesticide knowledge component, in the comparison between experimental and control groups. A complete description of the principal component analysis is presented in Appendix II (Principal component for education, reading and writing in Spanish and English). From the principal component information, the variability explained by the first variable called 'Liter 1' is due to education. The variability explained in 'Liter 2' is due mainly to reading and writing in Spanish. The overall variability explained using these two new variables is 92.5%.

Table 5.14 presents the correlations in the pre-test for age and agricultural work experience. Given that Pearson correlation was significant ($p<0.05$) among age and agricultural work, the principal component analysis was used to include age and agricultural experience maintaining the orthogonal (uncorrelated) nature of the factors. The principal component analysis for agricultural experience is shown in Appendix II. A complete description of the principal component outcome is presented in Appendix II (Principal Component for Agricultural Experience and Age). The new variable including age and agricultural experience was called 'Life 1'. The total variability explained by using the new variable is 80%.

Effects of Selected Demographic and Occupational Factors

The factors that were found to be significantly different in the experimental and control groups were as follows: age, agricultural experience, length of time working with grower, agricultural activities when the study was conducted, first time as a migrant farm worker, field conditions, and wearing gloves during fieldwork (Appendix II Multiple Regression Models Primary Analysis).

To assess the statistical significance of the effect of the risk reduction program in the experimental group, an analysis of variance was performed (Table 5.15). The number of migrant farmworkers in the sample are shown under the column "n". It should be noted that for some conditions, not all of the 152 migrant farmworkers responded to particular questions. Multiple regression analysis of demographic factors indicated that age, applied as a factor variable with six levels, had a significant effect ($p<0.05$) on pesticide knowledge in the post-test (Table 5.15). When analysis of age was included as continuous variable, the effect was not statistically significant.

The results of the analysis was that there was a need to control for age group in pretest pesticide knowledge in investigating the relationship of other independent variables with the effect of training. In subsequent analysis, involving the assessment of the effect of other independent variables on the post-test pesticide knowledge, mean score age as a continuous variable, was included as 'Life 1.' In order to evaluate the effect of training in pesticide knowledge due to training in the experimental group when compared to the control group, an analysis of the demographic and occupational factors that were significantly different between the experimental and control groups were performed by multiple regression using the general linear model. From Tables 5.15 to Table 5.22, the effect of training in the experimental group were shown when adjusted by the variables that were found to be significantly different between experimental and control groups. The differences in the post-test pesticide knowledge was compared between the experimental and control groups using as a covariate the pesticide pre-test knowledge score (Cox, 1958). The effect of risk reduction program measured as pesticide knowledge and SRP group remained statistically significant in the experimental when compared to the control group ($p<0.05$) after including the independent variables that were statistically significant different between groups.

Effects of Previous Training in Worker Protection Standard

Completion of the required Worker Protection Standard (WPS) training under the Environmental Protection Agency (EPA)for the migrant farmworkers in Colorado is described in Figure 5.8. Migrant farmworkers reported to have a card certifying the WPS training in 27%, migrant farmworkers reported to had received WPS training in 37% . The High Plains Intermountain Center for Agricultural Health & Safety (HI-CAHS) was reported as the provider for the WPS training in 30% of the migrant farmworkers during the previous years. Table 5.11 presents the pre-test knowledge score according to the WPS card and WPS training.

There was no difference between the experimental and control groups by blue card status or previous WPS training. There was a statistically significant difference in the pre-test knowledge score (Table 5.11) when it was compared to the migrant and seasonal farmworkers who had a blue card or prior to WPS training, versus the migrant and seasonal farmworkers who did not have the WPS training or card ($p<0.05$).

Differences in Selected Independent Variables and Pesticide Knowledge

The pesticide knowledge score in the post-test was statistically significant greater in the post-test pesticide knowledge score for the experimental group. This difference remained after adjusting for all the variables that were different between the experimental and the control groups. Appendix II (Multiple Regression Models Primary Analysis) includes a complete description of the models for the variables that were significant ($p<0.05$). The least square means of the multiple linear regression by general linear model for the knowledge pesticide score in the post-test indicated that the value increased with the group indicator(in the experimental group). The positive direction of the relationships, all with *p-values* less than 5%, supported the hypothesis that the risk reduction program favors pesticide knowledge gain. The regression coefficients for the pesticide knowledge post-test score were positive, indicating positive linear relationships.

After the general linear models for multiple regression analyses were performed, the plots of residual values for all analyses did not indicate any major violations of the modeling assumptions. The 27.5% difference in the mean values between the experimental and control group in pesticide knowledge, was statistically significant, and no trend was detected in the plot of residuals. Significant levels for the outlier test were used ($\alpha=0.05$; Weisberg, 1980).

5.2.3 Safety Risk Perception (SRP) Component

The Safety Risk Perception (SRP) among migrant and seasonal farmworkers was assessed through a t-test for comparing two means and multiple linear regression by general linear model after the data were arranged by experimental and control groups.

Table 5.23 shows the results obtained from the comparison of means in the pre and post-test SRP. Analysis shows no difference in the pre-test SRP between the experimental and control groups. Complete responses for the SRP score were recorded for 129 subjects. The SRP average (SRPA) was weighted by the number of respondents in order to consider a total of 151 respondents. One respondent was excluded from this analysis due to the fact that when the pre-test was taken, this worker had to leave to get medical attention at a health services van. This migrant farm worker completed all of the pre-test but the SRP component.

There was no statistical significant difference in the pretest of the unadjusted means for SRP by experimental and control groups (Table 5.23). Migrant farmworkers with previous WPS training had statistically significant different better SRP (lower score) than the migrant farmworkers who did not have the previous WPS training. There was statistically significant difference in SRP between the migrant workers that had WPS training in the experimental group (score of 2.38) than the migrant workers who had the WPS training in the control group (score of 2.08) ($p < 0.05$, Table 5.23). There was no difference in SRP in migrant workers by age group. Farmworkers that reported United States (US) as their Home Country had a better SRP than those reporting Mexico as their Home Country ($p < 0.05$, Table 5.23). There were significant differences between the gender groups in their SRPA. Females had a lower score when compared to males ($p < 0.001$, Table 5.23). The migrant farm worker women had significantly better SRP than the migrant farm worker males. The null hypothesis that the experimental and control groups were not different in the SRP means from one to another, can not be rejected ($p > 0.908$). In the post-test results of the SRPA, the null hypothesis that the experimental and control groups were not different in the SRP from one another can be rejected ($p<0.001$).

Effects of Selected Demographic and Occupational Factors

Factors that were previously found to be statistically significantly different between experimental and control groups were considered in evaluating the effect of the risk reduction program in SRPA between the experimental group compared to the control group. The results from the multiple linear regression by analysis of covariance (ANCOVA) using the demographic and occupational variables provided evidence to support that there was a difference in the SRPA post-test when compared in experimental and control groups.

Tables 5.24 to Table 5.31 presents the results of the ANCOVA along with the probability from the F-ratio for each independent variable adjusted by previous SRP score in pre-test and group status. The result of the ANCOVA and multiple linear regression, using the independent variables that differed between the experimental and control groups, provided evidence to support the hypothesis that differences in the SRP were statistically significant when comparing the experimental to the control group ($p<0.05$).

The general linear model used for multiple regression analysis (ANCOVA) showed the decrease in means to be significantly associated with the effect of being in the experimental group. Models were using the pretest SRP as a covariate. The plots of residual values for all analyses after the general linear model for multiple regression analyses were performed, did not indicate any major violations of the modeling assumptions. The 3% difference in mean values was statistically significant. Plots of residuals indicated no measurable trend. Significant levels for the outlier test were used (α=0.05; Weisberg, 1980).

5.2.4 Health Locus of Control

The purpose of including the health locus of control (HLC) in this study was to evaluate the association of HLC and the pesticide knowledge and SRP of migrant and seasonal farmworkers. The null hypothesis stated that there would be no significant association in Multi-dimensional Health Locus of Control (MHLC) orientation and the post-test scores of pesticide knowledge, and SRP between the experimental and control group.

The mean scores of HLC scores for the total sample in the pre-test and post-test are presented in Table 5.32. From the pre-test scores, 67% of all samples scored less than 25 for IHLC. Only 5% scored less than 20 in PHLC, and 16% had an score of equal or less than 16 in CHLC. All the means for these scores were not close to the 'normative means' of 26.5, 18.3, 15.0, respectively, that were established by Wallston and Wallston (Brown et al., 1983). The sample for this study appears to be more external than those reported by Wallston and Wallston (1985). Table 5.33 represents the mean values of health locus of control in the pre-test scores by group indicator among the migrant workers participating in the evaluation of the pesticide program.

There was a statistically significant difference in the experimental group with a lower IHLC mean than the control group (Table 5.33; $p < 0.02$). Table 5.34 displays the mean values for health locus of control by group indicator in the post-test. There was no difference between groups in the post-test score. In a t-test comparison of pre-test and post-test scores, there was no difference ($p< 0.05$) between the experimental and control group. The associations from pre to post-test for the HLC scores were significant for IHLC ($r= 0.43$, $p<0.001$), PHLC ($r= 0.48$, $p<0.001$) and CHLC ($r= 0.52$, $p<0.001$). Appendix II presents the complete correlation analysis (Health Locus of Control Correlation).

Associations were found between age and PHLC ($r= 0.31$, $p<0.001$); and CHLC ($r= 0.20$, $p< 0.016$). Demonstrating that an overall trend existed with older subjects more likely to have higher PHLC and CPHLC scores. Education was found to be associated with PHLC ($r= -0.35$, $p< 0.001$); and CHLC ($r= -0.43$, $p< 0.001$). Workers with less education were more disposed to have higher PHLC and CPHLC scores. There was no association between age or education and IHLC scores.

Overall, there were no statistically significant differences between the MHLC scores from pre- to post-test ($p<0.05$). The MHLC scores were used to determine if there were any changes in the three categories of HLC as a result of the risk reduction program for the migrant and seasonal farmworkers. The general linear model was used to analyze the data. Three separate general linear models (ANOVA's) were performed, one each on IHLC, PHLC, and CHLC because MHLC designates a tendency towards one sub-scale of HLC. There was no statistically significant effect on any of the HLC orientations due to the risk reduction program.

Least square means was used to evaluate the statistical significant differences in MHLC by age group using as covariate the correspondent pre-test score for each one of the three categories. The information is presented in Tables 5.35 and 5.36. There were more differences between age groups from the pre-test to the post-test scores in the IHLC.

Although the differences in the PHLC between the groups 21-30 and 41-50 were statistically significant in that score, those categories were not statistically significant in the post-test score (Table 5.36). Similarly, the differences in age groups in category CHLC from ages 18- 20 to 51-60 were statistically significant in the pre-test scores (Table 5.35), they were not statistically significant in the corresponding categories in the post-test scores (Table 5.36).

In order to determine if age was a predictor of MHLC, three separate analyses were performed. A linear regression model was performed on each category of HLC according to age groups and evaluated in three separate analyses. Each regression model was intented to predict IHLC, PHLC, and CHLC by age group. The complete outcomes of the regression models are presented at Appendix II (Age Group as a Predictor of Health Locus of Control). These models showed that as the migrant workers become older they are more likely to increase their external health locus of control in PHLC and CHLC ($p<0.05$). This effect persisted when age was used as a categorical variable ($p<0.05$).

Analyses by regression models (ANCOVA) were performed to evaluate the differences in pesticide knowledge scores among migrant workers by category pertaining to health locus of control (HLC). The models were significant for the IHLC component ($p<0.05$). A plot of the predicted values is presented at Appendix II (Health Locus of Control as a Predictor of Pesticide Knowledge Scores). The slope of the predicted value indicated that a migrant farm worker who had a high score for IHLC would have a high pesticide knowledge score. A migrant worker who had a low IHLC score would have a low pesticide knowledge score. These models were adjusted by group status, and the effect of the IHLC on the pesticide knowledge score persisted ($p<0.05$).

Table 5.37 presents the mean values of health locus of control recorded in the pre-test by selected variables in the group of migrant workers. Migrant and seasonal farmworkers were found to have higher PHLC and CHLC when they reported to have been told that pesticides were applied in the fields, as opposed to the farmworkers who reported that they were not told that pesticides were applied in the fields ($p<0.05$). Migrant farmworkers who reported to work in agriculture all year had higher external health locus of control scores for PHLC and CHLC when compared to the migrant workers who did not report to work in agriculture all year ($p <0.05$).

Table 5.38 presents the mean values of health locus of control recorded in the post-test by selected variables and migrant farmworkers. Higher scores in CHLC were found in two variables; migrant farmworkers who reported to have been told that pesticides were applied in the fields, and farmworkers who reported to have been working in agriculture all year ($p<0.05$).

The SRP scores in the post-test were statistically significant and correlated with the MHLC in the pretest as follows: IHLC scores ($r= -0.21$ and $p< 0.011$) , PHLC scores ($r= -0.34$ and $p< 0.001$), and CHLC scores ($r= -0.31$ and $p< 0.001$). The scores for MHLC were statistically significant when correlated to pretest knowledge scores in the following manner: IHLC scores ($r= 0.29$ and $p< 0.001$) , PHLC scores ($r= -0.22$ and $p< 0.008$), and CHLC scores ($r= -0.17$ and $p< 0.038$). Appendix II presents the complete Correlation Analysis (Health Locus of Control Correlation).

5.2.5 Stages of Change

This study included Stages of Change. This is designed to detect the relationship between the degree of change in the subject's four selected behaviors and the changes in the pesticide knowledge and SRP scores. This Stages of Change model is based upon the Prochaska Stages of Behavior Change model which promotes a similar pattern of occupational health and safety intervention. This model is used to precipitate behavioral changes for health and nutrition programs. It is the aim of this study to promote an risk reduction program that gradually induces the migrant worker to change harmful behaviors in pesticide use.

The null hypothesis was that there would be no statistically significant difference in migrant farmworkers' changing their stages of behavior as a result of this educational intervention program. The association of stages of behavior, knowledge of pesticides, and SRP as articulated through the experimental and the control groups, was evaluated. The length of time between the pre-test and post-test was from 7 to 18 days for the experimental group and 7 to 14 days for the control group. Table 5.39 represents the number of migrant farmworkers at each stage of change by group status. Overall the percentage of migrant workers during the first three stages (precontemplation, contemplation and preparation) called 'pre-active stage' was low. This pre-active stage for wearing a long sleeve shirt was 14 % in the experimental group and 7% in the control group. Pre-active stage for wearing long pants was 14% in the experimental group and 11% in the control group. Washing hands before eating, smoking or using the portable potty while working in the fields had a pre-active stage of 17% for the experimental group and 14% for the control group. Pre-active stage for separating clothes before washing them was 8% for the experimental group and 4% for the control group. Some of the stages had no workers, for example there was no workers in the preparation stage for separating clothes, no workers in contemplation stage for wearing long pants. Because of these low frequencies in the pre-active stages the rest of the analyses were conducting grouping the pre-active stages as one stage.

Part of this study's hypothesis was to determine if the individuals in the 'active' stages of change were more receptive to the educational intervention. The first three stages were grouped along with the migrant workers who responded 'no' to all of the stages of behavior questions as 'pre-active' stages. The 'pre-active' group was then considered as the baseline stage for the logistic regression analysis.

The logistic regression model was used to evaluate the probability of a migrant farmworker's improvement to a higher stage of change in the stages of change model. This model was a function of experimental group indicator, pesticide knowledge score at pre-test, and SRP score at pretest. Table 5.40 shows the independent variables that were statistically significant in predicting improvement in the individual worker's stages of behavior. A complete output analysis is displayed in Appendix II (Logistic Regression Models for Improvement in Stages of Behavior).

Agricultural work experience was found to be a good predictor of improving the worker's behavior in wearing a long sleeve shirt ($p<0.05$). The probability of improving the worker's behavior in wearing a long pants when working in the fields, was statistically significant in the experimental group in the active stage ($p<0.05$). SRP in the pre-test score was a statistically significant predictor of improvement in the stages of behavior in washing hands when working in the fields before using the portable potty or before eating ($p<0.05$). The odds of improvement in the workers stage of change for each unit of SRP was 3.83 higher. The probability of improving workers' stages of behavior in separating clothes before washing them after working in the fields was predicted by the following: IHLC, PHLC, CHLC, the SRP pretest score, and the worker's preexisting behavior in the maintenance stage of separating work clothes ($p<0.05$).

The education program was designed to promote the permanent adoption of newly learned health and safety behaviors (termination stage). The multi-category logistic regression model was used to predict the probability of reaching and maintaining the termination stage by identifying the factors associated with the termination stage for each of the four behaviors. A summary of the final models is presented in Table 5.41. Complete output results of the analysis are presented at Appendix II (Logistic Regression Models for Termination Stage).

The probability of being in the termination stage in wearing a long sleeve shirt while working in the fields was statistically significant for the experimental group when compared to the workers who were in the control group. Termination stage of wearing long sleeve shirt was also significant when the worker was previously in termination stage ($p<0.05$). The termination stage for washing hands before using the portable potty and before eating, was statistically significant with the independent variable constituted by age and agricultural work experience ('Life 1') ($p<0.05$).

The probability of improving workers' stages of behavior in separating clothes before washing them after working in the fields was predicted by the following: IHLC, PHLC, CHLC, the SRP pretest score, and the worker's preexisting behavior in the maintenance stage of separating work clothes ($p<0.05$).

Analysis of covariance (ANCOVA) by the general linear model was conducted to determine if differences in pesticide knowledge and SRP scores were significant at each stage in the stages of change model in the experimental and control groups of migrant and seasonal farmworkers. A comparison of the pesticide knowledge mean scores in the post-test of each of the four stages of change was conducted using least square differences (Tukey's method) given that this study had unequal sample sizes. Results are presented in Table 5.42.

The mean scores in pesticide knowledge were higher for the workers who were in Termination stage as compared to the workers who were in Action stage for wearing long pants. The mean score for SRP in washing hands before using the portable potty and before eating was statistically significant (ANCOVA, $F = 27.00$, $p<0.001$). Migrant workers who were in Termination stage had a lower score for SRP than workers who were at Action and Pre-active stages ($p<0.05$).

5.3 Results of the Primary Analysis

The overall objective of the study was to investigate the effectiveness of the risk reduction program in pesticide knowledge, SRP, and pesticide safety behaviors among the migrant and seasonal farmworkers. The effectiveness was measured also using the Multi-dimensional Health Locus of Control and the Stages of Change to determine the association of the attitudes and beliefs of the workers with the effectiveness of the risk reduction program. The analysis for the two dependent variables, pesticide knowledge and SRP, was conducted using statistical methods relevant to continuous dependent variables.

The preliminary analysis identified independent variables in order to isolate specific data from the samples. This analysis was also used to identify the independent variables which required control in further analyses. The result of this assessment of the relationship between demographic and occupational parameters presented here are based on the data in the restricted sample. The effects of factors which were identified in the preliminary analysis to have an impact in pesticide knowledge or SRP (dependent variables) were entered in the ANCOVA's procedures as covariates of these dependent variables to further assess their impact and to control for their effects.

5.3.1 Effects of the Pesticide Risk Reduction Program in Pesticide Knowledge

Pesticide knowledge was evaluated by the analysis of variance, t-test and Kruskal-Wallis analysis after data were arranged by experimental and control group. Multiple regression was used to construct models to elucidate the relationship of pesticide knowledge to agricultural work experience and demographics. This methodology checks upon modeling assumptions and the overall fit of each model.

Statistical software provided a diagnostic test to detect outliers that may have biased the outcome estimates. A manual check of residuals plotted against predicted values, as well as the residuals plotted against each independent variable, was conducted to detect important violations of assumptions ($\alpha = 0.05$). Based in the two sample t-test the means were significantly different between the experimental and the control group for the post-test knowledge and post-test SRP. There was an higher score in post-test of pesticide knowledge in the experimental group when compared to the control group. This higher score in pesticide knowledge reflected that the experimental group improved their pesticide knowledge. Furthermore, there was a lower score in SRP in the experimental group when it was compared to the control group. The lower score in SRP indicated that the migrant farmworkers in the experimental group raised their awareness of SRP.

Analysis of covariance (ANCOVA) was used to account for the factors that were statistically significant different between the experimental and the control group in the pesticide post-test knowledge. The model used the pretest pesticide knowledge as a covariate. The first steps in the multiple regression analyses kept the covariate into the model and included all independent variables one by one to detect which of the independent variables were statistically significant for post-test pesticide knowledge (dependent variable). The same procedure was used in measuring the effects of the risk reduction program related to pesticide knowledge and SRP. The results of ANCOVA analyses.

The next step was done through multiple regression analysis, in which general linear models used the pre-test scores for pesticide knowledge as a covariate into the model along with the variables that were found, in preliminary analysis, to be different between experimental and control groups. The statistically significant models are presented in Table 5.43 as results of the previous analyses The plots of residual values for all analyses did not indicate there was any evidence for major violations of the modeling assumptions and the outliers were assessed by The Table for Critical Values for the Outlier Test (α=0.05) (Weisberg, 1980).

Multiple linear regression, in which only independent variables that were significant ($p<0.15$), were included for further analysis. This procedure provided more information in eliminating some of the independent variables that were no significant on the effects of the risk reduction program in pesticide knowledge and SRP. Negative regression coefficients (β) indicated that a negative relationship existed between the variables. The final regression models were those in which the main effects of the pesticide risk reduction program were statistically significant ($p<0.05$). These are presented for pesticide knowledge at Table 5.44 which shows the least square estimators of the regression parameters of the models of the experimental and the control groups. The results of these regression analyses were consistent with the results obtained from the initial unadjusted comparison of means by t-test.

In the regression analysis, age was not included in the model as its effects were not significant ($p<0.15$). When age was included as "Age Groups," the effects were significant ($p<0.15$). Age was included in all the models as a continuous variable using the principal component analysis along with agricultural work experience ('Life 1'). The final regression equation describing the effects of the pesticide risk reduction program in pesticide knowledge is shown below:

Pesticide Knowledge Post-test = 11.10 + 0.21*Pesticide Knowledge Pre-test+ 2.19*Group Indicator

The regression coefficient for a migrant farmworker participating in the risk reduction program indicates that for a one unit increase in the group indicator (1 = experimental group; 0 = control group), the pesticide knowledge post-test increased by score of 2.19. Using this multiple linear regression model for a migrant farmworker with a pretest pesticide knowledge score equal to 12.53 (mean value), in the experimental group the predicted value for his/her pesticide knowledge post-test score would be equal to:

$$\text{Pesticide Knowledge Post-test} = 11.10 + 0.21(12.53)$$

$$= 15.92$$

The regression coefficients provided estimates for the slopes that were due to the effects of specific independent variables in the regression equations. These regression coefficients were based on models in which the error associated with the dependent variable was normally distributed with a constant variance. The R^2 value when group indicatorand pre-test knowledge score was included in the multiple linear regression model prior to inclusion of the control variables was 0.24. This indicated that the proportion of variance explained by the final model including the statistically significant independent variables was about 4%. The overall regression model for the pesticide post-test knowledge score was significant at $p<0.001$ indicating that the risk reduction program was a significant predictor of the pesticide knowledge gained in the post-test.

Overall, the multiple linear regression analyses by ANCOVA's models substantiated the results obtained from the comparison of unadjusted means between the experimental and the control group in pesticide knowledge post-test. Using the backward method of variable selection, in the beginning all the regression models were simplified taking out the independent variables that were no statistically significant in the model ($p> 0.15$), only potential confounders were maintained even when they were not significant. The effects of the pesticide knowledge pre-test used as a covariate, and the effects of group indicator were always kept. Independent variables were removed from the regression equation one by one by the largest *p-value*.

In many of the regressions, group indicator was the first covariate with a *p-value* less than 0.05, indicating that group indicator had a high level of significance in the models compared to other independent variables. The main effects of the control variables that were maintained in the model were as expected. For example, being in the experimental group was predictive of a low SRP score and an increase in the pesticide knowledge score. It is interesting to note that agricultural work experience and age as a "Life1" variable was not significant in the model of pesticide knowledge.

5.3.2. The Effects of the Risk Reduction Program in Safety Risk Perception (SRP)

Pearson correlation analysis was conducted to assess the relationship between pretest and post test SRP ($r= 0.58$, $p<0.001$). The association between pretest pesticide knowledge and pretest SRP was also statistically significant (-0.22, $p<0.005$). This indicated that a high score in SRP was negatively correlated with the pretest pesticide knowledge score. The pesticide post-test score was only marginally ($r= -0.16$, $p = 0.047$), negatively correlated with pre-SRP score. The post-test SRP and post-test pesticide knowledge was statistically significant negative correlated ($r= -0.26$, $p<0.001$). This correlation is not significant if we remove the risk reduction program effect was removed ($r=-0.13$, $p>0.106$).

A multiple linear regression, by ANCOVA's model, was conducted to predict the effect of the risk reduction program SRP in the post-test. The previous independent variables that were used in the knowledge post test models were included for the multiple final regression model (Table 5.44). The final regression equation describing the effects of the pesticide risk reduction program in SRP is shown below:

SRP Post-test = 2.828+ 0.350* Pre-test SRP -0.324*Group indicator-0.027* Principal Component for Health Locus of Control Scores - 0.180* Being Told when Pesticides are Sprayed in the Fields Indicator

The regression coefficient for a migrant worker that participated in the risk reduction program indicated that for a one unit increase in the group indicator (1 = experimental group; 0 = control group) the SRP post-test decreased by 7%. In this model, the health locus of control was the variable used with the principal component analysis. The new variable 'pcloc1' includes the three categories of the health locus of control. A substitution of the health locus of control, one by one, was conducted to determine the type of relationship between the SRP post-test and each category of HLC. As a result, the three final models are as follows:

SRP Post-test = 2.659+ 0.331* Pre-test SRP -0.413*Group indicator-0.034*Internal Health Locus of Control - 0.244*Being Told when Pesticides are Sprayed in the Fields Indicator.

SRP Post-test = 2.611+ 0.351*Pre-test SRP -0.328*Group indicator-0.033*Powerful Others Health Locus of Control - 0.178*Being Told When Pesticides are Sprayed in the Fields Indicator.

SRP Post-test = 2.104+ 0.355*Pre-test SRP -0.317*Group indicator- 0.018*Health Locus of Control - 0.200*Being Told When Pesticides are Sprayed in the Fields Indicator.

Using this multiple linear regression model, a migrant farm worker with a pre-test SRP score, equal 2.46 (mean value) in the experimental group, and with Internal Health Locus equal 23 (mean value) who reported being told when pesticides are sprayed in the fields would have a the predicted value for SRP as follows:

$$\text{SRP Post-test} = 2.659+ 0.331(2.46) -0.413(1)- 0.034(23) - 0.244$$
$$= 2.03$$

The regression coefficients provided estimates of the slopes due to the effects of specific independent variables in the regression equations, and these coefficients were based on models in which the error associated with the dependent variable was normally distributed with a constant variance. When group indicator and the pre-test SRP score was included in the multiple linear regression model prior to inclusion of the independent variables, the R^2 value was 0.45. The R^2 value for the final model was 0.59 using the 'pcloc1' variable for the health locus of control components. This indicated that the proportion of variance explained by the final model, including the statistically significant independent variables, was about 14%.

The group of significant predictors in the overall regression model for SRP are as follows: pre-SRP, health locus of control, and perception of being told that pesticides were being sprayed in the fields. These predictors are significant when the risk reduction program is in the model ($p<0.001$).

Overall, the multiple linear regression (ANCOVA) analysis substantiated the results obtained from the comparison of unadjusted means between the experimental and the control group in SRP post-test. Using the backward method of variable selection. the regression models were simplified while controlling for potential confounders, and significant main effects were preserved (i.e., gender). The effects of the SRP pre-test when used as covariate and the group indicator as control variable were in the regression equation, and one by one the independent variables were removed by the largest *p-value*.

In many of the regressions, group indicatorwas the first covariate with a *p-value* of less than 0.05 indicating that risk reduction program had a high level of significance in the models as compared to other independent variables. Overall, the conclusion was that a worker's being in the experimental group was predictive of decreasing that worker's the SRP in the post-test after controlling for other confounders.

The results of the analysis of variance on the effects of health locus of control on pesticide the SRP indicated that the categories of HLC were good predictors for the SRP score. Those predictors are presented at Appendix II (SRP and Health Locus of Control). Figure 5.9 presents the slope of the predictive values for the categories of IHLC scores. This indicated that a migrant worker with a high IHLC (internal) in our study would be expected to have a significant decrease in SRP scores when compared to another migrant worker with a lower IHLC score.

5.3.3. Effects of the Health Locus of Control and Stages of Change

Table 5.45 presents the results in evaluating the predictors of the IHLC. Multiple linear regression was conducted by ANCOVA's model for each one of the three categories using the pre-test HLC score as a covariate. The IHLC orientation suggested a significant interaction effect ($p<0.05$). 'Life1' was the statistically significant independent variable for the PHLC orientation. 'Life 1' as a function of the PHLC at pre-test (Table 5.46). There were no statistically significant predictors for LHLC in the multiple regression (ANCOVA's) model when the pre-test scores were used as covariates ($R^2=0.31$; $F= 18.67$ $p<0.001$).

Associations between health locus of control and stages of behavior were evaluated by the general linear (ANCOVA's) model using as a covariate the pre-test score in each of the HLC orientations. The means of HLC are presented by Stages of Change in Table 5.47. Those means were obtained by the least means squares analyses. The two stages of change that were statistically significant in the models were wearing long pants in the IHLC post-test, and separating clothes before washing them in the PHLC post-test ($p<0.05$).

The overall regression model for the IHLC post-test score was significant (using as a covariate the pre-test IHLC) , indicating that the worker's wearing long pants in Termination stage was statistically significantly different in the IHLC post-test score when compared to the workers being in Action stage ($p<0.001$). Workers being in Maintenance stage for wearing long pants were statistically significantly different than the Pre-active stage in their IHLC post-test score ($p<0.05$). Farmworkers who where in the Termination stage on separating clothes before washing them after working in the fields were statistically significantly different than farmworkers in the Pre-active stage or Action stage in the PHLC post-test ($p<0.05$).

The regression model for the PHLC post-test score was significant at $p<0.001$ indicating that the worker's separating clothes before washing them, (using as a covariate the pre-test PHLC) was a significant predictor of PHLC in the post-test. The estimates of the slopes for separating clothes before washing them indicated that the migrant farmworker in the Maintenance stage was a good predictor of PHLC which was lower than the migrant worker who was in the pre-active stage.

5.4. Section III

5.4.1 Safety Audits Results

The analysis of the data collected in this section was performed in a descriptive manner. This method of analysis was chosen to effectively characterize the study population and the number and types of findings observed.

<u>Participant Characteristics</u>

Of the four participating growers, 32 audits represented a combined total of 405 migrant farmworkers (1,316 worker/observations) in the fields. Table 5.48 includes the description of the weather conditions at the time that the safety audits were conducted. There was no difference with regard to temperature and weather conditions between the experimental and control group. Of the audits, 58% were conducted among growers served by HI-CAHS previous to this study, and 42 % were new contacts (Farmworker Checklist, Appendix I). It was possible to return to observe the workers in the field in 79% of the audits. Only 33% of the audits had a Central Barn located at a distance of less than five miles from the migrant workers.

Decontamination water was present in 25 % of the safety audits (8 out of 32) according to the total number of audits Table 5.49. Soap was available for migrant workers in only one audit (3%). Towels for migrant worker use were present in only 9% of the audits (3 out of 32). Decontamination field compliance conditions observed during audits were low (Table 5.49). Water to wash hands and towels were present in the field more often in the experimental group than the control group. This reflects the compliance of one grower who always provide water and soap, along with clean portable potty (data no presented).

A detailed description of the frequency of audits and workers observed by grower is presented in Table 5.50. Grower number 3 was divided between the experimental and the control group (3.A and 3.B). There were four groups of migrant farmworkers, included in this study, that were located accordingly for grower 3, and the audits were conducted by group of workers: 3.A.1, 3.A.2 in the experimental group and 3.B.1, 3.B.2 in the control group. Table 5.51 displays the proportion of the farmworkers participating in this study that were observed and the total number of workers observed in the fields while the audits were conducted.

A summary of behaviors recorded during the audits is presented at Table 5.52 During the period in which the audits were conducted, there was a decrease (9 to 7) in the number of workers not washing their hands (before eating or using the portable potty) in the experimental group. An increase (13 to 21) in the number of workers not washing hands (before eating or using the portable potty) was observed in the control group. When we consider the denominator for each group the proportion of workers not washing hands in the experimental group increased (from 2% to 4%) in lower rate than the increase of proportion of workers not washing hands in the control group (from 3% to 6%).

The percentage of workers wearing gloves decreased from the pretest to the post-test audits in the experimental group (17% to 11%), and in the control group (34% to 19%). The percentage of workers wearing long pants decreased in the experimental group (99% to 78%), and in the control group (89% to 72%). The percentage of workers wearing long sleeve shirts increased in the experimental group (61% to 72%), as compared to a corresponding decreased in the control group (66% to 56%).

The percentage of tasks observed during the audits is sumarized in Table 5.53. The main tasks observed during the audits included 80% of workers harvesting onions, and 7%of workers harvesting cucumbers. There was only one migrant farm worker who was observed applying pesticides in the fields when an audit was conducted. That applicator did not wear any personal protective equipment (PPE) required for applying pesticides. That applicator was wearing only a long sleeve shirt and long pants.

Of the two migrant camps audited serious health and safety hazards were found in one. There was no safe drinking water available to the workers. There was evidence of migrant children living in the camp. Two empty non-working refrigerators were found with toys inside them. The owner was immediately notified that the non-working refrigerators were a safety hazard, and to dispose of them. There were no workers in the laundry facilities when the audits were conducted. The second migrant camp did not have any laundry facilities. Consequently, no behaviors regarding separating clothes when washing them after working in the fields were recorded.

There were no pesticide containers observed in the migrant camps during the safety audits. According to the Central Barn audit, the types of safety hazards for migrant farm workers were related to ergonomics, work practices, physical agents, personal protective equipment/safety devices, and lack of hygiene in some toilet facilities. Safety device hazards involved inadequately charged or missing fire extinguishers in the Central Barn. Farmworkers smoked cigarettes around piles of scattered boxes and sacs in this enclosed area. Under such conditions, the probability of fire was high. There was a conveyor belt moving in the Central Barn, where workers, in both sides, sorted and boxed produce. Those workers wore loose clothing which could easily be caught in the conveyor belt.

All of the audits reflected a high number of ergonomic hazards. Migrant farmworkers carried sacs filled with onions or cucumbers across the fields. These activities were hazardous due to the length of time and the intensity of the labor required to harvest before the weather changed or the crops diminished.

TABLES

TABLE 5.1. Number of Migrant Workers Participating in the Pesticide Evaluation Program by Age, Gender, and Group Status.								
Age Group	*Experimental Group % (n = 77)*		*Control Group % (n = 75)*		*n (n = 151)*		*Mean (SEM*□*)*	*p-value**
	F	*M*	*F*	*M*	*F*	*M*		
18 - 20 years	1	6	5	17	6	23	18.52 (0.14)	0.427
21 - 30 years	8	25	3	27	11	52	24.38 (0.33)	0.026
31 - 40 years	2	16	1	10	3	26	35.41 (0.58)	0.841
41 - 50 years	0	8	0	7	0	15	44.47 (0.80)	0.401
51 - 60 years	3	7	0	2	3	9	54.50 (0.44)	0.327
> 60 years	0	1	0	2	0	3	62.67 (0.67)	0.667
Total	14	63	9	65	23	128	30.52 (0.96)	0.002
Percentage Males	82%		87%		85%			
Mean Age (SEM)	33.34 (1.36)		27.59 (1.28)		30.52 (0.96)		F:28.39 (2.44) M:30.91 (1.04)	

F Female
M Male
□ SEM: Standard Error of the Mean
* t-test

TABLE 5.2. Number of Migrant Workers Participating in the Pesticide Evaluation Program by Grower, Crops, and Group Status According to Final Training Status.

Grower ID	*Treatment Group*	*Control Group*	*Total (Percentage)*
1	17 Cucumbers Green Beans		17 (11)
2	35 Onions	7 Onions	42 (28)
3.A	25 Onions Zucchini Green Chile Cucumbers Lettuce Broccoli	6 Onions Zucchini Green Chile Cucumbers Lettuce Broccoli	31 (20)
3.B		19 Onions Zucchini Green Chile Cucumbers Lettuce Broccoli	19 (13)
4		43 Onions	43 (28)
Total	77	75	100

TABLE 5.3. Percentage of Migrant Workers Participating in the Pesticide Evaluation Program by Literacy Variables and Group Status.					
Level of Education	*Experimental Group %*	*Control Group %*	*n*	*Mean (SEM)*	*p-value*
Less than Elementary School	28	27	83	3.02 (0.26)	0.817
Elementary School	16	17	51	6	
Junior High	3	3	8	7.75 (0.16)	0.134
High School	3	2	7	11.14 (0.40)	0.352
More than High School	1	1	3	15.33 (0.88)	0.212
Years of Education Mean (SEM)	5.36 (0.38)	5.64 (0.40)		5.49 (0.28)	0.629

Level of Education	Experimental Group %	Control Group %	n	Mean (SEM)	p-value
Reading Spanish				2.97 (0.08)	0.406
None	2	4	10		
Some	15	15	42		
Good	17	15	40		
Very Well	17	16	58		
Writing Spanish				2.90 (0.07)	0.694
None	2	4	9		
Some	15	14	43		
Good	17	18	52		
Very Well	17	14	46		
Reading English				1.39 (0.06)	0.197
None	33	39			
Some	11	9	106		
Good	4	1	29		
Very Well	2	1	7		
			5		
Writing English				1.32 (0.06)	0.173
None	36	41	115		
Some	9	7	25		
Good	3	0	4		
Very Well	2	1	5		

TABLE 5.4. Percentage of Migrant Workers Participating in the Pesticide Evaluation Program by Literacy Variables and Group Status.

TABLE 5.5. Percentage of Selected Agricultural Activities Reported by Group Status Among Migrant Workers Participating in the Pesticide Evaluation Program.

Agricultural Activity	*Experimental Group %*	*Control Group %*	*n*	*p value*
Harvesting	47	53	131	0.048
Weeding	46	54	122	0.036
Watering	45	55	11	0.754
Mixing Pesticides	17	83	6	0.086
Loading Pesticides	20	80	5	0.168
Applying Pesticides	0	100	3	0.076
Opening Pesticides Containers	20	80	5	0.172
Flagger	0	100	9	0.002
Pesticide Machinery	50	50	4	0.967
Empty Pesticide Containers	43	57	7	0.658
Working in Agriculture in Mexico	43	57	110	0.701
Planning to Comeback Yearly	57	43	97	0.001
First Time	4	87	23	

TABLE 5.6. Percentage of Selected Demographic Factors by Group Status among Migrant Workers.				
Factor	***Experimental Group %***	***Control Group %***	***n***	***p-value****
Tobacco Use				
Yes	55	45	53	0.182
day (mean)	7.11	4.63	5.70	0.186
year (mean)	8	7.13	7.6	0.760
Drinking Alcohol				
Yes	42	41	83	0.763
Alcohol/week (mean)	6.95	5.92	6.45	0.511
Home Country				
Mexico	62	69	131	0.059†
United States	14	6	20	
Country of Origin				
Mexico	71	69	140	0.778†
United States	5	4	9	
Home State From Mexico				
Chihuaha	1	3	4	
Coahuila	0	1	1	
Distrito Federal	1	0	1	
Durango	1	1	2	
Guanajuato	25	38	63	
Jalisco	3	0	3	
Mexico	5	18	23	
Puebla	2	4	6	
San Luis Potosi	1	0	1	
Zacatecas	15	3	18	
Subtotal	54	68	122	
Home State From United States				
Colorado	3	1	4	
Florida	10	3	13	
Texas	1	0	1	
Subtotal	**14**	4	**18**	

† Chi Square test
* t-test

TABLE 5.6. (Con't.) Mean of Selected Agricultural Factors in Length of Time (Months) Reported by Group Status among Migrant Workers.						
Factor	***Experimental Group***		***Control Group***		***n***	***p- value****
	Mean	***SEM o***	***Mean***	***SEM***		
Agricultural Work Experience	85.62	(10.46)	40.37	(6.03)	146	<0.001
Agricultural Work Experience in Mexico	103.08	(17.58)	156.27	(25.57)	74	0.091
Working with Grower	54.47	(6.97)	29.07	(5.43)	135	0.812

o SEM: Standard Error of the mean

* t-test

TABLE 5.7. Percentage of Self-reported Pesticide-related Factors by Group Status Among Migrant Farmworkers (*n*=13). *

Factor	*Experimental Group %*	*Control Group %*	*n*	*p-value***
Activity †				
Applying Pesticides	23	15	2	
Harvesting		15	5	
Weeding		8	1	
Described Symptoms				
Body Pain	2	2	2	
Body Rash	1		2	
Dizziness			1	
Experienced				
Within a month		2	3	
1998	1	2	2	
1997		1	3	
1995	2	1	1	
Visited Doctor	3	1	4	0.172
Total Reported to have Experienced Symptoms of Pesticide Poisoning	6	7	**13**	**0.812**

* Self reported activities prior to onset of symptoms
† Reported activity prior to onset of symptoms
** t-test

TABLE 5.8. Percentage of Required Field Safety Conditions Reported among Migrant Farmworkers at the Pre-test.				
Present in Field	*Experimental Group %*	*Control Group %*	*n*	*p-value**
Water to wash hands	52	48	100	0.144
Soap	83	17	30	0.001
Towels	67	33	46	0.003
Decontamination Water	65	35	34	0.126

* t-test

TABLE 5.9 Percentage of Selected Safety Behavior Factors Reported Among Migrant Workers Participating in the Pesticide Evaluation Program by Group Status (n=152).

