

**Final Report to the U.S. Environmental Protection Agency from the
Pesticide Farm Safety Center Advisory Panel**

Published by

**The UC Agricultural Health and Safety Center at Davis
Division of Occupational and Environmental Medicine
Department of Internal Medicine, School of Medicine
Institute for Toxicology and Environmental Health
University of California
Davis, California 95616;**

and by

**The Western Consortium for Public Health
2001 Addison Street, Suite 200
Berkeley, California 94704**

May 7, 1992

EXECUTIVE SUMMARY

Background

The Pesticide Farm Safety Center (PFSC) was created through a Cooperative Agreement between the U.S. Environmental Protection Agency and the University of California, Davis in 1986 to encourage health effects research on pesticides and to assess the health status of the nation's farmworkers and the relationship between their well-being and exposure to pesticides. As part of the PFSC Cooperative Agreement, an Advisory Panel was selected to provide a communication link between the PFSC staff and the following groups: farmworkers and their representatives, State pesticide regulators, experts in the areas of pesticides exposure and health, and migrant health care providers. The Advisory Panel members were also to provide a link with EPA staff regarding issues relevant to the effects of pesticides on the health of farmworkers. During the period from 1987 to 1989, the Advisory Panel sought the views of farmworkers, staff of the nation's migrant clinics, growers, and State and Federal officials concerned with pesticide regulations and health research, and legal representatives of farmworkers. This report was prepared to give voice to the collective concerns of the groups from whom the Panel heard comments, particularly those of migrant agricultural workers.

The list of Panel members, PFSC staff, EPA staff, and locations of Panel meetings are included at the end of the Executive Summary

The Advisory Panel recognized that pesticide use must be placed in a broad context of current agricultural practice in the United States. Farmworkers and farmers earn a living in a sector of the economy which is as dangerous as mining for industrial traumatic accidents and fatalities. There is a glaring gap in Federal funding spent per worker in the area of health and safety protection. In agriculture \$.30 is spent annually on employee health protection compared to \$4.34 spent on all other industrial workers. The compensation awarded for deaths and disabling injuries is equally stark. In agriculture, on-the-job death benefits average \$606.25 per worker, while for occupational accidents the average compensation is \$5.71 per worker. By contrast, the figures for all other industries are \$39,769.57 and \$230.66, for accidental deaths and injuries, respectively. The Panel heard directly from Federal health scientists that there is little coordination of funding for health and safety research on pesticides. In 1987 EPA specifically recognized that levels of health risks from pesticide exposures were unreflective in the Agency's program budget when compared to spending on other areas over which EPA has regulatory responsibility.

Review Process

The Advisory Panel recognized that they were selected to give voice to the needs of farmworkers, and there was a clear understanding that more education on pesticides is needed by farmworkers, growers, and clinic and regulatory staff. The education needs to be directed and focused appropriately for the target groups, using language and media that will permit the information and educational content to be grasped. Recommendations are listed in the Executive Summary first by the Advisory Panel and then by the farmworkers and other groups from whom the Panel heard.

To complete the work of the PFSC Advisory Panel and to arrive at a set of recommendations that most closely approximated consensus, a group process was conducted during the Panel's last meeting. The technique employed is called "nominal group process", or the modified Delphi method. Through this process, equal weight is given to the input of each member, with all persons present participating. The core of the method is one that coalesces the thoughts of a diverse group through a dynamic process in which active participation by all is expected.

A series of key questions were asked of all Panel members which was designed to elicit the most salient issues heard during the Panel meetings. In this manner no individual controlled the agenda, and less vocal persons were ensured equal recognition. Each observation and recommendation was discussed by the group to obtain clarification and ranking of importance. Then through group effort, each point and recommendation was prioritized again with all Panel members participating.

The end process reflected a negotiated set of priorities representative of the perspectives of the Panel members in attendance. After the in-person session, the PFSC staff drafted the Panel report and twice contacted and incorporated comments of all members, including ex-officio members. EPA staff were consulted regarding format and divisions of authority among Federal agencies. Through these steps, the initial nominal group process was extended to include all Advisory Panel members. Members of the Advisory Panel made specific short- and long-range recommendations to the EPA and to other agencies. The priorities and recommendations contained in this report are a product of the original nominal process.

Recommendations of the Advisory Panel

A. Short Range recommendations:

1. Weaknesses in FIFRA affecting farmworkers:

- a. Like other statutes, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) must be a health-risk based law. This means that Congress should amend FIFRA so EPA can act (as it does under most other EPA statutes) to reduce health risk, rather than permit hazardous pesticide products to remain in use.
- b. There should be mandatory reporting of all injuries and illnesses related to pesticides to public health departments.
- c. To ensure access for future research projects and to increase safety and public awareness, mandatory reporting of the application of pesticide chemicals should be required by all commercial and private applicators including restricted and non-restricted use pesticides.
- d. Pesticide injury and use records should be retained for 30 years by a regulatory agency charged with this task, and pesticide-related injuries and fatalities should be recorded in the same manner as notifiable communicable diseases.
- e. Mandatory training about pesticide health and safety should be required for all farmworkers and farmers in the United States.
- f. To prevent discrimination for reporting pesticide health and safety violations, anti-retaliation protections (as set by OSHA) need to be adopted.
- g. EPA and States' enforcement officials should become more visible in the agriculture workplace by conducting more inspections and imposing stiffer penalties for health and safety violations.
- h. The product label should include statements listing any health or safety data that are incomplete.
- i. Prior to release of a product, information for the laboratory analysis and detection of the chemical in humans (i.e., metabolite analysis) should be included as part of the labeling.
- j. Training on the health hazards of pesticides for State public health officials and for State pesticide enforcement staff must be

improved and made available, especially in regions where pesticide use is concentrated.

- k. The provision that a weaker Federal standard cannot pre-empt a stronger State standard should be retained.
- l. All chemicals in the formulation, including inerts, must be on the label.
- m. In the interim while inert ingredients are being added to the label, this information should be available from the registrant upon demand.
- n. Personal protective equipment needs to be clean, to fit, and to be appropriate for the specific chemical being applied.
- o. "Minor" use chemicals should not receive exemptions, but be regulated like all other products.
- p. Under FIFRA's Section 18, emergency exemptions should be much stricter so that worker protection is given paramount importance.

2. Immediate response to farmworker problems:

- a. Create an advisory panel for agricultural workers to advise EPA on farmworker health and safety issues.
- b. Regional panels of farmworkers should be created by State and local agencies to address local health and safety concerns.

3. Enforcement of farmworker statutes:

- a. Given the perceived lack of balance on the pesticide issue among State departments of agriculture, future enforcement and regulations should be delegated to that State agency whose primary responsibility is public health and/or worker health and safety.

B. Long range recommendations:

1. Statutory and regulatory changes needed to effect a safer workplace:

- a. Hazard communication and field sanitation

- i. Farmworkers should continue to be covered under OSHA.
 - ii. The stronger worker standard, be it State or Federal should always pre-empt the weaker.
 - b. Workplace Insurance
 - i. Farmworkers must be covered by unemployment insurance and by Workers' Compensation insurance that is transferable between States.
 - ii. Under Workers' Compensation, the minimum coverage must include the doctor's initial evaluation for any suspected work- or pesticide-related injury or illness.
 - c. Child Labor
 - i. Fair labor practices regarding child labor and wage and hours must be adopted and enforced by OSHA/Department of Labor.
 - ii. This recommendation would be easier if day care services were available for farmworkers' families.
 - d. Adopt Industry-like Practices

Discontinue the agriculture exemption from compliance with other industrial health and safety practices. Especially with the use of pesticides, the agriculture workplace must be regulated as any other place of employment.
2. Fund Human Health Research
 - a. Human health research on pesticides should be funded by agencies in addition to the EPA, i.e., the National Cancer Institute (NCI), National Institute for Environmental Health Sciences (NIEHS), National Institute for Occupational Safety and Health (NIOSH), and the National Center for Health Statistics (NCHS).
 - b. Biological markers should be developed as a means of determining degree of exposure (e.g., urine dipstick) for use in the field as better means of enforcement.
 - c. Epidemiology studies (both prospective and retrospective) should be undertaken in the field of pesticide medicine.
 - d. A future Advisory Panel should be appointed to develop a complete research agenda.
3. Education (both statutory and non-statutory):

- a. Statutory changes need to include the following: posting with name of pesticide and symbol (skull and crossbones) to warn those who do not read; training for farmworkers to enable them to recognize pesticide health hazards and to take action when the need arises; training in pesticide health and safety for all applicators; and distribution of crop sheets (such as those developed in Texas) in all States.
- b. Include health and safety educational materials and a system of delivery as part of the new EPA worker protection regulations.
- c. Health and safety education programs must be multi-pronged in approach to reach all of the target populations, including growers and especially the farmworkers.

4. Future Activities

- a. Build in a mechanism for ensuring ongoing farmworker input into EPA decision-making.
- b. This Panel should be reconvened to review the progress EPA is making on these recommendations once the worker regulations are promulgated.

Recommendations of Farmworkers

Farmworkers and their representatives made the following recommendations to the Panel. They are grouped by agency having the primary enforcement or regulatory authority.

EPA:

1. Prohibit the use of pesticides that present the greatest risk to workers, including chemicals that increase the risk of human poisoning, cancer, respiratory effects, nervous system effects and interference with normal reproductive function.
2. Require the keeping of records of all pesticides used.
3. Require cholinesterase monitoring and use of protective equipment for all mixers, loaders, and applicators.
4. Establish a no-spray zone around migrant camps.

5. Require the posting of all fields in English, Spanish, and universally-recognized symbols (for those who cannot read at all) including the name of all chemicals, the safe re-entry date/time, and symptoms of exposure. Posting must include the use of skull and crossbones symbol, which removes the need for farmworkers to ask and thus risking the loss of their jobs.
6. Develop better regulations to prevent pesticide drift onto field workers and onto non-target crops.
7. Require worker education at the workplace to prevent pesticide exposure and illnesses.
8. Increase sanctions and/or penalties for violations of EPA laws by growers and farm labor contractors.

OSHA and Department of Labor:

9. Enforce Federal minimum hourly wage laws and child labor laws.
10. Remove the piece rate exclusion to the minimum wage law.
11. Increase enforcement, sanctions and/or penalties for violations of Labor/OSHA laws by growers and farm labor contractors.

Both EPA and OSHA

12. State or Federal enforcement agencies should have the unannounced right of entry to agriculture workplaces where violations are suspected.
13. Agencies such as Labor or Public Health should have regulatory authority over pesticides rather than those affiliated with agriculture (as has been done with the new California EPA which assumed pesticide regulatory authority from the California Department of Food and Agriculture).
14. There should be representatives of farmworkers in an advisory capacity within these Federal and State agencies, and medical and public health experts on pesticide toxicity should be added to their staff.

The recommendations of migrant clinic staff, legal representatives of farmworkers, State pesticide regulators, and growers are similar to the recommendations made by farmworkers. Because of the similarities they are not listed separately in the Executive Summary, but are included in the body of the report.

Pesticide Farm Safety Center Advisory Panel & Staff

John E. Davies, MD, MPH
Dept. of Epidemiology & Public Health
University of Miami School of Medicine
P.O. Box 016069
Miami, FL 33101

Ralph Lightstone, JD
California Rural Legal Assistance
Migrant Farmworker Project
2000 "O" Street, Suite 240
Sacramento, CA 95814

Keith Long, PhD, *Chairman*
Institute of Agricultural Medicine &
Occupational Health
Department of Preventative Medicine
& Environmental Health
College of Medicine
Iowa City, IA 52242

Robert McCarty, Director
Bureau of Plant Industry
Mississippi Department of
Agriculture & Commerce
P.O. Box 5207
Mississippi State, MS 39762

Paul Monahan, MD
Medical Director
Yakima Valley Farm Workers Clinic
P.O. Box 190
Toppenish, WA 98948

Marion Moses, MD
Pesticide Education Center
P.O. Box 420870
San Francisco, CA 94142-0870

Roberta Ryder, Executive Director
National Migrant Resource Program
2512 South IH35, Suite 220
Austin, TX 78704

Baldemar Velasquez
Farm Labor Organizing Committee
507 South St. Claire
Toledo, OH 43602

Sheldon Wagner, MD
Department of Agricultural Chemistry
Oregon State University
Corvallis, OR 97331

Ex-Officio Members

Sonia M. Leon Reig
Office of Migrant Health
Department of Health and Human
Services
Parklawn Building
5600 Fishers Lane, Room 7A42
Rockville, MD 20857

Valerie A. Wilk
Farmworker Justice Fund
2001 "S" Street NW, Room 210
Washington, DC 20009

Sheila Hoar Zahm, ScD
Environmental Epidemiology Branch
National Cancer Institute
Executive Plaza North, Room 418
Bethesda, MD 20892

Pesticide Farm Safety Center Staff

David F. Goldsmith, MSPH, PhD
(Principal Author)
Western Consortium for Public Health
2001 Addison Street, Suite 200
Berkeley, CA 94704

Lynne A. Morrin
Division of Occupational &
Environmental Medicine
University of California--ITEH
Davis, CA 95616

Marc B. Schenker, MD, MPH
Director, UC Agricultural Health &
Safety Center at Davis
Division of Occupational &
Environmental Medicine
University of California--ITEH
Davis, CA 95616

Environmental Protection Agency Staff

James Boland
Office of Pesticide Programs
U.S. Environmental Protection Agency H7506C
401 "M" Street SW
Washington DC 20460

Patricia Breslin, PhD
Office of Vehicle Safety
U.S. Department of Transportation
400 Seventh Street SW
Washington DC 20590

Steven Johnson
Office of Pesticide Programs
U.S. Environmental Protection Agency H7506C
401 "M" Street SW
Washington DC 20460

Carol Parker
Office of Pesticide Programs
U.S. Environmental Protection Agency H7506C
401 "M" Street SW
Washington DC 20460

Louis P. True
Office of Pesticide Programs
U.S. Environmental Protection Agency H7501C
401 "M" Street SW
Washington DC 20460

Pesticide Farm Safety Center Advisory Panel Meeting Dates and Locations

April 23-24, 1987 West Sacramento, California

September 14-15, 1987 Arlington, Virginia

January 25-26, 1988 Orlando, Florida

June 24-25, 1988 Toledo, Ohio

November 18-19, 1988 Harlingen, Texas

April 14-15, 1989 Crystal City, Virginia

August 25-26, 1989 Yakima, Washington

Final Report to the Environmental Protection Agency from the Pesticide Farm Safety Center Advisory Panel

Introduction:

The Pesticide Farm Safety Center (PFSC) was funded at the University of California at Davis, School of Medicine in 1986 by the United States Environmental Protection Agency (EPA) to gather information and to foster research on the effects of pesticide exposures on the health of farmworkers and farmers. As part of this research effort, experts representing farmworker labor unions, university-based academics, rural legal aid, physicians, toxicologists, State pesticide enforcement experts, and migrant health clinic personnel were brought together as an Advisory Panel. Panel members met at many locations throughout the country (listed in the Executive Summary) to gather information. When it convened, the Advisory Panel was addressed by:

- farmworkers,
- migrant health clinic staff members
- other health professionals with expertise in pesticide-related health issues
- growers and commodity organizations
- attorneys representing farmworker interests, and
- State and Federal officials involved in promulgating and enforcing pesticide and public/occupational health regulations.

This report presents the Advisory Panel's short-and long-range recommendations to EPA, the Department of Labor, and other governmental agencies regarding the issue of farmworkers' exposure to pesticides. The recommendations were adopted by nominal group process among members of the Panel. The Advisory Panel report also presents the views and recommendations of the groups who addressed the Panel, and these views are presented as follows:

- a) farmworker concerns about pesticide exposure;
- b) concerns of health and legal professionals regarding pesticide exposures;
- c) State and Federal protections of agricultural workers exposed to pesticides; and
- d) the current status of education in the area of pesticide health and safety.

Because pesticide use is part of the larger picture of the status and welfare of agriculture, this report addresses issues that are part of the broader political and social environment affecting the health and safety of farmworkers. In addition, this report makes an attempt to present what farmworkers told the Advisory Panel, and to provide EPA with supporting evidence for the views farmworkers and others who expressed their opinions to the Panel.

The report is organized to answer four sets of questions and to develop specific recommendations to EPA (and other Federal agencies). The Panel has made recommendations intended to reduce the health risk from exposure to pesticides in the United States. The four questions are as follows:

- a. What did the Advisory Panel hear from farmworkers regarding pesticide exposure and health?
- b. What did the PFSC Advisory Panel hear from the migrant clinic staff, farmworker legal representatives, and others about health hazards from pesticides?
- c. What did the Advisory Panel learn about State and Federal protections for farmworkers from pesticide exposure?
- d. What did the Advisory Panel learn regarding the current status of education on the risks from pesticides?

Statement of the Problem:

Farm labor is integral to American agriculture, one of the important sectors of the nation's economy. There are about two million farms in the United States and farming is a leading industry in states such as California, Iowa, Wisconsin, Ohio, New York, Texas, Arizona and Florida. The U. S. Department of Agriculture (USDA) data show that two million citizens are primarily farmers, while 3.1 million others have some farm income. Many large farms (especially in California) are operated by farm managers and farm management companies that hire and employ large numbers of temporary and permanent employees (Villarejo, 1990). While estimates vary, the U.S. Governmental Accounting Office reports that there are 1.5 to 2.5 million hired farmworkers, and the migrant farmworker population ranges from 1 to 4 million (GAO, 1992). The office of Migrant Health in the Department of Health and Human Services (DHHS) estimates that there are 2.7 million migrant and seasonal agriculture workers, including dependents.

Farm work is very hazardous. The National Safety Council statistics show that agriculture has an annual death rate of 50 per 100,000 workers, about the same as mining. This rate is five times greater than the 11 per 100,000 workers national rate for all U. S. industries. In 1986, there were 1,900 deaths and 170,000 disabling farm injuries in agriculture including 300 children killed while engaging in farm work. In California, farmworkers and farmers have significantly elevated death rates from accidents (Singleton and Beaumont, 1990). In Washington State agricultural workers have two and half times the risk of nonfarm employees for fatal injury, and they have significantly greater risk of Workers' Compensation claims compared to other workers for sprains and strains, fractures, dislocations,

concussions, amputations, dermatitis, systemic poisonings, respiratory disease, and tendonitis (Demers and Rosenstock, 1991)

Farmworkers suffer from a variety of health problems that are strongly linked to their occupations. These conditions include respiratory infections and allergies, dermatitis and conjunctivitis, diarrhea, urinary tract infections and parasitic disorders, sun and heat stroke, and musculoskeletal injuries (Wilk, 1986; Mines and Kearney, 1982). Other farmworker health concerns include cancer, birth defects, reproductive impairment, chronic respiratory diseases, and systemic poisoning (Mines and Kearney, 1982; Schenker, 1990). Some epidemiologic studies link pesticide exposures to these chronic conditions, especially cancer (Moses, 1989) and animal toxicology data support these associations (Sharp, et al., 1986; Baker and Wilkinson, 1990). However, data on human populations are limited, and essentially there is no information on chronic disease risks among migrant or seasonal farmworkers.