Safety Perception & Behavior	*Experimental Group %*	*Control Group %*	*n*	*p-value**
Fields are contaminated with pesticides	45	55	119	0.125
Told when Pesticides are applied in the fields	50	50	88	0.063
Wears protective clothing				
Cap	84	16	38	0.404
Cowboy Hat	41	59	98	0.628
Wears protective clothing				
Did not try gloves	65	35	65	0.003
Tried gloves	40	60	47	0.404
Wears protective eye wear				
Safety Glasses	50	50	10	
Prescription Glasses	79	21	14	0.054
Washes hands before smoking	71	29	7	0.276
Showers after field work	51	49	135	0.603

* t-test

TABLE 5.10. Means for Pesticide Knowledge Scores in Pre-test among Migrant Farmworkers.						
Score Area	*Experimental Group*		*Control Group*		*Total Mean Score/ Total Possible*	*p-value*
	Mean	*SEM* ◻	*Mean*	*SEM*		
Absorption	2.88	(0.11)	2.79	(0.13)	2.83/4	0.591
First Aid	1.98	(0.06)	1.92	(0.06)	1.95/5	0.403
Safety	3.48	(0.08)	3.53	(0.08)	3.5/5	0.643
Sources	1.74	(0.09)	1.84	(0.06)	1.78/3	0.389
Toxicity	2.56	(0.08)	2.51	(0.09)	2.53/3	0.669
Overall Pre-test Knowledge Score	12.53 n=77	(0.25)	12.63 *n*=75	(0.31)	12.58/20 *n*=152	0.813

◻ SEM: Standard Error of the Mean

TABLE 5.11. Means of Pesticide Knowledge Scores in Pre-test by Selected Demographic and Occupational Factors and among Migrant Workers.

Factor	*n*	*Experimental Group*	*Control Group*	*Mean*	*p- value**
Age Group					
18 - 20 years	29	12	11.77	11.83	0.806
21 - 30 years	63	12.30	12.90	12.59	0.373
31 - 40 years	29	13.05	14.09	13.45	0.099
41 - 50 years	15	12.63	11.71	12.20	0.360
51 - 60 years	9	12.40	13.00	12.50	0.665
> 60 years	3	15	13	13.67	0.454
Home Country					
Mexico	62	12.19	12.67	12.44	0.257
US	14	14.07	12.16	13.50	0.134
Females	23	14.07	11.56	13.08	0.047
Males	128	12.19	12.77	12.49	0.156
Worker Protection Card Indicator	38				
Mean		13.33	13.70	13.52	0.562
SEM		(0.43)	(0.41)		
Worker Protection Previous Training Status Indicator	42				
Mean		13.27	13.95	13.58	0.855
SEM		(0.38)	(0.29)		

* t-test

TABLE 5.12. Means for Pesticide Knowledge Scores in Post-test among Migrant Workers.						
Score Area	***Experimental Group***		***Control Group***		***Score/Total Possible***	***p-value****
	Mean	***SEM*** ◻	***Mean***	***SEM*** ◻		
Absorption	3.50	(0.09)	2.79	(0.11)	3.11/4	<0.001
First Aid	2.81	(0.11)	1.98	(0.63)	2.40/5	<0.001
Safety	3.66	(0.07)	3.41	(0.09)	3.54/5	0.035
Sources	2.13	(0.07)	2.07	(0.07)	2.10/3	0.514
Toxicity	2.87	(0.04)	2.72	(0.06)	2.80/3	0.047
Overall Post-test Knowledge Score	15.95 n=77	(0.24)	13.77 n=75	(0.27)	14.88/20 n=152	<0.001

◻ SEM: Standard Error of the mean

* t-test

TABLE 5.13. Pearson Correlation Coefficients (PCC) of Pesticide Knowledge Score in Pre-test and Years of Education among Migrant Workers.				
	Pre-knowledge Score	*p-value*	*Education*	*p-value*
Education (years)	0.232	0.012	1	
Reading Spanish	0.108	0.187	0.464	<0.001
Writing Spanish	0.090	0.271	0.486	<0.001
Reading English	0.118	0.154	0.541	<0.001
Writing English	0.142	0.082	0.485	<0.001

TABLE 5.14. Pearson Correlation Coefficients (PCC) of Pesticide Knowledge Score in Pre-test and Agricultural Work Experience as Age Among Migrant Workers.				
Factor	*Pre-knowledge Score*	*p-value*	*Age (years)*	*p-value*
Age (years)	0.091	0.264	1	
Agricultural Work Experience in US	0.174	0.035	0.603	<0.001
Agricultural Work Experience in Mexico	0.014	0.901	0.517	<0.001
Time Working With Same Grower	0.239	0.005	0.489	<0.001

TABLE 5.15. Multiple Regression Model Predicting Post-test Pesticide Knowledge Score as a Function of Experimental Group Status Indicator and Pre-test Knowledge Score (n = 151, R^2 = 0.32).			
Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	2.08	0.36	<0.001
Pesticide Pre-knowledge	0.21	0.07	0.004
Age in years (n=151)			
18-20	4.34	1.26	0.008
21-30	4.44	1.22	<0.001
31-40	4.97	1.26	<0.001
41-50	3.96	1.31	<0.001
51-60	4.54	1.35	0.003
>60	0	0	0.001

TABLE 5.16. Multiple Regression Model Predicting Post-test Pesticide Knowledge Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Harvesting Indicator (n = 149; R^2 = 0.24).			
Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	2.14	0.36	<0.001
Pesticide Pre-knowledge	0.22	0.07	0.002
Harvesting indicator	-0.12	0.55	0.833

TABLE 5.17. Multiple Regression Model Predicting Post-test Pesticide Knowledge Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Weeding Indicator (n = 150; R^2 = 0.25).			
Independent Variable	*β*	*SE*	*p-value*
Experimental Group Indicator	2.05	0.35	<0.001
Pesticide Pre-Knowledge	0.23	0.07	<0.001
Weeding Indicator	-0.59	0.45	0.199

TABLE 5.18. Multiple Regression Model Predicting Post-test Pesticide Knowledge Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Returning Yearly (n = 147; R^2 = 0.26).			
Independent Variable	*β*	*SE*	*p-value*
Experimental Group Indicator	2.10	0.38	<0.001
Pesticide Pre-Knowledge	0.22	0.07	<0.002
Returning Yearly			
Yearly	0.71	0.53	0.400
First Time	0.50	0.64	

TABLE 5.19. Multiple Regression Model Predicting Post-test Pesticide Knowledge Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Agricultural Worker Experience (n = 152; R^2 = 0.24).

Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	2.21	0.37	<0.001
Pesticide Pre-Knowledge	0.23	0.07	<0.002
Agricultural Work Experience	-0.01	0.01	0.285

TABLE 5.20. Multiple Regression Model Predicting Post-test Pesticide Knowledge Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Worked in Other States in Agriculture Indicator (n = 147; R^2 = 0.29).

Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	2.09	0.36	<0.001
Pesticide Pre-Knowledge	0.24	0.07	<0.001
Worked in Other States in Agriculture Indicator	0.84	0.36	0.022

TABLE 5.21. Multiple Regression Model Predicting Post-test Pesticide Knowledge Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Towels in the Fields Indicator (n = 148; R2 = 0.29).

Independent Variable	β	*SE*	*p-value*
Experimental Group indicator	2.26	0.35	<0.001
Pesticide Pre-Knowledge	0.26	0.07	<0.001
Towels in the Fields Indicator	0.169	0.38	0.656

Table 5.22. Multiple Regression Model Predicting Post-test Pesticide Knowledge Score as Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Wearing Gloves (n = 146; R^2 = 0.26).

Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	2.12	0.38	<0.001
Pesticide Pre-Knowledge	0.20	0.08	<0.009
Wearing Gloves			
Always	0.33	0.69	0.669
Frequently	1.27	0.98	
Sometimes	0.14	0.68	
Rarely	-0.53	2.29	
Never	0	0	

TABLE 5.23. Safety Perception Score (SRPA) in Selected Variables among Migrant Workers (n=152).							
	Experimental Group		*Control Group*		*n*		*p-value**
	Mean	*SEM*	*Mean*	*SEM*	*Mean*	*SEM*	
Safety Risk Perception Score (SRPA Pre-test)	2.46	0.79	2.47	0.78	2.47	0.06	0.908
Safety Risk Perception Score (SRPA Post-test)	2.14	0.06	2.49	0.06	2.31	0.04	<0.001
Previous WPS Training Indicator †							
Yes	2.38	0.12	2.08	0.14	2.24	0.01	
No	2.47	0.15	2.64	0.11	2.55	0.09	0.020
Age Group †							
18 - 20 years	2.72		2.45		2.51		0.278
21 - 30 years	2.43		2.47		2.45		0.833
31 - 40 years	2.61		2.52		2.58		0.737
41 - 50 years	2.63		2.40		2.52		0.591
51 - 60 years	1.98		2.38		2.05		0.623
> 60 years	2.30		3.15		2.87		0.530
Home Country ††							
Mexico	2.62		2.50		2.56		0.285
US	1.80		2.20		1.91††		0.150
Females †††	1.71		2.32		1.94		0.025
Males	2.63		2.50		2.56†††		0.246

† Safety Risk Perception Mean at Pre-test
†† Difference between Mexico & U.S. $p<0.001$.
††† Difference between Females & Males $p <0.001$.
* t-test

TABLE 5.24. Multiple Regression Model Predicting Post-test Safety Risk Perception Score (SRPA) as a Function of Experimental Group Status Indicator Pre-test Safety Risk Perception Score, and Age Groups (n = 151; R^2 = 0.49)

Independent Variable	β	*SE*	*p-value*
Experimental Group	-0.34	0.06	<0.001
Pre-SRPA †	0.45	0.05	<0.001
Age in years (n=151)			
18-20	-0.39	0.22	0.020
21-30	-0.29	0.22	0.088
31-40	-0.55	0.23	0.190
41-50	-0.47	0.24	0.017
51-60	-0.28	0.25	0.050
>60	0	0	0.254

† Safety Risk Perception Mean at Pre-test

TABLE 5.25. Multiple Regression Model Predicting Post-test Safety Risk Perception Score (SRPA) as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Harvesting Indicator (n = 149, R^2 = 0.46).

Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	-0.35	0.06	<0.001
Pre-SRPA	0.46	0.05	<0.001
Harvesting Indicator	-0.06	0.10	0.559

TABLE 5.26. Multiple Regression Model Predicting Post-test Safety Risk Perception Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Weeding Indicator (n = 150, R^2 = 0.47).			
Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	-0.36	0.06	<0.001
Pre-SRPA	0.47	0.05	<0.001
Weeding Indicator	-0.09	0.08	0.256

TABLE 5.27. Multiple Regression Model Predicting Post-test Safety Risk Perception Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Returning Yearly (n = 147, R^2 = 0.48).			
Independent Variable	β	*SE*	*p-value*
Experimental Group	-0.33	0.65	<0.001
Pre-SRPA	0.38	0.49	<0.001
Returning Yearly			
Yearly	-0.27	0.09	0.007
First Time	-.15	0.11	

TABLE 5.28. Multiple Regression Model Predicting Post-test Safety Risk Perception Score in Agricultural Work Experience as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Agricultural Work Experience (n = 146, R^2 = 0.48).			
Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	-0.28	0.05	<0.001
Pre-SRPA	0.41	0.05	<0.001
Agricultural Work Experience	-0.001	<0.01	0.024

Table 5.29. Multiple Regression Model Predicting Post-test Safety Risk Perception Score in Working in Other States in Agriculture as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Worked in Other States in Agriculture Indicator (n = 147, R^2 = 0.44).			
Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	-0.33	0.07	<0.001
Pre-SRPA	0.43	0.05	<0.001
Worked in Other States in Agriculture Indicator	0.01	0.07	0.919

TABLE 5.30. Multiple Regression Model Predicting Post-test Safety Risk Perception Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Towels in the Fields Indicator (n = 148, R^2 = 0.46).*

Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	-0.35	0.065	<0.001
Pre-SRPA	0.46	0.055	<0.001
Towels in the Fields Indicator	-0.03	0.08	0.919

TABLE 5.31. Multiple Regression Model Predicting Post-test Safety Risk Perception Score as a Function of Experimental Group Status Indicator, Pre-test Knowledge Score, and Wearing Gloves (n = 146, R^2 = 0.51).

Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	-0.27	0.06	<0.001
Pre-SRPA	0.40	0.05	<0.001
Wearing Gloves			0.010
Always	-0.09	0.12	
Frequently	-0.14	0.16	
Sometimes	0.14	0.12	
Rarely	0.37	0.38	
Never	0	0	

Pre-SRPA Pre-test safety risk perception

TABLE 5.32. Mean Values of Health Locus of Control Subscales in Pre-test and Post-test Scores among Migrant Workers						
Health Locus of Control	*Pre-test Mean*	*Pre-test SEM*	*Pre-test Mean 95% CI*	*Post-test Mean*	*Post-test SEM*	*Post-test Mean 95% CI*
IHLC	23.32	0.29	22.76 - 23.89	23	0.35	22.30 - 23.68
PHLC	26.18	0.28	25.63 - 26.72	26	0.24	25.95 - 26.90
CHLC	21.42	0.43	20.50 - 22.26	22	0.42	21.30 - 22.97

IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.33. Mean Values of Health Locus of Control Subscales in the Pre-test by Group Status among Migrant Workers.					
Health Locus of Control	*Experimental Group Mean*	*Experimental Group SEM*	*Control Group Mean*	*Control Group SEM*	*p-value*
IHLC	22.66	0.39	24.00	0.41	0.020
PHLC	26.36	0.36	26.00	0.42	0.520
CHLC	21.99	0.57	21.85	0.63	0.182

IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.34. Mean Values of Health Locus of Control in the Post-test by Group Status Among Migrant Workers.					
Health Locus of Control	***Experimental Group Mean***	***SEM***	***Control Group Mean***	***SEM***	***p-value***
IHLC	22.46	0.51	23.53	0.47	0.124
PHLC	26.45	0.33	26.40	0.34	0.911
CHLC	22.07	0.62	22.20	0.59	0.872

IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.35. Differences in the Pre-test Mean Values of Health Locus of Control by Age Among Migrant Workers.						
18-20	***21-30***	***31-40***	***41-40***	***51-60***	***>60***	
23.21^{ab}	23.08^{ab}	24.43^{b}	23.27^{ab}	21.92^{a}	25.00^{ab}	IHLC
25.28^{ab}	25.21^{a}	27.38^{ab}	27.50^{b}	27.91^{b}	29.00^{ab}	PHLC
20.88^{ac}	20.30^{a}	22.32^{bc}	23.40^{bc}	22.83^{bc}	25.00^{c}	CHLC

* Means followed by a different letter are significantly different. Means followed by the same letter, or no letter, are not significantly different (p>0.05).
IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.36. Differences in the Post-test by Least Mean Values of Health Locus of Control by Age Among Migrant Workers.*						
18-20	***21-30***	***31-40***	***41-40***	***51-60***	***>60***	
22.28^{ac}	22.37^{ac}	24.17^{ac}	25.20^{b}	21.00^{b}	26.00	IHLC
26.17	26.25	26.92	26.80	26.33	25.00	PHLC
23.38	21.49	21.42	24.00	22.73	19.00	CHLC

* Means followed by a different letter are significantly different. Means followed by the same letter, or no letter, are not significantly different (p>0.05).
IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.37. Mean Values of Health Locus of Control in the Pre-test by Selected Variables Among Migrant Workers.

Independent Variable		*IHLC*		*PHLC*		*CHLC*	
		Mean	*SEM*	*Mean*	*SEM*	*Mean*	*SEM*
Level of Education							
	Less than Elementary	23.39	9.39	26.38	0.37	21.65	0.57
	Elementary	22.47	0.49	26.08	0.41	21.83	0.69
	Junior High	24.88	0.95	27.38	1.15	23.25	1.68
	High School	25.57	1.00	25.29	0.99	16.29	1.82
	More than High School	26.67	2.03	21.33	5.36	13.00	1.00
Gender	*Female*	22.43	0.74	25.87	0.57	19.50	1.53
	Male	23.49	0.31	26.23	0.31	21.73	0.45
	p-value	0.200		0.581		0.842	
Home Country	*Mexico*	23.19	0.31	26.00	0.30	21.40	0.46
	US	24.05	0.70	27.16	0.64	21.17	1.26
	p-value	0.270		0.113		0.862	
Smokers		23.52	0.58	25.52	0.59	21.84	0.78
Non Smokers		23.26	0.33	26.51	0.30	21.44	0.54
	p-value	0.683		0.140		0.660	
Drinking Alcohol		26.15	0.41	26.15		21.73	0.60
Not Drinking Alcohol		23.32	0.48	0.41		21.54	0.84
	p-value	0.687		26.5	0.41	0.842	
				0.555			

IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.37 (Con't.) Mean Values of Health Locus of Control in the Pre-test by Selected Variables among Migrant Workers.

Independent Variable	*IHLC*		*PHLC*		*CHLC*	
	Mean	*SEM*	*Mean*	*SEM*	*Mean*	*SEM*
Working in Other States in Agriculture	23.22	0.42	26.97	0.34	21.67	0.70
Not Working in Other States in Agriculture	23.35	0.41	25.60	0.41	21.28	0.56
p-value	0.827		0.156		0.664	
Told When Pesticides are Sprayed	23.65	0.38	26.91	0.31	22.69	0.49
Not Told When Pesticides are Sprayed	23.23	0.44	25.02	0.52	19.60	0.76
p-value	0.481		0:002		<0.001	
Working in Agriculture All Year	23.74	0.42	26.84	0.36	22.53	0.56
Not Working in Agriculture All Year	22.77	0.43	25.62	0.39	20.75	0.65
p-value	0.108		0.021		0.039	

IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.38. Mean Values of Health Locus of Control in the Post-test by Selected Variables Among Migrant Workers.

Independent Variable		*IHLC*		*PHLC*		*CHLC*	
		Mean	*SEM*	*Mean*	*SEM*	*Mean*	*SEM*
Level of Education							
	Less than Elementary	22.59	0.44	26.23	0.32	22.74	0.52
	Elementary	23.16	0.66	26.56	0.44	21.47	0.80
	Junior High	25.25	1.31	27.50	0.78	24.50	1.15
	High School	22.57	2.01	25.86	1.26	18.71	2.50
	More than High School	26.33	1.86	28.00	1.15	18.67	3.28
Gender	*Female*	22.21	1.06	25.78	0.63	20.08	1.21
	Male	23.13	0.37	26.54	0.26	22.50	0.44
	p-value	0.347		0.252		0.040	
Home Country	*Mexico*	22.89	0.34	26.47	0.26	22.28	0.43
	US	23.75	1.45	26.20	0.71	21.11	1.60
	p-value	0.570		0.720		0.487	
Smokers		23.25	0.59	26.55	0.45	22.92	0.75
Non Smokers		22.93	0.46	26.34	0.30	21.73	0.55
	p-value	0.675		0.694		0.196	
Drinking Alcohol		26.15	0.41	26.15	0.41	21.73	0.60
Not Drinking Alcohol		23.32	0.48	26.5	0.41	21.54	0.84
	p-value	0.687		0.555		0.842	

IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.38 (Con't.) Mean Values of Health Locus of Control in the Post-test by Selected Variables Among Migrant Workers.

Independent Variable	*IHLC*		*PHLC*		*CHLC*	
	Mean	*SEM*	*Mean*	*SEM*	*Mean*	*SEM*
Working in Other States in Agriculture	22.68	0.56	26.63	0.38	22.74	0.65
Not Working in Other States in Agriculture	23.06	0.46	26.14	0.32	21.34	0.56
p-value	0.589		0.324		0.103	
Told When Pesticides are Sprayed	22.86	0.47	26.39	0.30	23.31	0.53
Not Told When Pesticides Are Sprayed	23.15	0.54	26.40	0.42	20.29	0.70
p-value	0.702		0.984		<0.001	
In Agriculture All Year	23.04	0.56	26.72	0.37	23.24	0.55
Not in Agriculture All Year	22.88	0.44	25.93	0.33	20.82	0.64
p-value	0.823		0.115		0.005	

IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.39. Percentage of Stages of Change in the Pre-test among Migrant Workers.				
Stages of Change	*Experimental Group*		*Control Group*	
	Pre (%)	*Post (%)*	*Pre (%)*	*Post (%)*
Wearing Long Sleeve Shirt				
Pre-Contemplation		2 (1)		
Contemplation	4 (3)	3 (2)	4 (3)	1 (1)
Preparation	4 (3)	7 (5)	3 (2)	2 (1)
Action	13 (9)	4 (3)	11 (7)	9 (6)
Maintenance	9 (6)	6 (4)	15 (10)	12 (8)
Termination	40 (26)	53 (35)	29 (19)	30 (20)
Wearing Long Pants				
Pre-Contemplation		1 (1)		2 (1)
Contemplation				
Preparation	19 (13)		15 (10)	
Action	6 (4)	2 (1)	6 (4)	9 (6)
Maintenance	7 (5)	1 (1)	1 (1)	1 (1)
Termination	43 (28)	66 (43)	49 (32)	59 (39)
Washing Hands in the Fields				
Pre-Contemplation		4 (3)	1 (1)	2 (1)
Contemplation	2 (1)	17 (11)	1 (1)	16 (11)
Preparation	1 (1)	2 (1)		
Action	17 (11)	12 (8)	13 (9)	4 (3)
Maintenance	1 (1)	5 (4)	9 (6)	9 (6)
Termination	31 (20)	34 (22)	33 (22)	25 (16)
Separating Clothes Before Washing Them				
Pre-Contemplation	1 (1)	2 (1)		2 (1)
Contemplation	5 (3)	5 (3)	3 (2)	1 (1)
Preparation				
Action	11 (7)	6 (4)	17 (11)	6 (4)
Maintenance	5 (3)		11 (7)	12 (8)
Termination	51 (34)	51 (34)	39 (26)	49 (32)

TABLE 5.40. Final Regression Models for the Probability of Changing According to Stages of Behavior among Migrant Workers.				
Change of Stage of Behavior	***Independent Variables***	***Odds Ratio (95% CI)***	***Chi Square for Covariates***	***p-value***
Wearing Long Sleeve Shirt	Agricultural Work Experience	0.55 (0.32, 0.94)	6.57 4.80	0.010 0.028
Wearing Long Pants	Action Stage	37.45 (3.95,352.54)	20.78 10.00	<0.001 0.001
Washing Hands in the Field	Pre-SRPA	3.83 (2.85, 10.93)	7.75 6.34	0.005 0.011
Separating Clothes Before Washing Them	IHLC PHLC LHLC Pre-SRPA Maintenance Stage	1.50 (1.15,1.98) 1.25 (1.06,1.46) 0.59 (0.41,0.84) 3.04 (1.20,7.67) 13.37(2.54, 70.48)	42.50 8.82 7.14 8.54 5.54 9.35	<0.001 0.003 0.008 0.004 0.019 0.002

TABLE 5.41. Final Regression Models Predicting Being in Termination Stage Models of Stages of Change Among Migrant Workers.			
Stage of Change	***Statistically Significant Independent Variables***	***Chi Square***	***p-value***
Wearing Long Sleeve Shirt	Experimental Group Previous Termination Stage	10.24 14.53	0.017 0.002
Washing Hands in the Field	Age & Agricultural Work Experience ('Life1')	9.62	0.022
Separating Clothes Before Washing Them	Chance Luck Health Locus of Control** Previous Termination Stage	10.73 13.68	0.013 0.003

* There were no statistically significant independent variables predicting termination stage for wearing long pants.

** CHLC

TABLE 5.42. Mean Scores in Pesticide Knowledge and Safety Risk Perception by Stages of Change in the Post-test Scores Among Migrant Workers. †		
Stage of Change	*Pesticide Knowledge*	*Safety Risk Perception*
Wearing Long Sleeve Shirt		
Pre-action Stage	14.42	2.30
Action	14.57	2.38
Maintenance	15.12	2.39
Termination	15.09	2.66
Wearing Long Pants		
Pre-action Stage	14.95	2.25
Action	13.62[a]	2.34
Maintenance	15.33	2.31
Termination	14.94[b]	2.34
Washing Hands in the Field ††		
Pre-action Stage	14.87	2.39[a]
Action	14.49	2.38[a]
Maintenance	13.92	2.46
Termination	15.17	2.20[b]
Separating Clothes Before Washing Them		
Pre-action Stage	14.95	2.47
Action	14.35	2.33
Maintenance	14.85	2.33
Termination	15.00	2.27

† Means followed by a different letter are significantly different. Means followed by the same letter, or no letter, are not significantly different ($p>0.05$).

†† Significant in the safety risk perception analysis of variance model $p<0.05$.

TABLE 5.43. Multiple Regression Model Predicting Post-pesticide Knowledge Score as a Function of Experimental Group Status Indicator and Pre-test Knowledge Score (n = 159, R^2 = 0.24).			
Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	2.18	0.35	<0.001
Pesticide Pre-knowledge	0.21	0.07	0.004

TABLE 5.44. Multiple Regression Model Predicting Post-test Safety Risk Perception Score as a Function of Experimental Group Status Indicator and Pre-test Knowledge Score (n = 134, R^2 = 0.59).			
Independent Variable	β	*SE*	*p-value*
Experimental Group Indicator	-0.32	0.06	<0.001
Pre-SRPA ○	0.35	0.05	0.001
Told when pesticides are applied in the fields indicator	-0.18	0.07	0.07
*PCHLC**	-0.03	<0.01	0.015

* Principal Component Health Locus of Control

○ Safety Risk Perception Pre-Test

TABLE 5.45. Multiple Regression Linear Model in the Values of Post-test Internal Health Locus of Control Scores Subscale Adjusted Pre-test Internal Health Locus of Control Scores among Migrant Workers.*			
Independent Variable	β	***SE***	***p-value***
IHLC Pre-test	0.46	0.097	<0.001
PHLC	-0.06	0.14	0.653
PHLC*CHLC	0.006	0.002	0.259

* R^2=0.23; F= 19.87 p<0.001 (n=139).
IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.46. Multiple Regression Linear Model in the Values of Post-test Powerful Others Health Locus of Control Scores Subscale Adjusted Pre-test Powerful Others Health Locus of Control Scores among Migrant Farmworkers.*			
Independent Variable	β	***SE***	***p-value***
PHLC Pre-test	0.46	0.068	<0.001
Life1	-0.01	0.004	0.013

* R^2=0.25; F= 22.50 p<0.001 (*n*=139).
IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control

TABLE 5.47. Mean Scores in Post-test Health Locus of Control Subscale by Stages of Behavior Controlling by the Pre-test Health Locus of Control Orientation Scores among Migrant Workers.*

Stages of Behavior	*IHLC*	*PHLC*	*CHLC*
Wearing Long Sleeve Shirt			
No Actives	22.66[b]	26.04	23.14
Action	23.55[a]	27.50	22.33
Maintenance	22.18[b]	26.63	21.73
Termination	23.16	26.15	21.68
Wearing Long Pants †			
No Actives	24.20[b]	27.00	23.43
Action	20.44[c]	26.20	22.99
Maintenance	21.10[ac]	26.61	21.33
Termination	22.89[ab]	26.20	21.55
Washing Hands in the Field			
No Actives	23.19	26.62	22.39
Action	22.79	26.78	23.06
Maintenance	22.13	27.04	21.99
Termination	23.00	26.03	21.53
Separating Clothes Before Washing Them ‡			
No Actives	22.32[b]	27.53[b]	23.46
Action	23.92[b]	27.43[b]	21.98
Maintenance	22.99	26.41	21.11
Termination	22.78[a]	25.86[a]	22.08

IHLC: Internal Health Locus of Control
PHLC: Powerful Others Health Locus of Control
CHLC: Chance Health Locus of Control
† Statistically significant in the analysis of variance model as a function of IHLC pre-test ($p<0.014$).
‡ Statistically significant in the analysis of variance model as a function of PHLC pre-test ($p<0.012$)

Table 5.48. Proportion and Percentage of Behaviors Observed During the Safety Audit Conducted among Migrant and Seasonal Farmworkers.				
	Pre-test Experimental	*Post-test Experimental*	*Pre-test Control*	*Post-test Control*
Audits	9	9	9	5
Workers	377	190	405	375
Temperature	81.6° F	77.2° F	81.7° F	72.2° F
Sunny	100%	100%	100%	100%

TABLE 5.49. Frequency of Required Decontamination Site Conditions During the Audits by Group Status.				
Present in Field	*Pre-test Experimental Proportion*	*Post-test Experimental Proportion*	*Pre-test Control Proportion*	*Post-test Control Proportion*
Water to wash hands	4/9	3/9	0.9	1/5
Soap	0/9	0/9	0/9	1/5
Towels	2/9	1/9	0/9	0/5

TABLE 5.50. Frequency of Audits and Workers Observed by Grower Id among Migrant and Seasonal Farmworkers.								
Grower ID	*Pre-test Experimental Audits*	*Workers*	*Post-test Experimental Audits*	*Workers*	*Pre-test Control Audits*	*Workers*	*Post-test Control Audits*	*Workers*
1	3	71	3	57				
2	3	246	1	49				
3.A.1	2	39	3	49				
3.A.2	1	21	2	35				
3.B.1					2	26		
3.B.2					2	14	1	18
4					5	365	4	326
Total	9	377	9	190	9	405	5	344

TABLE 5.51. Percentage of the Proportion of Workers Participating in this Study Divided by the Mean of Number Workers by Grower ID among Migrant and Seasonal Farmworkers.								
Grower ID	*Pre-test Experimental Proportion*	*%*	*Post-test Experimental Proportion*	*%*	*Pre-test Control Proportion*	*%*	*Post-test Control Proportion*	*%*
1	17/ 23.7	72	17/19.0	89				
2	42/81.5	59	42/49.0§	86				
3.A.1	9/19.5	46	9/16.3	55				
3.A.2	16/21.0§	76	16/35.0	46				
3.B.1					6/13	46		
3.B.2					13/7	100	13/18.0§	72
4					43/73.0	59	49/81.5	53
Total	84/145.7	58	84/119.3	70	62/93	67	62/99.5	62

§ Number of workers in the audit conducted.

TABLE 5.52. Proportion and Percentage of Behaviors Observed During the Safety Audit Conducted among Migrant and Season Farmworkers.

Observed Behavior	*Pre-test Experimental Proportion*	*%*	*Post-test Experimental Proportion*	*%*	*Pre-test Control Proportion*	*%*	*Post-test Control Proportion*	*%*
Wearing Long Sleeve Shirt	229/377	61	137/190	72	269/405	66	193/344	56
Wearing Long Pants	376/377	100	149/190	89	361/405	78	246/344	72
Wearing Hat	248/377	66	169/190	89	304/405	84	289/344	75
Wearing Gloves	65/377	17	21/190	11	140/405	35	65/344	19
Number of Workers Not Washing Hands	9/377	2	7/190	4	13/405	3	21/344	6

5.53. Percentage of Audits and Workers by Tasks Performed by Migrant Farmworkers During Audits.

Tasks	*Percentage of Audits*	*Percentage of Workers*
Loading truck with green beans	3.1	1.9
Harvesting green beans	6.2	3.5
Harvesting onions	53.1	80.0
Packing coleslaw	3.1	1.6
Packing zucchinis and lettuce	3.1	1.6
Harvesting cucumbers	19.0	7.0
Harvesting cabbage	3.1	0.6
Harvesting cabbage and cucumbers	3.1	1.8
Packing zucchinis, beats, and coleslaw	3.1	1.5
Harvesting cucumbers and coleslaw	3.1	1.1

FIGURES

Figure 5.1 Number of Years of Education by Age Among Migrant & Seasonal Farm Workers in Colorado, 1998 (n=116).

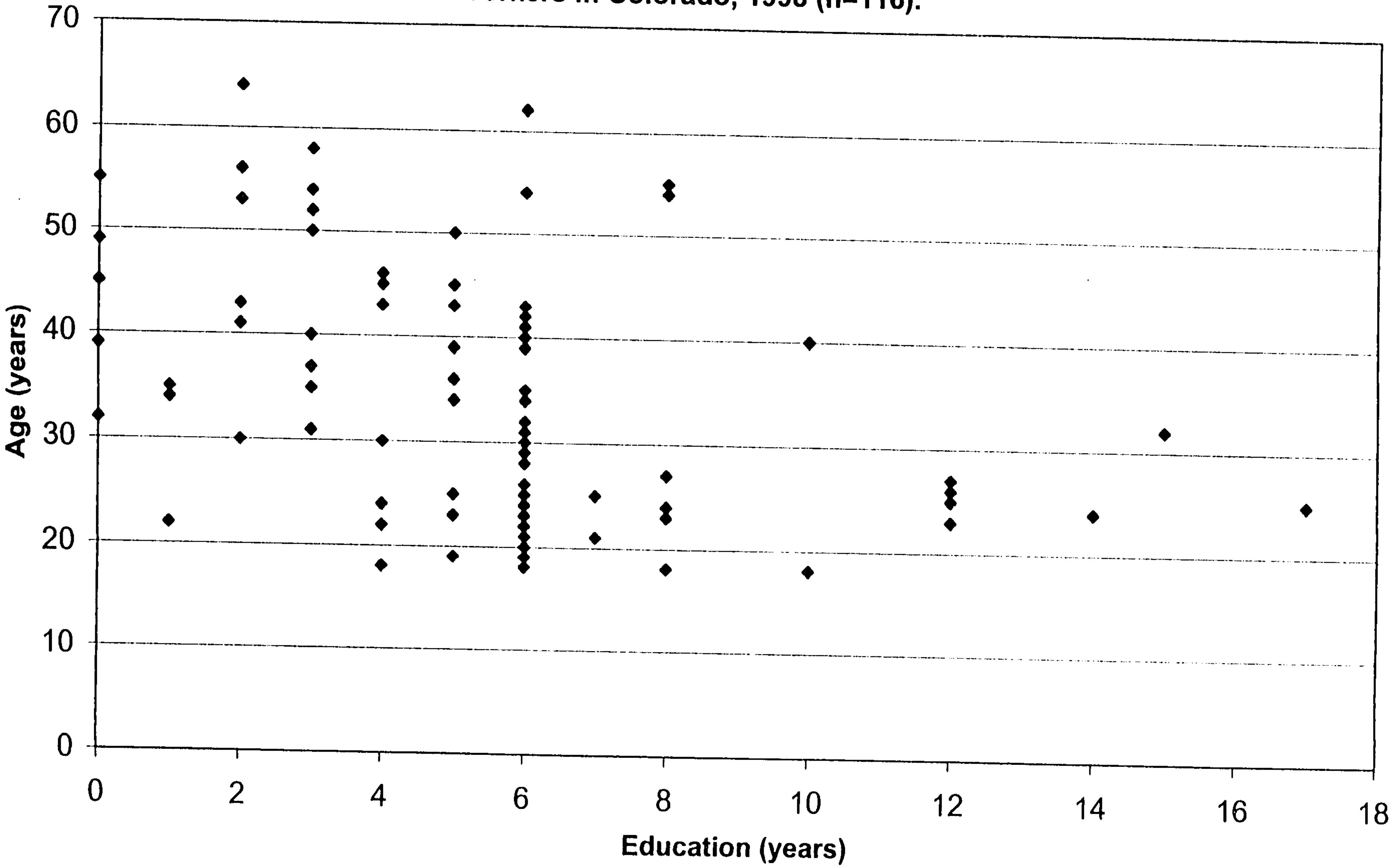


Figure 5.2 Percentage of Agricultural Activities Reported by Migrant & Seasonal Farm Workers during the 1998 Harvesting Season in Colorado (n=152).