Mitigating agricultural health problems is difficult. One difficulty stems from the characteristics of farmers and farmworkers. They are often independent, work long hours, are stoical about pain, fatigue, and accidents, and blame themselves for disabling injuries or health problems. Farmworkers may be permanent residents or may be migrants. Farmworkers in different parts of the country may include a wide diversity of ethnic groups: inner city poor and males or families from Jamaica, Puerto Rico, and Haiti predominate on the East Coast. In the West, Midwest, and Southwest, migrants tend to be Mexicans or Mexican-American families, and may include single males traveling alone or in small groups. Communication is difficult because of cultural and language barriers, limited formal education of many of the migrants (usually about six years), fear of authority stemming from a lack of documentation of citizenship. Lastly, farmworkers are poorly paid, often with average annual incomes of \$3,000, with months of unemployment (Villarejo, 1990).

Inadequate funding of occupational health and safety services and agencies is another characteristic of agriculture. The Advisory Panel noted that there needs to be balanced funding between agencies dealing with farm safety and health. As an example, in agriculture there is \$0.30 of Federal funds spent per worker on health and safety protection, while nationally there is \$4.34 spent for workers in all nonfarming sectors of the economy. For death and disabling injuries on the job the figures are \$606.25 and \$5.71 for agriculture, while nationally for all other industries the figures are \$39,769.57 and \$230.66, respectively (Merchant, et al., 1989).

In the agricultural workplace, the EPA and State agencies have regulatory authority for pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The Department of Labor's Occupational Safety and Health Administration (OSHA) enforces field sanitation and right to know regulations. Research, education, and health care on pesticides are not now coordinated

between the agencies with primary concern for this critical field: United States Department of Agriculture (USDA), EPA, National Institute for Occupational Safety and Health (NIOSH), OSHA, Office of Migrant Health, DHHS, National Cancer Institute (NCI), National Center for Health Statistics (NCHS), and National Institute for Environmental Health Sciences - National Toxicology Program (NIEHS-NTP). Lastly, EPA's internal assessment, "Unfinished Business," demonstrated that in terms of comparative budgeting for overall health risks, pesticide exposure was underfunded compared to other risks (such as toxic substances) over which the Agency has regulatory authority (EPA, 1987).

Pesticides are an important tool in agriculture, an industry which is very hazardous and which appears to lack funding and coordination of Federal programs. In this context the Advisory Panel was asked to review the health and safety of farmworkers exposed to pesticide chemicals and to make recommendations. The assessment took the form of questions reflecting the issues addressed by individuals who met with the Panel.

1. What did the Advisory Panel hear from farmworkers regarding pesticide exposure?

In the meetings the Advisory Panel held in California, Florida, Ohio, Texas, Washington, D. C., and Washington State, farmworkers and their representatives expressed similar points about pesticide exposures and their health. Most of the speakers clearly recognized that farmworkers (including mixers, loaders, and applicators) have the most frequent exposure to agricultural chemicals, and therefore, the greatest health risks from pesticide exposure.

A. Financial Barriers to Health Care and the Management of Patients with Pesticide Exposure:

Migrant and rural community clinics are a major supplier of health care for farmworkers and they are overburdened and often understaffed. The panel was informed that this often leads to six- to eight-week waits for appointments. Some farmworkers must impoverish themselves before they can receive treatment because medical payment often must come from State medical funding (Medicaid). In Texas, Medicaid pays for those individuals whose income is 25% of the State-determined poverty level. Therefore, if family income exceeds \$60 per month, farmworkers seeking care will not qualify for Medicaid, and must bear the expense from their meager resources.

In California, 44% of children surveyed in McFarland, a Kern County town with 65% Mexican-American population, (and by inference other agricultural working class communities) had no health insurance, and 21% were on Medi-Cal (Kreutzer et al., 1991). Less than one-third of farmworker families had health

insurance. Those without insurance cannot seek preventive health care to assess pesticide exposure and are not covered for pesticide-related health conditions. This situation is similar to that reported for migrant farmworkers in central California (Alvarado et al., 1990)

Nationally, there is a Federally-funded network of migrant health centers that provides clinical services for migrant farmworkers and other poor rural citizens (Wilk, 1986). These centers have been staffed in part by physicians and other health care professionals as part of National Health Service Corps repayment plans for health science school loans. During the 1980s, funding for the National Health Service programs has been reduced, and continued clinical staffing has been placed in jeopardy. In addition, rural hospitals have been closing. Therefore, access to medical services directed at diagnosing and treating health problems from pesticides is falling upon fewer professionals and upon fewer clinical institutions (Merchant et al., 1989).

In addition to a shortage of rural health care providers, there is a low number of physicians who accept Medicaid patients, thus increasing the gap between agricultural workers' health needs and treatment providers. And because of the rural locations of pesticide use and exposure, health care is likely to be difficult or absent when treatment for pesticide illnesses is required.

B. Children and Pesticide Exposure:

The children of migrant and non-migrant farmworkers need a day care system to help prevent their exposure to pesticides. In Texas, the Advisory Panel was told that bureaucratic barriers were erected with respect to licensing day care services for working parents in rural South Texas neighborhoods. The Federal nutrition program for women, infants, and children (WIC) for preschool children would allow for better food for those in day care, and provide a small income for day care providers. The Advisory Panel was told that some homes in the Texas colonias (where farmworker reside) could not qualify to be day care providers. Members of the Texas United Farm Workers of America argued that there should be special waivers to homes who do not meet all the qualifications because of a lack of indoor plumbing and telephones. Many of these day care centers could provide early prevention through classroom lessons focusing on health and safety education for pesticide chemicals.

Because of a lack of child care and because of opportunities to increase family earnings, some children work in the fields and leave school before completing the elementary grades. Depending on the children's ages, this practice may violate Federal child labor laws. It also places children at greater risk from pesticides (because of their lighter weights dose per kilogram of body weight will be greater than adults) via exposure to crop residues, soil, and to irrigation water. Addressing improved management of pesticide exposure also means grappling

with the issue of child labor/child care. The seriousness of this issue has recently been addressed in two meetings on pesticide health and safety (Goldsmith, 1991 and National Migrant Resource Program, 1991) and by the Governmental Accounting Office (GAO, 1992).

C. Farmworker Concerns about Their Health and Pesticide Exposures:

Farmworkers experience great difficulty when seeking medical care for any condition, including suspected pesticide illnesses. The time off work to seek medical care reduces already meager earnings and may result in job loss. There is often a lack of transportation to clinical facilities. Some clinicians demand payment before treatment because of uncertainties about Workers' Compensation and Medicaid. Through California's mandatory pesticide illness reporting system, almost 3,000 cases of possible or probable pesticide illnesses are reported annually, although this may underestimate by 80% the true number (perhaps 14,000 cases) of pesticide incidents or illnesses in the State (Wilkinson, 1990). Approximately 85,000 pesticide-related illnesses or calls for information are reported to poison control centers nationally, which results in 20,000 hospital admissions per year (Wilkinson, 1990). This figure is less than a third of the estimated 300,000 acute illnesses and injuries per year among farmworkers related to pesticide exposure (GAO, 1992 [quoting an EPA estimate]). Clearly, realistic estimates of the number of pesticide injuries among agricultural workers and their families, among those exposed in nonfarm settings, and the distribution of acute and chronic conditions has not been determined with any degree of confidence.

Farmworkers, because of past episodes of pesticide exposures or accidents such as dousing or being engulfed in cloud drift from aerial applications want to know the health hazards of the agricultural chemicals they encounter while working. Many farmworkers demonstrated their anxiety about the safety of pesticides by speaking emotionally to the Advisory Panel about episodes that they experienced or that friends or members of their family experienced. Many speakers recognized the importance of pesticides in production of crops and in producing jobs for them, but they returned to the themes of safety and health fears. Farmworkers are concerned about health effects other than acute or emergency episodes, because they mentioned anxiety about cancer, nervous system disorders, fertility loss or other reproductive interference, dermatitis, and allergies.

Groundwater contamination is an issue that touches both the occupational and non-occupational spheres. Farmworkers in Texas and Florida expressed concerns about pesticides in their drinking water and the provision of safe drinking water supplies to their homes.

Many farmworkers expressed concerns about children eating fruit in the fields or playing in ditches, puddles, or irrigation systems that contain pesticides.

Farmworkers are also concerned about pesticide containers that may be re-used to transport food or water if they are not disposed correctly (Morrin et al., 1989).

D. The Safety of the Working and Living Conditions:

Many speakers described the hard work and long hours farmworkers must labor in order to support themselves and their families. They expressed their concerns about working conditions. These concerns included: provision of fresh drinking water; hand washing and sanitary facilities in the fields; safety for themselves and their families; and security for their belongings.

Unionized farmworkers in Florida expressed the need for being provided with complete changes of clothes and better protection from exposure during application of pesticides and during citrus harvesting. These agricultural workers, via collective bargaining concessions, only apply chemicals from the safety of enclosed cabs. Farmworkers also expressed concern about hazardous equipment used in the application of pesticides as well as the dangers of other power take-off devices found in the agricultural workplace.

Migrant farmworkers were concerned about pesticide exposures in the non-occupational environment. Members of the Farm Labor Organizing Committee (FLOC) expressed concerns about the need for clean and safe housing in migrant camps, and for day care facilities. Migrant labor camps need potable drinking water, sanitary facilities including showers, security for personal belongings, and laundry facilities. Groups such as UFW, FLOC, and other unions raised these issues of health and environment as matters to be addressed in collective bargaining.