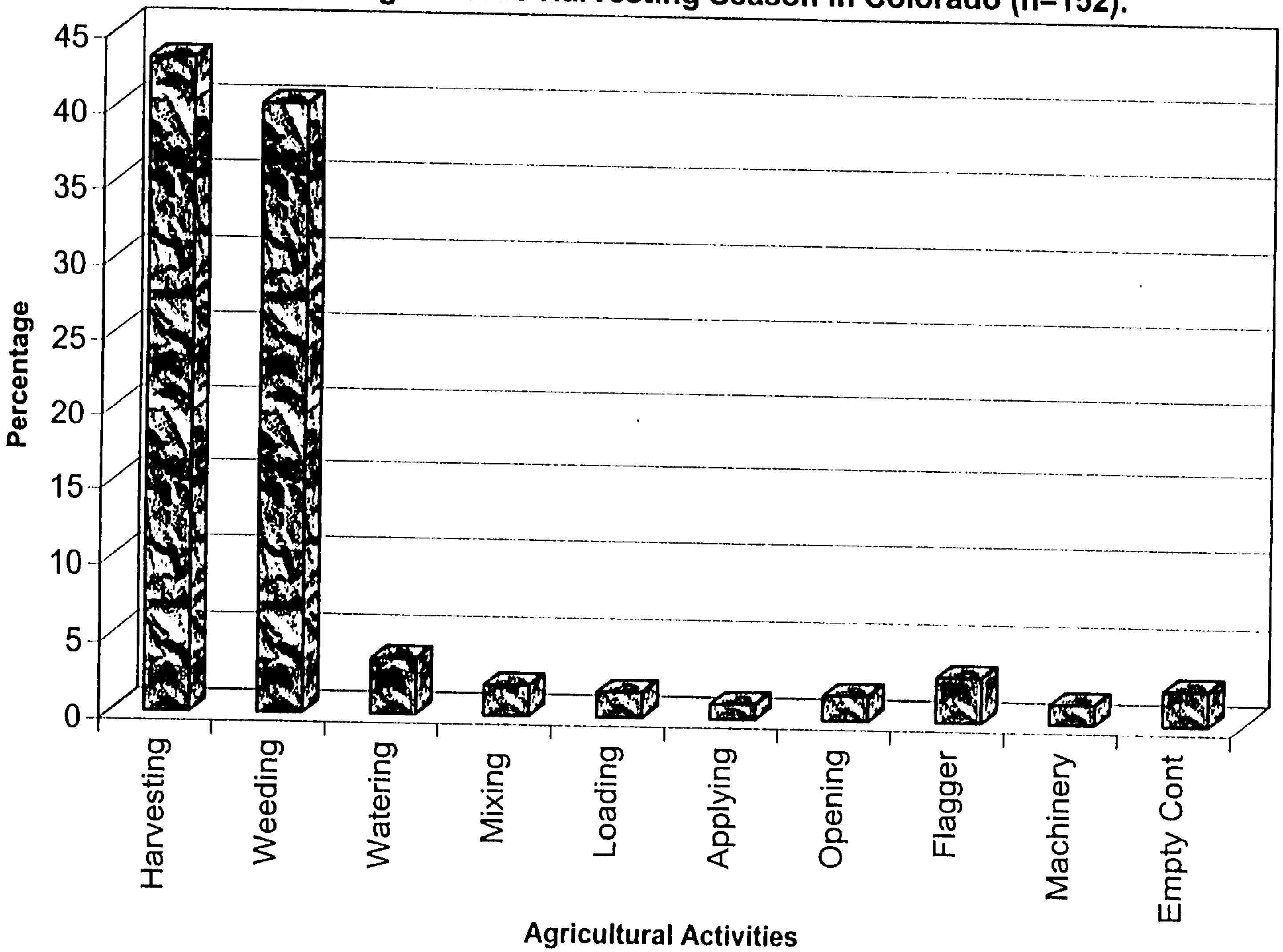


Figure 5.3 Reported Home State Among Migrant Farmworkers in Colorado, 1998

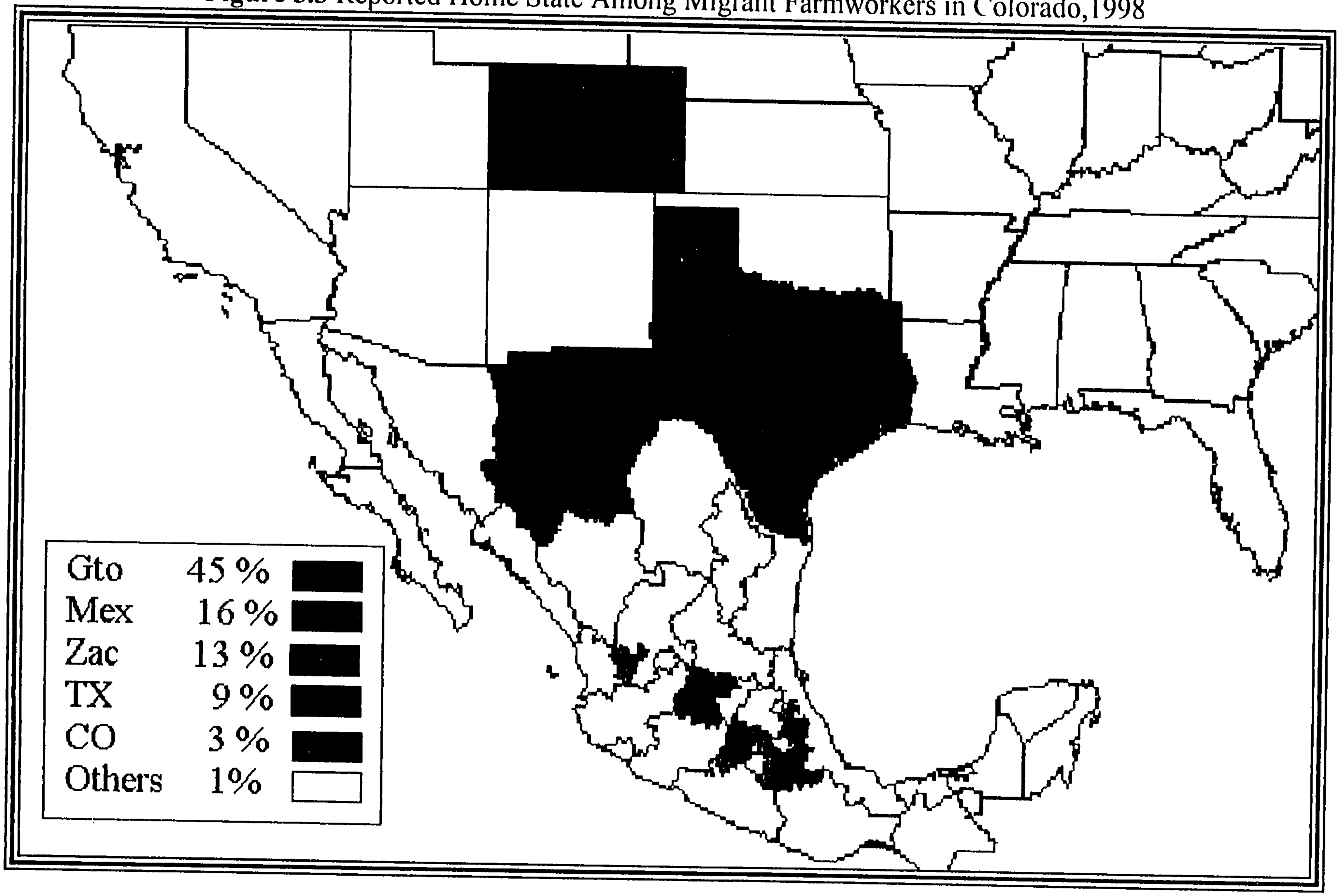


Figure 5.4 Frequency of States Reported by Migrant Farmworkers When Asked if They Have Ever Worked in Other States Within the United States in Agriculture? (n=65).

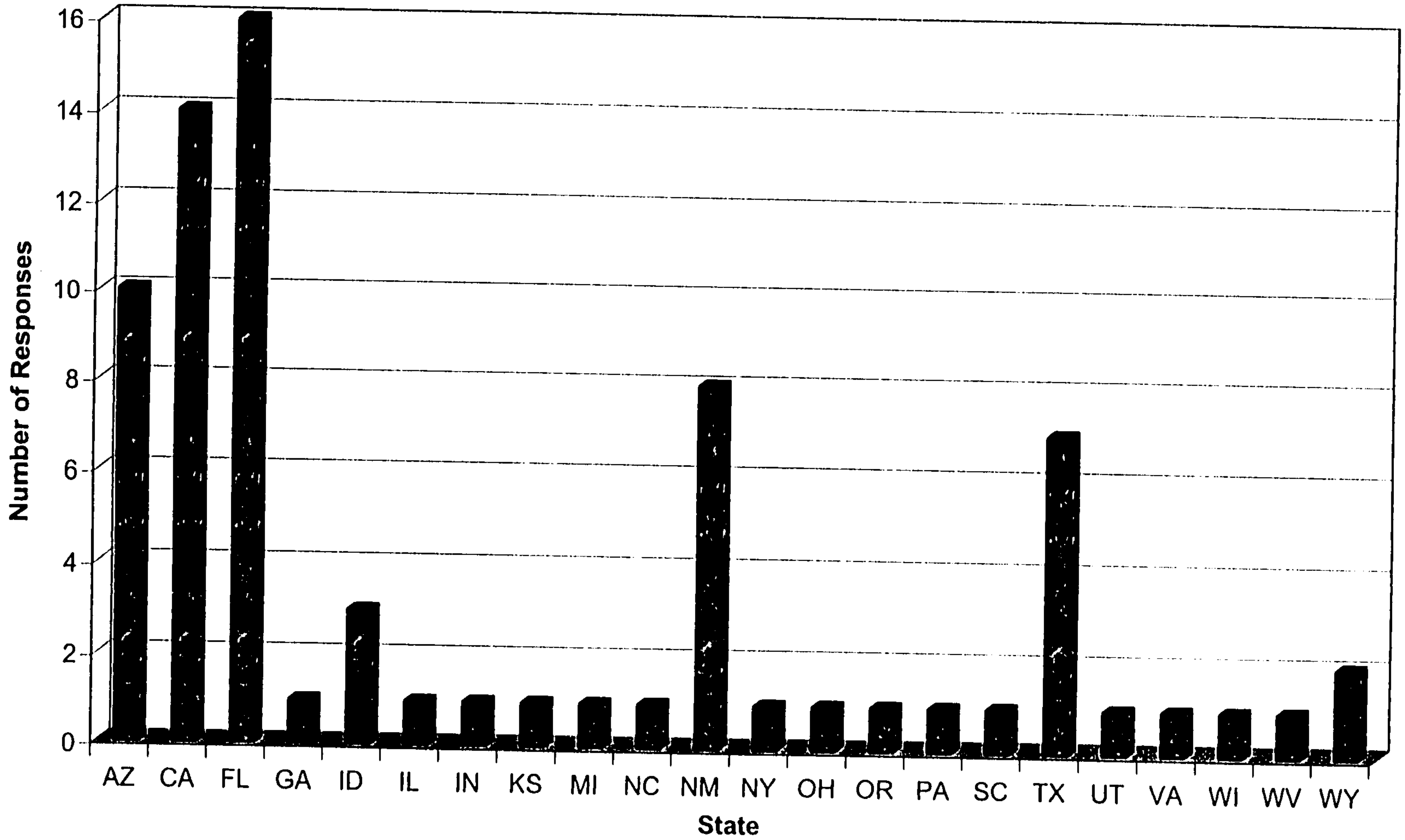


Figure 5.5 Percentage of Responses by Migrant & Seasonal Farm Workers When Asked How Many States they Worked in Agriculture (n=152).

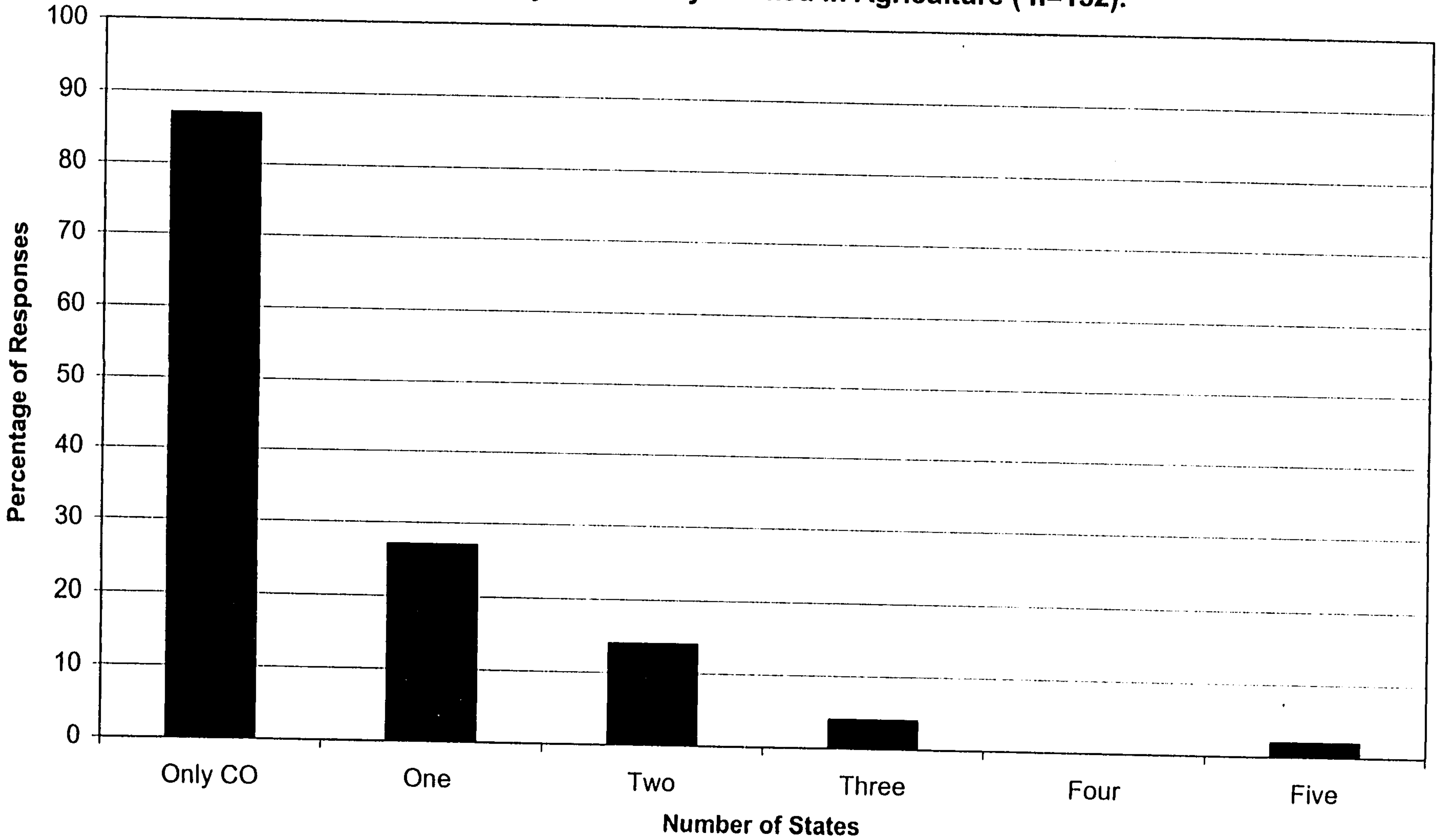


Figure 5.6 Frequency of Jobs/Occupations Reported by Migrant Farm Workers When Asked What Type of Work They do When not Working in Agriculture (n=44).

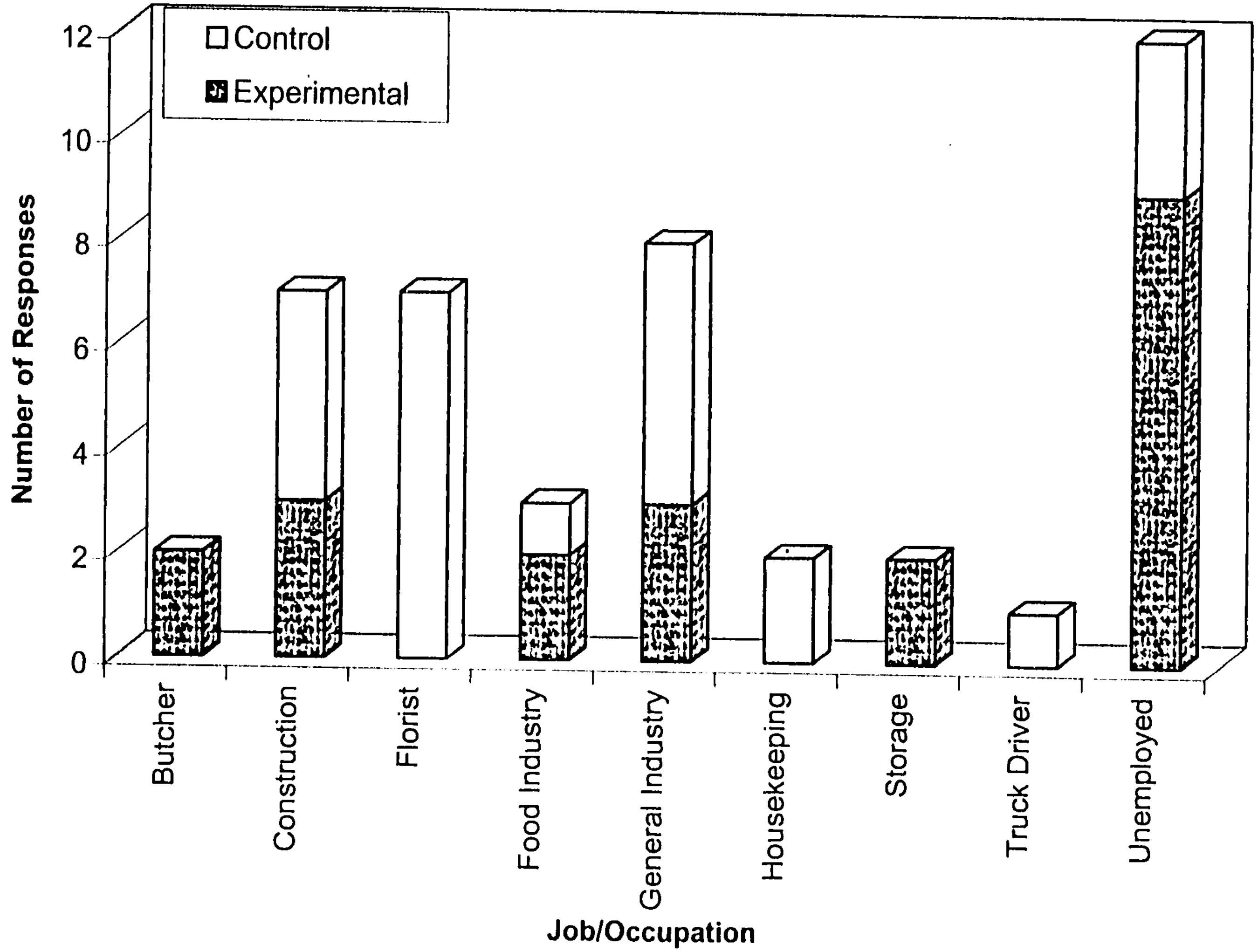


Figure 5.7 Percentage of Main Concerns Reported by Migrant & Seasonal Farmworkers in the State of Colorado, 1998 (n=141).

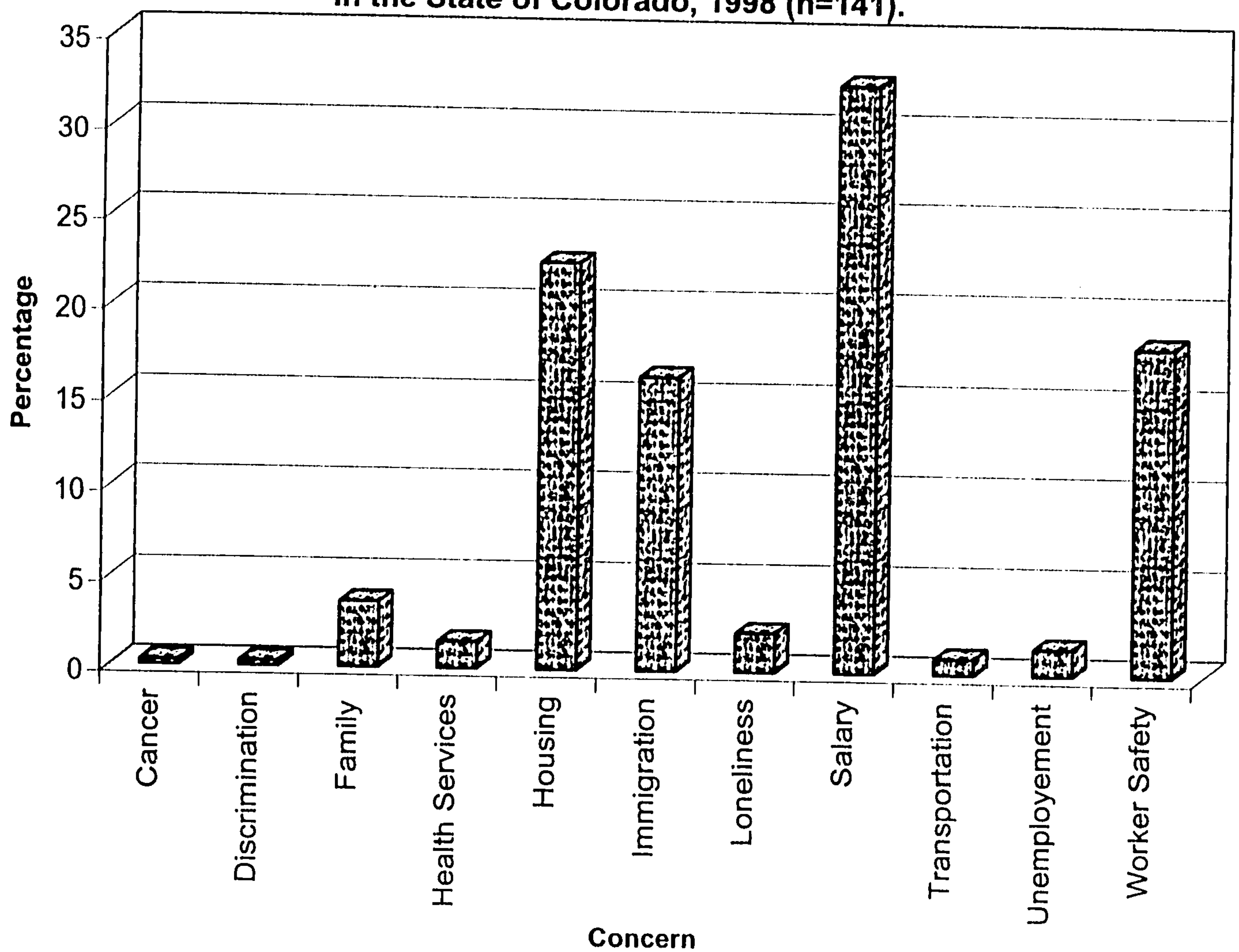


Figure 5.8 Percentage of Reported Worker Protection Standard Card, Previous Training by Migrant & Seasonal Farmworkers in Colorado (n=42), 1998.

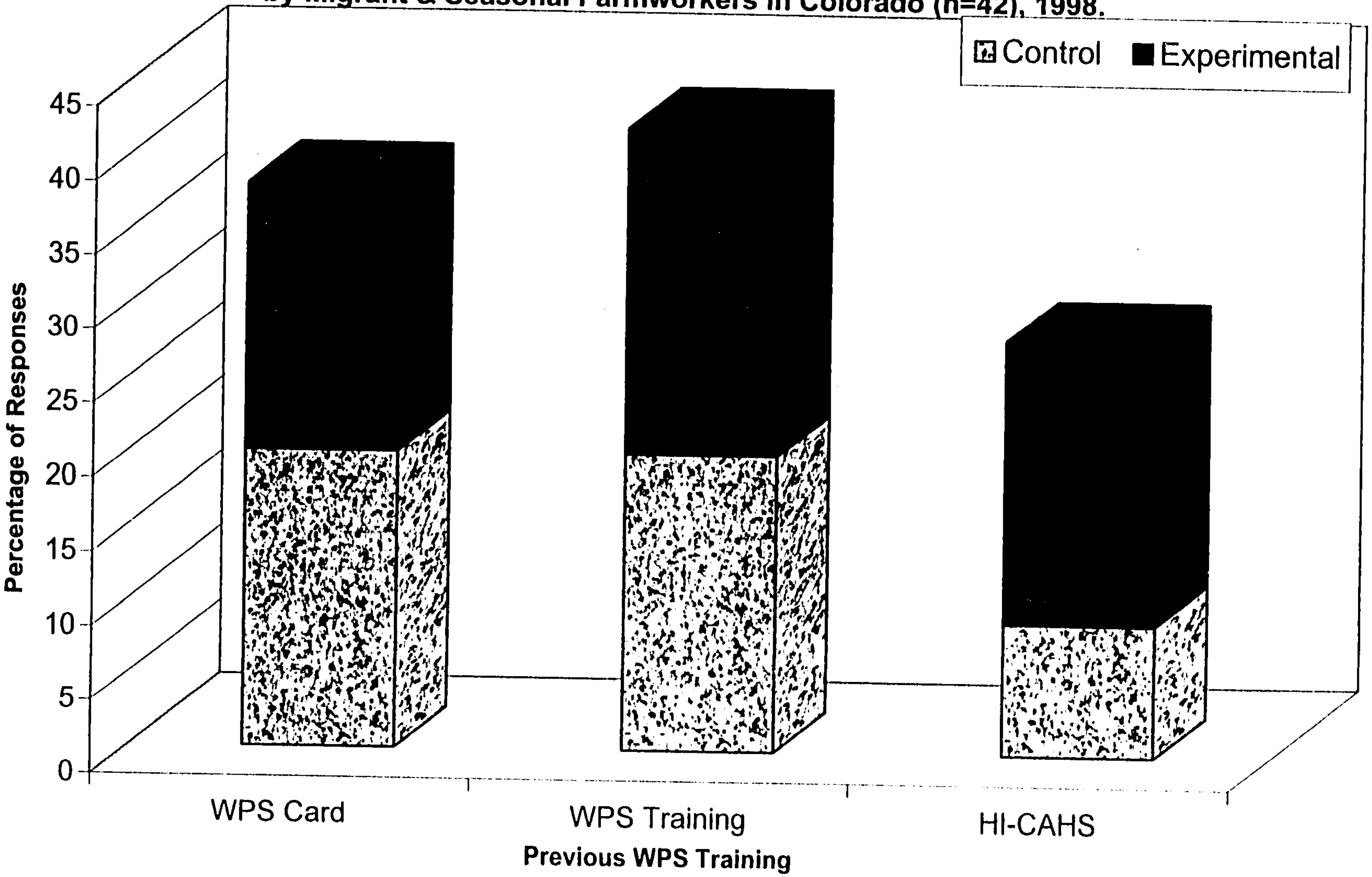
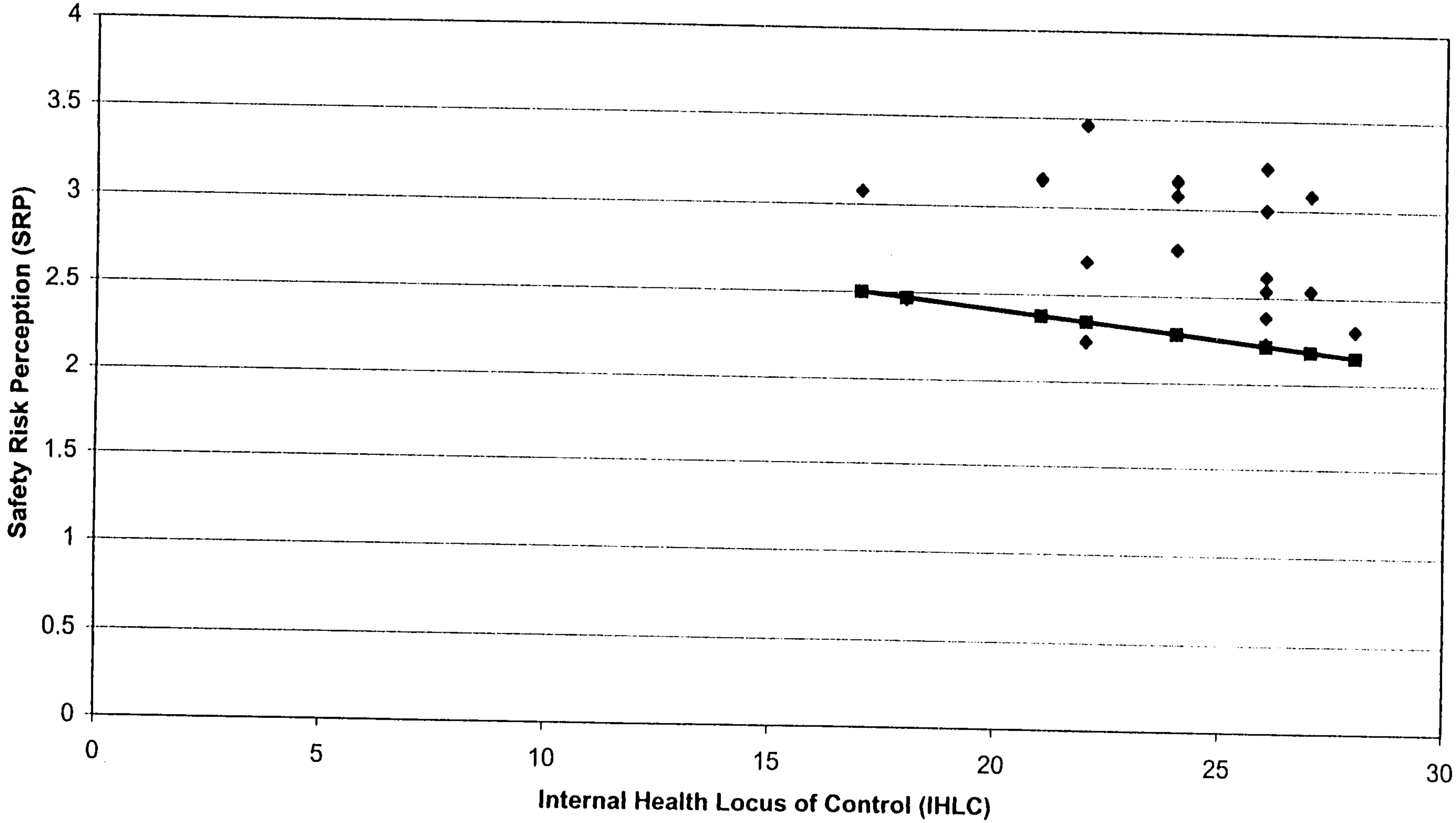


Figure 5.9 Predicted Values for Saferty Risk Perception (SRP) by Internal Health Locus of Control (IHLC).



6.0 DISCUSSION

The purpose of this study was to improve upon the methods used by that WPS training program and, consequently, to improve subsequent evaluations of a similar program. An experimental design was used (that complied with WPS criteria) to assess the effects of the new pesticide risk reduction program study.

The specific objectives of this investigation were:

(1) To develop instruments to assess the effectiveness of the pesticide risk reduction program in terms of :

(a) Knowledge in Pesticide Safety

(b) Modification of Safety Risk Perception

(c) Observed Behaviors Related to Pesticide Safety

(d) Health Locus of Control

(e) Stages of Change

(2) To evaluate the association between the Knowledge in Pesticide/ Safety Risk Perception and attitudes/beliefs as measured by:

(a) Health Locus of Control

(b) Stages of Change

This investigation accomplished these objectives, and much of this discussion provides details in how each of the specific objectives were met. Instruments were developed to evaluate the pesticide knowledge, safety risk perception, and safety audits as the first step in accomplishing the first objective. Numerous statistical analysis provided evidence of differences in the migrant farmworkers that were exposed to the risk reduction program (experimental group) versus the migrant workers who were not (control group). The pesticide knowledge, safety risk perception and observed behaviors showed more improvement in the experimental group than in the control group.

The second objective was to evaluate the association between attitudes/beliefs (as independent variables as measured by health locus of control (HLC and stages of change) with pesticide knowledge and safety risk perception (dependent variables). Significant correlations were found between the independent variables and the dependent variables, when the independent variables were used in the predictive models of the dependent variables. The assessment of the latter independent variables in health and safety was addressed by multiple regression modeling of the behaviors chosen.

In overall analysis, all of the potential confounding factors were considered, and then controlled for, in each of the analyses. The ability to control for confounders had a significant effect in the statistical models, and ensured validity in results and conclusions. Principal component analysis in multivariate modeling techniques for continuous independent variables was unique, and that analysis provided increased statistical power to detect significant relationships between variables.

This chapter is divided into three sections. The first section focuses upon the analyses and the development of the hypothesis, describing the two types of analysis, descriptive and multivariate. The second section is a discussion of the overall results. The results are divided as to (1) Demographic Profile of the Migrant and Seasonal Farmworkers, (2) Effects of the Pesticide Risk Reduction Program in Pesticide Knowledge and Safety Risk Perception, (3) Effects in Health Locus of Control, (4) Effects in Stages of Change, and (5) Safety Behaviors and Audits. In addition to reviewing the specific results, this section includes a discussion of the overall trends and patterns of the findings. The third discusses the strengths and weakness of this study. The chapter concludes with a discussion concerning the implications of the investigation's findings for workers, employers, and for future studies.

6.1 Discussion of Analyses

6.1.1. Hypothesis

The Worker Protection Standard (WPS) has been implemented nationwide. There is an ongoing informal evaluation of this program throughout each session. The instruments used in this research can be evaluated by health professionals in educational interventions with migrant and seasonal farmworker populations.

The effects of the pesticide risk reduction program among the population of migrant farmworkers served by HI-CAHS (using the WPS criteria) were not evaluated prior to this research. The results from other states will not necessarily apply to the Colorado migrant workforce. One hypothesis in the investigation was designed to determine the extent of the effectiveness of this unique pesticide risk reduction program.

The ultimate goal of the WPS or pesticide risk reduction program, is for the farmworker to adopt safety behaviors that diminish the risks of pesticide exposure. Knowledge is a requirement for changing behavior. However, in order to modify any hazardous behavior, the risk perception of the worker has to be changed. This precipitates the second step in changing behavior (Geller, 1996).

Behavior change can be evaluated in terms of stages, instead of an "all or nothing." The stages of change model was a valuable tool in the assessment of the effectiveness of this risk reduction program. A worker will adopt preventive (safety) behaviors if they perceive that they have control over their health. Multiple health locus of control studies have demonstrated that individuals with an internal orientation will adopt preventive health habits (Kennedy et al., 1999). Internally-oriented individuals tend to engage in preventive health habits that are transferable to specialized safety behaviors. What this study concluded was that stages of change and the health locus of control were associated with the pesticide knowledge and safety risk perception among the migrant and seasonal farmworkers.

The group interview method for collecting data was combined with self-administered questionnaires. The self-administered questionnaires were cheaper and quicker than survey interviews. The group interviews allowed more migrant farmworkers to be included in the study. Workers who might have been reluctant to respond to questions about their non-safe behaviors or who had reservations about giving their controversial opinions could now respond freely in an anonymous questionnaire.

The investigator read each question aloud to the group. The investigator's presence was beneficial in that any questions that the migrant farmworkers might have had during the group interview were immediately addressed in our study. In our study the group interview likely achieved a higher rate of completion than self-administered questionnaires.

6.1.2 Types of Analyses

The analysis of the data was conducted using two different methods. First, descriptive analysis was used to characterize demographic and occupational factors (as independent variables) to describe the migrant and seasonal farmworkers population as a group. Second, a comparison between the experimental and control group pre-test conditions were made by t-test and Kruskal-Wallis analyses to determine if there was a statistically significantly difference between independent variables that needed to be adjusted in subsequent analysis.

In the analysis of covariance, the effects of potential confounding factors were controlled by including those as covariates in the model. Some of the confounding factors, such as age and agricultural work experience, were fitted into the model by using principal component analysis. This method reduced the number of variables into a smaller set of factors which would 'explain' the variance in the original variables. The strength of this level of analysis was in its ability to include the highly correlated independent variables into the analysis of variance in an orthogonal model. The rationale (for the selection of dependent variables) in the analysis was based upon changing the behavior: pesticide knowledge, safety risk perception, attitudes for changing by health locus of control subscores, and then stages of change.

This investigation was limited, in part, because it required numerous statistical tests especially for the stages of change. To reduce the number of statistical tests, plots of the distributions of the independent variables for the experimental and control groups were reviewed, and only distributions that differed were considered for analysis. When hypothesis testing was performed, statistically significant results were expected to occur by chance. About one significant ($p< 0.05$) result in twenty tests was expected in the absence of any true relationships (Rosner, 1986). In the discussion of the results for the dependent variables (pesticide knowledge, safety risk perception) the focus was upon only those predictors that indicated consistent effects by different methods (i.e., unadjusted t-test and analysis of variance adjusting by the differences). There were no multiple comparison problems in this research. Neither were their any Type I errors that had been inflated.

An analysis that uses continuous dependent variables is able to detect changes in differences in the mean values of pesticide knowledge or safety risk perception. For each dependent variable, 15 separate models were developed to assess the impact of the risk reduction program on each dependent variable (pesticide knowledge or safety risk perception). By evaluating the effects of the health locus of control (as a dependent variable) and stages of change (as a dependent variable) in the risk reduction program, the detection of the attitudes and beliefs of the migrant and seasonal farmworkers was facilitated. These tools had not been formerly applied in the assessment of a health and safety program. The HLC and stages of change model helped to identify some cultural factors that could explain the lack of improvement in pesticide knowledge or safety risk perception.

The issue of multicollinearity between the dependent variables used in the analysis is important. The dependent variables: pesticide knowledge, safety risk perception, and health locus of control were highly correlated. Due to their inherent relationships, the mean value of one dependent variable affected the means of others. This effect must be considered when interpreting the results. Nonetheless, each dependent variable were individually significant. A migrant farmworker with an external orientation in health locus of control would perceive to have less control over his/her health. This HLC was conducive to a lower safety risk perception. Such an attitude would then affect the pesticide knowledge (learning).

An analysis of covariance (ANCOVA) was conducted to provide results that were more meaningful to the health and safety professionals. The allocation procedure (somewhat arbitrary in the case of workers in the experimental group who did not participate in the risk reduction program--13 workers), allowed for the classification of workers into two groups. The experimental group was defined as those workers who participated in the risk reduction program. They possessed more pesticide knowledge and better safety risk perceptions than the control group (who did not participate in the risk reduction program within the time that this study was conducted). The allocation procedure in defining experimental and control workers may result in misclassification. These limitations were likely to bias the estimates of the pesticide risk reduction program toward the null (Type II error).

Statistical modeling was conducted in order to calculate the odds ratios adjusted for the effects of potential confounding factors. Using the ratio of the odds of improvement in stages of change to occupational and demographic factors (between the experimental and control groups), the odds of improvement as a result of the risk reduction program were estimated. The analysis of the probability of being in the termination stage (for each of the four behaviors included in this study) was adjusted for the effects of potential confounding factors. These statistical methodologies provided estimates for the association between stages of change and pesticide risk reduction program.

6.2 Discussion of Results

6.2.1 Demographic Profile of the Migrant and Seasonal Farmworkers

The sample in this group were all (new and former) clients of HI-CAHS. The characteristics of all growers in Colorado are unknown. It is impossible from these data to be fully representative of the Colorado migrant and seasonal farmworkers. As a result, these findings were not generalizable. Moreover, there are no similar findings reported in other studies.

The profile for the migrant and seasonal farmworkers in this study was not the same for the Colorado Migrant Education Program or the Colorado Health Migrant Program (Anonymous, CMHP, 1995; McMullen Jager, 1996). The workers in this sample were predominantly males (85%) as presented in Table 5.1. In the Colorado Migrant Health Department 55% were males (McMullen Jager, 1996). This reflects the general characteristics of the sample: 'solo' workers, they are primarily men who migrate without their families. The migrant farmworker age mean (30 years, Table 5.1) in this sample was similar to the mean age for the Colorado Migrant Health Department (<40 years, McMullen Jager, 1996).

This sample population had similar education level (mean level 5 years, Table 5.3), than the education level (6 years) reported by the Migrant Education Program (Anonymous, CMHP, 1995). In this sample, literacy among migrant and seasonal farmworkers in this study was unexpected. The workers with a higher number of years of formal education were young (< 30 years old). Even though the mean in number of years of education was low (5 years), there was a farmworker with 18 years of education (Figure 5.1). In spite of their education, young workers were willing to become migrant farmworkers. The financial challenge that Mexico is facing may contribute to this fact.

During the time of this study, most of the activities reported by the migrant and seasonal farmworkers were harvesting and weeding (Figure 5.2). Those activities would have been different had the study would have been conducted in the beginning of the season. The quality of the migrant farmworkers responses may have been diminished because of the lateness of the season. In this sample, workers who were in this season for the first time (16% in our sample) were already used to their own behavior (not necessarily safety behavior). Workers in this study, who were coming every year 66% reported in this study, they may had been already tired (end of the season), ready to comeback home and not willing to learn more about pesticide safety. There is no way to know if the farmworker's responses would have been different at the beginning of the season. The fact that this evaluation found positive results from the risk reduction program provides an incentive for HI-CAHS to provide the risk reduction program regardless of the time in the season.

Over 50% of the migrant farm workers consumed alcohol, and 30% reported smoking cigarettes. The alcohol and cigarette use was higher in this sample than that reported by the Colorado Migrant Health Program (36% alcohol consumption and 27% smoking cigarettes) (McMullen Jager, 1996). Cigarette smoking and alcohol consumption would be compatible with low internality scales (Wallston, 1978; Kist-Kline, 1989) that were present in our sample. However, it is not possible to make a comparison between the HLC in this sample and the report in the HLC in the Colorado Migrant Health because there was no information collected on HLC (McMullen Jager, 1996).

Of the migrant farmworkers in this study, 43% had been working in agriculture in other states. The migrant farmworkers were found as mobile as traditionally described (Troter, 1988; Dever, 1991). They travel long distances every year to secure their work site (Figure 5.8). From the job/occupations reported in our sample it is encouraging to see that even when this population is working in work-sites considered non agricultural the workers will benefit from the pesticide risk reduction program, for example working as a florist, in addition to the benefit of the improvement in the safety risk perception. The percentage of migrant farmworkers reporting to have experienced pesticide symptoms were similar to the reported by the Colorado Migrant Health Program (~10%) (McMullen Jager, 1996). In the Colorado Migrant Health Program data was self reported comparable to the self reported method used in this research (McMullen Jager, 1996).

The mean values in pesticide knowledge of migrant farmworkers with previous WPS training were higher (mean=13.60) than those values in the workers who did not have the WPS training (mean=12.55) ($p<0.005$). Moreover, there was a significantly improved safety risk perception for the workers with previous WPS training ($p<0.05$). This is evidence to supports that WPS improved the knowledge and safety risk perception of farmworkers.

This study documented that other concerns reported by migrant and seasonal farmworkers. Those concerns were composed of multiple choice and open-ended questions, the responses were very informative. Some of the workers reported concerns that were addressed in this risk reduction program, about worker safety and health (i.e., cancer). However, some of the other concerns expressed would have to be addressed by other future research. Housing, immigration and salary were the main concerns that have been described as a problem for the migrant workforce (Smith 1986; Troter, 1991). Loneliness was prevalent among this worker population composed mainly by 'solo' workers.