E. Equal Benefits and Protections as Other Industrial Workers

1. Right-To-Know:

Texas has established a "Right-To-Know" law to insure that farmworkers are informed of the pesticides used on the crops where they labor. This information is transmitted using crop sheets printed in Spanish and in English. The crop sheets show what chemicals are often used on the crop, what the common symptoms of exposure are, and the re-entry intervals for each chemical (see Appendix A). In spite of the protection built into the "Right-To-Know" provisions, some unionized Texas workers expressed reluctance to ask for safety information from their employers because of fear of retaliation and loss of their jobs.

2. Workers' Compensation:

Farmworkers want pesticide-related conditions covered by Workers' Compensation insurance, including coverage for allergy testing and other specialized diagnoses and treatments. Initial examinations by doctors in California are paid by Workers' Compensation. In some other states, farmworkers must pay for the initial exam themselves and then collect from Workers' Compensation or some other source. In some states, such as Florida and North Carolina, Workers' Compensation benefits are nearly impossible to obtain because agriculture is excluded from mandatory coverage.

It is the position of farm labor unions that agriculture workers who are disabled on the job and are unable to continue to work in the fields should be retrained for other positions. Farmworkers should be provided personal protective equipment. Protective clothing worn only on the job and cleaned and maintained by the employer will improve workplace safety and protect workers' families from unintended residential exposure to pesticides. Protection can also be obtained via the use of lower toxicity chemicals, longer re-entry times, and alternative growing methods (such as those suggested by integrated pest management programs).

In addition, these workers felt that Workers' Compensation benefits should be extended to provide coverage in and between states so that benefits (including conditions related to pesticide exposures) would be extended for those migrants in the farm labor streams of the United States.

3. Anti-Retaliation Protection:

One of the most important guarantees in the OSHA law is protection for workers from employer retaliation for reporting health and safety violations to authorities. This protection is not part of EPA's FIFRA law and gaining this provision is one of the significant reasons why farmworkers want to remove State agriculture departments from control of health and safety matters. Farmworkers are worried about losing their jobs if they report violations of pesticide rules or regulations, and the threat of retaliation exists from both growers and from farm labor contractors. Because income loss is such a threat to the lives of farmworkers, this serves as a significant impediment to more active participation in the regulatory process.

F. Current Status of Enforcement of Farmworker Protection Statutes:

Agricultural pesticide use is regulated by EPA, which through transfer of regulatory authority, is usually administered by State departments of agriculture. In some states, such as California, pesticide regulation and enforcement receives more serious attention than in other states, such as Florida. Generally,

farmworkers expressed frustration about the uneven degree of pesticide regulation and enforcement. They feel they have neither a voice nor recourse when regulations are developed or when rules are violated. This situation may arise because of a lack of State funding for sufficient enforcement staff, or a lack of bilingual inspectors, or a lack of effective communication between two groups having different access to information and legal authority. Because of this lack of equal participation in the process, farmworkers expect regulatory agencies to be more active in protecting their health and enforcing rules.

G. Recommendations from farmworkers:

Farmworkers and their representatives made the following specific recommendations regarding regulations of pesticides and other statutes. These recommendations are grouped according to agencies with primary enforcement authority.

EPA:

1. Prohibit the use of pesticides that present the greatest risk to workers, including chemicals that increase the risk of human poisoning, cancer, respiratory effects, nervous system effects and interference with normal reproductive functions.
2. Require the keeping of records of all pesticides used.
3. Require cholinesterase monitoring and use of protective equipment for all mixers, loaders, and applicators.
4. Establish no-spray zones around migrant camps.
5. Require the posting of all fields in English, Spanish, and universally-recognized symbols (for those who cannot read at all) including the name of all chemicals, the safe re-entry date/time, and symptoms of exposure. Posting must include the use of skull and crossbones symbol, which removes the need for farmworkers to ask and thereby risk the loss of their jobs. Posted warnings should apply to all pesticide chemicals, regardless of toxicity.
6. Develop better regulations to prevent pesticide drift onto field workers and onto non-target crops.
7. Require worker education at the workplace to prevent pesticide exposure and illnesses.

8. Increase sanctions and/or penalties for violations of EPA laws by growers and farm labor contractors.

OSHA and Department of Labor:

9. Enforce Federal minimum hourly wage laws and child labor laws.
10. Remove the piece rate exclusion to the minimum wage law.
11. Increase sanctions and/or penalties for violations of Labor/OSHA laws by growers and farm labor contractors.

Both EPA and OSHA

12. State or Federal enforcement agencies should have the unannounced right of entry to agriculture workplaces where violations are suspected.
13. Agencies such as labor or public health should have regulatory authority over pesticides rather than those affiliated with agriculture (as has been done with the new California EPA which assumed pesticide regulatory authority from the California Department of Food and Agriculture).
14. There should be representatives of farmworkers in an advisory capacity within these agencies, and medical and public health experts on pesticide toxicity should be added to their staff.

2. What did the PFSC Advisory Panel hear from non-farmworkers (migrant clinic staff, growers, and legal staff) about the health hazards from pesticides?

- A. There is insufficient access to health care and the costs are high for laboratory tests and/or referrals. This position is similar to that expressed in Section 1.A.

The Advisory Panel heard repeatedly from physicians and other health care providers about the difficulties of medical practice in rural areas and the lack of resources to deal with pesticide health problems. In general farmworker patients are seen by clinicians in three settings: Federally funded migrant health clinics, rural hospital emergency rooms, and in private practice. Most of the health care providers and legal representatives who addressed this issue to the panel made the following points:

1. There is a widening gap between migrant clinic funding and demand for health services. This translates into lengthy delays (6 to 8 weeks in Texas migrant clinics) for clinical services, insufficient Medicaid reimbursement for health care providers and a limited number of physicians who will treat farmworkers who qualify for Medicaid, lack of funds for clinical/laboratory tests, and a lack of funds to pay for referrals for additional tests related to pesticide exposure. With limited or no insurance, this means that the worker has to pay their own expenses when made ill from pesticides on the job (in California, Workers' Compensation insurance covers the costs of the initial visit).
2. There is a lack of medical toxicology data readily available to assist clinical staff when treating patients with pesticide illnesses. This is particularly true for the non-organophosphate chemicals. The problem is exacerbated by high turn-over among migrant clinic staff who are repeatedly in need of training for appropriate patient management of pesticide health problems.
3. Physicians who treat farmworkers often are unable to test for the cause of the illness or injury, and therefore treat symptoms only. Since the cause is not ascertained, there can be little prevention of future exposure.
4. There should be national or regional laboratories to do standardized cholinesterase testing.
5. There is need for industry-wide health insurance for farmworkers and their families; preventive care, referral and laboratory tests should be covered by insurance.
6. There needs to be either an increase in funding and staff for migrant clinics or the initiation of regional family rural practitioner programs linked to clinical facilities.
7. There is a need for universal coverage for Workers Compensation insurance so that emergency first visits are covered through a "no-fault" system (similar to that in California).

B. The Causes and Reasons for Concern:

There are several parallel trends that concern physicians and other health professionals who treat farmworkers and farmers. Practicing medicine in the U. S. continues to be an urban profession and access to specialists and diagnostic testing laboratories requires access to urban or university medical centers. With time off work and travel costs, seeking expert care is a severe hardship for rural workers. Funding for DHHS office of Migrant Health has been reduced, and the National Health Service Corps has lowered the rate of placement of recent medical school graduates into migrant clinics. The lack of information about pesticide-related health problems is symptomatic of a lack of training in medical and public health schools in the broad field occupational and environmental medicine, and more instruction in this discipline should be included in the medicine curriculum (Institute of Medicine, 1988, 1991). However, the biggest reason for concern is the sizable debt many health science students carry when they graduate. In many cases, graduating medical students do not even consider rural employment because of the amount of money they owe (some are greater than \$75,000 for undergraduate and medical school loans). In these cases, their debts make it impossible to work in migrant clinics and out of necessity they take positions in urban locations where salaries are higher than in migrant clinics.

Lowering the medical impact of pesticides on health of agricultural workers would be helped if the following steps were taken:

Reporting System:

1. Pesticide injuries and illnesses should be designated as reportable conditions in the same way that many communicable diseases are monitored by State and Federal public health authorities. As such, there needs to be recognition of the importance of public health surveillance for these illnesses and there needs to be enforceable fines for failure to report. Some states, such as California, Hawaii, Oregon and Washington have pesticide illness reporting laws with fines for failure to report. Other states such as Florida, Texas, and Arizona have reporting laws that are not mandatory. Still other states have no reporting laws.

Record-Keeping:

2. Except for California, there is now no general requirement for growers to maintain written records of pesticide use. FLOC secured a contract with Campbell Soup Company in Ohio stipulating that written records of applied pesticides would be maintained by growers. The economic incentive is that when produce is purchased, growers have a complete record of chemicals applied and can document their pesticide use/residue record. Also, with this

information, questions health care providers have about the exposure of workers to pesticides can be answered.

Chronic Exposure and Delayed Adverse Effects:

3. More toxicologic and epidemiologic research is needed on repeated chronic low level exposures to pesticides. Having more information on the risks of pesticides will permit physicians to give patients (both farmers and farmworkers) better information about protective clothing, about which chemicals to avoid when pregnant, and other preventive medicine practices. This information can also be useful for EPA action to remove dangerous chemicals from the market.

Sanitation:

4. There is a need for uniform field and migrant camp sanitation requirements. This includes the provision of drinking and hand washing water, soap, and toilet facilities; clean work clothes, and personal protective equipment; posted re-entry warnings; pesticide control equipment; appropriate disposal of pesticide containers will all serve to lower health risk from the application of pesticides. However, it has been difficult to upgrade workers health using only improvements on the job because migrant workers' residential living conditions must also be improved if pesticide illnesses are to be prevented.