6.2.2 Effects on Pesticide Knowledge and Safety Risk Perception

The experimental group showed significantly greater gains than the control group in the pesticide knowledge and safety risk perception. The results indicated that the bilingual and bicultural strategies used in the pesticide risk reduction program contributed toward pesticide knowledge and safety risk perception performance. Pesticide knowledge and safety risk perception was improved among migrant and seasonal farmworkers. The content of the pesticide education program met WPS criteria.

This program had a positive impact for safety risk perception among migrant farmworkers because of the innovations applied to the safety risk reduction program. The stages of change and health and safety models produced a more effective model for changing safety behaviors. The next step in assessing the stages of change model would need to compare whether a program oriented toward specific stages of change in safety behavior would produce an advantage (more workers adopting a change of stages) over the current risk reduction program.

6.2.3 Effects in Health Locus of Control

Understanding the beliefs, values, and concerns of a population is one of the first and most important steps in assessing its health needs (Green, 1991). This is type of awareness is a fundamental requirement in planning an effective health and safety program. In this study, migrant farmworkers' beliefs about their safety (or their perception of risk) were strongly correlated with their perception of control in their own health (measured as health locus of control).

Table 6.1 Health Locus of Control Mean Scores by Ethnic Group.

	Healthy Adults*	White European **	South Asians **	Afro-Caribbean **	Migrant & Seasonal Farm Workers
IHLC	25.6	24.47 ± 4.77	29.23 ± 5.13	26.50 ± 4.30	Pre 23.32 ± 3.49 Post 22.99 ± 4.29
PHLC	19.2	16.87 ± 4.44	23.54 ± 8.47	16.81 ± 3.02	Pre 26.18 ± 3.36 Post 26.43 ± 2.93
CHLC	16.2	17.31 ± 4.71	25.26 ± 7.50	16.44 ± 4.10	Pre 21.42 ± 5.14 Post 22.13 ± 5.20

* Wallston and Wallston, 1981.
** Wrightson, 1997
IHLC Internal Health Locus of Control
PHLC Powerful Others Health Locus of Control
CHLC Chance Health Locus of Control

Migrant and seasonal farm workers in this sample were more external in their HLC scores when compared to other populations (Table 6.1). As predicted by theories of health-related behavior change (Wallston et al., 1978), those who were high internals were more likely to improve their safety risk perception and to adopt better safety behaviors. The improvement in safety risk perception among workers perceiving themselves as being in control and possessing minimal beliefs in powerful others and chance was better than those who were externally oriented (Kist-Kline and Lipnickey, 1989).

Although the attitudes of the migrant farmworkers in the pesticide risk reduction program were not changed, this program did bring the migrant farmworkers closer to change in behavior in that knowledge (awareness) is the first step. The second step was to increase the migrant farmworkers perception of risk. Safety cannot be improved unless the workers' perception of risk is improved, and their tolerance for risk decreased (Geller, 1996).

The programs demonstrated to have an effect upon health locus of control are ongoing during four to six months (Kennedy et al., 1999; Wallston, 1978; Kist-Kline, 1989). Worker's HLC values would need to be measured after a longer period of time than in this study (more than 4-5 weeks) with programs consisting of more than one intervention (Kennedy et al., 1999; Lefcourt, 1984; O'Brien, 1984). What was not clear was how direct an impact (if any) did the components of the pesticide risk reduction program have upon the workers' beliefs about changing their locus of control orientation. The question remains as to how much it would be possible for the workers to modify their perception of control in their health due to a health and safety risk reduction program. It would be desirable to conduct a long term program (more than once).

In this sample, migrant farmworkers were more likely to have higher scores in CHLC and PHCL among higher age groups. Due to the insufficient number of workers by age group, the findings did not detect all statistically significant differences. Education was negatively correlated with CHLC and PHCL. These findings were in agreement with the profile of the Mexican-American population found by other researchers (Kennedy et al., 1999; Bundek et al., 1993).

The multiple regression analyses confirmed that the pesticide risk reduction program did not have a statistically significant effect upon health locus of control. Most of the MHLC scores in the general population showed that individuals scored highest on the IHLC subscale, followed by PHLC, and CHLC (Wrightson, 1997; Wallston, 1978; Wallston, 1992). The pre-test and post-test scores in this study differed with the highest scores representing PHLC, followed by IHLC, and CHLC. This finding was supported by other researchers (Mirowsky et al., 1984; Sugarek et al., 1988; Kennedy et al., 1999) who found that Hispanic subjects were represented by a low IHLC.

The role of powerful others with respect to health (PHLC) was significant. Powerful others (PHLC), as a subscore of IHLC, reflected a tendency to rely upon family, friends, and or medical professionals with respect to the treatment of illness and disease. In the Mexican culture, *la familia* and interdependence among its members is highly integrated. This enhanced the emphasis upon the role of extended family systems in caring. Extended families bond together providing a cohesive network. This high PHLC may have reflected this social network (Molina & Aguirre-Molina, 1994; Kennedy et al., 1999; Bundek et al., 1993). Medical professionals also fit into the category of powerful others that influence a worker's perceived control of health.

The educational level was found to have a statistically significant correlation with the PHCL and CHLC. This indirect association indicated that the lower the educational level, the greater the disposition toward PHCL and CHLC. This finding supported past research conducted by Wallston, Maides and Wallston (1976) and Weihe (1987) and a recent study among Mexican-American women in Colorado (Kennedy et al., 1999). The risk reduction program was not directly oriented toward changing the perception of control of the workers over their health. This aspect could be assessed in future research.

The least square means (in multiple regression analysis) between the stages of change and HLC subscores indicated that there was a statistically significant difference in migrant farmworkers who separated their clothes in termination stage (who were significantly lower in PHLC) compared to those in the pre-active and active stages. The migrant farmworkers in termination stage of wearing long pants were significantly different from those in the pre-active stage (including action and maintenance stages) in IHLC. In other words, workers who were external were less likely to be in the termination stage of wearing long pants. This finding should be interpreted cautiously because an older worker would also have a higher IHLC, and would have more agricultural work experience.

The HLC orientation should not be characterized as having no impact upon the pesticide risk reduction program. Any doubt along these lines could be eliminated if this research was extended. These findings were important to health professionals. In receiving pesticide protection information in the workplace, farmworkers were encouraged to become more internally controlled, thus, less likely to adopt preventive behaviors (Kist-Kline, 1989). Longitudinal analysis should examine any further changes in HLC that may occur in the pesticide risk reduction program.

6.2.4 Effects in Stages of Change

Overall, the behaviors were improved in the experimental group when compared to the control group. Of those behaviors recorded, 4 out of 5 improved in the experimental group as opposed to one behavior in the control group. Using protective clothing (such as, long sleeve shirts and long pants) was already a common behavior in the experimental and control group. The stages of change model was found to be statistically significant when associated with the pesticide risk perception in washing hands while working in the fields before eating and before using the portable potty (Table 5.42). Even though there was no statistically significant difference in pesticide knowledge, the means of the pesticide knowledge and pesticide risk perception scores reflected an apparent trend from 'lower' pesticide knowledge means for the pre-active stage to 'higher' means for the active stages (Table 5.42). There was evidence for a similar pattern in the lower safety risk perception score. In this case, the higher safety risk perception score was significant, and it was statistically different in the individuals in termination stage compared to the pre-active and action stage (Table 5.42).

Although, separating clothes before washing them after working in the fields was not statistically significant in the modeling of pesticide knowledge and safety risk perception. The means resemble the pattern described for washing hands (Table 5.42). Migrant farmworkers in the pre-active stage had lower pesticide knowledge and higher pesticide risk perception scores. Wearing long sleeve shirt and long pants were behaviors that were included in the risk reduction program. However, from the audits these were behaviors that were already adopted by the migrant and seasonal farmworkers.

The ability to predict the termination stages demonstrated that the stages of change model was useful in health and safety education. The termination stage for wearing long pants was to occur in the action stage. The results indicated that migrant farmworkers wearing long pants would continue to practice this behavior. The termination stage for wearing a long sleeve shirt was predicted by agricultural work experience. Washing hands and separating clothes were more representative of the stages of change model that other behaviors. In these two behaviors, cultural determinants were not as important to the evaluation of the risk reduction program.

The researcher was also charged with the daunting task of promoting better health and safety behaviors among migrant farmworkers. That is, the health and safety professional had to consider that the migrant farmworker was not only facing housing, salary, and field conditions, but their own external perception of health control as well. Health and safety behaviors had to be modified and improved gradually (step-by-step), relative to the stage in which each worker was situated.

6.2.5 Effects in Safety Behaviors

According to the audits, four weeks of measurement did not demonstrate statistically significant improvement in behavior. The evaluation of the behaviors in the risk reduction program was limited by methodology in the observations that were made. During the audits, more than half of the workers in the fields participated in this study (from 58 to 70%, Table 5.50). The effect of the risk reduction program could have been diluted by the denominator in the experimental and control group. For example, the total number of workers participating in this study that were observed during the pre-test for grower 3.A.1 was 9 out of 19.5 (mean value) total workers observed. During the post-test the total number of workers participating in this study that were observed during the post-test for grower 3.A.1 was 9 out of 16.3 (mean value) total workers observed. There were more workers being observed during the audit that were not participating in this study.

The length of observation in each audit was limited to one hour. In the case of washing hands, (before eating, smoking, or using the portable potty) the positive and negative observations were limited by the number of workers who displayed such specific behavior. Safety audits provided relevant information not available through questionnaires. Decontamination required conditions to be reported that were present in more than 50% (52 to 83%) in the experimental group, and more than 17% (17- 48%) in the control group (Table 5.8). In contrast, the audit findings presented a different perspective (Table 5.51). This illustrated the limitations on self reporting data. One plausible explanation for these optimistic responses from the migrant farmworkers could be the fear of revealing a lack of compliance with their employer.

Although the groups in this sample were randomly assigned, in the audits the group of workers observed were not the same group of workers in the study. There was no way possible to identify the workers who were participating in this study. The proportion of workers participating in this study was more than 50% (Table 5.50). The observation of work practices during the audits were limited to one hour. The differences in the behavior between the post-test experimental and the post-test control group for all behaviors in Table 5.50 were not statistically significant ($p > 0.345$). However, in some of the behaviors recorded in the audit, (such the number of workers washing or not washing hands before using the portable potty, eating or smoking) could have occurred by other circumstances. In other words, not all the migrant farmworkers observed used the portable potty during that period of time. In such cases that migrant farmworkers were expected to have a comparable behavior between the experimental and the control group, the apparent differences, if only number of workers are considered, had to be interpreted with caution. A longer period of observation (an 8-hour or a day per field) would have been preferable in recording behaviors.

Migrant farmworkers who were wearing gloves decreased in the experimental group (from 17 % to 11%), and in the control group (from 34% to 19%). This apparent differences could have been due to harvesting different produce only and not due to safety behaviors (i.e., onions and cucumbers versus lettuce). Although there was no difference in the crops between the experimental and the control groups, the differences in wearing gloves could have been due to the particular crop the farmworker was harvesting.

6.3 Overall Trends and Findings

Generally, the goal of an occupational health professional is to provide an ideal working environment. This should apply to a fluctuating and highly mobile agricultural workforce as well. However, the growers were challenged to provide such conditions because their farmworkers labored on a work site that changed within the same day. Existing safety regulations needed enforcement in order to insure their compliance among the reluctant growers (Code of Federal Regulations, Environmental Protection Agency's 1992 Worker Protection Agency, Title 40, Part 170). In spite of this challenge, at least one of the growers complied with all the regulations. That grower provided the migrant farmworkers with a portable clean potty, drinking water, decontamination water, single use towels and soap. These decontamination conditions needed to be as mobile as the workforce. The migrant farmworkers started working at 4 a.m and continued until dusk. and during the summer they finished about 8:30 p.m. In the course of day, they moved several times to different field locations. The grower had to accommodate all these changes in order to provide an adequate safety environment. All those exterior circumstances for this evaluation had to be considered.

This risk reduction program did not constitute the daily routine in the migrant farmworker. Evaluation assessment would be influenced by all exterior factors including the risk reduction program. Migrant farmworkers could have become more motivated to change their safety risk perception and learn more about pesticide safety because of the exterior motivation (relative to the risk reduction program). However, exterior motivation did not provide complete justification for the results in this study.

Overall, the safety risk perception of the migrant farmworkers improved. Perceptions influenced actions, and actions influenced perceptions. If the workers perceived risks, they would act to reduce those risks. In acting to reduce risks, they became more aware of other associated risks. In this case, the goal of the pesticide risk reduction program was achieved by increasing the workers' perception of risk. Workers that were familiar with hazards may have underestimated them (Geller, 1996). The pesticide risk reduction program demonstrated that it elevated the migrant workers pesticide knowledge, in addition to improving their safety risk perception. Knowledge of pesticides was higher in the migrant farmworkers who had previous Worker Protection Standard (WPS) training.

Environment, behavior, and person factors are dynamic and interactive. A change in one factor eventually impacts the other two (Geller, 1996). Behaviors that reduce the probability of injury often involve environmental changes, which lead to attitudes consistent with the safe behaviors (Geller, 1996). When the migrant farmworkers chose to act safely (i.e., washing their hands before eating while working in the fields), they performed safe thinking, and this often resulted in environmental change. The adoption of safety behaviors by migrant farmworkers required them to resist natural motivation for comfort, convenience, and efficiency. The environment the growers provided to those migrant farmworkers needed to support the principles taught in WPS.

Experience and practices among migrant farmworkers, as well as any other individual, were hard to change. Encouragement in new learning behaviors and attitudes is a contest of human nature. The primary strategy for increasing safety and actively caring behaviors among migrant farmworkers, is to overcome the cost with benefits. What is the cost for the migrant farmworkers and growers in Colorado when safety fails relative to the cost of adopting a new safety behavior.

In summary, the bicultural and bilingual risk reduction program provided by HI-CAHS has demonstrated its effectiveness in improving the pesticide knowledge and safety risk perception of the migrant and seasonal farmworkers in Colorado during the 1998 Summer season. Statistical modeling provided evidence of the relationship between health locus of control, stages of change, and pesticide knowledge/SRP.

6.4 Strengths and Limitations of the Study

6.4.1 Internal Validity

Migrant farmworkers did not know if they belonged to the experimental or control group. They called ' time for the class' every time the investigator was there conducting group interviews or the risk reduction program. At the time of the pre-test, the investigator did not knew which group of workers were to become the experimental or control group. The limited number of bilingual personnel was a disadvantage in conducting this research. The investigator (at the time of the post-test) who conducted the group interviews, knew which groups were experimental and control.

For the safety audits, the double recording of the behavior in the fields was contributed to the reliability of the data. In this case, the safety professional helping the investigator in conducting the audit did not know which groups were experimental or control. The potential for misclassification of study workers into the experimental and control groups was possible in the case of the safety audits. In the questionnaires, the workers who were originally assigned to the experimental group may have been reassigned to the control group (13 out of 152 workers). Misclassification bias in both cases would likely have diluted the results of this study, biasing the estimates toward the null hypothesis, due to non-differential error.

Due to the large number of statistical procedures that were performed, the assessment of the interaction between variables was not extensively evaluated. Moreover, with so many independent variables considered in the analyses, it was impossible to ensure that all potential confounders were included. These limitations may have resulted in some spurious associations, while other true associations may have been masked. The hypothesis 'a priori' was proven, and the findings were not likely to be chance because they were based upon a highly significant statistical model ($p<0.05$). The dilution of effect estimates by misclassification occurred during the audits. The audits were conducted upon workers participating in this study, including non-participating workers. Misclassification in the questionnaires occurred when workers in the experimental group were considered as controls (n=13). Even with these limitations, the effect of the risk reduction program was good. There were improvements in the pesticide knowledge and safety risk perception among the migrant farmworkers. The association between HLC and Stages of Change in a health and safety risk reduction program was advantageous in assessing the changes in behavior among migrant farmworkers.

6.4.2 External Validity

All the workers were selected from the current population of migrant and seasonal farmworkers served by HI-CAHS. This study achieved its objectives with this population based upon a bilingual and bi-cultural pesticide risk reduction program. Generalizing these findings to other migrant and seasonal farmworker populations would not be appropriate.

However, the findings with regard to the instruments used in this research could be used in the evaluation of a program based in the WPS criteria. Migrant farmworkers in other areas may have had a different responses to the programs in place that either caused improvement or decreased the outcomes in pesticide knowledge and safety risk perception.

Generalizing the findings to the migrant workforce depends upon factors other than demographic and occupational. In order to generalize these results, all the factors that predict human behavior would have to be considered. Numerous investigators suggested that increasing educational health and safety programs improves the overall safety behavior of the workers (Geller, 1996). The findings of this investigation cannot be used to address this issue because of the limitations in generalizing the results to the broader migrant worker population.

6.5 Implications

The findings from the investigation provided evidence for the hypothesis that the bilingual and bi-cultural pesticide risk reduction program improved the pesticide knowledge, safety risk reduction and safety behaviors among migrant and seasonal farmworkers in Colorado. This study did not provide any evidence that it had an effect upon the health locus of control (HLC) of the migrant and seasonal farmworkers. Stages of change were found to be a potential tool in measuring the change in behaviors of the workers for the health and safety professionals. The limited findings of this investigation, are important to consider in any future study that would address the factors that influence behavior changes in the workplace.

The Worker Protection Standard (WPS) has been evaluated by the Association of Farmworker Opportunity Programs (AFOP) AmeriCorps WPS Pesticide Training Evaluation Project in other States in the U.S. The results of the Americorps evaluations indicated that there was an increase in pesticide knowledge among farmworkers (Deenys, 1999). Those evaluations included a pre- and post-test among the farmworkers trained. However, the evaluations were limited in that there was no assurance that the WPS caused the targeted population to change as a result of WPS training.

Future research is needed to provide support for the association between the stages of change model with the HLC. This link has not been demonstrated. The findings from this study have provided some support for this association, however, an alternative hypothesis could not be eliminated. More research will also be needed to assess the association of HLC orientation with safety behaviors in other health and safety programs, preferably a long term program, to assess any impact of the program in the HLC.

6.6 Conclusions

An important conclusion of this investigation is based on the significant differences of the pesticide risk reduction program among the migrant and seasonal farmworkers in Colorado. The pesticide risk reduction program was effective in improving and maintaining the total safety of migrant and seasonal farmworkers. Findings from this research supported that the pesticide risk reduction program was effective in (1) increasing the pesticide knowledge, (2) improving the safety risk perception resulting in (3) improving safety behavior among the migrant and seasonal farmworkers in Colorado. The effects of HLC orientation on safety risk perception and the stages of change model were a useful tool in evaluating the changes in behavior in the migrant farmworker environment.

The hypothesis 'a priori' was that there was a difference between experimental and control groups for pesticide knowledge and safety risk perception (SRP) due to the pesticide risk reduction program (intervention). This hypothesis was confirmed due to high statistically significant differences with low *p*-values ($p<0.001$). Therefore, it is likely that the results did not occur by chance.

One hypothesis of this investigation was that the attitudes and beliefs, measured by the HLC orientation and Stages of Change model, of the migrant and seasonal farmworkers were associated with the effectiveness of the pesticide risk reduction program. This study provided statistically significant evidence of the association between the HLC and SRP. Farmworkers who have an internal HLC orientation were more likely to increase their SRP. These findings do provide evidence that the attitudes and beliefs of a farmworker influenced the outcomes (safety behavior, SRP, and pesticide knowledge) in this pesticide risk reduction intervention. Findings have demonstrated that the Stages of Change model can be instrumental for measuring the behaviors in a work environment. In addition, a combination of HLC and Stages of Change used in this research provide important information in managing a special population of farmworkers.

Although the lack of statistical significance between the experimental and control group in the safety behaviors observed (audits) may have been the result of misclassification, the findings of this investigation provided reassurance that the pesticide risk reduction program had an effect in the attitudes and beliefs toward safety behavior among the migrant and seasonal farmworkers. Significant findings demonstrated that the work environment for the migrant and seasonal farmworkers in this research needs to be urgently improved. Enforcement of regulations could be an effective avenue, however, an educational intervention directed toward the growers seems necessary to achieve better field and housing conditions for the migrant farmworkers. Better housing for migrant and seasonal farmworkers is urgent. Safe drinking water and compliance with regulations is also a goal to be addressed.

In order to improve the behaviors and attitudes on the job among migrant and seasonal farmworkers, an effort should be made to consider a health and safety program that would be sensitive to the unique background of this under served population of workers. A new approach would incorporate the worker's background (including culture, attitudes and beliefs) as a collaborator with the health professional in improving the worker's safety and environment. With knowledge of the regulations and safety needs of the farmworkers, the health professional should involve the workers in the process. This process must to be interactive. The health professional needs to learn about the culture, beliefs, and attitudes of the workers and establish a close working partnership.

7.0 SUMMARY AND RECOMMENDATIONS

The bicultural and bilingual risk reduction program provided by the High Plains Intermountain Center for Agricultural Health and Safety (HI-CAHS) was effective in improving the pesticide knowledge and safety risk perception of the migrant and seasonal farmworkers in Colorado during the 1998 Summer season. The effectiveness of this risk reduction program was assessed through the steps of change in behavior as they occurred relative to knowledge, safety risk perception, attitudes, and stages of change model.

Four growers participated in the risk reduction program evaluation. Of the 152 migrant and seasonal farmworkers, 129 were males and 23 females. The average age was 30.52 (standard error of the mean (SEM), 0.96). These samples were divided into an experimental group with 77 migrant farmworkers, and a control group with 75 migrant farmworkers. A total of 405 workers were observed in the field audits. Pre-test Audits had 782 worker/observation units, and post-test audits had 565 worker/observations.

The first objective of this study was to develop instruments to assess the effectiveness of the pesticide risk reduction program in terms of knowledge, modification of safety risk perception, and observed audits related to pesticide safety. Those instruments were developed, and the risk reduction program was found to be effective in improving the pesticide knowledge, safety risk perception, and safety behaviors among migrant and seasonal farmworkers.

The second objective was to evaluate the relationship between attitudes/beliefs as measured by (1) health locus of control, (2) stages of behavior change in pesticide knowledge or safety risk perception. This was accomplished by statistical analysis of the instruments for each one of the attitudes/beliefs instruments. Health locus of control subscores was associated with the safety risk perception among the migrant and seasonal farmworkers. Stages of change was instrumental in the assessment of the behaviors in pesticide risk reduction.

The majority of the field conditions in this study (decontamination sites where migrant and seasonal farmworkers were located) indicated that the growers had not been in compliance with Environmental Protection Agency (Code of Federal Regulations, Environmental Protection Agency's 1992 Worker Protection Agency, Title 40, Part 170). A decontamination site was supplied (with water and towels) by one of the four growers participating in this study. This grower demonstrated that compliance with the Environmental Protection Agency code was possible, even with a group of workers moved from field to field on a regular basis. The migrant workforce deserves to work in an environment that provides for their protection from pesticides. When migrant farmworker experiences a pesticide poisoning health professional is not likely to suggest that the grower "educate the worker". This usually becomes management problem rather than a education issue.

The Environmental Protection Agency requires evidence of compliance with the Worker Protection Standard (WPS) every five years, as well as the yearly provision of a pesticide risk reduction program. For the seasonal farmworker that spends part of the year in agriculture, this would be a good 'fresh' reminder in how to protect from the pesticide risks after doing a non-agricultural job. For the migrant farmworker, this will reinforce pesticide safety behavior. Long term interventions in promoting health have been used with good results. The same successful long term programs have been implemented in the industrial sector. The health and safety needs of this highly mobile workforce (migrant farmworkers) can only be accomplished through nation-wide enforcement of regulations. In any given state, a migrant farmworker should be subject to more than one risk reduction intervention.

The goal in changing safety behavior can be met only if there is a long-term commitment on the part of the grower to such a program. The program also promotes an increased awareness in the worker of his/her control over health, empowering the worker while promoting a willingness to care for others. The program helps to motivate the individual worker toward improved safety behaviors. A desired outcome is more likely with a migrant farmworker that practices protection against pesticides.

In applying the principles of the Safety Culture (Geller, 1996), safety should be internally, not externally driven. This concept is applied to the migrant workers and could be applied to the growers as well. The growers are responsible for providing the required field conditions to the workers. The change in culture requires that the growers understand the principles of regulation and the gains in productivity associated with those principles. In this way, the grower provides the best possible environment for the workers. Time and effort is also required from health and safety professionals to insure that such safety practices become associated with increased productivity.

Education programs to workers are a good tool to assure that workers have the knowledge and adequate perception of risk to adopt the most appropriate behavior in each work situation. It is relevant to assess the post-education knowledge gain, but the ultimate goal is to change behavior. Effective education programs should assess the individual differences and take into account the characteristics or attribute of the worker. Aside from differences in aptitude, literacy or pre-training skill levels, how the workers perceive the educational program in terms of improving their job performance and self efficacy may require varied approaches. The type and level of the educational program for new migrant workers, and whether or not the program is long term or for seasonal workers applying the WPS criteria have to be addressed. Recommendations for future studies in this area includes the application of this research protocol to other groups of migrant farmworkers receiving traditional WPS training (showing only the video—the easiest method for the grower). Future studies should compare the differences in this bilingual and bicultural program.

Another study (that would reinforce the validity of this research project and benefit from the groundwork laid by this endeavor) might develop a experimental study based on the concept of stages of change to determine if a different intervention according to the stage of change in the migrant farmworkers would significantly change their behavior in a better way. This might be an improvement on the current risk assessment program. In reaching the migrant farmworkers frequently (more than once every five years) through the WPS, such a study would be able to assess the impact of health and safety risk reduction programs in the perception of health control in the migrant farmworkers. This prospective study would collect the health locus of control subscores at the beginning of the season (early May) and at the end of the season (September). The study could divide the migrant farmworkers into experimental and control group, similar to this study. Comparisons could be made between the long term intervention programs and a one time education program. These additional data collecting projects could strengthen or refute the conclusions of this dissertation.

A perceived lack of control over their health may keep many migrant farmworkers from taking precautions to reduce their health and safety risk. By making explanations of safety behavior better understood, the more pervasive and harder-to-change behaviors of the older migrants can be changed. However, great care must be taken not to threaten or degrade the culture when seeking to change a culturally based belief.

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APPENDICES

APPENDIX I

PRE-TEST

A SURVEY OF THE EFECTIVENESS OF TRAINING IN PESTICIDE USE

INTERVIEW FOR THE FIELD WORKER

INSTRUCTIONS TO INTERVIEWER	QUESTIONS
1. Write your identification number	1. Identification Code
2. Please enter the exact day, month, and year of this interview.	2. Interview Date: ___(Day)________(Month)_____(Year)
3. Please check only one response. *1= Yes* *2= No*	3. Have you received training in the use of pesticides? *Yes* *(1)* _______ *No* *(2)* _______
4. Please enter the exact number of days, months and years.	4. How long have you been working in the field? *Number of Days* ______ *Number of Months* ______ *Number of Years* ______
5. Please enter the exact number of days, months and years.	5. How long have you been working for this particular landowner? *Number of Days* ______ *Number of Months* ______ *Number of Years* ______

6. Please mark **only one** response: *1 – Yes* *2 = No* Ask the respondent to indicate how often he/she performs this activity each week.	6. Have you harvested? *Yes (1)* _______ *No (2)* _______ How often each week?
7. Please mark **only one** response: *1 = Yes* *2 = No* Ask the respondent to indicate how often he/she performs this activity each week.	7. Have you weeded? *Yes (1)* ______ *No (2)* ______ How often each week?
8. Please mark **only one** response: *1 = Yes* *2 = No* Ask the respondent to indicate how often he/she performs this activity each week.	8. Have you irrigated? *Yes (1)* ______ *No (2)* ______ How often each week?
9. Please mark **only one** response: *1 = Yes* *2 = No* Ask the respondent to indicate how often he/she performs this activity each week.	9. Have you mixed pesticides? *Yes (1)* ______ *No (2)* ______ How often each week?

10. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	10. Have you carried/transported pesticides? *Yes (1)* ______ *No (2)* ______ How often each week?
11. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	11. Have you applied pesticides in the fields? *Yes (1)* ______ *No (2)* ______ How often each week?
12. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	12. Have you opened pesticide containers? *Yes (1)* ______ *No (2)* ______ How often each week?
13. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	13. Have you been in charge of spraying pesticides in the fields? *Yes (1)* ______ *No (2)* ______ How often each week?

14. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	14. Have you mixed or loaded pesticides, cleaned, handled, adjusted or repaired equipment that was used in pesticide application that could contain pesticide residues this season? *Yes (1)* ______ *No (2)* ______ How often each week?
15. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	15. Have you thrown empty pesticide containers into the garbage/dump? *Yes (1)* ______ *No (2)* ______ How often each week?
16. Please show the respondent the blue certification card and mark **only one** response: *1= Yes* *2= No* If respondent's answer is No, indicate that respondent is to go on to question	16. Have you received a blue certification card like this one for pesticide use training within the past five years? *see card shown here* *Yes (1)* ______ *No (2)* ______
17. Mark **only one** response. If the answer is no, please go on to question 30: *1= Yes* *2= No*	17. Did you receive any training when you were given the blue certification card? *Yes (1)* ______ *No (2)* ______
18. Mark **only one** response. *1= Yes* *2= No*	18. Did the University of Colorado Train you (HICAHS)? *Yes (1)* ______ *No (2)* ______

19. Mark **only one** response. *1= Where I live* *2= Where I work* *3= I don't remember* *4= Other*	19. Where did your training take place? *Where I live* *(1)* ______ *Where I work* *(2)* ______ *I Don't Remember* *(3)* ______ *Other* *(4)* ______
20. Please record **all** the information that the respondent remembers about the training.	20. If your **blue card** is available, please fill in the following information. *Location of training*______________ *Date of training*______________ *Trainer information*______________ ______________

In this section of the Questionnaire you will be asked about your training (or class.)

21. Mark **only one** response. *1= Yes* *2= No*	21. Did you see a video? *Yes* *(1)* ______ *No* *(2)* ______
22. Mark **only one** response. *1= Yes* *2= No*	22. Did you receive a worker's brochure? *Yes* *(1)* ______ *No* *(2)* ______
23. Mark **only one** response. *1= Yes* *2= No*	23. Did the training provider(s) use a block with drawings (like the one you see now) in the explanation? *Yes* *(1)* ______ *No* *(2)* ______
24. Mark **only one** response. *1= Yes* *2= No*	24. Was the class conducted in Spanish? *Yes* *(1)* ______ *No* *(2)* ______

25. Mark **only one** response. *1= Yes* *2= No*	25. Was there a translator helping the training provider? *Yes (1)* ______ *No (2)* ______
26. Mark **only one** response. *1= Yes* *2= No*	26. Did you clearly understand the trainer's explanations? *Yes (1)* ______ *No (2)* ______
27. Mark **only one** response. *1= Yes* *2= No*	27. Did you have an opportunity to ask questions during the class? *Yes (1)* ______ *No (2)* ______
28. Please record your answer **in minutes**.	28. How long did your training last?
29. Please show at the respondent the green certification card and mark **only one** response: *1= Yes* *2= No* If the respondent's answer is No, please go on to question	29. Did you receive a **green card** like this one for pesticide training in the last five years? *See the card shown now* *Yes (1)* ______ *No (2)* ______
30. Mark **only one** response. *1= Yes* *2= No* If the respondent's answer is no, please go on to question	30. Did you receive training at the time you got the **green card**? *Yes (1)* ______ *No (2)* ______

31. Mark **only one** response. *1= Yes* *2= No*	31. Did the University of Colorado provide your training (HICAHS)? *Yes (1)* ______ *No (2)* ______
32. Mark **only one** response. *1 = Where I live* *2 = Where I work* *3 = I don't remember* 4 = Other	32. Where was the training? *Where I live (1)* ______ *Where I work (2)* ______ *I don't remember (3)* ______ *Other (4)* ______
33. Please record **all** the information that the respondent remembers about the training.	33.If your **green card** is available, please fill in the following information. *Location of training* ____________ *Date of training* ____/____/____ *Place of training*______________ *Company that provided training*____________________
34. Please record the respondent's response *1 = Yes* *2 = No* *3 = I don't know* Please record the year of the symptoms. *If respondent does not know, please record 1999.* *If respondent's answer is No, please go to question 49.*	34. Have you ever felt symptoms which you thought were due to exposure to pesticides (such as sweating, vomiting, dizziness, headaches, muscle pain, skin rashes)? *Yes (1)* ______ *If so, When*__________ *No (2)* ______ *I don't know (3)* ______

35. Please record **all** of the information respondent has given.	35. If you answered yes to the above question, what were you doing when this happened?
36. Please record **all** of the information respondent has given.	36. Which pains or complaints did you have when you saw the doctor?
37. Please mark **only one** response. *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never*	37. In your opinion, are the fields where you work contaminated with pesticides? *Always* *(1)*_____ *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____
38. Please mark **only one** response. *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never*	38. How often have you been told that a crop has been treated with pesticides before you worked in that field? *Always* *(1)*_____ *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____

39. Please mark **only one** response. *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never*	39. While working in the fields do you wear a long-sleeved shirt? *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____
40. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Continue with question*	40. If you do not wear a long-sleeved shirt for pesticide protection, (if you answered NO) are you thinking about wearing one in the next 6 months? *Yes (1)* ______ *No (2)* ______ *If Yes, continue with the next question* *If No, continue with question*
41. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Continue with question*	41. Are you thinking about wearing a long-sleeved shirt for pesticide protection in the next month? *Yes (1)* ______ *No (2)* ______ *If Yes, continue with the next question* *If No, continue with question*

42. Please mark **only one** response *1= From 1 to 6 months* *2= More than 6 months* *3= More than 5 years*	42. How long have you been wearing a long sleeved shirt to protect yourself from pesticides? *1 to 6 months* *(1)* ______ *More than 6 months* *(2)* ______ *More than 5 years* *(3)* ______
42. This question has two different answers.First, the respondent must to choose between a hat or a cap. *1= Hat* *2= Cap* Then, the respondent must choose *1= Frequently* *2= Sometimes* *3= Rarely* *4= Never*	43. Do you wear a cowboy hat or a cap while working in the fields? *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____
44. Please mark **only one** response *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never*	45. Do you wear long pants while working in the fields? *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____

46. Please mark **only one** response *1= Yes: Continue with the following question* *2= No: Go to question*	47. If you do not wear long pants in the fields for protection against pesticides (your answered was NO), are you thinking about wearing long pants during the next 6 months? *Yes (1)* ______ *No (2)* ______ *If YES, continue with the next question* *If No, go to question*
48. Please mark **only one** response *1= Yes: Continue with the following question* *2= No: Go to question*	49. Are you thinking about wearing long pants to protect yourself against pesticides in the next month? *Yes* ______ *No* ______ *If YES, continue with the next question* *If NO, go to question*
50. Please mark **only one** response *1= 1 to 6 months* *2= More than 6 months* *3= More than 5 years*	51. How long have you been wearing long pants to protect yourself from pesticides while working in the fields? *1 to 6 months (1)* ______ *More than 6 months (2)* ______ *More than 5 years (3)* ______

48. This question has two different answers, in the first one, please mark only one response *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never* Have you tried to wear gloves? *1= Yes* *2= No*	48. While working in the fields, do you wear gloves? *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____ *Do you try?* *Yes* *(1)* _____ *No* *(2)* _____
49. This question has two different answers, in the first one, please choose between *1= Yes* *2= No* Do you wear safety glasses? *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never*	49. Do you wear prescription glasses? (eye protection)? *Yes* *(1)* ______ *No* *(2)* ______ When you work in the fields, do you wear safety glasses? *Always* *(1)*______ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____

50. Please mark **only one** response *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never* *6= When there is soap & water*	50. While you work in the fields do you wash your hands before going to the toilet? *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____ *When there is soap & water available?* *(6)* _____
51. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Go to question*	51. If you do not wash your hands before using the toilet (your answer was NO), are you thinking about washing your hands this way in the next six months? *Yes (1)* ______ *No (2)* ______ *If YES continue with the next question* *If NO go to question*
52. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Go to question*	52. Are you thinking about washing your hands before using the toilet in the fields in the next month? *Yes (1)* ______ *No (2)* ______ *If YES continue with the next question* *If NO go to question*

53. Please mark **only one** response. *1= 1 to 6 months* *2= More than 6 months* *3= More than 5 years*	53. If you do wash your hands before using the toilet, how long have you been washing your hands before using the toilet? *1 to 6 months* *(1)* ______ *More than 6 months* *(2)* ______ *More than 5 years* *(3)* ______
54. This question has two different answers. First, please choose between *1= Yes* *2= No* If the answer is Yes, please ask if the respondent washes his/her hands before smoking in the fields *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never* *6= When there is soap and water*	54. Do you smoke? _______ *Yes (1)* ______ *No (2)*______ *If YES do you wash your hands before smoking in the fields?* *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____ *When there is soap and water available?(6)*_____
55. Please mark **only one** response *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never* *6= When there is soap & water available*	55. After working in the fields, do you bathe? *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____ *When there is soap & water available?* *(6)*_____

56. Please mark **only one** response *1= Always* *2= Frequently* *3= Sometimes* *4= Rarely* *5= Never*	56. After working in the fields, do you separate your work clothes from your non-work clothes? *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____
57. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Go to question*	57. If you do not separate your work clothes from your non-work clothes (your answer was NO), are you thinking about starting in the next six months? *Yes (1)* ______ *No (2)* ______ *If Yes continue with the next question* *If No go to question*

58. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Go to question*	58. If you do not now, are you thinking about separating your work clothes from your non-work clothes to protect yourself from pesticides in the next month? *Yes (1)* ______ *No (2)* ______ *If Yes continue with the next question* *If No go to question*
59. Please mark **only one** response *1= 1 to 6 months* *2= More than 6 months* *3= More than 5 years*	59. How long have you been separating your work clothes? *1 to 6 months (1)* ______ *More than 6 months (2)* ______ *More than 5 years (3)* ______

The following questions are about the feelings of workers towards their job.

60. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree* *2 = Disagree* *1 = Strongly disagree*	60. I think that my crew leader is well informed about how to protect workers from pesticides. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______

<table>
<tr>
<td>61. Please mark only one response

5 = Strongly agree
4 = Agree
3 = Neither agree
2 = Disagree
1 = Strongly disagree</td>
<td>61. I am concerned about health risks of being exposed to pesticides.

Strongly agree (5) ______
Agree (4) ______
Neither agree nor disagree (3) ______
Disagree (2) ______
Strongly disagree (1) ______</td>
</tr>
<tr>
<td>62. Please mark only one response

5 = Strongly agree
4 = Agree
3 = Neither agree
2 = Disagree
1 = Strongly disagree</td>
<td>62. When I know pesticides have been applied to the field, I don't go to work in that field.

Strongly agree (5) ______
Agree (4) ______
Neither agree nor disagree (3) ______
Disagree (2) ______
Strongly disagree (1) ______</td>
</tr>
<tr>
<td>63. Please mark only one response

5 = Strongly agree
4 = Agree
3 = Neither agree
2 = Disagree
1 = Strongly disagree</td>
<td>63. When I am told about hazardous pesticide field conditions (for example that there is no water available) my crew leader (supervisor) corrects these hazards quickly.

Strongly agree (5) ______
Agree (4) ______
Neither agree nor disagree (3) ______
Disagree (2) ______
Strongly disagree (1) ______</td>
</tr>
</table>

64. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree* *2 = Disagree* *1 = Strongly disagree*	64. I am willing to warn my co-workers to not enter a field where pesticides have been applied. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
65. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree* *2 = Disagree* *1 = Strongly disagree*	65. If any worker tries to enter a field sprayed with pesticides. his/her coworkers will warn that worker. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
66. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree* *2 = Disagree* *1 = Strongly disagree*	66. I received good training on this job about how to protect myself from pesticides. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
67. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree* *2 = Disagree* *1 = Strongly disagree*	67. Information about how, when, where and which pesticides have been applied is available to all the workers. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______

68. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree* *2 = Disagree* *1 = Strongly disagree*	68. I know where to get more information about the application of pesticides at work. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
69. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree* *2 = Disagree* *1 = Strongly disagree*	69. I know how to protect myself from pesticides so that they do not get into my body. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
71. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree* *2 = Disagree* *1 = Strongly disagree*	71. There is information on the location of the closest emergency medical facility posted in my workplace. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

72. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree* *2 = Disagree* *1 = Strongly disagree*	72. There is a poster with pesticide safety information in the office where I work.. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

In this part of the Questionnaire, you will be asked about the work conditions in the fields.