Improve Enforcement and Agency Coordination:

5. Many of the non-farmworkers expressed concern over the lack of effective enforcement of State and Federal laws. Growers, migrant health care staff, and legal aid attorneys remarked on the need for better and more predictable State and Federal coordination of health and safety laws. Specifically, there was poor enforcement for: field sanitation rules; anti-drift rules; contamination of water supplies; failure to follow instructions on the chemical containers. There was also a call for unannounced field inspections with fines for violations. There needs to be increased funds for regulatory agencies to take more aggressive role in enforcement. Specifically these needs include hiring more bilingual outreach staff to communicate with farmworker communities, better coordination between agencies, more inspection and enforcement staff, more on-site inspections, and better communication with growers and pesticide manufacturers.

Many of the people the Panel heard from, including growers, suggested that reentry intervals must be responsive to crop, geographic location, and weather conditions. Furthermore, there was a need for rapid response nationwide

when a reentry interval needed to be lengthened. As an example, when reformulated Omite-CR led to an outbreak of dermatitis among grape and citrus harvesters, a rapid response could have quickly lengthened re-entry intervals throughout the U. S. (Saunders, et al., 1988) and prevented other outbreaks of dermatitis.

6. Some specific suggestions were made to reform the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):

- a) As it is now written FIFRA is a risk-benefit statute, and it needs to become a public-health based risk-driven law.
- b) There needs to be mandatory record-keeping of all pesticides used with thirty-year record retention.
- c) Access to these records must be made mandatory so that workers and health providers can check them when health needs dictate.
- d) There needs to be a mandatory reporting of all pesticide injuries and illnesses and an annual national publication of statistics.

Many of the non-farmworkers the Advisory Panel heard from said the same thing: our employees and clients are afraid of the health hazards from pesticide exposure. Knowing that pesticides are toxic and recognizing that they will continue to be used in agriculture, there needs to be more research on their health hazards; there needs to be wider dissemination of pesticide training materials for farmworkers, for farmers, and for health care providers; and there needs to be better engineering and pesticide use practices that will separate the workers from the chemicals.

E. Pesticide Safety in Non-Occupational Exposures:

In parallel with agricultural workers, the non-farmworkers also raised the issue of protecting residential environments from exposure to pesticide chemicals. There should be wide buffer zones around migrant camps and housing to protect workers and their families from drift and overspray. There needs to be sturdy fencing to prevent children from playing in treated fields or in irrigation streams. There needs to be laundry and sanitary facilities at all migrant camps, and the provision of day care facilities would prevent non-occupational pesticide exposures. There must be proper storage and disposal of chemical containers so that they are not used either for toys or for food or water storage.

F. There Are Difficulties Accessing Workers' Medical Records for Compensation Purposes:

For migrant farmworkers, there is a great deal of difficulty linking clinical records from site to site. This problem is even more critical when filing Workers' Compensation claims because of the necessity for extensive records. Having shared computerized record systems will permit easy transmission of patient or family information/history/records. A computerized record system will enable epidemiologic research to be undertaken as well as managing clinic costs. There is also a need for computerized records so that referrals to other specialists can be made. The benefit for the farmworkers and their health providers will be the ease of documenting treatment so clinics can receive payment for their services.

G. Non-farmworker Recommendations:

1. The physicians and other migrant health care staff made the following recommendations, many of which are similar to those previously made by farmworkers:
 - a. Because there is a great need for more staff training on the recognition and management of pesticide illnesses, additional education is recommended. This should become an integral part of the teaching curriculum in all medical and public health schools.
 - b. Among migrant clinicians and clinic staff there needs to be greater networking between local and State experts for referral and between clinics in the migrant stream.
 - c. Clinic staff recommend that pesticide-crop sheets be adopted in all states in order to know the clinical implications and side effects of the chemicals to which workers are exposed.
 - d. Pesticide safety and health videos should be developed to increase patient education.
 - e. Rural public health clinics should have more funds available for urine, blood, and laboratory tests, with specific emphasis on detecting chemical metabolites of pesticides.
 - f. There is a need to develop methods for rapid dissemination of new information about pesticides including re-entry intervals, treatment protocols, and research findings.

2. The attorneys representing farmworkers made the following recommendations several of which are similar to those previously made by farmworkers:
 - a. There must be increased enforcement of State and Federal laws regarding pesticides, including unannounced regular inspections of agricultural workplaces.
 - b. Workers must have the right to a free medical exam if a pesticide illness is suspected, a right other industrial workers have under State Workers' Compensation laws.
 - c. Workers' Compensation must be available to all farmworkers in all States.
 - d. Medicare and Medicaid benefits and qualification requirements must be uniform in all States.
 - e. Each State must have a "Right-To-Know" law so that information about pesticides is readily available.
 - f. All agricultural employers should provide health care insurance to full and part-time employees.
 - g. The role of agricultural workers in pesticide policies would best be expressed through farmworker committees with the purpose of establishing an ongoing dialog with EPA and States and to negotiate directly regarding the protection of the health of workers.
3. State pesticide regulators made the following recommendations:
 - a. There must be the authority for unannounced inspections of farms and agricultural workplaces.
 - b. There is a need for greater education on the health hazards from pesticides among workers, growers, State agriculture officials, and Extension agents.
 - c. There should be OSHA funding to provide health care prevention and health education relevant to the importance of enforcing the sanitation regulations.
4. The growers the Advisory Panel heard from made the following recommendations:

- a. There was general support for improved pesticide safety and health, including an acceptance of the Texas "Right-To-Know" laws.
- b. Because of competition from Mexico and other countries, there was also a plea to consider the economic costs of regulations related to pesticides and workplace health and safety rules.
- c. Imported agricultural products should adhere to the same requirements for pesticide uses and pesticide residues as American produce.

3. What did the Advisory Panel observe about the State and Federal Responses to Protection of Farmworkers from Pesticides?

As noted in the statement of the problem above, regulatory agencies on the State and Federal levels are not preventing pesticide exposures among farmworkers and farmers. The Advisory Panel was made aware of several gaps in the regulatory responses of managing pesticides, and some of the most telling are listed below.

In some States, such as Texas and Florida, there are pesticide illness reporting laws in place but reporting is not mandatory, thus providing an inaccurate picture of the problem. Furthermore, there is a lack of training to instruct physicians on what is considered a case and little information on the bureaucratic process of filling in the intake forms to record pesticide illnesses. PFSC staff surveyed urban and rural physicians in California and made some instructive findings about doctors' knowledge of the state's pesticide illness reporting law. One-quarter of the physicians surveyed from rural counties did not know that suspected and confirmed illnesses had to be reported to the county health officer, while 56% of the urban physicians (from one control urban county) were unaware that reporting of pesticide illnesses was necessary (Goldsmith et al, in preparation). Surveyed physicians overwhelmingly indicated a strong desire for additional training in diagnosis and treatment of pesticide conditions, evaluation of clinical toxicology tests, and information about chronic health effects. This need has been amply demonstrated by the National Academy of Sciences Report (Institute of Medicine, 1988) and by those physicians who attended the Advisory Panel's sessions.

In all States the Advisory Panel visited there were insufficient personnel and resources to implement existing pesticide health laws or to do effective enforcement. Seen in this context, some growers and farm labor contractors were putting the health and safety of workers at unnecessary risk. This assessment of the situation was why the community of farm workers, migrant clinic staff and worker legal advocates felt that State and Federal agencies were not adequately doing their jobs. Because the division of regulatory responsibility between EPA

and OSHA for pesticides and field sanitation, (and "Right-to-Know") respectively, there was a lot of confusion regarding which agency (including Federal/State duties) is responsible for workplace enforcement. Confusion becomes overwhelming when migrant clinic staff cannot determine who should be informed when a poisoning episode or an epidemic of dermatitis occurs.

4. What did the Panel learn regarding the current status of education about the health hazards of pesticides?

The Advisory Panel heard from almost every speaker, regardless of whom they represented, that there is a great gap in farmworker knowledge concerning the health hazards of pesticides. Because there already exists extensive pesticide safety training for Agriculture Extension staff and certified mixer/loader/applicators, filling the health educational needs of farmworkers, farmers, Federal and State agricultural officials, and public health and clinical staff is paramount.

A. For farmworkers and for farmers, there needs to be health education programs involving these groups directly. This means that training must be delivered by those perceived as credible by the target audiences or it will not be perceived as being accurate or believable. This means that farmworkers (or growers) need to become trainers for themselves in order for the prevention message to be effective. Both farmworkers and farmers have to develop a means to equally share the toxicology and other risk information of all pesticides used in agriculture. Because there are differences in language and culture, the educational message needs to be in a format understood by non-English speaking (Spanish predominantly) migrant farmworkers. The training must include an understanding of label requirements, affected body parts and organs, protective clothing, re-entry intervals and field postings, regulations to control use of agricultural chemicals, what to do in case of emergencies, and what information to bring to physicians when an emergency arises. In Florida, the pesticide safety message was suggested to be in a video format (such videos are being produced by the Integrated Pest Management Program at UC Davis and by the National Migrant Resource Program in Austin, TX) in order to be understood by non-English speaking, sometimes illiterate, farmworkers. Comic book format has also been suggested as a possible vehicle for pesticide health and safety training and information. The Texas "Right-to-Know" crop sheets are also a means to transmit pesticide safety information to farmworkers (see Appendix A). Educational research is needed to determine what methods work and which are most cost-effective.

B. Migrant clinic physicians and staff, primary care practitioners, and emergency room staff need to know the following kinds of information: basics of clinical toxicology, a description of the health effects of the most common

pesticides, emergency management of pesticide poisonings, pesticide laws and regulations (including risk assessment), the chronic diseases related to pesticide exposures (such as cancer, neurological disorders, reproductive effects, dermatitis, and respiratory conditions), local pesticide illness reporting requirements and which crops most commonly use which pesticides. Health professionals may also need to know about contamination of groundwater and soils. Appendix B includes outlines for two- or three-day continuing medical education (CME) classes on pesticides and medicine organized by staff at the Western Consortium for Public Health and UC Davis. Clinic settings can also be a place where farmworker education pamphlets and videotapes can be made available to clients.