73. Please mark **only one** response *1 = Yes* *2 = No* *3 = Sometimes* *4 = I Don't Know*	73. My boss provides a decontamination site with water to wash my hands in the fields where I am working. *Yes* *(1)* ______ *No* *(2)* ______ *Sometimes* *(3)* ______ *I Don't Know* *(4)* ______
74. Please mark **only one** response *1= Yes* *2= No* *3= Sometimes* *4= I Don't Know*	74. My boss provides a decontamination site with Soap to wash my hands in the fields where I am working. *Yes* *(1)* _____ *No* *(2)* _____ *Sometimes* *(3)* _____ *I Don't Know* *(4)* _____

75. Please mark **only one** response *1= Yes* *2= No* *3= Sometimes* *4= I Don't Know*	75. My boss provides a decontamination site with Single-use towels for drying hands in the fields where I am working. *Yes* *(1)* _____ *No* *(2)* _____ *Sometimes* *(3)* _____ *I don't know* *(4)* _____
76. Please mark **only one** response 1= *Yes* *2= No* *3= Sometimes* *4= I Don't Know*	76. My boss provides a decontamination site with enough water to rinse my body (1 gallon, or 4 liters) in the fields where I work. *Yes* *(1)* _____ *No* *(2)* _____ *Sometimes* *(3)* _____ *I Don't Know* *(4)* _____

In this part of the questionnaire you will be asked for knowledge about pesticides.

77. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	77. After pesticides have been applied, they still be only be found on the leaves of plants. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____

78. Please mark **only one** response *1= Yes* *2= No* *3= I Don't know*	78. It is safe to use pesticide containers after washing those containers with hot soap and water. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
79. Please mark **only one** response *1= Yes* *2= No* *3= I Don't know*	79. Pesticides are used to kill insects. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't know* *(3)* _____
80. Please mark **only one** response *1= Yes* *2= No* *3= I Don't know*	80. It is safe to enter a field where pesticides have been applied if I cover my mouth and nose with a handkerchief. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
81. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	81. Pesticides can enter my body through my eyes. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
82. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	82. My skin prevents pesticides from getting into my body. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____

83. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	83. Pesticides can enter my body as I am breathing. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
84. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	84. Pesticides can damage my health after many years. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
85. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	85. Sweating, vomiting, dizziness, headache, muscle pain and skin irritation are all signs of pesticide poisoning. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
86. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	86. If a person becomes intoxicated from pesticide exposure that person should drink milk while waiting to get medical attention. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
87. Please mark **only one** response *1= Yes* *2= No* *3= I Don't know*	87. When pesticides are being applied to fields where I'm working, I should leave the area. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____

88. Please mark **only one** response *1= Yes* *2= No* *3= I Don't know*	88. It is dangerous to let children play in the fields. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
89. Please mark **only one** response *1= Yes* *2= No* *3= I Don't know*	89. It is important to bring the pesticide label with me when I go to the doctor. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
90. Please mark **only one** response *1= Yes* *2= No* *3= I Don't know*	90. I should give mouth to mouth resuscitation to an unconscious coworker in the same area that I found the coworker unconscious. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
91. Please mark **only one** response *1= Yes* *2= No* *3= I Don't know*	91. If I get pesticides in my eyes. I should rinse them with water for 5 minutes. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
92. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	92. The person who mixes and applies pesticides should have at least one year of experience working in the fields. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____

93. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	93. I should always wash my hands before eating, drinking, smoking or using the bathroom when I work in the fields. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
94. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	94. I should always wash my work clothes separately from my other clothes. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
95. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	95. My boss might punish or fire me if I try to protect myself from pesticides. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____
96. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	96. My boss should provide transportation to the doctor if I get sick from pesticides while working for him. *Yes* *(1)* _____ *No* *(2)* _____ *I Don't Know* *(3)* _____

97. Please mark **only one** response *1= Yes* *2= No* *3= I Don't Know*	97. Some people can get sick from pesticides faster than others, even if they are working in the same fields. *Yes* *(1)* ____ *No* *(2)* ____ *I Don't Know* *(3)* ____

In this section of the questionnaire, you will be asked about your health beliefs.

98. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	98. If I get sick, it is my own behavior that determines how soon I get well. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
99 . Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	99. I am in control of my health. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
100. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	100. When I get sick, I am to blame. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

101. Please mark **only** one response. *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	101. The main thing that affects my health is what I do. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
102. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	102. If I take care of myself, I can avoid getting sick. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
103. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	103. If I do the right things, I can stay healthy. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
104. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	104. Seeing the doctor regularly is the best way to avoid getting sick. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

105. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	105. Whenever I don't feel well, I should consult a medically trained professional. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
106. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	106. My family has a lot to do with my becoming sick or staying healthy. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
107. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	107. Health professionals control my health. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
108. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	108. When I recover from an illness, it's usually because other people (e.g. doctors, nurses, and friends) have taken good care of me. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor Disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

109. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	109. Regarding my health, all I can do is what the doctor tells me. *Strongly agree* (5) ______ *Agree* (4) ______ *Neither agree nor Disagree* (3) ______ *Disagree* (2) ______ *Strongly disagree* (1) ______
110. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	110. No matter what I do, if I'm going to be sick, I will get sick. *Strongly agree* (5) ______ *Agree* (4) ______ *Neither agree nor Disagree* (3) ______ *Disagree* (2) ______ *Strongly disagree* (1) ______
111. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	111. Most things that affect my health happen to me by accident. *Strongly agree* (5) ______ *Agree* (4) ______ *Neither agree nor disagree* (3) ______ *Disagree* (2) ______ *Strongly disagree* (1) ______
112. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	112. Luck plays a big part in determining how soon I will recover from illness. *Strongly agree* (5) ______ *Agree* (4) ______ *Neither agree nor Disagree* (3) ______ *Disagree* (2) ______ *Strongly disagree* (1) ______

113. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	113. My good health is largely a matter of fate. *Strongly agree* (5) ______ *Agree* (4) ______ *Neither agree nor Disagree* (3) ______ *Disagree* (2) ______ *Strongly disagree* (1) ______
114. Please mark **only one** response *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	114. No matter what I do, I am likely to get sick. *Strongly agree* (5) ______ *Agree* (4) ______ *Neither agree nor Disagree* (3) ______ *Disagree* (2) ______ *Strongly disagree* (1) ______
115. Please mark **only one** response. *5 = Strongly agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	115. If it's meant to be, I'll get sick. *Strongly agree* (5) ______ *Agree* (4) ______ *Neither agree nor Disagree* (3) ______ *Disagree* (2) ______ *Strongly disagree* (1) ______

In this section of the questionnaire, you will be asked about personal information as well as biography dates, educational and professional records.

116. Please record the exactly age in years.	116. Age_______
117. This question has two answers, for the first one, please mark the sex *1= Female* *2= Male* If the answer is the first one, please ask if she is pregnant or not *1= Yes* *2=No*	117. Sex: *Female* *(1)* _______ *Male* *(2)*_______ Pregnant (yes or no) _______ *Yes* *(1)* _______ *No* *(2)* _______
118. Please record **only one** response *1= Mexico* *2= USA* *3= State*	118. What country or State do you consider to be home? *Country?* *(1)* _______ *State?* *(3)* _______
119. Please record what state the respondent consider her/his home *1 = Chihuahua* *3 = Coahuila* *4 = Distrito Federal* *5 = Durango* *7 = Guanajuato* *8 = Jalisco* *9 = Estado de Mexico* *10 = Puebla* *11 = SLP* *14 = Zacatecas* *20 = Colorado* *22 = Texas* *26 = Florida* *999= Unknown*	119. State *Chihuahua* *(1)* ______ *Coahuila* *(3)* ______ *Distrito Federal* *(4)* ______ *Durango* *(5)* ______ *Guanajuato* *(7)* ______ *Jalisco* *(8)* ______ *Estado de Mexico* *(9)* ______ *Puebla* *(10)* ______ *SLP* *(11)* ______ *Zacatecas* *(14)* ______ *Colorado* *(20)* ______ *Texas* *(22)* ______ *Florida* *(26)* ______ *Unknown* *(999)* ______

120. Please record in what country is the state mentioned above *1= Mexico* *2= USA*	120. Country *Mexico* *(1)* ______ *U.S.A.* *(2)* ______
121. Please record the name where the respondent was born *1= Mexico* *2= USA*	121. In what country were you born? *Mexico* *(1)* ______ *U.S.A.* *(2)* ______
122. Please record **only one** response *1= Not at all* *2= A little* *3= Well* *4= Very Well*	122. How well do you read Spanish? *Not at all* *(1)* ______ *A Little* *(2)* ______ *Well* *(3)* ______ *Very Well* *(4)* ______
123. Please record **only one** response *1= Not at all* *2= A little* *3= Well* *4= Very Well*	123. How well do you read English? *Not at all* *(1)* ______ *A Little* *(2)* ______ *Well* *(3)* ______ *Very Well* *(4)* ______
124. Please record **only one** response *1= Not at all* *2= A little* *3= Well* *4= Very Well*	124. How well do you write Spanish? *Not at all* *(1)* ______ *A Little* *(2)* ______ *Well* *(3)* ______ *Very Well* *(4)* ______
125. Please record **only one** response *1= Not at all* *2= A little* *3= Well* *4= Very Well*	125. How well do you write English? *Not at all* *(1)* ______ *A Little* *(2)* ______ *Well* *(3)* ______ *Very Well* *(4)* ______

126. Please record **only one** response	129. How many years of school have you completed?
129. This response has two answers, both of them are numbers, so please record the exact number that the respondent says	129. Do you smoke? If YES how many cigarettes do you smoke per day? ______. If YES, for how may years? ______.
128. This response has two answers, both of them are numbers, so, please record the exactly number that the respondent says. *1=Yes* *2=No*	129. Do you chew tobacco? *Yes (1)* ______ *No (2)* ______ If YES, for how many years?_____
129. This response has several answers, in the first one, please choose between *1=Yes* *2=No* If the answer is Yes, please record the number of bottles of beer, or glasses of wine or any other liquor per week	129. Do you drink alcoholic beverages? *Yes (1)* ______ *No (2)* ______ How many per week? _____
130a.b.c. In this response, please write the exact number that the respondent says.	130a.b.c. <u>Type of Alcohol</u> 130a. Beer _____ (number per week) 130b. Wine _____ (glasses per week) 130c. Hard _____ (glasses per week)

131. Please write the exact number that the respondent says.	131. If you have already taken a pesticide training class. how may-years has it been? Or If this is a post-training evaluation. how many days has it been since your last training session?

POST-TEST

A SURVEY OF THE EFECTIVENESS OF TRAINING IN PESTICIDE USE

INTERVIEW FOR THE FIELD WORKER

Circle or mark your response. After this information is completed, the document will be kept under locked storage in Room 135, Department of Environmental Health, Colorado State University.

INSTRUCTIONS TO INTERVIEWER	QUESTIONS
1. Write the identification number assigned to every worker.	1. Identification Code
2. Please enter the exact month, day and year for this interview.	2. Interview Date: ____(Day)_______(Month)______(Year)
3. Please check only one response. *1= Yes* *2= No*	3. Have you received training in the use of pesticides? *Yes (1)* ______ *No (2)* _____
4. Please enter the exact number of days, months and years.	4. How long have you been working for this particular landowner? *Number of Days* ______ *Number of Months* ______ *Number of Years* ______
5. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	5. Have you harvested? *Yes (1)* ______ *No (2)* ______ How often each week?

6. Please mark **only one** response: 1= Yes 2= No Ask the respondent to indicate how often he/she performs this activity each week.	6. Have you weeded fields? *Yes (1)* ______ *No (2)* ______ How often each week?
7. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	7. Have you irrigated? *Yes (1)* ______ *No (2)* ______ How often each week?
8. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	8. Have you mixed pesticides? *Yes (1)* ______ *No (2)* ______ How often each week?
9. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week.	9. Have you carried/transported pesticides? *Yes (1)* ______ *No (2)* ______ How often each week?
10. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week	10. Have you applied pesticides in the fields? *Yes (1)* ______ *No (2)* ______ How often each week?

11. Please mark **only one** response: *1= Yes* *2= No* Ask the respondent to indicate how often he/she performs this activity each week	11. Have you opened pesticide containers? *Yes (1)* ______ *No (2)* ______ How often each week?
12. Have you been in charge of spraying pesticides in the fields? *1 = Yes* *2 = No* Ask the respondent to indicate how often he/she performs this activity each week	12. Have you been in charge of spraying pesticides in the fields where you were working? *Yes (1)* ______ *No (2)* ______ How often each week?
13. Please mark **only one** response: *1 = Yes* *2 = No* Ask the respondent to indicate how often he/she performs this activity each week	13. Have you mixed or loaded pesticides, cleaned, handled, adjusted or repaired equipment that was used in their application that could contain pesticide residues this season? *Yes (1)* ______ *No (2)* ______ How often each week?
14. Please mark **only one** response: *1 = Yes* *2 = No* Ask the respondent to indicate how often he/she performs this activity each week.	14. Have you thrown empty pesticide containers in the garbage/dump? *Yes (1)* ______ *No (2)* ______ How often each week?

15. Please show at the respondent the blue certification card and mark **only one** response: *1 = Yes* *2 = No* *If the answer is No, continue on to question 30*	15. Have you received a blue certification card like this one for training to protect yourself from pesticides within the past five years? *see card shown here* *Yes (1)* ______ *No (2)* ______
16. Mark **only one** response. 1= Yes 2= No *If the answer is no, continue on to question 29:*	16. Did you receive any training when you were given the blue certification card? Yes (1) ______ No (2) ______
17. Mark **only one** response. *1= Yes* *2= No*	17. Was it the University of Colorado that gave you the training (HICAHS)? *Yes*______ *No*______
18. Mark **only one** response. *1 = Where I live* *2 = Where I work* *3 = I don't remember* *4 = Other*	18. Where did the training take place? *Where I live (1)* ______ *Where I work (2)* ______ *I don't remember (3)* ______ *Other (4)* ______
19. Please record **all** the information that the respondent can remember about the training.	19. If you did receive the **blue card** please write the *Location of training* ______________ *Date of training* ______________ *Company providing the training* ______________________________

In this section of the Questionnaire, you will be asked how was the training (or class) that you received

20. Mark **only one** response. *1 = Yes* *2 = No*	20. Did you see a video? *Yes (1)* ______ *No (2)* ______
21. Mark **only one** response. *1= Yes* *2= No*	21. Did you receive a worker's brochure? *Yes (1)* ______ *No (2)* ______
22. Mark **only one** response. *1 = Yes* *2 = No*	22. Did the training provider(s) use a block with drawings (like the one you see now) in the explanation? *Yes (1)* ______ *No (2)* ______
23. Mark **only one** response. *1 = Yes* *2 = No*	23. Was the class conducted in Spanish? *Yes (1)* ______ *No (2)* ______
24. Mark **only one** response. *1 = Yes* *2 = No*	24. Was there a translator helping the training provider? *Yes (1)* ______ *No (2)* ______
25. Mark **only one** response. *1 = Yes* *2 = No*	25. Did you clearly understand the explanations? *Yes (1)* ______ *No (2)* ______
26. Mark **only one** response. *1 = Yes* *2 = No*	26. Did you have an opportunity to ask questions during the class? *Yes (1)* ______ *No (2)* ______

27. Please record **in minutes** this answer	27. How long did the training last?
28. Please show at the respondent the green certification card and mark **only one** response: *1 = Yes* *2 = No* *If the answer is No, continue on to question*	28. Did you receive a **green card** like this one to handle or apply pesticides ? *See the card they show you now* *Yes (1)* ______ *No (2)* ______
29. Mark **only one** response. If the answer is not, please go on to question 44: *1 = Yes* *2 = No*	29. Did you receive training at the time you got the **green card**? *Yes (1)* ______ *No (2)* ______
30. Mark **only one** response. *1 = Yes* *2 = No*	30. Did the University of Colorado provide the training (HICAHS)? *Yes (1)* ______ *No (2)* ______
31. Mark **only one** response. *1 = Where I live* *2 = Where I work* *3 = I don't remember* *4 =Other*	31. Where was the training? *Where I live (1)* ______ *Where I work (2)* ______ *I don't remember (3)* ______ *Other (4)* ______
32. Please record **all** the information that the respondent can remember about this process.	32. If you received the certification card, please write the *Location of training* ____________ *Date of training* _____/_____/_____ *Company that provided the training*____________________

33. Please record the response given *1 = Always* *2 = Frequently* *3 = Sometimes* *4 = Rarely* *5 = Never*	33. How have you been told that a crop has been treated with pesticides before you worked in that field? *Always* *(1)*_____ *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____
34. Please record the response given *1 = Always* *2 = Frequently* *3 = Sometimes* *4 = Rarely* *5 = Never*	34. While you work in the fields do you wear a long-sleeved shirt? *Always* *(1)* _____ *If not always, when?* *Frequently* *(2)* _____ *Sometimes* *(3)* _____ *Rarely* *(4)* _____ *Never* *(5)* _____
36. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Continue with question*	36. If you do not wear a long-sleeved shirt for pesticide protection, (if you answered NO) are you thinking about wearing one in the next six months? *Yes* *(1)* ______ *No* *(2)* ______ *If YES continue with the next question* *If NO go to question*

37. Please mark **only one** response. *1 = From 1 to 6 months* *2 = More than 6 months* *3 = More than 5 years*	37. How long have you worn a long-sleeved shirt to protect yourself from pesticides? *From 1 to 6 months* *(1)* ______ *More than 6 months* *(2)* ______ *More than 5 years* *(3)* ______
38. This question has two different answers. First, the respondent must to choose between a hat or a cap. *1 = Hat* *2 = Cap* Then, the respondent must choose between *1 = Frequently* *2 = Sometimes* *3 = Rarely* *4 = Never*	38. Do you wear a cowboy hat or a cap while working in the fields? *Always* *(1)* _____ *If not always, when?* *Frequently* *(2)* _____ *Sometimes* *(3)* _____ *Rarely* *(4)* _____ *Never* *(5)* _____
39. Please mark **only one** response *1 = Always* *2 = Frequently* *3 = Sometimes* *4 = Rarely* *5 = Never*	39. Do you wear long pants while working in the fields? *Always* *(1)* _____ *If not always, when?* *Frequently* *(2)* _____ *Sometimes* *(3)* _____ *Rarely* *(4)* _____ *Never* *(5)* _____

40. Please mark **only one** response. *1=Yes: Continue with next question* *2=No: Continue with question*	40. If you do not wear long pants for protection against pesticides (your answer was NO), are you thinking about wearing long pants in the next six months? *Yes (1)* ______ *No (2)* ______ *If YES continue with next question* *If NO go to question*
41. Please mark **only one** response. *1 = Yes: Continue with the next question* *2=No: Continue with question*	41. Are you planning to wear long pants to protect yourself against pesticides in the next month? *Yes (1)* ______ *No (2)* ______ *If YES continue with the next question* *If NO go to question*
42. Please mark **only one** response *1 = From 1 to 6 months* *2 = More than 6 months* *3 = More than 5 years*	42. How long have you been wearing long pants to protect yourself from pesticides while working in the fields? *From 1 to 6 months (1)*______ *More than 6 months (2)* _____ *More than 5 years (3)* _____

43. This question has two different answers. In the first one, please mark **only one** response. *1 = Always* *2 = Frequently* *3 = Sometimes* *4 = Rarely* *5 = Never* Have you tried to wear gloves? *1 = Yes* *2 = No*	43. While working in the fields, do you wear gloves? *Always* *(1)* ______ *If not always, when?* *Frequently* *(2)* ______ *Sometimes* *(3)* ______ *Rarely* *(4)* ______ *Never* *(5)* ______ Do you try? *Yes (1)* _____ *No (2)* _____
44. This question has two different answers. In the first one, please choose between *1= Yes* *2= No* Do you wear safety glasses? *1 = Always* *2 = Frequently* *3 = Sometimes* *4 = Rarely* *5 = Never*	44. Do you wear prescriptions glasses? (eye protection)? _____(Yes or No). *Yes (1)* ______ *No (2)* ______ When you work in the fields, do you wear safety glasses? *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____

45. Please mark **only one** response *1 = Always* *2 = Frequently* *3 = Sometimes* *4 = Rarely* *5 = Never* *6 = When there is soap and water available*	45. While you work in the fields do you wash your hands before going to the bathroom? *Always* *(1)*____ *If not always, when?* *Frequently* *(2)*____ *Sometimes* *(3)*____ *Rarely* *(4)*____ *Never* *(5)*____ *When there is soap & water available* *(6)* ____
46. Please mark **only one** response. *1 = Yes: Continue with the next question* *2 = No: Go to question*	46. If you do not wash your hands before using the toilet, (your answer was NO) are you thinking about starting in the next six months? *Yes (1)* _____ *No (2)* _____ *If Yes continue with the next question* *If NO go to question*
47. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Go to question*	47. Are you thinking about washing your hands before using the toilet in the next month? *Yes (1)* _____ *No (2)* _____ *If YES continue with the next question* *If NO go to question*

48. Please mark **only one** response. *1 = From 1 to 6 months* *2 = More than 6 months* *3 = More than 5 years*	48. If you do wash your hands before using the toilet while working in the field, how long have you been washing your hands before using the toilet in the field? *From 1 to 6 months (1)* _____ *More than 6 months (2)* _____ *More than 5 years (3)* _____
49. This question has two different answers. First, please choose between *1= Yes* *2= No* If your answer is Yes, please ask if the respondent washes his/her hands before smoking in the fields *1 = Always* *2 = Frequently* *3 = Sometimes* *4 = Rarely* *5 = Never* *6 = When there is soap and water*	49. Do you smoke? _______(Yes or No). If you do smoke, do you wash your hands before smoking in the fields? *Yes (1)* _____ *No (2)* _____ *Always (1)*_____ *If not always, when?* *Frequently (2)*_____ *Sometimes (3)*_____ *Rarely (4)*_____ *Never (5)*_____ *When there is soap & water (6)* _____
50. Please mark **only one** response *1 = Always* *2 = Frequently* *3 = Sometimes* *4 = Rarely* *5 = Never* *6 = When there is soap and water*	50. After working in the fields, do you bathe? *Always (1)*_____ *If not always, when?* *Frequently (2)*_____ *Sometimes (3)*_____ *Rarely (4)*_____ *Never (5)*_____ *When there is soap & water (6)* _____

51. Please mark **only one** response *1 = Always* *2 = Frequently* *3 = Sometimes* *4 = Rarely* *5 = Never*	51. After working in the fields, do you separate your work clothes from your non-work clothes? *Always* *(1)*_____ *If not always, when?* *Frequently* *(2)*_____ *Sometimes* *(3)*_____ *Rarely* *(4)*_____ *Never* *(5)*_____
52. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Go to question*	52. If you do not separate your work (field clothes) from your non-work clothes (your answser was NO), are you thinking about doing this in the next six months? *Yes* *(1)* ______ *No* *(2)* ______ *If YES continue with the next question* *If NO go to question*
53. Please mark **only one** response. *1=Yes: Continue with the next question* *2=No: Go to question 72*	53. Have you thought about separating your work clothes (field clothes) from your non-work clothes in the next month? *Yes* *(1)* ______ *No* *(2)* ______ *If YES continue with the next Question* *If NO go to question*

54. Please mark **only one** response *1= 1 to 6 months* *2 = More than 6 months* *3 = More than 5 years*	54. How long have you been separating your work clothes (field clothes) from your non-work clothes? *1 to 6 months (1)* ______ *More than 6 months (2)* ______ *More than 5 years (3)* ______

The following questions are about the feelings of the workers towards their job

55. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	55. I think that my crew leader is well informed about how to protect workers from pesticides. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor Disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
56. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	56. I want to know about the risks of being exposed to pesticides. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor Disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
57. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	57. My boss is more concerned about work than about the health of the workers. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor Disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______

58. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	58. When I know pesticides have been applied to the field, I don't go to work in the field. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor Disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
59. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	59. If I tell my boss that something is wrong in the fields, for example, that there is no water, he promptly corrects the problem and shows interest in my comments. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor Disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
60. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	60. I am willing to warn my co-workers not enter a field where pesticides have been applied. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______

61. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	61. If one of our co-workers were going to enter a field where pesticides had been applied, we would warn him/her about the pesticides. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
62. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	62. I received good training on this job about how to protect myself from pesticides at work. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
63. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	63. Information about how, when, where and which pesticides have been applied is available to all workers, and I know where I can go to see it. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

64. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	64. I know where to get more information at work about the application of pesticides. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
65. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	65. I know how to protect myself from pesticides so that they don't get into my body. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
66. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	66. I know where to get more information on how to apply pesticides at work. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

67. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	67. There is a poster with pesticide information in the office where I work. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

In this part of the Questionnaire, you will be asked about working conditions in the field.

68. Please mark **only one** response *1 = Yes* *2 = No* *3 = Sometimes* *4 = I Don't Know*	68. My boss provides a decontamination site with water to wash my hands in the fields where I am working. *Yes* *(1)* ______ *No* *(2)* ______ *Sometimes* *(3)* ______ *I Don't Know* *(4)* ______
69. Please mark **only one** response *1 = Yes* *2 = No* *3 = I don't know* *4 = Sometimes*	69. My boss provides a decontamination site with soap to wash my hands in the fields where I am working. *Yes* *(1)* ______ *No* *(2)* ______ *Sometimes* *(3)* ______ *I Don't Know* *(4)* ______

70. Please mark **only one** response *1 = Yes* *2 = No* *4 = Sometimes* *3 = I don't know*	70. My boss provides a decontamination site with single-use towels for drying hands in the fields where I am working. *Yes* *(1)* ______ *No* *(2)* ______ *Sometimes* *(3)* ______ *I Don't Know* *(4)* ______
71. Please mark **only one** response *1 = Yes* *2 = No* *4 = Sometimes* *3 = I don't know*	71. My boss provides a decontamination site with enough water to rinse my body (1 gallon, or 4 liters) in the fields where I am working. *Yes* *(1)* ______ *No* *(2)* ______ *Sometimes* *(3)* ______ *I Don't Know* *(4)* ______

In this part of the questionnaire you will be asked for knowledge about pesticides

72. Please mark **only one** response *1 = Yes* *2 = No* *3 = I don't know*	72. After pesticides have been applied, they can be found only on the leaves of the plants. *Yes* *(1)* ______ *No* *(2)* ______ *I Don't Know* *(3)* ______
73. Please mark **only one** response *1 = Yes* *2 = No* *3 = I don't know*	73. It is dangerous to use pesticide containers even after rinsing them with hot water and soap. *Yes* *(1)* ______ *No* *(2)* ______ *I don't know* *(3)* ______

74. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	74. Pesticides are used to kill insects. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______
75. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	75. It is safe and healthy to go into fields where pesticides have been applied if I cover my mouth and nose with a handkerchief. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______
76. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	76. Pesticides can enter my body through my eyes. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______
77. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	77. My skin prevents pesticides from getting into my body. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______
78. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	78. Pesticides can enter my body as I am breathing. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______
79. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	79. Pesticides can damage my health after many years. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______

80. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	80. Sweating, vomiting, nausea, headaches, muscular pains and skin irritation are all symptoms of pesticide poisoning. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______
81. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	81. If someone becomes intoxicated from exposure to pesticides, they should drink milk while waiting to get medical attention. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______
82. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	82. When pesticides are being applied to fields where I'm working, I should leave the area. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______
83. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	83. It is safe to let children play in the fields. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______
84. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	84. It is important to bring the pesticide label with me when I go to the doctor. *Yes (1)* ______ *No (2)* ______ *I Don't Know (3)* ______

85. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	85. If a co-worker gets trapped in a closed space, one should save him/her by loosening their clothing. *Yes* *(1)* ______ *No* *(2)* ______ *I Don't Know* *(3)* ______
86. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	86. If I get pesticides in my eyes, I should rinse them with water for 1 minute. *Yes* *(1)* ______ *No* *(2)* ______ *I Don't Know* *(3)* ______
87. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	87. The person who applies pesticides in the field should take a pesticide safety class and have a green certification card. *Yes* *(1)* ______ *No* *(2)* ______ *I Don't Know* *(3)* ______
88. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	88. I should always wash my hands before eating, drinking, smoking or using the bathroom when I am working in the fields. *Yes* *(1)* ______ *No* *(2)* ______ *I Don't Know* *(3)* ______
89. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	89. I should separate my work clothes from my non-work clothes when doing laundry, only if pesticides have been applied. *Yes* *(1)* ______ *No* *(2)* ______ *I Don't Know* *(3)* ______

90. Please mark **only one** response *1 = Yes* *2 = No* *3 = I Don't Know*	90. My boss might punish or fire me if I try to protect myself from pesticides. *Yes* *(1)* ______ *No* *(2)* ______ *I Don't Know* *(3)* ______
91. Please mark **only one** response *1 = Yes* *2 = No* *3 = I don't know*	91. My boss should provide transportation to the doctor if I get sick from pesticides while working for him. *Yes* *(1)* ______ *No* *(2)* ______ *I Don't Know* *(3)* ______
92. Please mark **only one** response *1 = Yes* *2 = No* *3 = I don't know*	92. Some people can get sick from pesticides faster than others can, even if they are working in the same fields. *Yes* *(1)* ______ *No* *(2)* ______ *I Don't Know* *(3)* ______

In this section of the questionnaire, you will be asked about your health beliefs.

93. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	93. If I get sick, it is what I do that determines how soon I get well. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

94. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	94. I am in control of my health. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
95. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	95. When I get sick, I am to blame. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
96. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	96. The main thing that affects my health is what I do. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
97. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	97. If I take care of myself, I can avoid getting sick. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

98. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	98. If I do the right thing, I can stay healthy. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
99. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	99. The best way to avoid getting sick, is to see the doctor regularly. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
100. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	100. Whenever I don't feel well, I should consult a medically trained professional. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
101. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	101. My family has a lot to do with my becoming sick or healthy. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

102. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	102. Doctors and nurses control my health. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
103. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	103. When I recover from an illness, it is because of other people (like doctors, nurses and friends) have taken good care of me. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
104. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	104. With regard to my health, all I can do is what the doctor tells me. *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______
105. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	105. No matter what I do, if I'm going to get sick, I will get sick *Strongly agree* *(5)* ______ *Agree* *(4)* ______ *Neither agree nor disagree* *(3)* ______ *Disagree* *(2)* ______ *Strongly disagree* *(1)* ______

106. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	106. Most things that affect my health happen to me by accident. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
107. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	107. Luck plays a big part in determining how soon I will recover from an illness. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
108. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	108. Good health is just a matter of good luck. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______
109. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	109. No matter what I do; I am likely to get sick. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______

110. Please mark **only one** response *5 = Strongly Agree* *4 = Agree* *3 = Neither agree nor disagree* *2 = Disagree* *1 = Strongly disagree*	110. If it is meant to be, I'll get sick. *Strongly agree (5)* ______ *Agree (4)* ______ *Neither agree nor disagree (3)* ______ *Disagree (2)* ______ *Strongly disagree (1)* ______

In this section of the questionnaire, you will be asked about personal information as well as professional records

111. Please record the exact number that the respondent indicates.	111. If you have already taken the class, how long ago did you take it? *Days*________ *Weeks*_________ *Months*_________ *Years*________
112. This record has two answers. For the first one, please choose between *1= Yes* *2= No* *If the answer is Yes, please ask the names of the State(s), write all the names that the respondent mentions.* *If the answer is No, go to the next question*	112. Have you done field work in other parts of the country? *Yes (1)* ________ *No (2)* ________ *Where?*________________
113. Please mark **only one** response *1 = Yes* *2 = No*	113. Do you work in the fields all year long? *Yes (1)* ________ *No (2)* ________

114. Please record all the information that the respondent provide it.	114. If you don't work in the fields all year long, what do you do when you are not working in the fields?
115. This record has two answers, the first one, please choose between *1 = Yes* *2 = No* *If the answer is Yes, please ask how long, and write all the information that the respondent gives.* *If the answer is No, go to the next question*	115. Have you worked in agriculture in Mexico? *Yes (1)* ________ *No (2)* _______ *How long?*____________ *Days*________ *Weeks*_________ *Months*_________ *Years*________
116. Please mark **only one** response *1 = Yes* *2 = No*	116. Do you come to Colorado every year to work for the same land owner? *Yes (1)* ________ *No (2)* ________
117. This record has two answers. For the first one, please choose between *1= Yes* *2= No* *If the answer is Yes, please ask how many, and write all the information that the respondent gives.* *If the answer is No, go to the next question*	117. Have you worked for other landowners in Colorado? *Yes (1)* ________ *No (2)* ________ *How many?*_________

118. Please mark **only one** response *1 = Yes* *2 = No*	118. Do you plan to come here every season? *Yes (1)* ________ *No (2)* ________
119. *Please record all the information that the respondent provides. Use (1) for the most important problem, (2) for the second one, and so on.* *If the respondent has other concerns, please write what the respondent indicates.*	119. In your opinion, what is the biggest problem facing migrant fieldworkers? *Lack of housing?* *Salary?* *Lack of health care/protection for your job?* *Others* ____________

Thank you very much for your participation!

Entrevista Codigo de Identificación

1. Código__________

NOMBRE____

Escriba su nombre en letra de molde por favor y entrege esta forma a la persona haciendo las preguntas.

NOTE to the interviewer:

After completing the information above please keep in the folder provided. This form is to be kept in the Environmental Health Building Room 135 locked under the research files called Pesticide Evaluation Training ID after the interview is completed.

ESTUDIO DE LA EFECTIVIDAD DE LA CAPACITACION EN PESTICIDAS

1. Codigo de Identificación__________________

ENTREVISTA PARA EL TRABAJADOR DEL CAMPO

Circule o cruce la respuesta que usted eliga. Después de completar esta información este documento será mantenido en el Departamento de Salud Ambiental en el cuarto 135 en el archivo bajo llave.

2. Fecha de la Entrevista:_______(Dia)________(mes)_________(Año)

Recibio usted la capacitación de pesticidas? SI______ NO_____

3. Cuánto tiempo ha estado trabajando en el campo?
Número de Dias _______Número de Meses_________Número de Años________

5. Cuánto tiempo ha trabajado con este patrón?
Número de Dias______ Número de Meses_________Número de Años__________

Digáme que actividades ha estado haciendo enesta temporada

Actividad	SI	No	Cuánto tiempo por semana
6. Ha estado usted cosechando?			
7. Ha estado usted Desyerbando?			
8.Ha estado usted Regando los campos?			
9.Ha estado usted Mezclando Pesticidas?			
10.Ha estado usted Cargando Pesticidas?			
11. Ha estado usted aplicando pesticidas en el Campo?			
12. Ha estado usted abriendo envases de pesticidas?			
13. Ha estado usted trabajando como abanderado en el campo cuando rocian pesticidas?			

14. Ha estado usted limpiando transportando, ajustando o reparando partes de mezcladoras, cargamento o maquinaria para uso de pesticidas que puedan contener residuos de pesticidas?
Si_____No_____Cuánto tiempo por semana__________________

15. Ha estado usted tirando los envases vacios de pesticidas a la basura?
Si_____No_____Cuánto tiempo por semana__________________

16. Ha recibido usted una credencial azul como ésta de capacitación para protegerse de pesticidas durante los ultimos 5 años? *Vea la tarjeta que le muestran*
Si_____No_____

17. Recibió usted capacitación cuando le dieron la credencial azul?
Si_____No_____

18. Fue la universidad de Colorado los que le dieron la capacitación (HICAHS)?
Si_____No_____

19. Dónde fue la capacitación?
   a) Donde vivo
   b) En mi trabajo
   c) No me acuerdo
   d) Otro____________________

20. Si tiene la credencial por favor escriba la fecha____________
Lugar de Capacitación_____________
Compania que le dio la Capacitación__________

21. Por favor explique a continuación como fue la capacitación (o clase) que recibió

Método que uso el capacitador	Si	No	Comentarios
22. Vio usted una pelicula?			
23. Recibio usted un folleto del trabajador?			
24. Usaron un block con dibujos en la explicación como el que le muestran ahora?			
25. La clase fue en español?			
26. Habia un traductor ayudandole a la persona dando la clase?			
27. Entendio usted claramente a las explicaciones?			
28. Tuvo usted la oportunidad de hacer preguntas durante la clase?			

29. Cuánto tiempo duro la capacitación?_______________

30. Ha recibido usted una credencial verde como esta para manejar o aplicar pesticidas?
Vea la tarjeta que le muestran

31. Recibio usted una capacitación cuando le dieron la credencial verde?

32. Recibió usted capacitación cuando le dieron la credencial verde?
Si_____No_____

33. Fue la universidad de Colorado los que le dieron la capacitación (HICAHS)?
Si_____No_____

34. Dónde fue la capacitación?
   a) Donde vivo
   b) En mi trabajo
   c) No me acuerdo
   d) Otro____________________

35. Si tiene la credencial por favor escriba la fecha___________
Lugar de Capacitación____________
Compania que le dio la Capacitación__________

36. Por favor explique a continuación como fue la capacitación (o clase) que recibió

Método que uso el capacitador	Si	No	Comentarios
37. Vio usted una pelicula?			
38. Recibio usted un folleto del trabajador?			
39. Usaron un block con dibujos en la explicación como el que le muestran ahora?			
40. La clase fue en español?			
41. Habia un traductor ayudandole a la persona dando la clase?			
42. Entendio usted claramente a las explicaciones?			
43. Tuvo usted la oportunidad de hacer preguntas durante la clase?			

44. Cuánto tiempo duro la capacitación?______________

45. Alguna vez ha sentido sintomas que en su opinion fueron debido a los pesticidas (como por ejemplo mareos, sudores, vómitos, dolor de cabeza, dolor muscular, irritación en la piel)?
Si_______ Cuándo______________________________NO_______ NO se _______

46. Si repondio que si ha sentido sintomas que usted cree fueron por pesticidas, que actividad estaba haciendo cuando le pasó esto?
____

47. Ha usted consultado a un médico debido a intoxicación de pesticidas?
Si_______ Cuándo______________________________NO________

48. Cuáles fueron las molestias que usted tenia cuando fue a consultar al médico?
____

49. En su opinion los campos donde usted trabaja estan contaminados con pesticidas?
Siempre (1)____
Frequentemente (2)____
Algunas Veces (3)____
Raramente (4)____
Nunca (5)_____

50. Antes de trabajar en el campo donde se hayan aplicado pesticidas, que tan frequente le avisan que se aplicaron pesticidas?
Siempre (1)____
Frequentemente (2)____
Algunas Veces (3)____
Raramente (4)____
Nunca (5)______

51. Cuando usted trabaja en el campo usa camisa de manga larga?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)_____	

52. Si usted no usa camisa de manga larga (respuesta fue NO). ha pensando usted en usar camisa de manga larga cuando trabaja en el campo en los siguientes 6 meses?
Si : continue con la siguiente pregunta No: Continue en pregunta 58

53. Ha pensado usted pensando en usar camisa de manga alrga para protegerse de los pesticidas en el siguiente mes?
Si : continue con la siguiente pregunta No: Continue en pregunta 58

54. Cuánto tiempo ha usado usted camisa de manga larga para protegese de los pesticidas

De 1 a 6 meses Más de 6 meses Más de 5 años

55. Cuando usted trabaja en el campo usa sombrero o Cachucha? (Circule cual de los dos)

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)____	

56. Cuando esta trabajando en el campo usa usted pantalones largos?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)_____	

57. Si usted no usa pantalones largos (su respuesta fue NO), esta usted pensando en usar pantalones largos durante los siguientes 6 meses?
Si: siga con la siguiente pregunta No: Vaya a la pregunta 60

58. Esta planeando usar patalones largos durante el siguiene mes?
Si: siga con la siguiente pregunta No: Vaya a la pregunta 60

59. Cuánto tiempo ha usted usado pantalones largos para protegerse de los pesticidas cuando trabaja en el campo?
1 a 6 meses Mas de 6 meses Mas de 5 años

60. Cuando trabaja en el campo usa guantes?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)_____	Ha intentado Usar Guantes?_______

61. Usa usted anteojos?_______(SI o NO). Cuando trabaja en el campo usa lentes para protección de sus ojos?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)_____	

62. Cuándo esta trabajando en el campo se lava sus manos antes de ir al baño?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)_____	Cuando hay agua y jabón______

63. Si usted no se lava las manos cuando esta trabajando en el campo, ha pensado empezar a lavarselas durante los siguientes 6 meses?
Si: Vaya a la siguiente pregunta No: Continue en la pregunta 66

64. Ha pensado en lavarse las manos antes de ir al baño durante el siguiente mes?
Si: Vaya a la siguiente pregunta No: Continue en la pregunta 66

65. Cuánto tiempo ha estado lavandose las manos antes de ir al baño cuando trabaja en el campo?
1 a 6 meses Mas de 6 meses Mas de 5 años

66. Fuma usted?_____(SI o NO). Si usted fuma, se lava las manos antes de fumar cuando esta trabajando en el campo?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)_____	Cuando hay agua y jabón______

67. Después de cada dia de trabajar en el campo se baña?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)_____	Cuando hay agua y jabón______

68. Después del trabajo en el campo separa usted sus ropas de trabajo de las de su familia?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)_____	Cuando hay agua y jabón______

69. Si usted separa usted sus ropas de trabajo de las de su familia despues de estar trabajando en el campo, ha pensado en hacerlo durante los siguientes 6 meses?
Si: Vaya a la siguiente pregunta No: Continue en la pregunta 72

70. Ha pensado en separar usted sus ropas de trabajo de las de su familia despues de estar trabajando en el campo durante el siguiente mes?
Si: Vaya a la siguiente pregunta No: Continue en la pregunta 72

71. Cuánto tiempo ha estado separando usted sus ropas de trabajo de las de su familia despues de estar trabajando en el campo?
1 a 6 meses Mas de 6 meses Mas de 5 años

Las siguientes preguntas eliga el número que represente mejor como se siente usted en respuesta a la frase en cada pregunta

72. Yo creo que mi patrón esta bien informado de la manera de proteger a los trabajadores de los pesticidas.
Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

73. Me importa saber acerca de los riesgos de estar expuesto a pesticidas.
Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

74. Al patrón que tengo le preocupa mas el trabajo que la salud de los trabajadores.
Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

75. Cuando yo se que aplicaron pesticidas en el campo yo no entro a trabajar en el campo.
Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

76. Si le aviso a mi patrón de alguna anormalidad en el campo, por ejemplo, que no hay agua él los corrige rápido y muestra interés en mis comentarios.
Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

77. Yo estoy dispuesto a avisarles a mis compañeros si van a entrar a un campo donde se han aplicado pesticidas.
Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

78. Si uno de nuestros compañeros fuera a entrar al campo donde aplicaron pesticidas los compañeros de trabajo se avisarian de los pesticidas.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

79. Yo recibo buena capacitacion para protegerme de los pesticidas en mi trabajo.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

80. La información de los pesticidas cuando se aplicaron, donde, y cuales pesticidas esta disponible para todos los trabajadores.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

81. Yo sé donde conseguir mas información de la aplicación de los pesticidas en mi trabajo.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

82. Yo se como protegerme para que los pesticidas no entren a mi cuerpo.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

83. En mi trabajo hay avisos de donde esta el lugar médico mas cercano.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

84. Hay un poster con información de los pesticidas en la oficina donde trabajo.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

Marque con una X en la respuesta que usted eliga en las siguientes preguntas

85. Mi patrón tiene agua para lavarse las manos en el campo donde ando trabajando.
    - Si ____
    - No ____
    - No se ____
    - Algunas Veces ____

86 Mi patrón tiene jabón para lavarse las manos en el campo donde ando trabajando.
    - Si ____
    - No ____
    - No se ____
    - Algunas Veces ____

87. Mi patrón tiene toallas para secarse las manos en el campo donde ando trabajando.
    - Si ____
    - No ____
    - No se ____
    - Algunas Veces ____

88. Mi patrón tiene agua para enjuagarse el cuerpo (1 galón, como 4 litros) en el campo donde ando trabajando
    - Si ____
    - No ____
    - No se ____
    - Algunas Veces ____

Marque con una X en la respuesta que usted eliga en las siguientes preguntas

89. Después de aplicar pesticidas pueden ser hallados solamente en las hojas de las plantas
    - Si ____
    - No ____
    - No se ____

90. Es seguro usar los envases de pesticidas después de enjuagarlos con agua caliente y jabón.
    - Si ____
    - No ____
    - No se ____

91. Los pesticidas se usan para matar insectos.
    - Si ____
    - No ____
    - No se ____

92. Es sano y salvo entrar a los campos donde se aplicaron pesticidas si me tapo la boca y nariz con un pañuelo
    - Si ____
    - No ____
    - No se ____

93. Los pesticidas pueden entrar a mi cuerpo a través de mis ojos
    - Si ____
    - No ____
    - No se ____

94. Mi piel me protege de los pesticidas para que no entren adentro de mi cuerpo.
Si ____
No ____
No se ____

95. Los pesticidas pueden entrar a mi cuerpo al respirar.
Si ____
No ____
No se ____

96. Los pesticidas pueden dañar mi salud después de muchos años.
Si ____
No ____
No se ____

97. Sudar. vomitar. mareos . dolor de cabeza. dolores musculares e irritación en la piel todos son sintomas que pueden ser debido a pesticidas.
Si ____
No ____
No se ____

98. Cuando alguien se intoxica con pesticidas, esa persona debe de tomar leche mientras se va al doctor.
Si ____
No ____
No se ____

99. Cuando esten aplicando pesticidas en el campo donde estoy trabajando debo de alejarme de esa area.
Si ____
No ____
No se ____

100. Es peligroso dejar a niños jugar en los campos
Si ____
No ____
No se ____

101. Es importante llevar la etiqueta o marca del pesticida cuando alguien necesita ir al doctor
Si ____
No ____
No se ____

102. Si un compañero esta atrapado en un espacio encerrado uno debe salvarlo dandole respiración de boca a boca.
Si ____
No ____
No se ____

103. Si los pesticidas entran a mis ojos debo enjuagarlos con agua durante 5 minutos
Si ____
No ____
No se ____

104. La persona que aplica los pesticidas debe de tener un año de experiencia en el campo

Si ____
No ____
No se ____

105. Yo siempre debo de lavar mis manos antes de comer, beber, fumar o usar el baño cuando estoy trabajando en el campo.

Si ____
No ____
No se ____

106. Yo siempre debo de separar la ropa de trabajo del campo de la ropa de mi familia, cuando la lavo.

Si ____
No ____
No se ____

107. Mi patrón me puede correr si yo me protego de los pesticidas.

Si ____
No ____
No se ____

108. Mi patrón debe darme transporte para ir al doctor si me enfermo por pesticidas cuando estoy trabajando.

Si ____
No ____
No se ____

109. Algunas personas pueden enfermarse más rápido que otras con pesticidas, aunque esten trabajando en el mismo campo.

Si ____
No ____
No se ____

En las siguientes preguntas circule el número que mejor le paresca para cada respuesta

110. Cuando me enfermo es lo que yo hago que determina que tan pronto me alivio

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

111. Yo estoy en control de mi salud

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

112. Cuando me enfermo, yo soy el culpable

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

113. La principal cosa que afecta mi salud es lo que yo hago

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

114. Si me cuido bien puedo evitar enfermarme

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

115. Si hago las cosas correctas puedo estar sano

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

116. Viendo al médico regularmente es la mejor manera para evitar enfermarme

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

117. Siempre que no me siento bien debo ir a ver al médico

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

118. Mi familia tiene mucho que ver en si me enfermo o si estoy sano

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

119. Los médicos y enfermeras controlan mi salud

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

120. Cuando me recupero de una enfermedad es debido a otras personas (como son doctores, enfermeras y amigos) que han cuidado bien de mi.

Estoy muy de Acuerdo	(1)____
Yo creo que si	(2)____
Yo no se	(3)____
No estoy de Acuerdo	(4)____
No Estoy de acuerdo definitivamente	(5)____

121. Con respecto a mi salud, yo solo puedo hacer lo que me dice el doctor

Estoy muy de Acuerdo	(1)____
Yo creo que si	(2)____
Yo no se	(3)____
No estoy de Acuerdo	(4)____
No Estoy de acuerdo definitivamente	(5)____

122. No importa lo que haga si me he de enfermar me voy a enfermar

Estoy muy de Acuerdo	(1)____
Yo creo que si	(2)____
Yo no se	(3)____
No estoy de Acuerdo	(4)____
No Estoy de acuerdo definitivamente	(5)____

123. Las cosas que afectan mi salud me pasan por accidente.

Estoy muy de Acuerdo	(1)____
Yo creo que si	(2)____
Yo no se	(3)____
No estoy de Acuerdo	(4)____
No Estoy de acuerdo definitivamente	(5)____

124. La suerte importa mucho en que tan rápido me recupero de una enfermedad.

Estoy muy de Acuerdo	(1)____
Yo creo que si	(2)____
Yo no se	(3)____
No estoy de Acuerdo	(4)____
No Estoy de acuerdo definitivamente	(5)____

125. Mi buena salud es cosa de buena suerte

Estoy muy de Acuerdo	(1)____
Yo creo que si	(2)____
Yo no se	(3)____
No estoy de Acuerdo	(4)____
No Estoy de acuerdo definitivamente	(5)____

126. No importa lo que yo haga soy propenso a enfermarme

Estoy muy de Acuerdo	(1)____
Yo creo que si	(2)____
Yo no se	(3)____
No estoy de Acuerdo	(4)____
No Estoy de acuerdo definitivamente	(5)____

127. Si ya me toca no me he de enfermar.

Estoy muy de Acuerdo	(1)____
Yo creo que si	(2)____
Yo no se	(3)____
No estoy de Acuerdo	(4)____
No Estoy de acuerdo definitivamente	(5)____

128. Edad______
129. Sexo: Hombre ______ Mujer ______ Embarazada(SI o NO)______
130. En donde considera usted su hogar___________ (PAIS)
131. Estado_________
132. Pais________
133. De que pais es usted?___________
134. Sabe leer en español?
    - Nada ______
    - Poco ______
    - Bien ______
    - Muy bien _____
135. Sabe leer en Inglés?
    - Nada ______
    - Poco ______
    - Bien ______
    - Muy bien _____
136. Sabe escribir en español?
    - Nada ______
    - Poco ______
    - Bien ______
    - Muy bien _____
137. Sabe escribir en ingles?
    - Nada ______
    - Poco ______
    - Bien ______
    - Muy bien _____
138. Cuantos años de escuela terminó usted?______

139. Si Usted fuma cuantos cigarros se fuma al dia? (SI o NO)_________Por cuantos años?________

140. Mastica Tabaco?(SI o NO)_______Por cuantos años?_______

141. Toma bebidas alcoholicas?(SI o NO)_______ Cuanto por semana?
    Cerveza ________(número por semana)
    Vino de Mesa ________(número de vasos por semana)
    Licor fuerte ________(número de vasospor semana)
    Por cuantos años?_______
142. Si ya recibio la clase de los pesticidas cuanto tiempo hace que la recibió?
    ________ ________

ESTUDIO DE LA EFECTIVIDAD DE LA CAPACITACION EN PESTICIDAS

1.Codigo de Identificación__________________

ENTREVISTA PARA EL TRABAJADOR DEL CAMPO

Circule o cruce la respuesta que usted eliga. Después de completar esta información este documento será mantenido en el Departamento de Salud Ambiental en el cuarto 135 en el archivo bajo llave.

2. Fecha de la Entrevista:________(Dia)__________(mes)__________(Año)

3. Recibio usted la capacitación de pesticidas? SI_______ NO______

4. Cuánto tiempo ha trabajado con este patrón?
Número de Dias______ Número de Meses__________Número de Años___________

Digáme que actividades ha estado haciendo en esta temporada

Actividad	SI	No	Cuánto tiempo por semana
5. Ha estado usted cosechando?			
6. Ha estado usted Desyerbando?			
7.Ha estado usted Regando los campos?			
8.Ha estado usted Mezclando Pesticidas?			
9.Ha estado usted Cargando Pesticidas?			
10. Ha estado usted aplicando pesticidas en el Campo?			
11. Ha estado usted abriendo envases de pesticidas?			
12. Ha estado usted trabajando como abanderado en el campo cuando rocian pesticidas?			

13. Ha estado usted limpiando transportando, ajustando o reparando partes de mezcladoras, cargamento o maquinaria para uso de pesticidas que puedan contener residuos de pesticidas?
Si_____No_____Cuánto tiempo por semana___________________

14. Ha estado usted tirando los envases vacios de pesticidas a la basura?
Si_____No_____Cuánto tiempo por semana___________________

15. Ha recibido usted una credencial azul como ésta de capacitación para protegerse de pesticidas durante los ultimos 5 años? *Vea la tarjeta que le muestran*
Si_____No_____

16. Recibió usted capacitación cuando le dieron la credencial azul?
Si_____No_____

17. Fue la universidad de Colorado los que le dieron la capacitación (HICAHS)?
Si_____No_____

18. Dónde fue la capacitación?
a) Donde vivo
b) En mi trabajo
c) No me acuerdo
d) Otro____________________

19. Si tiene la credencial por favor escriba la fecha____________
Lugar de Capacitación_____________
Compania que le dio la Capacitación__________

20. Por favor explique a continuación como fue la capacitación (o clase) que recibió

Método que uso el capacitador	Si	No	Comentarios
21. Vio usted una pelicula?			
22. Recibio usted un folleto del trabajador?			
23. Usaron un block con dibujos en la explicación como el que le muestran ahora?			
24. La clase fue en español?			
25. Habia un traductor ayudandole a la persona dando la clase?			
26. Entendio usted claramente a las explicaciones?			
27. Tuvo usted la oportunidad de hacer preguntas durante la clase?			

28. Cuánto tiempo duro la capacitación?_______________

29. Ha recibido usted una credencial verde como esta para manejar o aplicar pesticidas?
Vea la tarjeta que le muestran

30. Recibio usted una capacitación cuando le dieron la credencial verde?

31. Recibió usted capacitación cuando le dieron la credencial verde?
Si_____No_____

32. Fue la universidad de Colorado los que le dieron la capacitación (HICAHS)?
Si_____No_____

33. Dónde fue la capacitación?
a) Donde vivo
b) En mi trabajo
c) No me acuerdo
d) Otro________________

34. Si tiene la credencial por favor escriba la fecha__________
Lugar de Capacitación__________
Compania que le dio la Capacitación________

35. Por favor explique a continuación como fue la capacitación (o clase) que recibió

Método que uso el capacitador	Si	No	Comentarios
36. Vio usted una pelicula?			
37. Recibio usted un folleto del trabajador?			
38. Usaron un block con dibujos en la explicación como el que le muestran ahora?			
39. La clase fue en español?			
40. Habia un traductor ayudandole a la persona dando la clase?			
41. Entendio usted claramente a las explicaciones?			
42. Tuvo usted la oportunidad de hacer preguntas durante la clase?			

43. Cuánto tiempo duró la capacitación?____________

44. Antes de trabajar en el campo donde se hayan aplicado pesticidas. que tan frequente le avisan que se aplicaron pesticidas?

Siempre	(1)____
Frequentemente	(2)____
Algunas Veces	(3)____
Raramente	(4)____
Nunca	(5)____

45. Cuando usted trabaja en el campo usa camisa de manga larga?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	____________
Algunas Veces	(3)____	____________
Raramente	(4)____	____________
Nunca	(5)____	

46. Si usted no usa camisa de manga larga (respuesta fue NO). ha pensando usted en usar camisa de manga larga cuando trabaja en el campo en los siguientes 6 meses?

Si : continue con la siguiente pregunta No: Continue en pregunta 58

47. Ha pensado usted pensando en usar camisa de manga alrga para protegerse de los pesticidas en el siguiente mes?

Si : continue con la siguiente pregunta No: Continue en pregunta 58

48. Cuánto tiempo ha usado usted camisa de manga larga para protegese de los pesticidas

De 1 a 6 meses Más de 6 meses Más de 5 años

49. Cuando usted trabaja en el campo usa sombrero o Cachucha? (Circule cual de los dos)

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)____	

50. Cuando esta trabajando en el campo usa usted pantalones largos?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)____	

51. Si usted no usa pantalones largos (su respuesta fue NO). esta usted pensando en usar pantalones largos durante los siguientes 6 meses?
Si: siga con la siguiente pregunta No: Vaya a la pregunta 54

52. Esta planeando usar patalones largos durante el siguiene mes?
Si: siga con la siguiente pregunta No: Vaya a la pregunta 54

53. Cuánto tiempo ha usted usado pantalones largos para protegerse de los pesticidas cuando trabaja en el campo?
1 a 6 meses Mas de 6 meses Mas de 5 años

54. Cuando trabaja en el campo usa guantes?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)____	Ha intentado Usar Guantes?________

55. Usa usted anteojos?________(SI o NO). Cuando trabaja en el campo usa lentes para protección de sus ojos?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)____	

56. Cuándo esta trabajando en el campo se lava sus manos antes de ir al baño?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)____	Cuando hay agua y jabón______

57. Si usted no se lava las manos cuando esta trabajando en el campo, ha pensado empezar a lavarselas durante los siguientes 6 meses?
Si: Vaya a la siguiente pregunta   No: Continue en la pregunta 60

58. Ha pensado en lavarse las manos antes de ir al baño durante el siguiente mes?

Si: Vaya a la siguiente pregunta   No: Continue en la pregunta 60

59. Cuánto tiempo ha estado lavandose las manos antes de ir al baño cuando trabaja en el campo?

1 a 6 meses   Mas de 6 meses   Mas de 5 años

60. Fuma usted?_____(SI o NO). Si usted fuma, se lava las manos antes de fumar cuando esta trabajando en el campo?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)____	Cuando hay agua y jabón______

61. Después de cada dia de trabajar en el campo se baña inmediatamente?

Siempre	(1)____	si no siempre cuando?
Frequentemente	(2)____	________________
Algunas Veces	(3)____	________________
Raramente	(4)____	________________
Nunca	(5)____	

62. Después del trabajo en el campo separa usted sus ropas de trabajo de las de su familia o de las suyas que no son de trabajo?

Siempre (1)____
Frequentemente (2)____
Algunas Veces (3)____
Raramente (4)____
Nunca (5)____

si no siempre cuando?
____
____
____

63. Si usted separa usted sus ropas de trabajo de las de su familia despues de estar trabajando en el campo, ha pensado en hacerlo durante los siguientes 6 meses?

Si: Vaya a la siguiente pregunta No: Continue en la pregunta 66

64. Ha pensado en separar usted sus ropas de trabajo de las de su familia despues de estar trabajando en el campo durante el siguiente mes?

Si: Vaya a la siguiente pregunta No: Continue en la pregunta 66

65. Cuánto tiempo ha estado separando usted sus ropas de trabajo de las de su familia despues de estar trabajando en el campo?

1 a 6 meses Mas de 6 meses Mas de 5 años

Las siguientes preguntas eliga el número que represente mejor como se siente usted en respuesta a la frase en cada pregunta

66. Yo creo que mi patrón esta bien informado de la manera de proteger a los trabajadores de los pesticidas.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

67. Me importa saber acerca de los riesgos de estar expuesto a pesticidas.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

68. Al patrón que tengo le preocupa más el trabajo que la salud de los trabajadores.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

69. Cuando yo se que aplicaron pesticidas en el campo yo no entro a trabajar en el campo

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

70. Si yo le aviso a mi patrón de alguna cosa que falta en el trabajo. por ejemplo. que no hay agua él los corrige rápido y muestra interés en mis comentarios.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

71. Yo estoy dispuesto a avisarles a mis compañeros si ellos fueran a entrar a un campo donde se han aplicado pesticidas.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

72. Si uno de nuestros compañeros fuera a entrar al campo donde aplicaron pesticidas los compañeros de mi trabajo le avisarian de que hay pesticidas.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

73. Yo recibo buena capacitacion para protegerme de los pesticidas en mi trabajo.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

74. La información de los pesticidas cuando se aplicaron. donde. y cuales pesticidas esta disponible para todos los trabajadores y yo la puedo ir a ver.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

75. Yo sé donde conseguir mas información de los pesticidas en mi trabajo.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

76. Yo se como protegerme para que los pesticidas no entren a mi cuerpo.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

77. En mi trabajo hay avisos de donde esta el lugar médico mas cercano.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

78. Hay un poster con información de los pesticidas en la oficina donde trabajo.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

Marque con una X, o circule la respuesta que usted eliga en las siguientes preguntas

79. Mi patrón tiene agua para lavarse las manos en el campo donde ando trabajando.

Si ____
No ____
No se ____
Algunas Veces ____

80. Mi patrón tiene jabón para lavarse las manos en el campo donde ando trabajando.

Si ____
No ____
No se ____
Algunas Veces ____

81. Mi patrón tiene toallas para secarse las manos en el campo donde ando trabajando.

Si ____
No ____
No se ____
Algunas Veces ____

82. Mi patrón tiene agua para enjuagarse el cuerpo (1 galón. como 4 litros) en el campo donde ando trabajando

Si ____
No ____
No se ____
Algunas Veces ____

Marque con una X, o circule la respuesta que usted eliga en las siguientes preguntas.

83. Después de aplicar pesticidas pueden ser encontrados solamente en las hojas de las plantas

Si ____
No ____
No se ____

84. Es peligroso usar los envases de pesticidas después de enjuagarlos con agua caliente y jabón.

Si ____
No ____
No se ____

85. Los pesticidas se usan para matar plagas como los insectos.

Si ____
No ____
No se ____

86. Es sano y salvo entrar a los campos donde se aplicaron pesticidas si me tapo la boca y nariz con un pañuelo

Si ____
No ____
No se ____

87. Los pesticidas pueden penetrar a mi cuerpo a través de mis ojos

Si ____
No ____
No se ____

88. Mi piel me protege de los pesticidas para que no entren adentro de mi cuerpo.

Si ____
No ____
No se ____

89. Los pesticidas pueden entrar a mi cuerpo cuando respiro.

Si ____
No ____
No se ____

90. Los pesticidas pueden dañar mi salud después de muchos años.

Si ____

No ____
No se ____

91. Sudar. vomitar. y mareos son sintomas que pueden ser debido a pesticidas.
Si ____
No ____
No se ____

92. Cuando alguien se intoxica con pesticidas. esa persona debe de tomar leche mientras se va al doctor.
Si ____
No ____
No se ____

93. Cuando esten aplicando pesticidas en el campo donde estoy trabajando debo de alejarme de esa area.
Si ____
No ____
No se ____

94. Es bueno dejar a niños jugar en los campos
Si ____
No ____
No se ____

95. Es importante llevar la etiqueta o marca del pesticida cuando alguien necesita ir al doctor
Si ____
No ____
No se ____

96. Si un compañero esta atrapado en un espacio encerrado uno debe aflojarle la ropa para salvarlo.
Si ____
No ____
No se ____

97. Si los pesticidas entran a mis ojos debo enjuagarlos con agua durante 1 minuto
Si ____
No ____
No se ____

98. La persona que aplica los pesticidas debe de tener una credencial verde y tomar una clase
Si ____
No ____
No se ____

99. Yo siempre debo de lavar mis manos antes de fumar o usar el baño cuando estoy trabajando en el campo.

Si ____
No ____
No se ____

100. Yo debo de separar la ropa de trabajo del campo de la ropa de mi familia. cuando la lavo solamente si aplicaron pesticidas.

Si ____
No ____
No se ____

101. Mi patrón me puede correr si yo me protego de los pesticidas.

Si ____
No ____
No se ____

102. Mi patrón debe darme transporte para ir al doctor si me enfermo por pesticidas cuando estoy trabajando.

Si ____
No ____
No se ____

103. Algunas personas pueden enfermarse más rápido que otras con pesticidas. aunque esten trabajando en el mismo campo.

Si ____
No ____
No se ____

En las siguientes preguntas circule el número que mejor le paresca para cada respuesta

104. Cuando me enfermo es lo que yo hago que decide que tan rápido me alivio

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

105. Yo controlo mi salud

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

106. Si me enfermo yo soy el culpable

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

107. Lo que yo hago es lo que más afecta mi salud

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

108. Si me cuido bien puedo evitar enfermarme

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

109. Si yo hago las cosas correctas puedo estar saludable

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

110. Yendo a ver al doctor frequentemente es la mejor manera para evitar enfermarme

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

111. Siempre que yo no me siento bien debo ir a ver al doctor

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

112. Mi familia tiene mucho que ver en si me enfermo o si estoy saludable

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

113. Los doctores y las enfermeras controlan mi salud

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

114. Cuando me recupero de una enfermedad es gracias a otras personas (como son los doctores. las enfermeras y mis amigos) que han cuidado bien de mi.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

115. Con respecto a mi salud. yo solo debo de hacer lo que me dice el doctor

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

116. No importa lo que yo haga si me toca enfermarme me voy a enfermar

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

117. Las cosas que afectan mi salud me pasan por accidente.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

118. La suerte importa mucho en que tan rápido me recupero de estar enfermo.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

119. La buena salud es cosa de buena suerte

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

120. No importa lo que haga yo soy propenso a enfermarme

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

121. Si ya me toca me he de enfermar.

Estoy muy de Acuerdo (1)____
Yo creo que si (2)____
Yo no se (3)____
No estoy de Acuerdo (4)____
No Estoy de acuerdo definitivamente (5)____

122. Si ya tomo la clase cuanto tiempo ha pasado desde que tomo la clase?

Dias__________ Semanas________ Meses __________ Años_________

123. Ha trabajado en otros estados del pais en el campo?

SI____ NO____ Cuáles?________________________________

124. Trabaja usted siempre en el campo durante todo el año?

SI____ NO_____

125. Si no trabajado todo el año en el campo. Cuando no trabaja en el campo a que se dedica?
____

126. Ha trabajado en la agricultura en México?

SI____ NO_______ Cuanto Tiempo?
Dias__________ Semanas________ Meses __________ Años_________

127. Viene usted cada año a este estado a trabajar con el mismo patrón?

SI____ NO_______

127. Ha trabajado con otros patrones aqui en Colorado?

SI____ NO_______ Cuantos?______________

128. Planea usted venir cada temporada?

SI____ NO_______

130. Cuál es en su opinion el principal problema de los trabajadores migratorios del campo
Falta de Vivienda?
Salario
Falta de protección de su salud en su trabajo?
Otros____

Muchas Gracias por su participación !

PRE-TEST
A SURVEY OF THE EFECTIVENESS OF TRAINING IN PESTICIDE USAGE

1. Identification Code__________________

INTERVIEW FOR THE FIELD WORKER

Circle or mark the response that you choose. After this information is complete, the document will be kept under locked storage in Room 135, Department of Environmental Health, Colorado State University.

2. Interview Date: _______(Day)________(Month)________(Year)

Have you received training in the use of pesticides? YES_______ NO_______

3. How long have you been working in the fields?
Number of Days______ Number of Months_______ Number of Years_______

5. How long have you been working for this particular land owner?
Number of Days______ Number of Months_______ Number of Years_______

Tell me which activities you have been participating in during this time period:

Activity	Yes	No	How often each week?
6. Have you harvested?			
7. Have you weeded?			
8. Have you irrigated?			
9. Have you mixed pesticides?			
10. Have you carried/transported pesticides?			
11. Have you applied pesticides in the fields?			
12. Have you opened pesticide containers?			
13. Have you been in charge of spraying pesticides in the fields where you are working?			

14. Have you cleaned, transported, adjusted, or repaired parts of mixing containers, storage containers, or machinery involved in pesticide use that could contain pesticide residues?
Yes______ No_______ How often each week?____________________

15. Have you thrown empty pesticide containers in the garbage/dump?
Yes______ No_______ How often each week?____________________

16. Have you received a blue certification card like this one for training to protect yourself from pesticides within the past five years? *see card shown here*
Yes______ No_______

17. Did you receive any training when you were given the blue certification card?
Yes______ No_______

18. Was it the University of Colorado that gave you the training (HICAHS)?
Yes______ No_______

19. Where did the training take place?
   a) Where I live
   b) Where I work
   c) I don't remember
   d) Other__________________

20. If you did receive a certification card please write the date_______________
   Place of training_____________
   Company that provided the training_____________

21. Please describe further what the training (or class) you received was like

Method used by the training provider	Yes	No	Comments
22. Did you see a movie?			
23. Did you receive a worker's brochure?			
24. Did the training provider(s) use a block with drawings (like the one you see now) in the explanation?			
25. Was the class conducted in Spanish?			
26. Was there a translator helping the training provider?			
27. Did you clearly understand the explanation?			
28. Did you have an opportunity to ask questions during the class?			

29. How long did the training last?_____________

30. Did you receive a green card like this one to handle or apply pesticides?
See the card shown now

31. Did you receive training when you were given the green certification card?
Yes______ No_______

32. Did you receive training when you were given the green certification card?
Yes______ No_______

33. Was it the University of Colorado that provided the training (HICAHS)?
Yes______ No_______

34. Where did the training take place?
   a) Where I live
   b) Where I work
   c) I don't remember
   d) Other__________________

35. If you received the certification card, please write the date_________
Place of training_____________
Company that provided the training______________

36. Please describe further what the training (or class) you received was like

Method used by the training provider	Yes	No	Comments
37. Did you see a movie?			
38. Did you receive a worker's brochure?			
39. Did the training provider(s) use a block with drawings (like the one you see now) in the explanation?			
40. Was the class conducted in Spanish?			
41. Was there a translator helping the training provider?			
42. Did you clearly understand the explanation?			
43. Did you have an opportunity to ask questions during the class?			

44. How long did the training last?________________

45. Have you ever felt symptoms which in your opinion were due to pesticides (such as nausea, sweats, vomiting, headaches, muscular pain, skin irritation)?
Yes________ When__________________________ No_______ I don't know_______

46. If you answered yes to the above question, what were you doing when this happened?
____

47. Have you consulted a doctor due to pesticide poisoning?
Yes________ When__________________________ No_______ I don't know_______

48. Which pains or complaints did you have when you went to see the doctor?
____

49. In your opinion, are the fields where you work contaminated with pesticides?
Always (1)_____
Frequently (2)_____
Sometimes (3)_____
Rarely (4)_____
Never (5)_____

50. Before working in fields where pesticides have been applied, how often are you informed that pesticides have been applied?
Always (1)_____
Frequently (2)_____
Sometimes (3)_____
Rarely (4)_____
Never (5)_____

51. When you work in the fields do you wear a long-sleeved shirt?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	________________

52. If you don't wear long-sleeved shirts (if you answered no above), have you thought about wearing a long-sleeved shirt when you work in the fields in the upcoming 6 months?

Yes: Continue with the next question   No: Continue with question 58

53. Have you thought about wearing a long-sleeved in order to protect yourself from pesticides in the next month?

Yes: Continue with the next question   No: Continue with question 58

54. How long have you been wearing a long-sleeved shirt to protect yourself from pesticides?

From 1 to 6 months   More than 6 months   More than 5 years

55. When you work in the fields, do you wear a hat or a cap? (Circle which of the two)

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	________________

56. When you work in the fields, do you wear long pants?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	________________

57. If you do not wear long pants (if you answered no), are you thinking about wearing long pants during the next 6 months?

Yes: Continue with the following question   No: Go to question 60

58. Are you planning to wear long pants during the next month?

Yes: Continue with the following question   No: Go to question 60

59. How long have you been wearing long pants to protect yourself from pesticides when working in the fields?

From 1 to 6 months   More than 6 months   More than 5 years

60. When you work in the fields, do you wear gloves?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	Have you tried to wear gloves?________

61. Do you wear glasses?_____(Yes or No). When you work in the fields, do you wear safety glasses?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	________________

62. When you work in the fields do you wash your hands before going to the bathroom?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	When there is soap and water________

63. If you do not wash your hands when you are working in the fields, have you thought about starting to wash them in the next 6 months?

Yes: continue with the following question No: Go to question 66

64. Have you thought about washing your hands before going to the bathroom in the coming month?

Yes: continue with the following question No: Go to question 66

65. For how long have you been washing your hands before going to the bathroom when you are working in the fields?

From 1 to 6 months More than 6 months More than 5 years

66. Do you smoke? _______(Yes or No). If you do smoke, do you wash your hands before smoking in the fields?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	When there is soap and water_____

67. After working each day in the fields, do you bathe?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	When there is soap and water_____

68. After working in the field, do you separate your work clothes from your family's clothes?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	________________

69. If you do not separate your work clothes from your family's clothes after working in the field, have you thought about doing so during the next 6 months?

Yes: Continue with the following question   No: Go to question 72

70. Have you thought about separating your work clothes from your family's clothes after working in the field during the coming month?

Yes: Continue with the following question   No: Go to question 72

71. How long have you been separating your work clothes from your family's clothes after working in the fields?

1 to 6 months   More than 6 months   More than 5 years

Pick the number that best represents how you feel about the following questions.

72. I think that my boss is well informed about how to protect workers from pesticides.
- I strongly agree (1)____
- I think so (2)____
- I don't know (3)____
- I do not agree (4)____
- I definitely do not agree (5)____

73. I want to know about the risks of being exposed to pesticides.
- I strongly agree (1)____
- I think so (2)____
- I don't know (3)____
- I do not agree (4)____
- I definitely do not agree (5)____

74. My boss is more concerned about work than about the health of the workers.
- I strongly agree (1)____
- I think so (2)____
- I don't know (3)____
- I do not agree (4)____
- I definitely do not agree (5)____

75. When I know pesticides have been applied to the field, I don't go to work in the field.
- I strongly agree (1)____
- I think so (2)____
- I don't know (3)____
- I do not agree (4)____
- I definitely do not agree (5)____

76. If I inform my boss that something is wrong in the fields, for example, that there is no water, he promptly corrects the problem and shows interest in my comments.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

77. I am willing to inform my co-workers that they are entering a field where pesticides have been applied.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

78. If one of our co-workers was going to enter a field where pesticides had been applied, we would inform him/her about pesticides.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

79. I receive good training to protect myself from pesticides at work.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

80. Information about when, where and which pesticides have been applied is available for all the workers.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

81. I know where to get more information about the application of pesticides at work.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

82. I know how to protect myself so that pesticides do not enter my body.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

83. At work there is information about where the closest medical facility is.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

84. There is a poster with pesticide information in the office where I work.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

Mark with an X your response to the following questions

85. My boss has water for washing hands in the fields where I am working.

Yes ______
No ______
I don't know ______
Sometimes ______

86. My boss has soap for washing hands in the fields where I am working.

Yes ______
No ______
I don't know ______
Sometimes ______

87. My boss has towels for drying hands in the fields where I am working.

Yes ______
No ______
I don't know ______
Sometimes ______

88. My boss has water for rinsing the body (1 gallon, or 4 liters) in the fields where I am working.

Yes ______
No ______
I don't know ______
Sometimes ______

Mark with an X your response to the following questions

89. After applying pesticides, they can be found only on the leaves of the plants.

Yes ______
No ______
I don't know ______

90. It is safe to use pesticide containers after rinsing them with hot water and soap.

Yes ______
No ______
I don't know ______

91. Pesticides are used to kill insects.
Yes _____
No _____
I don't know _____

92. It is safe and healthy to go into the fields where pesticides have been applied if I cover my mouth and nose with a handkerchief.
Yes _____
No _____
I don't know _____

93. Pesticides can enter my body before my eyes.
Yes _____
No _____
I don't know _____

94. My skin prevents pesticides from entering my body.
Yes _____
No _____
I don't know _____

95. Pesticides can enter my body through breathing.
Yes _____
No _____
I don't know _____

96. Pesticides can damage my health after many years.
Yes _____
No _____
I don't know _____

97. Sweating, vomiting, nausea, headaches, muscular pains and skin irritation are all symptoms that can be due to pesticide exposure.
Yes _____
No _____
I don't know _____

98. When some one is poisoned by pesticides, they should drink milk on the way to the doctor.
Yes _____
No _____
I don't know _____

99. When pesticides are being applied to fields where I'm working, I should move away from that area.
Yes _____
No _____
I don't know _____

100. It is dangerous to let children play in the fields.
Yes _____
No _____
I don't know _____

101. It is important to bring the label of the pesticide when some one needs to go to the doctor.

Yes _____
No _____
I don't know _____

102. If a co-worker is trapped in a closed space, one should save him/her by giving mouth to mouth resuscitation.

Yes _____
No _____
I don't know _____

103. If I get pesticides in my eyes, I should rinse them with water for 5 minutes.

Yes _____
No _____
I don't know _____

104. The person who applies pesticides in the field should have one year of experience in the field.

Yes _____
No _____
I don't know _____

105. I should always wash my hands before eating, drinking, smoking or using the bathroom when I am working in the fields.

Yes _____
No _____
I don't know _____

106. I should always separate my work clothes from my family's clothes for doing laundry.

Yes _____
No _____
I don't know _____

107. My boss can make me feel ashamed if I protect myself from pesticides.

Yes _____
No _____
I don't know _____

108. My boss should provide transportation to the doctor if I get sick from pesticides when I am working.

Yes _____
No _____
I don't know _____

109. Some people can get sick from pesticides faster than others, even if they are working in the same fields.

Yes _____
No _____
I don't know _____

Circle the number of the response that looks best for each question

110. When I get sick, it is what I do that determines how quickly I will get better.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

111. I am in control of my health.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

112. When I get sick, it is my own fault.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

113. What I do is the primary thing that affects my health.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

114. If I take good care of myself, I can avoid getting sick.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

115. If I do the right things, I can stay healthy.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

116. Seeing the doctor regularly is the best way to avoid getting sick.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

117. Whenever I don't feel well, I should go to the doctor.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

118. My family has much to do with whether I am sick or healthy.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

119. Doctors and nurses control my health.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

120. When I recover from getting sick, it is because of other people (like doctors, nurses and friends) that have taken good care of me.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

121. With respect to my health, all I can do is what the doctor tells me.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

122. It doesn't matter what I do; if I'm going to get sick, I'm going to get sick.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

123. Things that affect my health happen by accident.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

124. Luck is very important in how quickly I recover from an illness.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

125. Good health is just a matter of good luck.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

126. It doesn't matter what I do; I am prone to getting sick.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

127. If I've already been sick, I won't get sick again.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

128. Age_______
129. Sex: Male________ Female________ Pregnant (yes or no)________
130. Where do you consider your home to be________(country)
131. State____________
132. Country _________
133. What country were you born in?_________
134. Do you know how to read in Spanish?
No ________
A little ________
Well ________
Very Well ________
135. Do you know how to read in English?
No ________
A little ________
Well ________
Very Well ________

136. Do you know how to write in Spanish?
- No ________
- A little ________
- Well ________
- Very Well ________

137. Do you know how to write in English?
- No ________
- A little ________
- Well ________
- Very Well ________

138. How many years of school did you complete?________

139. If you smoke, how many cigarettes do you smoke per day?______ For how may years?_______

140. Do you chew tobacco? (yes or no) _______ For how many years?________

141. Do you drink alcoholic beverages? (yes or no) _____ How many each week?_____
- Beer ______ (number per week)
- Table wine ______ (number of glasses per week)
- Hard Liquor ______ (number of glasses per week)
- For how many years?______

142. If you have already taken a pesticide training class, how many years has it been since then? _______________

POST-TEST
A SURVEY OF THE EFECTIVENESS OF TRAINING IN PESTICIDE USAGE

1. Identification Code__________________

INTERVIEW FOR THE FIELD WORKER

Circle or mark the response that you choose. After this information is complete. the document will be kept under locked storage in Room 135, Department of Environmental Health, Colorado State University.

2. Interview Date: _______(Day)________(Month)________(Year)

3. Have you received training in the use of pesticides? YES_______ NO_______

4. How long have you been working for this particular land owner?
Number of Days______ Number of Months_______ Number of Years_______

Tell me which activities you have been participating in during this time period

Activity	Yes	No	How often each week?
5. Have you harvested?			
6. Have you weeded fields?			
7. Have you irrigated?			
8. Have you mixed pesticides?			
9. Have you carried/transported pesticides?			
10. Have you applied pesticides in the fields?			
11. Have you opened pesticide containers?			
12. Have you been in charge of spraying pesticides in the fields when you are working?			