This CME pesticide training will also be very useful for State and Federal regulatory officials who must be aware of the toxicology and health content of these classes. This information will be helpful to connect the various parties in the pesticide and health network including growers, farmworkers, the public, insurance officials, physicians, and other members of the public health and regulatory communities.

5. The Advisory Panel's Specific Recommendations

By nominal group process among the members, the Panel considered short range and long range recommendations to the Agency:

A. Short Range recommendations:

1. Weaknesses in FIFRA law affecting farmworkers:

- a. Like other statutes, FIFRA must be a health-risk based law. This means that Congress should amend the Act so the Agency can operate (as it does under all other EPA statutes) to reduce health risk, rather than permit hazardous products to remain in use. As an example, Alar could have been removed from the market quickly when its carcinogenicity was first assumed. The lengthy delays were a function (in part) of the requirements under FIFRA that Alar's usefulness (benefit) be weighed against the cost of removing it from the market.
- b. There should be mandatory reporting of all deaths, injuries, and illnesses related to pesticides with fines for noncompliance. Without this information, the agricultural and medical community cannot know what is harmful, and what research needs to be undertaken to prevent these conditions from arising.
- c. To ensure access for future research projects and to increase safety and public awareness, mandatory record keeping and reporting

of the use of pesticide chemicals should be required by all commercial and private applicators including restricted and non-restricted use pesticides.

- d. Pesticide injury and use records should be retained for 30 years by a regulatory agency charged with this task, and pesticide-related injuries and fatalities should be recorded in the same manner as notifiable communicable diseases.
- e. Mandatory training about pesticide health and safety should be required for all farmworkers and farmers. This recommendation is being adopted in Texas and California, and EPA should mandate it nationwide.
- f. To prevent discrimination against farmworkers for reporting pesticide health and safety violations, anti-retaliation protections (as set by OSHA) need to be adopted.
- g. EPA and State enforcement officials should become more visible in the agriculture workplace by conducting more inspections and imposing stiffer penalties for health and safety violations.
- h. The product label should include statements listing any health or safety data that are incomplete (i.e., indicating the lack of information about health effects).
- i. Prior to release of a product, information for the laboratory analysis and detection of the chemical in humans (i.e., metabolite analysis) should be included as part of the labeling.
- j. Training on the health hazards of pesticides for State public health officials and for State pesticide enforcement staff must be improved and made available, especially in regions of the country where pesticide use is concentrated.
- k. The provision that a weaker Federal standard cannot pre-empt a stronger State standard should be retained.
- l. All chemicals in the formulation--including inerts--must be on the label.
- m. In the interim while this change is being made, this information should be available from the registrant upon demand.
- n. Personal protective equipment needs to be clean, to fit, and to be appropriate for the specific chemical being applied.

- o. "Minor" use chemicals should not receive exemptions, but be regulated like all other products.
- p. Under FIFRA's Section 18, emergency exemptions for special local needs should be much stricter so that worker protection is given paramount importance.

2. Immediate response to farmworker problems:

- a. Create an advisory panel (similar to Pesticide Users Advisory Committee) for agricultural workers to advise EPA on farmworker health and safety issues.
- b. Regional panels of farmworkers should be created by State and local agencies to address local health and safety concerns.

3. Enforcement of farmworker statutes:

Given the perceived lack of balance on the pesticide issue among State departments of agriculture, future enforcement and regulations should be delegated to that State agency whose primary responsibility is public health and/or worker health and safety.

B. Long range recommendations:

1. Statutory and regulatory changes needed to effect a safer workplace:

a. Hazard communication and field sanitation

- i. Farmworkers should continue to be covered under OSHA
- ii. The stronger worker standard, be it State or Federal should always pre-empt the weaker.

b. Workplace Insurance

- i. Farmworkers must be covered by unemployment insurance and Workers' Compensation insurance that is transferable between States.
- ii. Under Workers' Compensation, the minimum coverage must include the doctor's initial evaluation for any suspected work-related injury or illness.

c. Child Labor

Fair Labor practices regarding child labor and wage and hours must be adopted and enforced by OSHA/Department of Labor. This recommendation would be easier if day care services were available for farmworkers' families.

d. Adopt Industry-like Practices

Discontinue the agriculture exemption from compliance with other industrial health and safety practices. Especially with the use of pesticides, the agriculture workplace must be regulated as any other place of employment.

2. Fund Human Health Research:

a. Human health research should be funded by agencies in addition to the EPA, i.e. the National Cancer Institute (NCI), National Institute for Environmental Health Sciences (NIEHS), National Institute for Occupational Safety and Health (NIOSH), and the National Center for Health Statistics (NCHS). There needs to be better coordination between these Federal agencies responsible for conducting pesticide-related human health research.

b. Biological markers should be developed as a means of determining degree of exposure (e.g., urine dipstick) for use in the field as better means of enforcement. Urinary metabolite concentrations should reflect osmolality or creatinine differences.

c. Epidemiology studies (both prospective and retrospective) should be undertaken in the field of pesticide medicine. Linked computerized health records in migrant clinics and pesticide use and illness registration data should be available to assist this process.

d. A future Advisory Panel should be appointed to develop a complete health research agenda.

3. Education (both statutory and non-statutory):

a. Statutory changes need to include the following: posting with name of pesticide and symbol (skull and crossbones) to warn those who do not read; training for farmworkers to enable them to recognize pesticide health hazards and to take action when the need arises; training in pesticide health and safety for all applicators; distribution of crop sheets such as those developed in Texas for all applications so that doctors can know what workers have been exposed to in emergencies.

- b. Include health and safety educational materials and a system of delivery as part of the new EPA worker protection regulations.
 - c. Health and safety education programs must be multi-pronged in approach to reach all of the target populations, including growers and, especially, farmworkers.
4. Future Efforts:
Build in a mechanism for ensuring ongoing farmworker input into EPA decision-making.
 5. This panel should be reconvened to review the progress EPA is making on these recommendations once the EPA worker protection regulations are promulgated.

References

Alvarado, AJ, Riley, GL, and Mason, HO. (1990) Workers in Central California in 1989. Final Research Report, Center for Agricultural Business, California State University, Fresno, March.

Baker, SR and Wilkinson, CF (1990) Effects of Pesticides on Human Health. Princeton Scientific Publishing Co, Inc. pp 438.

Demers P. and Rosenstock, L (1991) Occupational injuries and illnesses among Washington State agricultural workers. Am J Pub Health 81:1656-1658.

EPA (1987) U. S. Environmental Protection Agency. Office of Policy Analysis, Planning and Evaluation, "Unfinished Business: A Comparative Assessment of Environmental Problems," Washington DC.

GAO (1992) U.S. General Accounting Office Report to Congressional Requesters. Hired Farmworkers Health and Well-Being at Risk. Pub. No. GAO/HRD-92-46, February, pp40.

Goldsmith DF (1991) Pesticide-related Health Care Issues: Focus on children. Pesticides and the Health and Safety of the Agricultural Work Force, Stockton, CA, December 10-11.

Goldsmith, DF, Morrin, LA, Schenker, MB. Survey of California physicians: Diagnosing pesticide-related illnesses. In Preparation.

Institute of Medicine (1988) Division of Health Promotion and Disease Prevention, Role of the Primary Care Physician in Occupational and Environmental Medicine, National Academy Press, Washington DC.

Institute of Medicine (1991) Division of Health Promotion and Disease Prevention, Addressing the Physician Shortage in Occupational and Environmental Medicine, National Academy Press, Washington DC.

Kreutzer R, Casey A, Deane M, Smith M, Goldman LR (1991) McFarland Child Health Screening Project, 1989 California Department of Health Services, Environmental Epidemiology and Toxicology Branch, Emeryville, CA, January pp44.

Merchant, JA, Kross, BC, Donham, KJ, and Pratt, DS, editors. (1989) Agricultural Occupational and Environmental Health: Policy Strategies for the Future. A Report to the Nation, December, Institutes of Agricultural Medicine and Occupational Health, Iowa City.

Mines, R, and Kearney, M. (1982) The health of Tulare County Farmworkers: A Report of 1981 Survey and Ethnographic Research, Tulare County Department of Health, April, pp. 87.

Morrin, LA, Kattan, A, Goldsmith, DF, Schenker, MB. (1989) Pesticide Safety and Training Materials Catalog. U. S. Environmental Protection Agency, Washington, DC

Moses, M. (1989) Cancer in Humans and Potential Occupational and Environmental Exposure to Pesticides. Am Acad Occup Health Nur J, March, 3: 131-136.

National Migrant Resource Program (1991) Experts meeting on Children and Pesticides, Savannah, GA, November 9-10.

Saunders LD, Ames RG, Knaak JB, Jackson RJ. (1987) Outbreak of Omite-CR induced dermatitis among orange pickers in Tulare County, California. J Occup Med 29:409-413.

Schenker MB (1990) Agriculture-related chronic disease. Health Concerns of Living and Working in Agricultural California, Report of a Conference held at the University of California, Davis June 6,7, Center for Occupational and Environmental Health, Berkeley, pp64-73.

Sharp, D, Eskenazi, B, Harrison, R, Callas, P, Smith, AH. (1986) Delayed Health Hazards of Pesticide Exposure. Ann Rev Public Health, 7: 441-471.

Singleton, J, and Beaumont JJ. (1990) California Occupational Mortality, 1979-1981; Adjusted for Smoking, Alcohol, and Socioeconomic Status, December 21, 1989.

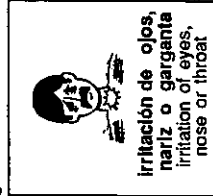
Villarejo, D. (1990) Environmental Effects of Living and Working in Agricultural Areas of California--Social and Economic Factors. Health Concerns of Living and Working in Agricultural California, Report of a Conference held at the University of California, Davis June 6,7, Center for Occupational and Environmental Health, Berkeley, pp17-44.

Wilk, VA. (1986) The Occupational Health of Migrant and Seasonal Farmworkers in the United States, National Rural Health Care Association, Kansas City, MO.

Wilkinson CF (1990) Introduction and Overview (Chapter 1) in Baker, SR and Wilkinson, CF (eds.) Effects of Pesticides on Human Health. Princeton Scientific Publishing Co, Inc. Princeton NJ pp 5-33.

LEA Y GUARDE ESTE INFORME DE COSECHA / READ AND SAVE THIS CROP SHEET

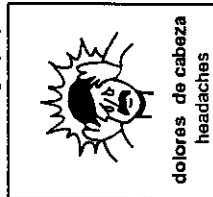
Este Informe de Cosecha es para trabajadores de vivero. Uno o varios de los siguientes síntomas pueden indicar que ha sido envenenado con un pesticida. This crop sheet is for greenhouse workers. One or several of the following symptoms may indicate a pesticide poisoning:



irritación de ojos, nariz o garganta
irritation of eyes, nose or throat



picañón, erupción de la piel o ampollas
itching, rash, or blisters



dolores de cabeza
headaches



vista borrosa
blurry vision



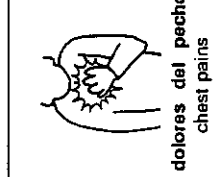
mareos
dizziness



sudar demasiado
excessive sweating



vómito
vomiting



dolores del pecho
chest pains

Insecticidas usados con frecuencia/ Commonly used insecticides	Período de Entrada Prohibida: No Entre a Las Areas Rociadas / Reentry Interval: Do Not Enter Sprayed Areas.	Al trabajar los pesticidas pueden caer sobre su piel, cabello, o ropa. When you work, pesticides can get on your skin, hair, or clothes.	Protégase! Use camisa de manga larga, pantalones largos, zapatos y calcetines, y un sombrero o una pañueta y guantes. Protect yourself! Wear long sleeved shirt, long-legged pants, shoes and socks, a hat or scarf and gloves.	El aspirar esto es venenoso. Poisonous if breathed.	Esto es venenoso por medio de contacto con la piel. Poisonous by skin contact.	El tomar esto es venenoso. Poisonous if swallowed.
Aldicarb (C1) Temik*	POR 24 HORAS For 24 hours					
Daminozide B-Nine*	POR 24 HORAS For 24 hours					
Chlorpyrifos (C1) Dursban*	POR 24 HORAS For 24 hours					
Acophaat (C1) Orthene*	POR 24 HORAS For 24 hours					
Oxanyl (C1) Vydate*	POR 48 HORAS For 48 hours					
Diazinon (C1) Diazinon*	Hasta que el pesticida esté seco/ Until pesticide spray has dried.					
Bifenthrin Talstar*	Hasta que el pesticida esté seco/ Until pesticide spray has dried.					
Malathion (C1) Cythion, Malathion*	Hasta que el pesticida esté seco/ Until pesticide spray has dried.					

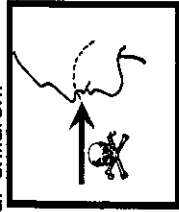
EFFECTOS A LA SALUD Y PRECAUCIONES HEALTH EFFECTS AND PRECAUTIONS

EFFECTOS A LARGO PLAZO / Long Term Effects:

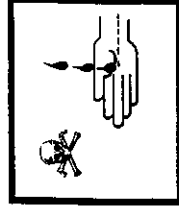
Se sospecha que algunos pesticidas causan defectos natales, aborto espontáneo, esterilidad en el hombre y la mujer, irritaciones a la piel, daños al hígado u otros órganos. También se sospecha que algunos pesticidas causan, a largo plazo, tumores o cáncer. / Some pesticides are suspected of causing birth defects, reproductive effects, skin problems, and injury to liver or other organs. Some pesticides are also suspected of causing tumors or cancer over a long period of time.

PRECAUCIONES EN GENERAL / General Precautions:

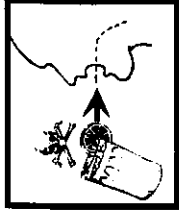
Los pesticidas se deben de usar y guardar de acuerdo con las instrucciones que aparecen en la etiqueta. Cuide su salud y la de su familia siguiendo las recomendaciones que se dan en este informe. / Pesticides must be handled, stored, and used according to label directions. Follow the safety precautions on this sheet to protect yourself and your children.



El aspirar esto es venenoso.
Poisonous if breathed.



Esto es venenoso por medio de contacto con la piel.
Poisonous by skin contact.



El tomar esto es venenoso.
Poisonous if swallowed.

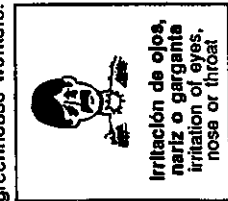
C1= Cholinesterase Inhibitor

Otros insecticidas usados son / Other insecticides used are : Abamectin, Aencymidol, Dimethoate, Endosulfan, Bacillus thuringiensis, Safer's Soap, Metam-Sodium, Chlormequat, Cyromazine, Fenvalerate, d-phenothrin, Dicofo, Eihophon, Resmethrin, Oxydemeton-methyl, Carbaryl, Bendiocarb, Lindane, Permethrin, Malathion, Parathion, Dientochlor, Fluvalinate.

* PRODUCTOS DE USO GENERAL
* Commonly used product

LEA Y GUARDE ESTE INFORME DE COSECHA / READ AND SAVE THIS CROP SHEET

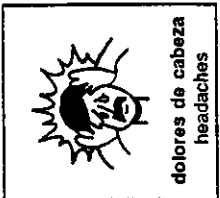
Este Informe de Cosecha es para trabajadores de vivero. Uno o varios de los siguientes síntomas pueden indicar que ha sido envenenado con un pesticida.
This crop sheet is for greenhouse workers. One or several of the following symptoms may indicate a pesticide poisoning:



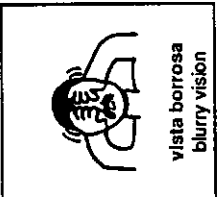
irritación de ojos,
nariz o garganta
irritation of eyes,
nose or throat



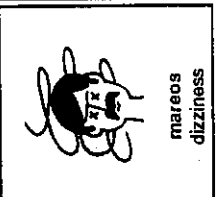
picazón, erupción de
la piel o ampolla
itching, rash, or blisters



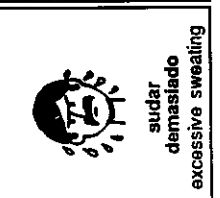
dolores de cabeza
headaches



vista borrosa
blurry vision



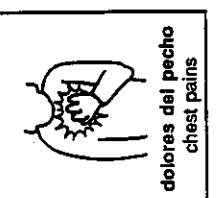
mareos
dizziness



sudar
demasiado
excessive sweating

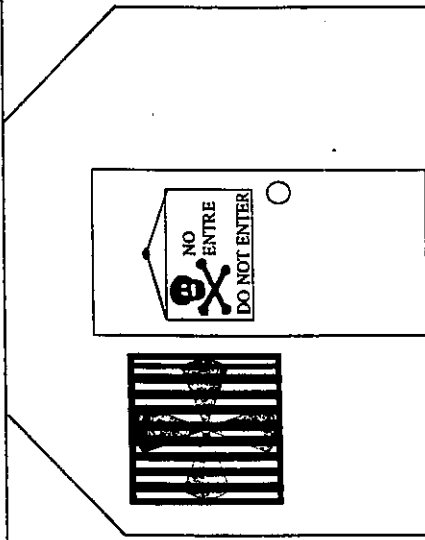


vómito
vomiting



dolores del pecho
chest pains

Fumigantes (o fumigantes en forma de rocío) son químicas que se aplican a todo el vivero en forma de humo o gas. Fumigants or Foggers are chemicals that are applied as a smoke or gas to the whole greenhouse.



Methyl Bromide Brom-O-Gas* Terr-O-Gas*	
Sulfotepp Dithio, Dithione, Plantfume 103*	
Dichlorvos Vapona, DDVP*	
Nicotine Nicotine Fumigátor*	
Chlorothalonil Exothermal Termil*	

No trabaje en el vivero hasta que éste haya sido completamente aireado. Busque un letrero de aviso en la puerta antes de entrar al vivero.

Do not work in the greenhouse until it has been completely aired out. Look for a warning sign on the door before you enter the greenhouse.

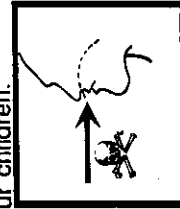
EFFECTOS A LA SALUD Y PRECAUCIONES HEALTH EFFECTS AND PRECAUTIONS

EFFECTOS A LARGO PLAZO / Long Term Effects:

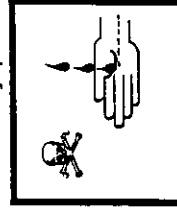
Se sospecha que algunos pesticidas causan defectos natales, aborto espontáneo, esterilidad en el hombre y la mujer, irritaciones a la piel, daños al hígado u otros órganos. También se sospecha que algunos pesticidas causan, a largo plazo, tumores o cáncer. / Some pesticides are suspected of causing birth defects, reproductive effects, skin problems, and injury to liver or other organs. Some pesticides are also suspected of causing tumors or cancer over a long period of time.