13. Have you cleaned, transported, adjusted or repaired parts of mixing containers, storage containers, or machinery involved in pesticide use that could contain pesticide residues?
Yes______ No_______ How often each week?____________________

14. Have you thrown empty pesticide containers in the garbage/dump?
Yes______ No_______ How often each week?____________________

15. Have you received a blue certification card like this one for training to protect yourself from pesticides within the past five years?
Yes______ No_______

16. Did you receive any training when you were given the blue certification card?
Yes______ No_______

17. Was it the University of Colorado that gave you the training (HICAHS)?
Yes______ No_______

18. Where did the training take place?
    a) Where I live
    b) Where I work
    c) I don't remember
    d) Other_________________

19. If you did receive a certification card please write the date______________
    Place of training____________
    Company that provided the training_____________

20. Please describe further what the training (or class) you received was like

Method used by the training provider	Yes	No	Comments
21. Did you see a movie?			
22. Did you receive a worker's brochure?			
23. Did the training provider(s) use a block with drawings (like the one you see now) in the explanation?			
24. Was the class conducted in Spanish?			
25. Was there a translator helping the training provider?			
26. Did you clearly understand the explanation?			
27. Did you have an opportunity to ask questions during the class?			

28. How long did the training last?_____________

29. Did you receive a green card like this one to handle or apply pesticides?

See the card they show you now

30. Did you receive training when you were given the green certification card?
Yes______ No_______

31. Did you receive training when you were given the green certification card?
Yes______ No_______

32. Was it the University of Colorado that provided the training (HICAHS)?
Yes______ No_______

33. Where did the training take place?
    a) Where I live
    b) Where I work
    c) I don't remember
    d) Other_________________

34. If you received the certification card, please write the date_________
    Place of training____________
    Company that provided the training_____________

35. Please describe further what the training (or class) you received was like

Method used by the training provider	Yes	No	Comments
36. Did you see a movie?			
37. Did you receive a worker's brochure?			
38. Did the training provider(s) use a block with drawings (like the one you see now) in the explanation?			
39. Was the class conducted in Spanish?			
40. Was there a translator helping the training provider?			
41. Did you clearly understand the explanation?			
42. Did you have an opportunity to ask questions during the class?			

43. How long did the training last?_______________

44. Before working in fields where pesticides have been applied, how often are you informed that pesticides have been applied?

Always (1)_____
Frequently (2)_____
Sometimes (3)_____
Rarely (4)_____
Never (5)_____

45. When you work in the fields do you wear a long-sleeved shirt?

Always	(1)_____	If not always, when?
Frequently	(2)_____	_______________
Sometimes	(3)_____	_______________
Rarely	(4)_____	_______________
Never	(5)_____	_______________

46. If you don't wear long-sleeved shirts (if you answered no above), have you thought about wearing a long-sleeved shirt when you work in the fields in the upcoming 6 months?

Yes: Continue with the next question   No: Continue with question 58

47. Have you thought about wearing a long-sleeved in order to protect yourself from pesticides in the next month?

Yes: Continue with the next question   No: Continue with question 58

48. For how long have you worn a long-sleeved shirt to protect yourself from pesticides?

From 1 to 6 months   More than 6 months   More than 5 years

49. When you work in the fields, do you wear a hat or a cap? (Circle which of the two)

Always	(1)_____	If not always, when?
Frequently	(2)_____	_______________
Sometimes	(3)_____	_______________
Rarely	(4)_____	_______________
Never	(5)_____	_______________

50. When you work in the fields, do you wear long pants?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	________________

51. If you do not wear long pants (if you answered no), are you thinking about wearing long pants during the next 6 months?

Yes: Continue with the following question No: Go to question 54

52. Are you planning to wear long pants during the next month?

Yes: Continue with the following question No: Go to question 54

53. For how long have you been wearing long pants to protect yourself from pesticides when working in the fields?

From 1 to 6 months More than 6 months More than 5 years

54. When you work in the fields, do you wear gloves?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	Have you tried to wear gloves?_________

55. Do you wear glasses?_____(Yes or No). When you work in the fields, do you wear safety glasses?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	________________

56. When you work in the fields do you wash your hands before going to the bathroom?

Always	(1)_____	If not always, when?
Frequently	(2)_____	________________
Sometimes	(3)_____	________________
Rarely	(4)_____	________________
Never	(5)_____	When there is soap and water________

57. If you do not wash your hands when you are working in the fields, have you thought about starting to wash them in the next 6 months?

Yes: continue with the following question No: Go to question 66

58. Have you thought about washing your hands before going to the bathroom in the coming month?

Yes: continue with the following question No: Go to question 66

59. For how long have you been washing your hands before going to the bathroom when you are working in the fields?

From 1 to 6 months   More than 6 months   More than 5 years

60. Do you smoke? _______(Yes or No). If you do smoke, do you wash your hands before smoking when you are working in the fields?

Always	(1)_____	If not always, when?
Frequently	(2)_____	_______________
Sometimes	(3)_____	_______________
Rarely	(4)_____	_______________
Never	(5)_____	When there is soap and water_____

61. After working each day in the fields, do you bathe?

Always	(1)_____	If not always, when?
Frequently	(2)_____	_______________
Sometimes	(3)_____	_______________
Rarely	(4)_____	_______________
Never	(5)_____	When there is soap and water_____

62. After working in the field, do you separate your work clothes from your family's clothes, or from your non-work clothes?

Always	(1)_____	If not always, when?
Frequently	(2)_____	_______________
Sometimes	(3)_____	_______________
Rarely	(4)_____	_______________
Never	(5)_____	_______________

63. If you do not separate your work clothes from your family's clothes after working in the field, have you thought about doing so during the next 6 months?

Yes: Continue with the following question   No: Go to question 66

64. Have you thought about separating your work clothes from your family's clothes after working in the field during the coming month?

Yes: Continue with the following question   No: Go to question 72

65. For how long have you been separating your work clothes from your family's clothes after working in the fields?

1 to 6 months   More than 6 months   More than 5 years

Pick the number that best represents how you feel about the following questions.

66. I think that my boss is well informed about how to protect workers from pesticides.

I strongly agree	(1)____
I think so	(2)____
I don't know	(3)____
I do not agree	(4)____
I definitely do not agree	(5)____

67. I want to know about the risks of being exposed to pesticides.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

68. My boss is more concerned about work than about the health of the workers.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

69. When I know pesticides have been applied to the field, I don't go to work in the field.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

70. If I inform my boss that something is wrong in the fields, for example, that there is no water, he promptly corrects the problem and shows interest in my comments.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

71. I am willing to inform my co-workers that they are entering a field where pesticides have been applied.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

72. If one of our co-workers was going to enter a field where pesticides had been applied, we would inform him/her about pesticides.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

73. I receive good training to protect myself from pesticides at work.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

74. Information about when, where and which pesticides have been applied is available for all the workers and I can go to see it.

- I strongly agree (1)____
- I think so (2)____
- I don't know (3)____
- I do not agree (4)____
- I definitely do not agree (5)____

75. I know where to get more information about the application of pesticides at work.

- I strongly agree (1)____
- I think so (2)____
- I don't know (3)____
- I do not agree (4)____
- I definitely do not agree (5)____

76. I know how to protect myself so that pesticides do not enter my body.

- I strongly agree (1)____
- I think so (2)____
- I don't know (3)____
- I do not agree (4)____
- I definitely do not agree (5)____

77. At work there is information about where the closest medical facility is.

- I strongly agree (1)____
- I think so (2)____
- I don't know (3)____
- I do not agree (4)____
- I definitely do not agree (5)____

78. There is a poster with pesticide information in the office where I work.

- I strongly agree (1)____
- I think so (2)____
- I don't know (3)____
- I do not agree (4)____
- I definitely do not agree (5)____

Mark with an X your response to the following questions

79. My boss has water for washing hands in the fields where I am working.

- Yes _____
- No _____
- I don't know _____
- Sometimes _____

80. My boss has soap for washing hands in the fields where I am working.

- Yes _____
- No _____
- I don't know _____
- Sometimes _____

81. My boss has towels for drying hands in the fields where I am working.
    Yes ______
    No ______
    I don't know ______
    Sometimes ______
82. My boss has water for rinsing the body (1 gallon, or 4 liters) in the fields where I am working.
    Yes ______
    No ______
    I don't know ______
    Sometimes ______

Mark with an X your response to the following questions

83. After applying pesticides, they can be found only on the leaves of the plants.
    Yes ______
    No ______
    I don't know ______
84. It is dangerous to use pesticide containers after rinsing them with hot water and soap.
    Yes ______
    No ______
    I don't know ______
85. Pesticides are used to kill insects.
    Yes ______
    No ______
    I don't know ______
86. It is safe and healthy to go into the fields where pesticides have been applied if I cover my mouth and nose with a handkerchief.
    Yes ______
    No ______
    I don't know ______
87. Pesticides can enter my body before my eyes.
    Yes ______
    No ______
    I don't know ______
88. My skin prevents pesticides from entering my body.
    Yes ______
    No ______
    I don't know ______
89. Pesticides can enter my body through breathing.
    Yes ______
    No ______
    I don't know ______
90. Pesticides can damage my health after many years.
    Yes ______
    No ______
    I don't know ______

91. Sweating, vomiting, nausea, headaches, muscular pains and skin irritation are all symptoms that can be due to pesticides.

Yes _____
No _____
I don't know _____

92. When some one is poisoned by pesticides, they should drink milk on the way to the doctor.

Yes _____
No _____
I don't know _____

93. When pesticides are being applied to fields where I'm working, I should move away from that area.

Yes _____
No _____
I don't know _____

94. It is good to let children play in the fields.

Yes _____
No _____
I don't know _____

95. It is important to bring the label of the pesticide when some one needs to go to the doctor.

Yes _____
No _____
I don't know _____

96. If a co-worker is trapped in a closed space, one should save him/her by loosening their clothing.

Yes _____
No _____
I don't know _____

97. If I get pesticides in my eyes, I should rinse them with water for 1 minute.

Yes _____
No _____
I don't know _____

98. The person who applies pesticides in the field should have a green certification card and take a class.

Yes _____
No _____
I don't know _____

99. I should always wash my hands before eating, drinking, smoking or using the bathroom when I am working in the fields.

Yes _____
No _____
I don't know _____

100. I should separate my work clothes from my family's clothes for doing laundry only if pesticides have been applied.

Yes _____
No _____
I don't know _____

101. My boss can make me feel ashamed if I protect myself from pesticides.

Yes _____
No _____
I don't know _____

102. My boss should provide transportation to the doctor if I get sick from pesticides when I am working.

Yes _____
No _____
I don't know _____

103. Some people can get sick from pesticides faster than others, even if they are working in the same fields.

Yes _____
No _____
I don't know _____

Circle the number of the response that looks best for each question

104. When I get sick, it is what I do that determines how quickly I will get better.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

105. I am in control of my health.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

106. When I get sick, it is my own fault.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

107. What I do is the thing that most affects my health.

I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

108. If I take good care of myself, I can avoid getting sick.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

109. If I do the right things, I can stay healthy.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

110. Seeing the doctor regularly is the best way to avoid getting sick.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

111. Whenever I don't feel well, I should go to the doctor.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

112. My family has much to do with whether I am sick or healthy.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

113. Doctors and nurses control my health.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

114. When I recover from getting sick, it is because of other people (like doctors, nurses and friends) that have taken good care of me.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

115. With respect to my health, all I can do is what the doctor tells me.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

116. It doesn't matter what I do; if I'm going to get sick, I'm going to get sick.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

117. Things that affect my health happen by accident.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

118. Luck is very important in how quickly I recover from an illness.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

119. Good health is just a matter of good luck.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

120. It doesn't matter what I do; I am prone to getting sick.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

121. If I've already been sick, I will get sick again.
I strongly agree (1)____
I think so (2)____
I don't know (3)____
I do not agree (4)____
I definitely do not agree (5)____

122. If you have already taken the class, how long ago did you take it?
Days________ Weeks_________ Months_________ Years_________

123. Have you done field work in other parts of the country?
Yes________ No________ Where?____________________________

124. Do you work in the fields all year long?
Yes________ No________

125. If you don't work in the fields all year long, what do you do when you are not working in the fields?

____

126. Have you worked in agriculture in Mexico?
Yes________ No________ How long?____________________________
Days________ Weeks________ Months________ Years________

127. Do you come to Colorado every year to work for the same land owner?
Yes________ No________

128. Have you worked for other land owners here in Colorado?
Yes________ No________ How many?________

129. Do you plan to come here every season?
Yes________ No________

130. In your opinion, what is the biggest problem facing migrant field workers?
Lack of housing?
Salary?
Lack of health care/protection in your job?
Others____

Thank you very much for your participation!

FARM BEHAVIOR PLAN WORKSHEET

This form has been designed to help you think through some of the barriers to doing Farmworker Behavior Checklist as certain sites and how you might overcome them. Respond to each question with a "yes" or "no" for each site you re considering. If you get a response of no for more than three questions it is probably not a good site to choose for using this Farmworker Behavior Checklist.
You should fill out this sheet before filing out any information in the observation tools (worker, applicator, central location, migrant camp).

Type of Evaluation: **Pre-training** **Post-training**

Weather Conditions
Sunny Raining **Approx. Temperature**________

Grower ID _______ **Location**___________________________________ **Date** __________

Questions to ask about the proposed site Why is this site a good choice?	Yes	No	Don't Know
Does HI-CAHS have a previous relationship with this grower?			
It is possible to comeback to this site to do a post-training observation within 2 weeks?			
Is there a central barn, office or packing house where workers assemble to prepare to go into the fields, and you will be able to observe workers there?			
Does this grower have a history being friendly to HI-CAHS members and or other farmworker service providers (i.e.. Salud Clinic)?			
Does this grower hire more than 10 workers?			
It is possible to observe workers in the fields without trespassing or disturbing the workers?			
It is possible to observe workers at least in two of the three locations required for the checklist?			
Do the most of the workers who work at the farm all live at the same camp?			

A farmworker checklist must be completed before and after a training at two farm sites in their service area. Since these checklists require that you observe workers while they are working and where they live, you should carefully consider which sites you choose to do these more intensive evaluations.

Don't forget to use the project supervisor (Martha S. Vela) as resource in choosing your sites.
1-800-622-8673

Field Location ______________________________________ Date______________

SITE CHARACTERISTICS	Description	Unknown
Miles from central location (Approx)		
Pesticides being Used		
Number of Workers Employeed		
Arrival Date of Workers		
Primary Crops		
Camp Location		

15. Do you see pesticides being applied near the workers or by the workers?
Yes No

16. If you answered Yes above, complete the following questions:
a. How are the pesticides being applied:
By hand Plane/helicopter Truck/tractor In irrigation water

b. Are pesticides drifting into the area where the workers are?
Yes No Don't know

c. How close are the workers to the area where pesticides are being applied?
Less than a football field (300 ft.) More than a football field

d. How are the workers reacting to the application?
They are staying clear of the area
They are telling their boss
No apparent reaction

c. Is PPE being worn by the workers applying pesticides? Yes No

17. Do you see any pesticide containers? Yes No

18. Are pesticide containers being used for purposes other than storing pesticides?
Yes No

19. If yes, what are the containers being used for?
Storing other substances (specify)____________________________
Other (specify) ____

AT FARMWORKER CAMPS/HOMES

Type of Evaluation: **Pre-training** **Post-training**

Weather Conditions
Sunny **Raining** **Approx. Temperature**________

Grower ID (if only one)_______
Description of Location________________________________

Date _________ **Time** _________

1. If this is a post-training evaluation, how many days has it been since training was done? ____

2. Number of workers observed: _____ (minimum of 5 required)

3. How long have the workers been back at home/camp since working?
   Less than 2 hours More than 2 hours
   They have not worked today Don't know

4. How many workers have showered or bathed since returning from work? _____. Don't know

5. Do you see any workers doing laundry? Yes No

6. If yes above, please answer the following questions:
   How many workers are doing laundry? _____
   Are they washing work clothes separate from other clothes?
   Yes No Don't know
   Are they using hot water and soap to wash their clothes?
   Yes No Don't know
   Are they washing their work clothes before wearing them again?
   Yes No Don't know

7. Do you see any pesticide containers?
   Yes No

8. Are pesticide containers being used for purposes other than storing pesticides?
   Storing other substances (specify) ________________________________
   Other (specify) ________________________________

APPLICATORS AUDIT FORM

Location ID____Date______________

Task (Record the task that is being perform during your observation)

____

QUESTION	Yes	No	COMMENTS
1. Is the applicator wearing long pants?			
2. Is the applicator wearing a long-sleeved shirt?			
3. Is the applicator wearing shoes and socks?			
4. Does the applicator wear gloves during application procedures?			
5. Does the applicator wear a respirator during application procedures?			
6. Does the applicator wear some type of eye protection during application procedures?			
7. Is soap available for washing?			
8. Is water available for washing?			
9. Does the applicator wash hands before eating, drinking, smoking, chewing gum or tobacco?			
10. Does the applicator wash hands before using the toilet?			
11. Are workers in areas were pesticides are being applied?			
12. Are workers in areas that have been posted?			

COLORADO STATE UNIVERSITY
INFORMED CONSENT TO PARTICIPATE IN A RESEARCH

TITLE OF PROJECT:
Assessing the Effectiveness of Pesticide Safety Training for Migrant Farm Workers in Colorado.

NAME OF PRINCIPAL INVESTIGATOR:
Philip Bigelow, PhD, CIH

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS:
Philip Bigelow, PhD, CIH (970) 491-6151 or 1-800-622-8673
Martha Vela Acosta MS (970) 491-6151 or 1-800-622-8673
Wendy Johnson, CIH, CSP (970) 491-6151 or 1-800-622-8673

SPONSOR OF PROJECT:
Environmental Protection Agency (EPA)

PURPOSE OF THE RESEARCH:
This research is being conducted to assess the effectiveness of pesticide safety training that is given to farm workers.in Colorado by the High Plains Intermountain Center for Agricultural Health and Safety (HI-CAHS). We will be interviewing you two times, one before attending the Worker Protection Standard (WPS), and after four weeks of the training. Observation of work practices at your workplace will be also conducted to evaluate this training.

PROCEDURES/METHODS TO BE USED:
You might be either in a group that receives an interview, the pesticide training, and a second interview or in a group who receives the training after the interviews are completed. The second interview will be done after 4 weeks of the first one. You will be asked to participate in each interview for 45 to 60 minutes interview after work. During the interviews you will be asked questions about your background, knowledge and work practices related to your job. For participating you will receive $10 dollars after each interview. If your boss provides permission, we will be observing the entire group of workers. A researcher will observe and record the work practices of farm workers during a normal work day which will take about one hour.

RISKS INHERENT IN THE PROCEDURE:
There are no known risks in the procedure. It is not possible to identify all risks in an experimental procedure, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown risk. Risks in this research will be those associated with farm

Participant Initials_____ Date________

operations.

BENEFITS:

The results of this study will determine if the training methods currently used for the pesticide safety training are effective. This study will provide an understanding of the necessary improvements to be made in the current pesticide training.

CONFIDENTIALITY:

The results of this study will be kept strictly confidential. All records will be kept locked at the Colorado State University Department of Environmental Health, accessible only to authorized personnel. The results of this study will be released as group data only. There will be no means of identifying any individual results that are published. You will not be identified in any way in any presentation or publication. Additionally, your data will be assigned an ID code which will not be connected with your name or farm.

LIMITATION IN LIABILITY

The Colorado Governmental immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury., Questions concerning your rights as study participant may be addressed to Celia Walker, Administrator, Human Research Committee, at (970) 491-1563.

PARTICIPATION:

Your participation in this research is optional . If you decide to participate in this study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled. Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing two (2) pages.

______________________________ ________

Participant Name (printed) Date

______________________________ ________

Participant Signature

Date

______________________________ ________

Investigator or Co-Investigator Signature

Participant Initials ____Date______

COLORADO STATE UNIVERSITY

INFORMACION PARA EL CONSENTIMIENTO Y PARTICIPACION EN INVESTIGACION

TITULO DEL PROYECTO:
Evaluando la Efectividad de la Capacitación en Seguridad y Pesticidas para los Trabajadores Migratorios en el Campo de Colorado.

INVESTIGADOR PRINCIPAL:
Phil Bigelow, Dr. P.H., CIH

NOMBRE Y TELEFONOS DE LAS PERSONAS PARA COMUNICARSE EN CASO DE PREGUNTAS O PROBLEMAS:

Phil Bigelow, PhD, CIH (970) 491-6151 o 1-800-622-8673
Martha Vela Acosta, MS (970) 491-6151 o 1-800-622-8673
Wendy Johnson, CIH, CSP (970) 491-6151 o 1-800-622-8673

OBJETIVO DE LA INVESTIGACION:
El propósito de este estudio es evaluar la efectividad de capacitación en pesticidas por el High Plains Intermountain Center for Agricultural health and Safety (HI-CAHS). Estaremos entrevistandolo dos veces, una antes de atender la capacitación y la segunda vez después de cuatro semanas. Vamos a observarlo cuando este trabajando para evaluar esta capacitación.

METODOS Y PROCEDIMIENTOS:
Usted puede pertenecer al grupo en el que su entrevista será antes de la capacitación luego recibirá la capacitación con otra entrevista cuatro semanas después. O usted puede pertenecer al grupo en el cual las entrevistas serán hechas antes de la capacitación . Cada entrevista tomará de 45 a 60 minutos de su tiempo después de su trabajo. Durante las entrevistas le haremos algunas preguntas acerca de usted, su conocimiento en pesticidas y sus practicas de trabjao. Por cada entrevista usted recibirá $10 doláres al final. Si su patrón nos autoriza estaremos observando a todos trabajadores de su compañia durante horas normales de trabajo.

RIESGOS ASSOCIADOS AL PROCEDIMIENTO:
No existen riesgos conocidos en este procedimiento. Aunque no es posible identificar todos los riesgos en un experimento, pero los investigadores han tomado precauciones para minimizar cualquier riesgo potencialmente conocido. Los riesgos de esta investigación son consecuencias de los procedimientos usuales en la agricultura.

 Iniciales del Participante _____ Fecha _____

BENEFICIOS:

Los resultados de este estudio ayudarán a determinar la si la capacitatión en los pesticidas son adequadas y efectivas. Este estudio permitirá el mejoramiento de la capacitación en los pesticidas.

ANONIMATO:

Los resultados de este estudio serán mantenidos estrictamente confidenciales. Todos los archivos serán conservados con llave en el Departamento de Salud Ambiental de la Colorado State University donde solo el personal autorizado tendrá acceso. Los resultados de este estudio serán publicados en grupo solamente. No habrá manera de identificación personal en cualquier publicación. El questionario obtenido de usted será etiquetado con un nùmero de tal manera que no haya conexión con su nombre e identificación.

LIMITACION LEGAL:

La ley del Govierno de Inmunidad de Colorado determina y limita la responsabilidad legal de Colorado State University en caso de que daño ocurra debido a este estudio. Reclamaciones contra la Universidad deben hacerse dentro de los primeros 180 dias despues de que haya ocurrido el daño. Preguntas referentes a sus derechos como participante de este estudio deben dirigirse a Celia Walker, Administrador del Comite de Investigaciones Humanas al teléfono (970) 491-1563.

PARTICIPACION:

Su participación en esta investigación es completamente voluntaria. Si usted decide participar en esta investigación usted puede retirar su consentimiento en cualquier momento sin ninguna penalidad o pérdida de beneficios a los que de otra manera tendria derecho. Su firma certifica que usted leyo esta información y desea firmar este consentimiento. Su firma tambien ratifica que ha recibido una copia conteniendo dos páginas de este documento.

____
Nombre del Participante ______ Fecha

____
Firma del Participante ______ Fecha

____
Firma del Investigador ______ Fecha

Página 2 de 2 Iniciales del Participante _____ Fecha _____

APPENDIX II

1. Linear Regression Model for Education

Correlation Analysis

2 'VAR' Variables: AGE Education (EDUC)

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
AGE	151	30.523179	11.841078	4609.000000	18.000000	64.000000
EDUC	115	5.486957	2.965785	631.000000	0	17.000000

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / Number of Observations

	AGE	EDUC
AGE	1.00000 0.0 151	-0.38726 0.0001 114
EDUC	-0.38726 0.0001 114	1.00000 0.0 115

Model: MODEL Education = Age
Dependent Variable: EDUCATION

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	149.44365	149.44365	19.760	0.0001
Error	112	847.04758	7.56292		
C Total	113	996.49123			

Root MSE	2.75008	R-square	0.1500
Dep Mean	5.50877	Adj R-sq	0.1424
C.V.	49.92178		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	8.465850	0.71334884	11.868	0.0001
AGE	1	-0.093902	0.02112416	-4.445	0.0001

2. Linear Regression Model Agricultural Factors

Correlation Analysis

2 'VAR' Variables: AGE AGRICULTURAL WORK EXPERIENCE (AGWRK)

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
AGE	151	30.523179	11.841078	4609.000000	18.000000	64.000000
AGWRK	146	62.995411	76.189850	9197.330000	0	360.000000

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / Number of Observations

	AGE	AGWRK
AGE	1.00000 0.0 151	0.60389 0.0001 145
AGWRK	0.60389 0.0001 145	1.00000 0.0 146

Model: MODEL Agricultural Work Experience = Age
Dependent Variable: AGWRK

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	306958.31093	306958.31093	82.085	0.0001
Error	143	534751.21487	3739.51899		
C Total	144	841709.52580			

Root MSE	61.15161	R-square	0.3647
Dep Mean	62.99538	Adj R-sq	0.3602
C.V.	97.07316		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-54.180901	13.89456377	-3.899	0.0001
AGE	1	3.842280	0.42408913	9.060	0.0001

Model: MODEL Agricultural Work Experience in Mexico = Age
Dependent Variable: Agricultural Work Experience in Mexico (HOWLG)

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	353469.24488	353469.24488	25.869	0.0001
Error	71	970130.64553	13663.81191		
C Total	72	1323599.8904			

Root MSE	116.89231	R-square	0.2671
Dep Mean	131.12329	Adj R-sq	0.2567
C.V.	89.14687		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-53.750994	38.83799349	-1.384	0.1707
AGE	1	6.368958	1.25221391	5.086	0.0001

Model: MODEL Working with the Same Grower = Age
Dependent Variable: Working with the Same Grower (GRWRK)

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	88285.31556	88285.31556	41.895	0.0001
Error	133	280268.41777	2107.28134		
C Total	134	368553.73333			

Root MSE	45.90513	R-square	0.2395
Dep Mean	41.48889	Adj R-sq	0.2338
C.V.	110.64440		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	-24.248720	10.89760247	-2.225	0.0278
AGE	1	2.201036	0.34005109	6.473	0.0001

3. Principal component for Education (educ), reading in Spanish (readsp) and writing in Spanish (writesp) , reading in English (readng) writing in English (writeng):

Principal Component Analysis

107 Observations
5 Variables

Simple Statistics

	EDUC	READSP	WRITESP	READENG	WRITENG
Mean	5.485981308	2.943925234	2.794392523	1.373831776	1.308411215
StD	2.918271930	0.959872001	0.908433420	0.733605267	0.678667048

Correlation Matrix

	EDUC	READSP	WRITESP	READENG	WRITENG
EDUC	1.0000	0.4679	0.4758	0.5665	0.5476
READSP	0.4679	1.0000	0.7873	0.3114	0.2730
WRITESP	0.4758	0.7873	1.0000	0.2297	0.2415
READENG	0.5665	0.3114	0.2297	1.0000	0.8653
WRITENG	0.5476	0.2730	0.2415	0.8653	1.0000

Eigenvalues of the Correlation Matrix

	Eigenvalue	Difference	Proportion	Cumulative
PRIN1	2.91264	1.61260	0.582529	0.58253
PRIN2	1.30004	0.85533	0.260009	0.84254
PRIN3	0.44472	0.22839	0.088944	0.93148
PRIN4	0.21633	0.09007	0.043266	0.97475
PRIN5	0.12626	.	0.025253	1.00000

Eigenvectors

	PRIN1	PRIN2	PRIN3	PRIN4	PRIN5
EDUC	0.474785	-.034868	-.874637	-.080734	0.043075
READSP	0.425119	0.510351	0.281692	-.659509	0.210981
WRITESP	0.407045	0.557946	0.125521	0.680056	-.211610
READENG	0.466362	-.456757	0.252593	-.167085	-.694376
WRITENG	0.458992	-.467327	0.275864	0.261028	0.653219

4. Principal Component for Agricultural Experience (AGWRK) and Age:

Principal Component Analysis

145 Observations
2 Variables

Simple Statistics

	AGE	AGWRK
Mean	30.49655172	62.99537931
StD	12.01626452	76.45394065

Correlation Matrix

	AGE	AGWRK
AGE	1.0000	0.6039
AGWRK	0.6039	1.0000

Eigenvalues of the Correlation Matrix

	Eigenvalue	Difference	Proportion	Cumulative
PRIN1	1.60389	1.20778	0.801946	0.80195
PRIN2	0.39611	.	0.198054	1.00000

Eigenvectors

	PRIN1	PRIN2
AGE	0.707107	0.707107
AGWRK	0.707107	-.707107

5. Multiple Regression Models Primary Analysis (Pesticide Knowledge).

Being told when pesticides are sprayed in the fields (Told)

1 = Yes
2 = No

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2
TOLD	2	1 2

Number of observations in data set = 152

NOTE: Due to missing values, only 144 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	199.90606399	66.63535466	15.80	0.0001
Error	140	590.25365824	4.21609756		
Corrected Total	143	790.15972222			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.252995	13.75883	2.05331380	14.92361111

Source	DF	Type I SS	Mean Square	F Value	Pr > F
PREKN1	1	21.67902222	21.67902222	5.14	0.0249
TRAINEDP	1	156.79756685	156.79756685	37.19	0.0001
TOLD	1	21.42947491	21.42947491	5.08	0.0257

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	28.97767293	28.97767293	6.87	0.0097
TRAINEDP	1	156.86967446	156.86967446	37.21	0.0001
TOLD	1	21.42947491	21.42947491	5.08	0.0257

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		11.06210704 B	11.55	0.0001	0.95776322
PREKN1		0.18527071	2.62	0.0097	0.07066923
TRAINEDP	1	2.09055755 B	6.10	0.0001	0.34272671
	2	0.00000000 B	.	.	.
TOLD	1	0.79137090 B	2.25	0.0257	0.35101820
	2	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| H0: LSMEAN1=LSMEAN2
1	15.8809598	0.0001
2	13.7904022	.

<u>Taking a shower after working in the fields (show)</u>

Yes = 1
No = 2

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2
SHOW	2	0 1

Number of observations in data set = 152

NOTE: Due to missing values, only 149 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	220.62806303	73.54268768	15.86	0.0001
Error	145	672.43233965	4.63746441		
Corrected Total	148	893.06040268			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.247047	14.46655	2.15347728	14.88590604

Source	DF	Type I SS	Mean Square	F Value	Pr > F
PREKN1	1	40.98468082	40.98468082	8.84	0.0035
TRAINEDP	1	176.53715986	176.53715986	38.07	0.0001
SHOW	1	3.10622234	3.10622234	0.67	0.4145

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	42.07811983	42.07811983	9.07	0.0031
TRAINEDP	1	176.41264464	176.41264464	38.04	0.0001
SHOW	1	3.10622234	3.10622234	0.67	0.4145

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		11.05400189 B	11.69	0.0001	0.94597545
PREKN1		0.21773156	3.01	0.0031	0.07228256
TRAINEDP	1	2.17677791 B	6.17	0.0001	0.35293080
	2	0.00000000 B	.	.	.
SHOW	0	-1.25516952 B	-0.82	0.4145	1.53365053
	1	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| H0: LSMEAN1=LSMEAN2
1	15.3416443	0.0001
2	13.1648664	

Home Country (homecty)

Mexico = 1
United States = 2

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2
HOMECTY	2	1 2

Number of observations in data set = 152

NOTE: Due to missing values, only 151 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	231.54931609	77.18310536	17.02	0.0001
Error	147	666.53015411	4.53421874		
Corrected Total	150	898.07947020			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.257827	14.32865	2.12937050	14.86092715

Source	DF	Type I SS	Mean Square	F Value	Pr > F
PREKN1	1	37.44367657	37.44367657	8.26	0.0047
TRAINEDP	1	179.23780656	179.23780656	39.53	0.0001
HOMECTY	1	14.86783295	14.86783295	3.28	0.0722

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	47.18100119	47.18100119	10.41	0.0015
TRAINEDP	1	191.24622783	191.24622783	42.18	0.0001
HOMECTY	1	14.86783295	14.86783295	3.28	0.0722

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		9.970714924 B	8.92	0.0001	1.11821750
PREKN1		0.232101260	3.23	0.0015	0.07195238
TRAINEDP	1	2.279882944 B	6.49	0.0001	0.35104868
	2	0.000000000 B	.	.	.
HOMECTY	1	0.947775176 B	1.81	0.0722	0.52339880
	2	0.000000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| H0: LSMEAN1=LSMEAN2
1	15.6449649	0.0001
2	13.3650819	

Number of beer drink per week (BEERWK)

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post test Score in Pesticide Knowledge
Prekn1 = Pre test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2

Number of observations in data set = 152

NOTE: Due to missing values, only 80 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	73.14922986	24.38307662	8.79	0.0001
Error	76	210.85077014	2.77435224		
Corrected Total	79	284.00000000			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.257568	11.10426	1.66563869	15.00000000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
PREKN1	1	2.95532413	2.95532413	1.07	0.3053
TRAINEDP	1	55.81458325	55.81458325	20.12	0.0001
BEERWK	1	14.37932247	14.37932247	5.18	0.0256

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	13.01506391	13.01506391	4.69	0.0335
TRAINEDP	1	60.68718489	60.68718489	21.87	0.0001
BEERWK	1	14.37932247	14.37932247	5.18	0.0256

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		12.01543644 B	9.96	0.0001	1.20592556
PREKN1		0.19317742	2.17	0.0335	0.08918956
TRAINEDP	1	1.79103969 B	4.68	0.0001	0.38294598
	2	0.00000000 B	.	.	.
BEERWK		-0.06182497	-2.28	0.0256	0.02715661

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| H0: LSMEAN1=LSMEAN2
1	15.8731318	0.0001
2	14.0820922	

Principal Component Variable for the three categories of Health Locus of Control (pcloc1)

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2

Number of observations in data set = 152

NOTE: Due to missing values, only 139 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	201.54136696	67.18045565	13.99	0.0001
Error	135	648.28597117	4.80211830		
Corrected Total	138	849.82733813			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.237156	14.75780	2.19137361	14.84892086

Source	DF	Type I SS	Mean Square	F Value	Pr > F

PREKN1	1	32.00771154	32.00771154	6.67	0.0109
TRAINEDP	1	168.30496922	168.30496922	35.05	0.0001
PCLOC1	1	1.22868620	1.22868620	0.26	0.6138

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	40.29096444	40.29096444	8.39	0.0044
TRAINEDP	1	169.27565392	169.27565392	35.25	0.0001
PCLOC1	1	1.22868620	1.22868620	0.26	0.6138

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		11.57715316 B	6.36	0.0001	1.82044043
PREKN1		0.22987870	2.90	0.0044	0.07936177
TRAINEDP	1	2.21411677 B	5.94	0.0001	0.37292346
	2	0.00000000 B	.	.	.
PCLOC1		-0.01784966	-0.51	0.6138	0.03528792

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| H0: LSMEAN1=LSMEAN2
1	15.9798726	0.0001
2	13.7657558	

Internal Health Locus of Control Pre-test score (HLCE1)

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2

Number of observations in data set = 152
NOTE: Due to missing values, only 148 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	223.04115549	74.34705183	15.82	0.0001
Error	144	676.76965533	4.69978927		
Corrected Total	147	899.81081081			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.247876	14.57081	2.16789974	14.87837838

Source	DF	Type I SS	Mean Square	F Value	Pr > F
PREKN1	1	37.40961597	37.40961597	7.96	0.0055
TRAINEDP	1	185.18478478	185.18478478	39.40	0.0001
HLCE1	1	0.44675474	0.44675474	0.10	0.7583

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	39.26970788	39.26970788	8.36	0.0044
TRAINEDP	1	174.67217148	174.67217148	37.17	0.0001
HLCE1	1	0.44675474	0.44675474	0.10	0.7583

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		11.38563534 B	8.12	0.0001	1.40240044
PREKN1		0.21920714	2.89	0.0044	0.07583419
TRAINEDP	1	2.21585106 B	6.10	0.0001	0.36346944
	2	0.00000000 B	.	.	.
HLCE1		-0.01682624	-0.31	0.7583	0.05457473

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| H0: LSMEAN1=LSMEAN2
1	15.9713319	0.0001
2	13.7554809	

Powerful Others Health Locus of Control Pre test score(HLCT1)

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2

Number of observations in data set = 152

NOTE: Due to missing values, only 148 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	219.93196173	73.31065391	15.72	0.0001
Error	144	671.49371395	4.66315079		
Corrected Total	147	891.42567568			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.246719	14.54693	2.15943298	14.84459459

Source	DF	Type I SS	Mean Square	F Value	Pr > F
PREKN1	1	44.04151425	44.04151425	9.44	0.0025
TRAINEDP	1	175.87714107	175.87714107	37.72	0.0001
HLCT1	1	0.01330640	0.01330640	0.00	0.9575

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	45.37823155	45.37823155	9.73	0.0022
TRAINEDP	1	175.54334455	175.54334455	37.64	0.0001
HLCT1	1	0.01330640	0.01330640	0.00	0.9575

Parameter		Estimate	T for HO: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		10.95167707 B	6.45	0.0001	1.69698556
PREKN1		0.22931518	3.12	0.0022	0.07351040
TRAINEDP	1	2.18151163 B	6.14	0.0001	0.35555360
	2	0.00000000 B	.	.	.
HLCT1		-0.00283962	-0.05	0.9575	0.05315813

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| HO: LSMEAN1=LSMEAN2
1	15.9500904	0.0001
2	13.7685787	

Chance Health Locus of Control Pre-test score (HLCL1)

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2

Number of observations in data set = 152

NOTE: Due to missing values, only 145 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	203.18817956	67.72939319	14.56	0.0001
Error	141	656.05319976	4.65285957		
Corrected Total	144	859.24137931			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.236474	14.51379	2.15704881	14.86206897

Source	DF	Type I SS	Mean Square	F Value	Pr > F
PREKN1	1	30.98372698	30.98372698	6.66	0.0109
TRAINEDP	1	169.05744959	169.05744959	36.33	0.0001
HLCL1	1	3.14700299	3.14700299	0.68	0.4122

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	33.90880291	33.90880291	7.29	0.0078
TRAINEDP	1	171.99210819	171.99210819	36.96	0.0001
HLCL1	1	3.14700299	3.14700299	0.68	0.4122

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		11.67838998 B	8.27	0.0001	1.41233503
PREKN1		0.21463266	2.70	0.0078	0.07950594
TRAINEDP	1	2.19347106 B	6.08	0.0001	0.36077599
	2	0.00000000 B	.	.	.
HLCL1		-0.02966073	-0.82	0.4122	0.03606561

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| H0: LSMEAN1=LSMEAN2
1	15.9512408	0.0001
2	13.7577697	

Safety Risk Perception Pre-test score(SRPA1)

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2

Number of observations in data set = 152

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	231.34112416	77.11370805	17.00	0.0001
Error	148	671.28387584	4.53570186		
Corrected Total	151	902.62500000			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.256298	14.31744	2.12971873	14.87500000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
PREKN1	1	36.92536963	36.92536963	8.14	0.0049
TRAINEDP	1	182.92696738	182.92696738	40.33	0.0001
SRPA1	1	11.48878715	11.48878715	2.53	0.1136

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	29.31558577	29.31558577	6.46	0.0120
TRAINEDP	1	181.59633036	181.59633036	40.04	0.0001
SRPA1	1	11.48878715	11.48878715	2.53	0.1136

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		12.45535529 B	9.87	0.0001	1.26137883
PREKN1		0.18555122	2.54	0.0120	0.07298553
TRAINEDP	1	2.18687712 B	6.33	0.0001	0.34561541
	2	0.00000000 B	.	.	.
SRPA1		-0.41433664	-1.59	0.1136	0.26033856

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| H0: LSMEAN1=LSMEAN2
1	15.9540512	0.0001
2	13.7671741	

Principal Component Variable for Literacy (lit2)

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

General Linear Models Procedure
Class Level Information

Class	Levels	Values
TRAINEDP	2	1 2

Number of observations in data set = 152

NOTE: Due to missing values, only 107 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: POSKN2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	169.84471247	56.61490416	12.00	0.0001
Error	103	485.76276417	4.71614334		
Corrected Total	106	655.60747664			

R-Square	C.V.	Root MSE	POSKN2 Mean
0.259065	14.33489	2.17166833	15.14953271

Source	DF	Type I SS	Mean Square	F Value	Pr > F
PREKN1	1	22.05602918	22.05602918	4.68	0.0329
TRAINEDP	1	102.81342280	102.81342280	21.80	0.0001
LIT2	1	44.97526048	44.97526048	9.54	0.0026

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PREKN1	1	18.99508770	18.99508770	4.03	0.0474
TRAINEDP	1	63.79067580	63.79067580	13.53	0.0004
LIT2	1	44.97526048	44.97526048	9.54	0.0026

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		10.09641744 B	7.55	0.0001	1.33812336
PREKN1		0.18870439	2.01	0.0474	0.09402749
TRAINEDP	1	1.61222922 B	3.68	0.0004	0.43837087
	2	0.00000000 B	.	.	.
LIT2		0.64171970	3.09	0.0026	0.20780310

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

TRAINEDP	POSKN2 LSMEAN	Pr > |T| H0: LSMEAN1=LSMEAN2
1	15.8727757	0.0004
2	14.2605465	

6. Age Group as a Predictor of Health Locus of Control

Model: MODEL Internal Health Locus of Control(HLCE)= Age

Dependent Variable: HLCE1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	0.21163	0.21163	0.017	0.8957
Error	146	1790.22080	12.26179		
C Total	147	1790.43243			

Root MSE	3.50168	R-square	0.0001
Dep Mean	23.32432	Adj R-sq	-0.0067
C.V.	15.01301		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	23.421528	0.79390162	29.502	0.0001
AGE	1	-0.003179	0.02419956	-0.131	0.8957

Model: MODEL1 Chance Health Locus of Control(HLCL)= Age

Dependent Variable: HLCT1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	158.52779	158.52779	15.509	0.0001
Error	145	1482.17969	10.22193		
C Total	146	1640.70748			

Root MSE	3.19718	R-square	0.0966
Dep Mean	26.14966	Adj R-sq	0.0904
C.V.	12.22645		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	23.453790	0.73359519	31.971	0.0001
AGE	1	0.088696	0.02252251	3.938	0.0001

Model: Powerful Others Health Locus of Control(HLCT)= Age

Dependent Variable: HLCL1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	151.64920	151.64920	5.945	0.0160
Error	143	3647.68873	25.50831		
C Total	144	3799.33793			

Root MSE	5.05058	R-square	0.0399
Dep Mean	21.42069	Adj R-sq	0.0332
C.V.	23.57802		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	18.768524	1.16579504	16.099	0.0001
AGE	1	0.086013	0.03527645	2.438	0.0160

7. Health Locus of Control as a predictor of pesticide knowledge scores

Internal Health Locus of Control (HLCE)

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post-test Score in Pesticide Knowledge
Prekn1 = Pre-test Score in Pesticide Knowledge

Model: MODEL Pesticide Knowledge Post-test score= Pesticide Knowledge Pre-test score + Group Status + Internal Health Locus of Control

Dependent Variable: POSKN2

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	3	223.04116	74.34705	15.819	0.0001
Error	144	676.76966	4.69979		
C Total	147	899.81081			

Root MSE	2.16790	R-square	0.2479
Dep Mean	14.87838	Adj R-sq	0.2322
C.V.	14.57081		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	15.817337	1.38677242	11.406	0.0001
PREKN1	1	0.219207	0.07583419	2.891	0.0044
HLCE1	1	-0.016826	0.05457473	-0.308	0.7583
TRAINEDP	1	-2.215851	0.36346944	-6.096	0.0001

Powerful Others Health Locus of Control (HLCT)

Experimental Group = 1 (trainedp)

Control Group = 2 (trainedp)

Poskn2 = Post-test Score in Pesticide Knowledge

Prekn1 = Pre-test Score in Pesticide Knowledge

Model: MODEL Pesticide Knowledge Post-test score= Pesticide Knowledge Pre-test score + Group Status + Powerful Others Health Locus of Control

Dependent Variable: POSKN2

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	3	219.93196	73.31065	15.721	0.0001
Error	144	671.49371	4.66315		
C Total	147	891.42568			

Root MSE	2.15943	R-square	0.2467
Dep Mean	14.84459	Adj R-sq	0.2310
C.V.	14.54693		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	15.314700	1.79780850	8.519	0.0001
PREKN1	1	0.229315	0.07351040	3.119	0.0022
HLCT1	1	-0.002840	0.05315813	-0.053	0.9575
TRAINEDP	1	-2.181512	0.35555360	-6.136	0.0001

Chance Health Locus of Control (HLCL)

Experimental Group = 1 (trainedp)
Control Group = 2 (trainedp)
Poskn2 = Post test Score in Pesticide Knowledge
Prekn1 = Pre test Score in Pesticide Knowledge

Model: MODEL Pesticide Knowledge Post-test score= Pesticide Knowledge Pre-test score + Group Status + Chance Health Locus of Control

Dependent Variable: POSKN2

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	3	203.18818	67.72939	14.557	0.0001
Error	141	656.05320	4.65286		
C Total	144	859.24138			

Root MSE	2.15705	R-square	0.2365
Dep Mean	14.86207	Adj R-sq	0.2202
C.V.	14.51379		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	16.065332	1.51975742	10.571	0.0001
PREKN1	1	0.214633	0.07950594	2.700	0.0078
HLCL1	1	-0.029661	0.03606561	-0.822	0.4122
TRAINEDP	1	-2.193471	0.36077599	-6.080	0.0001

8. Health Locus of Control Correlation Analysis

Correlation Analysis

10 'VAR' Variables: HLCE1 HLCE2 HLCL1 HLCL2 HLCT1 HLCT2 SRPA1 SRPA2 PREKN1 POSKN2

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
HLCE1	148	23.324324	3.489959	3452.000000	13.000000	30.000000
HLCE2	151	22.993377	4.285630	3472.000000	11.000000	30.000000
HLCL1	145	21.420690	5.136564	3106.000000	8.000000	30.000000
HLCL2	150	22.133333	5.195076	3320.000000	9.000000	30.000000
HLCT1	148	26.175676	3.355808	3874.000000	11.000000	30.000000
HLCT2	150	26.426667	2.927185	3964.000000	18.000000	30.000000
SRPA1	152	2.467125	0.683214	375.002991	0	3.923077
SRPA2	152	2.309433	0.517624	351.033800	1.076923	3.769231
PREKN1	152	12.578947	2.437365	1912.000000	5.000000	17.000000
POSKN2	152	14.875000	2.444923	2261.000000	7.000000	20.000000

Correlation Analysis

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / Number of Observations

	HLCE1	HLCE2	HLCL1	HLCL2	HLCT1
HLCE1	1.00000 0.0 148	0.43040 0.0001 147	0.19646 0.0191 142	0.17242 0.0368 147	0.22969 0.0056 144
HLCE2	0.43040 0.0001 147	1.00000 0.0 151	0.28375 0.0005 145	0.29777 0.0002 149	0.23021 0.0049 148
HLCL1	0.19646 0.0191 142	0.28375 0.0005 145	1.00000 0.0 145	0.51869 0.0001 143	0.48936 0.0001 142
HLCL2	0.17242 0.0368 147	0.29777 0.0002 149	0.51869 0.0001 143	1.00000 0.0 150	0.24992 0.0023 147
HLCT1	0.22969 0.0056 144	0.23021 0.0049 148	0.48936 0.0001 142	0.24992 0.0023 147	1.00000 0.0 148
HLCT2	0.15427 0.0630 146	0.49898 0.0001 149	0.30666 0.0002 144	0.35181 0.0001 148	0.47582 0.0001 146
SRPA1	-0.16329 0.0474 148	-0.01857 0.8209 151	-0.11634 0.1634 145	-0.06252 0.4472 150	-0.13973 0.0903 148
SRPA2	-0.20904 0.0108 148	-0.13902 0.0887 151	-0.30553 0.0002 145	-0.20491 0.0119 150	-0.33918 0.0001 148
PREKN1	0.28948 0.0004 148	0.02565 0.7545 151	-0.22118 0.0075 145	-0.16895 0.0388 150	-0.01824 0.8258 148
POSKN2	-0.04661 0.5737 148	-0.13804 0.0910 151	-0.05733 0.4934 145	-0.08917 0.2779 150	0.01567 0.8500 148

Correlation Analysis

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / Number of Observations

	HLCT2	SRPA1	SRPA2	PREKN1	POSKN2
HLCE1	0.15427 0.0630 146	-0.16329 0.0474 148	-0.20904 0.0108 148	0.28948 0.0004 148	-0.04661 0.5737 148
HLCE2	0.49898 0.0001 149	-0.01857 0.8209 151	-0.13902 0.0887 151	0.02565 0.7545 151	-0.13804 0.0910 151
HLCL1	0.30666 0.0002 144	-0.11634 0.1634 145	-0.30553 0.0002 145	-0.22118 0.0075 145	-0.05733 0.4934 145
HLCL2	0.35181 0.0001 148	-0.06252 0.4472 150	-0.20491 0.0119 150	-0.16895 0.0388 150	-0.08917 0.2779 150
HLCT1	0.47582 0.0001 146	-0.13973 0.0903 148	-0.33918 0.0001 148	-0.01824 0.8258 148	0.01567 0.8500 148
HLCT2	1.00000 0.0 150	0.09331 0.2561 150	-0.14392 0.0789 150	-0.04151 0.6140 150	-0.00486 0.9529 150
SRPA1	0.09331 0.2561 150	1.00000 0.0 152	0.58212 0.0001 152	-0.22438 0.0055 152	-0.16152 0.0468 152
SRPA2	-0.14392 0.0789 150	0.58212 0.0001 152	1.00000 0.0 152	-0.17487 0.0312 152	-0.26221 0.0011 152
PREKN1	-0.04151 0.6140 150	-0.22438 0.0055 152	-0.17487 0.0312 152	1.00000 0.0 152	0.20226 0.0125 152
POSKN2	-0.00486 0.9529 150	-0.16152 0.0468 152	-0.26221 0.0011 152	0.20226 0.0125 152	1.00000 0.0 15

9. Logistic Regression Models for Improvement in Stages of Behavior

Wearing Long Sleeve Shirt

1 = Move up Stage
0 = No Change

Agricultural Work Experience (AGWRK) time in months.

The LOGISTIC Procedure

Data Set: A.NEW
Response Variable: Wearing Long Sleeve Shirt (SLV1)
Response Levels: 2
Number of Observations: 90
Link Function: Logit

Response Profile

Ordered Value	SLV1	Count
1	1	23
2	0	67

WARNING: 62 observation(s) were deleted due to missing values for the response or explanatory variables.

Model Fitting Information and Testing Global Null Hypothesis BETA=0

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	104.304	99.738	.
SC	106.804	104.738	.
-2 LOG L	102.304	95.738	6.566 with 1 DF (p=0.0104)
Score	.	.	5.361 with 1 DF (p=0.0206)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-0.4430	0.3388	1.7104	0.1909	.	.
AGWRK	1	-0.00985	0.00449	4.8022	0.0284	-0.438986	0.990

Association of Predicted Probabilities and Observed Responses

Concordant	= 63.6%	Somers' D	= 0.318
Discordant	= 31.8%	Gamma	= 0.333
Tied	= 4.6%	Tau-a	= 0.122
(1541 pairs)		c	= 0.659

The LOGISTIC Procedure

Wearing Long Pants

1 = Move up Stage
0 = No Change

Group Experimental (trainedp) = 1
Control (trainedp) = 2

Action Stage in Wearing Long Pants(LP1)
Yes= 1
No = 0

Data Set: A.NEW
Response Variable: PAN1
Response Levels: 2
Number of Observations: 103
Link Function: Logit

Response Profile

Ordered Value	PAN1	Count
1	1	12
2	0	91

WARNING: 49 observation(s) were deleted due to missing values for the response or explanatory variables.

Model Fitting Information and Testing Global Null Hypothesis BETA=0

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	76.140	59.357	.
SC	78.775	67.261	.
-2 LOG L	74.140	53.357	20.783 with 2 DF (p=0.0001)
Score	.	.	23.121 with 2 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	0.9743	1.3091	0.5538	0.4568	.	.
TRAINEDP	1	-2.8147	1.1646	5.8410	0.0157	-0.779671	0.060
LP1	1	3.6230	1.1455	10.0039	0.0016	0.594288	37.448

Association of Predicted Probabilities and Observed Responses

Concordant	= 65.4%	Somers' D	= 0.583
Discordant	= 7.1%	Gamma	= 0.805
Tied	= 27.6%	Tau-a	= 0.121
(1092 pairs)		c	= 0.792

The LOGISTIC Procedure

Washing Hands before eating or using the Portable Potty while working in the fields (POTTY1):

1 = Move up Stage

0 = No Change

Safety Risk Perception Score (from 1 to 5)

Data Set: A.NEW
Response Variable: POTTY1
Response Levels: 2
Number of Observations: 62
Link Function: Logit

Response Profile

Ordered Value	POTTY1	Count
1	1	13
2	0	49

WARNING: 90 observation(s) were deleted due to missing values for the response or explanatory variables.

Model Fitting Information and Testing Global Null Hypothesis BETA=0

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	65.678	59.931	.
SC	67.805	64.185	.
-2 LOG L	63.678	55.931	7.746 with 1 DF (p=0.0054)
Score	.	.	7.052 with 1 DF (p=0.0079)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-4.7558	1.4758	10.3842	0.0013	.	.
SRPA1	1	1.3450	0.5341	6.3428	0.0118	0.546364	3.838

Association of Predicted Probabilities and Observed Responses

Concordant	= 68.8%	Somers' D	= 0.399
Discordant	= 28.9%	Gamma	= 0.408
Tied	= 2.4%	Tau-a	= 0.134
(637 pairs)		c	= 0.699

The LOGISTIC Procedure

Separating Clothes before washing them while working in the fields (SEPAR1):

1 = Move up Stage
0 = No Change

Principal Component Health Locus of Control (PCLOC1)
Safety Risk Perception Score (pretest=1) form 1 to 5.

Data Set: A.NEW
Response Variable: SEPAR1
Response Levels: 2
Number of Observations: 109
Link Function: Logit

Response Profile

Ordered Value	SEPAR1	Count
1	1	25
2	0	84

WARNING: 43 observation(s) were deleted due to missing values for the response or explanatory variables.

Model Fitting Information and Testing Global Null Hypothesis BETA=0

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	119.393	110.280	.
SC	122.084	121.045	.
-2 LOG L	117.393	102.280	15.113 with 3 DF (p=0.0017)
Score	.	.	13.219 with 3 DF (p=0.0042)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-11.2528	3.1335	12.8963	0.0003	.	.
TRAINEDP	1	1.3481	0.5495	6.0198	0.0141	0.372581	3.850
PCLOC1	1	0.1371	0.0525	6.8129	0.0090	0.401097	1.147
SRPA1	1	0.8404	0.3775	4.9576	0.0260	0.314430	2.317

Association of Predicted Probabilities and Observed Responses

Concordant	= 75.0%	Somers' D	= 0.502
Discordant	= 24.8%	Gamma	= 0.503
Tied	= 0.3%	Tau-a	= 0.179
(2100 pairs)		c	= 0.751

The LOGISTIC Procedure

Separating Clothes before washing them while working in the fields (SEPAR1):

1 = Move up Stage
0 = No Change

Internal Health Locus of Control (HLCE1)
Powerful Others Health Locus of Control (HLCT1)
Chance Health Locus of Control (HLCL1)
Safety Risk Perception Score (pretest=1) form 1 to 5.

Data Set: A.NEW
Response Variable: SEPAR1
Response Levels: 2
Number of Observations: 104
Link Function: Logit

Response Profile

Ordered Value	SEPAR1	Count
1	1	23
2	0	81

WARNING: 48 observation(s) were deleted due to missing values for the response or explanatory variables.

Model Fitting Information and Testing Global Null Hypothesis BETA=0

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	111.900	76.517	.
SC	114.544	92.384	.
-2 LOG L	109.900	64.517	45.383 with 5 DF (p=0.0001)
Score	.	.	30.632 with 5 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-2.8795	3.3130	0.7555	0.3848	.	.
TRAINEDP	1	0.8828	0.7135	1.5305	0.2160	0.243392	2.418
HLCE1	1	0.5251	0.1821	8.3125	0.0039	1.038671	1.691
HLCL1	1	0.3089	0.1051	8.6327	0.0033	0.907059	1.362
HLCT1	1	-0.6755	0.2186	9.5511	0.0020	-1.024162	0.509
LIFE1	1	-0.0386	0.0148	6.8271	0.0090	-1.226776	0.962

The LOGISTIC Procedure

Association of Predicted Probabilities and Observed Responses

Concordant	= 89.5%	Somers' D	= 0.790
Discordant	= 10.5%	Gamma	= 0.791
Tied	= 0.1%	Tau-a	= 0.275
(1863 pairs)		c	= 0.895

10. Logistic Regression Models for Termination Stage(3)

Wearing Long Sleeve Shirt Termination Stage (Stages2)
Termination Stage in Pretest Wearing Long Sleeve Shirt = LS3
Group

Experimental (trainedp) = 1
Control (trainedp) = 2

CATMOD PROCEDURE

Response: STAGES2		Response Levels (R)=	4
Weight Variable: None		Populations (S)=	4
Data Set: NEW		Total Frequency (N)=	152
Frequency Missing: 0		Observations (Obs)=	152

RESPONSE PROFILES

Response	STAGES2
1	0
2	1
3	2
4	3

MAXIMUM-LIKELIHOOD ANALYSIS-OF-VARIANCE TABLE

Source	DF	Chi-Square	Prob
INTERCEPT	3	57.38	0.0000
TRAINEDP	3	10.24	0.0166
LS3	3	14.53	0.0023
LIKELIHOOD RATIO	3	3.28	0.3500

ANALYSIS OF MAXIMUM-LIKELIHOOD ESTIMATES

Effect	Parameter	Estimate	Standard Error	Chi-Square	Prob
INTERCEPT	1	-0.8798	0.2217	15.75	0.0001
	2	-2.1894	0.4160	27.70	0.0000
	3	-1.5505	0.2802	30.61	0.0000
TRAINEDP	4	-0.5232	0.2114	6.13	0.0133
	5	-0.6489	0.3307	3.85	0.0497
	6	-0.6123	0.2772	4.88	0.0272
LS3	7	0.6986	0.2202	10.07	0.0015
	8	1.0308	0.4041	6.51	0.0107
	9	0.4059	0.2717	2.23	0.1352

Wearing Long Pants Termination Stage (Stagep2)
Termination Stage in Pretest Wearing Long Pants = LP3
Action Stage in Wearing Long Pants (LP1): 1 = yes; 0 = No
Maintenance Stage in wearing Long Pants(LP2): 1 = yes; 0 = No

```
Response: STAGEP2                      Response Levels (R)=     4
Weight Variable: None                  Populations     (S)=     4
Data Set: NEW                          Total Frequency (N)=   152
Frequency Missing: 0                   Observations  (Obs)=   152
```

RESPONSE PROFILES

Response	STAGEP2
1	3
2	0
3	1
4	2

MAXIMUM-LIKELIHOOD ANALYSIS-OF-VARIANCE TABLE

Source	DF	Chi-Square	Prob
INTERCEPT	3	214.80	0.0000
LP2	1*	.	.
LP1	2*	.	.
LP3	2*	.	.
LIKELIHOOD RATIO	4	0.00	1.0000

NOTE: Effects marked with '*' contain one or more redundant or restricted parameters.

ANALYSIS OF MAXIMUM-LIKELIHOOD ESTIMATES

Effect	Parameter	Estimate	Standard Error	Chi-Square	Prob
INTERCEPT	1	9.9484	1.0996	81.85	0.0000
	2	3.2680	0.8792	13.82	0.0002
	3	9.2476	0.8658	114.09	0.0000
LP2	4	-1.7220	0.7369	5.46	0.0195
	5	3.2885 #	.	.	.
	6	-2.5127 #	.	.	.
LP1	7	-1.2137	0.5978	4.12	0.0423
	8	-1.7140	0.6892	6.19	0.0129
	9	-2.9774 #	.	.	.
LP3	10	-3.3359	0.5682	34.47	0.0000
	11	-3.5892	0.6309	32.37	0.0000
	12	-3.0636 #	.	.	.

NOTE: Parameters marked with '#' are regarded to be infinite.

Washing hands before eating and before using the portable potty Termination Stage (Stagewh2)

Principal Component of Age and Agricultural Experience(LIFE1)

Response: STAGEWH2		Response Levels (R)=	4
Weight Variable: None		Populations (S)=	88
Data Set: NEW		Total Frequency (N)=	145
Frequency Missing: 7		Observations (Obs)=	145

RESPONSE PROFILES

Response	STAGEWH2
1	0
2	1
3	2
4	3

MAXIMUM-LIKELIHOOD ANALYSIS-OF-VARIANCE TABLE

Source	DF	Chi-Square	Prob
INTERCEPT	3	13.55	0.0036
LIFE1	3	9.62	0.0221
LIKELIHOOD RATIO	258	223.32	0.9419

ANALYSIS OF MAXIMUM-LIKELIHOOD ESTIMATES

Effect	Parameter	Estimate	Standard Error	Chi-Square	Prob
INTERCEPT	1	0.6961	0.2971	5.49	0.0191
	2	-0.5740	0.4453	1.66	0.1974
	3	-0.4567	0.5013	0.83	0.3622
LIFE1	4	-0.00855	0.00340	6.30	0.0120
	5	-0.00979	0.00589	2.76	0.0965
	6	-0.0166	0.00849	3.85	0.0498

Separating clothes before washing them Termination Stage (STAGECL2)
Principal Component of Health Locus of Control Categories (PCLOC1)
Termination Stage in Separating clothes before washing them(CL3):
1 = yes;
0 = No

```
Response: STAGECL2                    Response Levels (R)=      4
Weight Variable: None                 Populations     (S)=    130
Data Set: NEW                         Total Frequency (N)=    139
Frequency Missing: 13                 Observations  (Obs)=    139
```

RESPONSE PROFILES

Response	STAGECL2
1	0
2	1
3	2
4	3

MAXIMUM-LIKELIHOOD ANALYSIS-OF-VARIANCE TABLE

Source	DF	Chi-Square	Prob
INTERCEPT	3	7.99	0.0463
PCLOC1	3	12.23	0.0066
CL3	3	13.91	0.0030
LIKELIHOOD RATIO	381	231.28	1.0000

ANALYSIS OF MAXIMUM-LIKELIHOOD ESTIMATES

Effect	Parameter	Estimate	Standard Error	Chi-Square	Prob
INTERCEPT	1	5.4889	2.3241	5.58	0.0182
	2	5.4789	2.9891	3.36	0.0668
	3	-0.7256	2.3033	0.10	0.7527
PCLOC1	4	-0.1808	0.0608	8.83	0.0030
	5	-0.1983	0.0795	6.22	0.0126
	6	-0.0243	0.0560	0.19	0.6640
CL3	7	0.7979	0.2837	7.91	0.0049
	8	0.8394	0.3746	5.02	0.0250
	9	0.6541	0.2816	5.40	0.0202

11. Safety Risk Perception and Health Locus of Control

General Linear Models Procedure
Class Level Information

Class	Levels	Values
SHIRT1	4	0 1 2 3

Number of observations in data set = 152

Wearing Long Sleeve Shirt (SHIRT1)

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Internal Health Locus of Control Pre test (HLCE1)
Internal Health Locus of Control Post test (HLCE2)

NOTE: Due to missing values, only 147 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCE2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	525.22557514	131.30639378	8.64	0.0001
Error	142	2158.52952691	15.20091216		
Corrected Total	146	2683.75510204			

R-Square	C.V.	Root MSE	HLCE2 Mean
0.195705	16.98159	3.89883472	22.95918367

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCE1	1	497.15747298	497.15747298	32.71	0.0001
SHIRT1	3	28.06810216	9.35603405	0.62	0.6061

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCE1	1	501.27070366	501.27070366	32.98	0.0001
SHIRT1	3	28.06810216	9.35603405	0.62	0.6061

Parameter		Estimate		T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		10.73333284	B	4.89	0.0001	2.19708817
HLCE1		0.53285248		5.74	0.0001	0.09279096
SHIRT1	0	-0.50461202	B	-0.61	0.5408	0.82307538
	1	0.38636064	B	0.42	0.6786	0.93059491
	2	-0.98259921	B	-1.04	0.3021	0.94882089
	3	0.00000000	B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

SHIRT1	HLCE2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	22.6619454	1	.	0.3935	0.6520	0.5408
1	23.5529180	2	0.3935	.	0.2313	0.6786
2	22.1839582	3	0.6520	0.2313	.	0.3021
3	23.1665574	4	0.5408	0.6786	0.3021	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Wearing Long Pants (Pant1)

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Internal Health Locus of Control Pre test (HLCE1)
Internal Health Locus of Control Post test (HLCE2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
PANT1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 147 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCE2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	654.16401001	163.54100250	11.44	0.0001
Error	142	2029.59109203	14.29289501		
Corrected Total	146	2683.75510204			

R-Square	C.V.	Root MSE	HLCE2 Mean
0.243750	16.46659	3.78059453	22.95918367

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCE1	1	497.15747298	497.15747298	34.78	0.0001
PANT1	3	157.00653703	52.33551234	3.66	0.0140

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCE1	1	447.36319151	447.36319151	31.30	0.0001
PANT1	3	157.00653703	52.33551234	3.66	0.0140

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		11.17717694 B	5.25	0.0001	2.12723929
HLCE1		0.50204211	5.59	0.0001	0.08973671
PANT1	0	1.31279757 B	1.81	0.0731	0.72718825
	1	-2.45104691 B	-2.03	0.0445	1.20899651
	2	-1.78587968 B	-1.28	0.2031	1.39666406
	3	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

PANT1	HLCE2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	24.2042904	1	.	0.0042	0.0369	0.0731
1	20.4404459	2	0.0042	.	0.7055	0.0445
2	21.1056132	3	0.0369	0.7055	.	0.2031
3	22.8914928	4	0.0731	0.0445	0.2031	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Separating Clothes before washing them (Clothe1):

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Internal Health Locus of Control Pre test (HLCE1)
Internal Health Locus of Control Post test (HLCE2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
CLOTHE1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 147 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCE2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	533.07183765	133.26795941	8.80	0.0001
Error	142	2150.68326439	15.14565679		
Corrected Total	146	2683.75510204			

R-Square	C.V.	Root MSE	HLCE2 Mean
0.198629	16.95070	3.89174213	22.95918367

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCE1	1	497.15747298	497.15747298	32.83	0.0001
CLOTHE1	3	35.91436468	11.97145489	0.79	0.5011

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCE1	1	496.73537718	496.73537718	32.80	0.0001
CLOTHE1	3	35.91436468	11.97145489	0.79	0.5011

Parameter		Estimate		T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		10.44187959	B	4.80	0.0001	2.17681937
HLCE1		0.52864239		5.73	0.0001	0.09230888
CLOTHE1	0	-0.45944779	B	-0.45	0.6502	1.01109962
	1	1.13911602	B	1.34	0.1808	0.84701363
	2	0.21167436	B	0.19	0.8463	1.09033352
	3	0.00000000	B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

CLOTHE1	HLCE2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	22.3174209	1	.	0.1765	0.6226	0.6502
1	23.9159847	2	0.1765	.	0.4578	0.1808
2	22.9885430	3	0.6226	0.4578	.	0.8463
3	22.7768687	4	0.6502	0.1808	0.8463	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Washing Hands before eating and before using the portable potty (hand1):

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Internal Health Locus of Control Pre test (HLCE1)
Internal Health Locus of Control Post test (HLCE2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
HAND1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 147 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCE2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	507.32278062	126.83069515	8.27	0.0001
Error	142	2176.43232142	15.32698818		
Corrected Total	146	2683.75510204			

R-Square	C.V.	Root MSE	HLCE2 Mean
0.189035	17.05187	3.91496975	22.95918367

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCE1	1	497.15747298	497.15747298	32.44	0.0001
HAND1	3	10.16530764	3.38843588	0.22	0.8816

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCE1	1	474.16785111	474.16785111	30.94	0.0001
HAND1	3	10.16530764	3.38843588	0.22	0.8816

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		10.75927009 B	4.63	0.0001	2.32501098
HLCE1		0.52448352	5.56	0.0001	0.09429620
HAND1	0	0.19433326 B	0.25	0.8010	0.76961879
	1	-0.21175056 B	-0.24	0.8137	0.89683219
	2	-0.86014930 B	-0.64	0.5223	1.34112341
	3	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

HAND1	HLCE2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	23.1915522	1	.	0.6659	0.4415	0.8010
1	22.7854683	2	0.6659	.	0.6538	0.8137
2	22.1370696	3	0.4415	0.6538	.	0.5223
3	22.9972189	4	0.8010	0.8137	0.5223	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Wearing Long Sleeve Shirt (SHIRT1):

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Powerful Others Health Locus of Control Pre test (HLCT1)
Powerful Others Locus of Control Post test (HLCT2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
SHIRT1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 146 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCT2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	312.33889848	78.08472462	12.19	0.0001
Error	141	903.33233440	6.40661230		
Corrected Total	145	1215.67123288			

R-Square	C.V.	Root MSE	HLCT2 Mean
0.256927	9.578662	2.53112866	26.42465753

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCT1	1	275.23247038	275.23247038	42.96	0.0001
SHIRT1	3	37.10642810	12.36880937	1.93	0.1274

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCT1	1	291.60302100	291.60302100	45.52	0.0001
SHIRT1	3	37.10642810	12.36880937	1.93	0.1274

Parameter		Estimate		T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		14.63533159	B	8.16	0.0001	1.79369996
HLCT1		0.43913524		6.75	0.0001	0.06509033
SHIRT1	0	-0.10732158	B	-0.20	0.8446	0.54638704
	1	1.34770183	B	2.15	0.0330	0.62593075
	2	0.48066564	B	0.79	0.4311	0.60877380
	3	0.00000000	B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve
the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

SHIRT1	HLCT2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	26.0417751	1	.	0.0334	0.3859	0.8446
1	27.4967985	2	0.0334	.	0.2415	0.0330
2	26.6297623	3	0.3859	0.2415	.	0.4311
3	26.1490967	4	0.8446	0.0330	0.4311	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Wearing Long Pants (Pant1)

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Powerful Others Health Locus of Control Pre test (HLCT1)
Powerful Others Locus of Control Post test (HLCT2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
PANT1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 146 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCT2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	292.80162998	73.20040749	11.18	0.0001
Error	141	922.86960290	6.54517449		
Corrected Total	145	1215.67123288			

R-Square	C.V.	Root MSE	HLCT2 Mean
0.240856	9.681692	2.55835386	26.42465753

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCT1	1	275.23247038	275.23247038	42.05	0.0001
PANT1	3	17.56915960	5.85638653	0.89	0.4456

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCT1	1	242.67364717	242.67364717	37.08	0.0001
PANT1	3	17.56915960	5.85638653	0.89	0.4456

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		15.65557302 B	8.86	0.0001	1.76699636
HLCT1		0.40210018	6.09	0.0001	0.06603643
PANT1	0	0.80174649 B	1.60	0.1111	0.50004612
	1	0.00521375 B	0.01	0.9951	0.84822021
	2	0.41560987 B	0.44	0.6609	0.94540955
	3	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve
the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

PANT1	HLCT2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	27.0000557	1	.	0.3844	0.7001	0.1111
1	26.2035230	2	0.3844	.	0.7331	0.9951
2	26.6139191	3	0.7001	0.7331	.	0.6609
3	26.1983092	4	0.1111	0.9951	0.6609	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Separating Clothes before washing them (Clothe1):

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Powerful Others Health Locus of Control Pre test (HLCT1)
Powerful Others Locus of Control Post test (HLCT2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
CLOTHE1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 146 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCT2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	344.80633976	86.20158494	13.96	0.0001
Error	141	870.86489311	6.17634676		
Corrected Total	145	1215.67123288			

R-Square	C.V.	Root MSE	HLCT2 Mean
0.283635	9.404949	2.48522570	26.42465753

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCT1	1	275.23247038	275.23247038	44.56	0.0001
CLOTHE1	3	69.57386939	23.19128980	3.75	0.0124

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCT1	1	328.56400511	328.56400511	53.20	0.0001
CLOTHE1	3	69.57386939	23.19128980	3.75	0.0124

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		13.28601237 B	7.39	0.0001	1.79895820
HLCT1		0.47963852	7.29	0.0001	0.06576122
CLOTHE1	0	1.66470472 B	2.43	0.0165	0.68571350
	1	1.57321838 B	2.86	0.0049	0.55056758
	2	0.54474364 B	0.78	0.4371	0.69898209
	3	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

CLOTHE1	HLCT2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	27.5264448	1	.	0.9047	0.2078	0.0165
1	27.4349584	2	0.9047	.	0.1984	0.0049
2	26.4064837	3	0.2078	0.1984	.	0.4371
3	25.8617400	4	0.0165	0.0049	0.4371	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Washing Hands before eating and before using the portable potty (hand1)

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Powerful Others Health Locus of Control Pre test (HLCT1)
Powerful Others Locus of Control Post test (HLCT2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
HAND1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 146 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCT2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	292.40951934	73.10237984	11.16	0.0001
Error	141	923.26171353	6.54795542		
Corrected Total	145	1215.67123288			

R-Square	C.V.	Root MSE	HLCT2 Mean
0.240533	9.683748	2.55889730	26.42465753

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCT1	1	275.23247038	275.23247038	42.03	0.0001
HAND1	3	17.17704897	5.72568299	0.87	0.4560

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCT1	1	276.41181261	276.41181261	42.21	0.0001
HAND1	3	17.17704897	5.72568299	0.87	0.4560

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		14.54739008 B	7.80	0.0001	1.86569810
HLCT1		0.43790640	6.50	0.0001	0.06739937
HAND1	0	0.58608294 B	1.16	0.2484	0.50562278
	1	0.74880673 B	1.22	0.2226	0.61130545
	2	1.01112674 B	1.11	0.2700	0.91311659
	3	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve
the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

HAND1	HLCT2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	26.6150189	1	.	0.7927	0.6500	0.2484
1	26.7777427	2	0.7927	.	0.7920	0.2226
2	27.0400627	3	0.6500	0.7920	.	0.2700
3	26.0289359	4	0.2484	0.2226	0.2700	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Wearing Long Sleeve Shirt (SHIRT1)

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Chance Health Locus of Control Pre test (HLCL1)
Chance Others Locus of Control Post test (HLCT2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
SHIRT1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 143 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCL2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1090.84965048	272.71241262	13.53	0.0001
Error	138	2780.88461526	20.15133779		
Corrected Total	142	3871.73426573			

R-Square	C.V.	Root MSE	HLCL2 Mean
0.281747	20.28857	4.48902415	22.12587413

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCL1	1	1041.66269852	1041.66269852	51.69	0.0001
SHIRT1	3	49.18695196	16.39565065	0.81	0.4884

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCL1	1	1048.17689268	1048.17689268	52.02	0.0001
SHIRT1	3	49.18695196	16.39565065	0.81	0.4884

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		10.18355307 B	5.74	0.0001	1.77285378
HLCL1		0.53763110	7.21	0.0001	0.07454509
SHIRT1	0	1.45361140 B	1.47	0.1431	0.98698988
	1	0.64805799 B	0.60	0.5503	1.08226044
	2	0.04455964 B	0.04	0.9676	1.09386000
	3	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

SHIRT1	HLCL2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	23.1379583	1	.	0.5078	0.2473	0.1431
1	22.3324049	2	0.5078	.	0.6429	0.5503
2	21.7289066	3	0.2473	0.6429	.	0.9676
3	21.6843469	4	0.1431	0.5503	0.9676	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Wearing Long Pants (Pant1):

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Chance Health Locus of Control Pre test (HLCL1)
Chance Others Locus of Control Post test (HLCT2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
PANT1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 143 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCL2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1136.14178227	284.03544557	14.33	0.0001
Error	138	2735.59248346	19.82313394		
Corrected Total	142	3871.73426573			

R-Square	C.V.	Root MSE	HLCL2 Mean
0.293445	20.12268	4.45231782	22.12587413

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCL1	1	1041.66269852	1041.66269852	52.55	0.0001
PANT1	3	94.47908375	31.49302792	1.59	0.1949

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCL1	1	731.15395388	731.15395388	36.88	0.0001
PANT1	3	94.47908375	31.49302792	1.59	0.1949

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		11.40238330 B	6.90	0.0001	1.65363757
HLCL1		0.47454612	6.07	0.0001	0.07813762
PANT1	0	1.87229332 B	2.00	0.0473	0.93544900
	1	1.43378590 B	0.96	0.3371	1.48861449
	2	-0.22376131 B	-0.14	0.8922	1.64817440
	3	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

PANT1	HLCL2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	23.4259813	1	.	0.7901	0.2331	0.0473
1	22.9874739	2	0.7901	.	0.4361	0.3371
2	21.3299267	3	0.2331	0.4361	.	0.8922
3	21.5536880	4	0.0473	0.3371	0.8922	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Separating Clothes before washing them (Clothe1):

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Chance Health Locus of Control Pre test (HLCL1)
Chance Others Locus of Control Post test (HLCT2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
CLOTHE1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 143 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCL2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1086.13140302	271.53285075	13.45	0.0001
Error	138	2785.60286272	20.18552799		
Corrected Total	142	3871.73426573			

R-Square	C.V.	Root MSE	HLCL2 Mean
0.280528	20.30578	4.49283073	22.12587413

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCL1	1	1041.66269852	1041.66269852	51.60	0.0001
CLOTHE1	3	44.46870450	14.82290150	0.73	0.5332

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCL1	1	1086.12136698	1086.12136698	53.81	0.0001
CLOTHE1	3	44.46870450	14.82290150	0.73	0.5332

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		10.38856607 B	6.21	0.0001	1.67417637
HLCL1		0.54676300	7.34	0.0001	0.07453839
CLOTHE1	0	1.37274654 B	1.13	0.2584	1.20970749
	1	-0.10373612 B	-0.10	0.9170	0.99400546
	2	-0.97658518 B	-0.77	0.4419	1.26641902
	3	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

CLOTHE1	HLCL2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	23.4574526	1	.	0.2953	0.1502	0.2584
1	21.9809699	2	0.2953	.	0.5487	0.9170
2	21.1081208	3	0.1502	0.5487	.	0.4419
3	22.0847060	4	0.2584	0.9170	0.4419	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

Washing Hands before eating and before using the portable potty (hand1)

Termination = 3
Maintenance= 2
Action = 1
NO Active = 0

Chance Health Locus of Control Pre test (HLCL1)
Chance Others Locus of Control Post test (HLCT2)

General Linear Models Procedure
Class Level Information

Class	Levels	Values
HAND1	4	0 1 2 3

Number of observations in data set = 152

NOTE: Due to missing values, only 143 observations can be used in this analysis.

General Linear Models Procedure

Dependent Variable: HLCL2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1090.94487026	272.73621757	13.53	0.0001
Error	138	2780.78939547	20.15064779		
Corrected Total	142	3871.73426573			

R-Square	C.V.	Root MSE	HLCL2 Mean
0.281772	20.28823	4.48894729	22.12587413

Source	DF	Type I SS	Mean Square	F Value	Pr > F
HLCL1	1	1041.66269852	1041.66269852	51.69	0.0001
HAND1	3	49.28217175	16.42739058	0.82	0.4875

Source	DF	Type III SS	Mean Square	F Value	Pr > F
HLCL1	1	1078.87710442	1078.87710442	53.54	0.0001
HAND1	3	49.28217175	16.42739058	0.82	0.4875

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		10.04538686 B	5.87	0.0001	1.71081158
HLCL1		0.53673985	7.32	0.0001	0.07335376
HAND1	0	0.86155445 B	0.97	0.3348	0.89019082
	1	1.53941975 B	1.49	0.1373	1.03006345
	2	0.46103234 B	0.30	0.7639	1.53170782
	3	0.00000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve
the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure
Least Squares Means

HAND1	HLCL2 LSMEAN	Pr > |T| H0: LSMEAN(i)=LSMEAN(j) i/j	1	2	3	4
0	22.3886700	1	.	0.5335	0.7994	0.3348
1	23.0665353	2	0.5335	.	0.5159	0.1373
2	21.9881479	3	0.7994	0.5159	.	0.7639
3	21.5271156	4	0.3348	0.1373	0.7639	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.