PRECAUCIONES EN GENERAL / General Precautions:

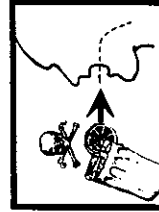
Los pesticidas se deben de usar y guardar de acuerdo con las instrucciones que aparecen en la etiqueta. Cuide su salud y la de su familia siguiendo las recomendaciones que se dan en este informe. / Pesticides must be handled, stored, and used according to label directions. Follow the safety precautions on this sheet to protect yourself and your children.



El aspirar esto es venenoso.
Poisonous if breathed



Esto es venenoso por medio de contacto con la piel.
Poisonous by skin contact.



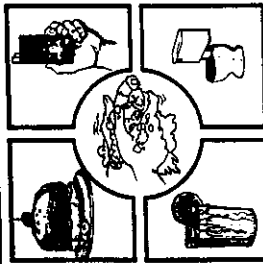
El tomar esto es venenoso.
Poisonous if swallowed.

* PRODUCTOS DE USO GENERAL
* Commonly used product

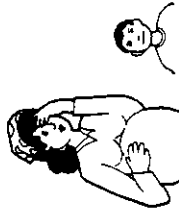
NOMBRE DEL PATRON / Name of Employer
DIRECCION / Address
TELEFONO / Phone Number

Distributed by:
TEXAS DEPARTMENT OF AGRICULTURE
Jim Hightower, Commissioner
P.O. Box 12847, Austin, Texas 78711
1-800-832-7347

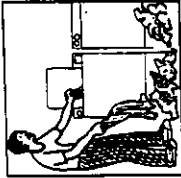
NO USE BOTES DE PESTICIDAS EN EL HOGAR / DO NOT USE PESTICIDE CONTAINERS FOR HOME USE



Lávese las manos bien con agua y jabón antes de comer, beber, fumar, masticar chicle o tabaco, o ir al baño.
Wash before eating, drinking, smoking using gum or tobacco, or going to the bathroom.



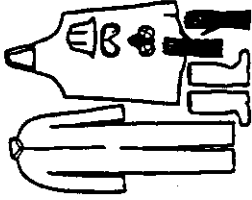
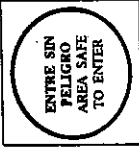
Mantenga su niño por nacer en buena salud! Consulte con su médico sobre los peligros de estar expuesta a pesticidas durante su embarazo.
Keep your unborn Baby healthy!
Ask your doctor about the risk of being exposed to pesticides during your pregnancy.



Es posible que ensucie la ropa de trabajo con los pesticidas. Lave su ropa de trabajo aparte de su otra ropa. Use ropa limpia todos los días.
Pesticides can remain on your work clothes. Wash your work clothes separately from other laundry. Wear clean clothes daily.



Busque un letrero de aviso en la puerta antes de entrar al vivero.
Look for a warning sign on the door before you enter the greenhouse.

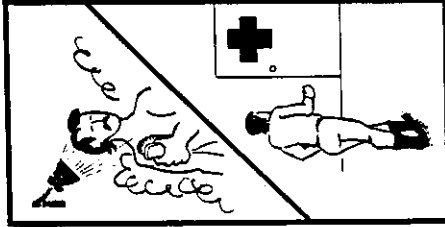


Use ropa extra protectora si Usted mezcla, carga, y aplica pesticidas.
Wear extra protective clothing if you mix, load, and apply pesticides.

SI Usted cree que tiene algun sintoma de envenenamiento con pesticidas:

- Inmediatamente lávese con jabón y agua.
- Vaya al doctor, hospital o clínica de migrantes más cercano.
- Vaya con un familiar o un amigo (No maneje Usted mismo).
- Liévase este Informe de Cosecha (Crop Sheet) para que lo vea el doctor.
- Dígame al doctor que Usted cree que ha sido expuesto a pesticidas.
- Para conseguir información de emergencia acerca de los pesticidas su doctor debe de llamar a su patrón o a un Centro de Control de Venenos al 1-800-441-0040 o al 409-765-1420 o al 1-800-392-8548 o la Cadena Nacional de Telecomunicaciones sobre Pesticidas al 1-800-858-7378
- Por ley se le requiere a los doctores reportar todos los envenenamientos por pesticidas en el trabajo al Departamento de Salud: 1-800-252-8239.

Como trabajador de vivero Usted tiene el derecho de:
• Pedir los nombres de las químicas que se usaron en la labor,
• Recibir de cada patrón los informes de Cosecha para cada cosecha en la que Usted trabaja,
• Pedir al patrón su lista de productos químicas e informes de estos productos,
• Presentar su queja al Departamento de Agricultura de Texas si sus derechos han sido violados. LLAME GRATIS AL 1-800-832-7347, y
• Asistir a los programas de entrenamiento presentados por el Departamento de Agricultura de Texas o por el Servicio de Extensión Agrícola de Texas, (según donde usted trabaje). Comuníquese con su oficina local o llame al 1-800-832-7347.



If you think you have a pesticide poisoning symptom:


- Immediately wash with soap and water.
- Go to the nearest doctor, hospital, or migrant health clinic.
- Have a family member or friend go with you (Do not drive yourself).
- Take this Crop Sheet with you for the doctor.
- Tell the doctor you think you were exposed to pesticides.
- Have your doctor call to get emergency information about the pesticides from your employer or from a Poison Control Center at 1-800-441-0040 or 409-765-1420 or 1-800-392-8548 or The National Pesticide Telecommunications Network at 1-800-858-7378
- Doctors are required by law to report all occupational pesticide poisonings to the Texas Department of Health: 1-800-252-8239.

As a greenhouse worker you have the the right to:


- Request the names of the chemicals that have been applied to a field.
- Receive Crop Sheets each season from each employer.
- Receive the Workplace Chemical List and Material Safety Data Sheets from your employer(s) when you ask,
- File a complaint with the Texas Department of Agriculture if your rights are violated. CALL 1-800-832-7347, and
- Attend training programs provided by the Texas Department of Agriculture or Texas Agricultural Extension Service, (depending on where you work). Contact your local office or call 1-800-832-7347.

LEA Y GUARDE ESTE INFORME DE COSECHA / READ AND SAVE THIS CROP SHEET


Este Informe de Cosecha es para trabajadores de vivero. Uno o varios de los siguientes síntomas pueden indicar que ha sido envenenado con un pesticida. This crop sheet is for greenhouse workers. One or several of the following symptoms may indicate a pesticide poisoning:




Irritación de ojos, nariz o garganta
irritation of eyes, nose or throat




picaazón, erupción de la piel o ampolla
itching, rash, or blisters



dolores de cabeza
headaches




vista borrosa
blurry vision




mareos
dizziness











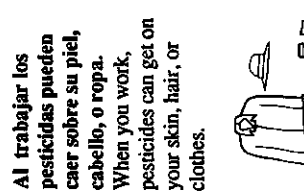

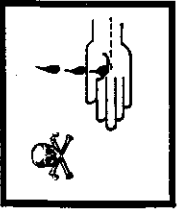
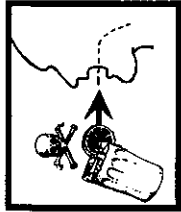
sudar demasiado
excessive sweating



vómito
vomiting



dolores del pecho
chest pains

Fungicidas usados con frecuencia / Commonly used fungicides	Período de Entrada Prohibida: No Entre a Las Areas Rociadas / Reentry Interval: Do Not Enter Sprayed Areas.	EFFECTOS A LA SALUD Y PRECAUCIONES / HEALTH EFFECTS AND PRECAUTIONS
Benomyl Benlate*	 POR 24 HORAS For 24 hours	<p>EFFECTOS A LARGO PLAZO / Long Term Effects: Se sospecha que algunos pesticidas causan defectos natales, aborto espontáneo, esterilidad en el hombre y la mujer, irritaciones a la piel, daños al hígado u otros órganos. También se sospecha que algunos pesticidas causan, a largo plazo, tumores o cáncer. / Some pesticides are suspected of causing birth defects, reproductive effects, skin problems, and injury to liver or other organs. Some pesticides are also suspected of causing tumors or cancer over a long period of time.</p> <p>PRECAUCIONES EN GENERAL / General Precautions: Los pesticidas se deben de usar y guardar de acuerdo con las instrucciones que aparecen en la etiqueta. Cuide su salud y la de su familia siguiendo las recomendaciones que se dan en este informe. / Pesticides must be handled, stored, and used according to label directions. Follow the safety precautions on this sheet to protect yourself and your children.</p>
Eridiazole+Thiophanate Banrol*	 Hasta que el pesticida esté seco/ Until pesticide spray has dried. POR 4 DIAS For 4 days	
Captan Captan*	 POR 24 HORAS For 24 hours	
Metaxyl Ridomil, Subdue*	 Hasta que el pesticida esté seco/ Until pesticide spray has dried. POR 24 HORAS For 24 hours	
Aluminum tris Aliette*	 Hasta que el pesticida esté seco/ Until pesticide spray has dried. POR 24 HORAS For 24 hours	
Iprodione Chipco*	 Hasta que el pesticida esté seco/ Until pesticide spray has dried. POR 24 HORAS For 24 hours	
Eridiazole Truban, Ethazol*	 POR 24 HORAS For 24 hours	
Chlorothalonil Daconil*	 POR 24 HORAS For 24 hours	
<p>Al trabajar los pesticidas pueden caer sobre su piel, cabello, o ropa. When you work, pesticides can get on your skin, hair, or clothes.</p>  <p>Protégase! Use camisa de manga larga, pantalones largos, zapatos y calcetines, y un sombrero o una pañuelita y guantes. Protect yourself! Wear long sleeved shirt, long-legged pants, shoes and socks, a hat or scarf and gloves.</p>		
 <p>El aspirar esto es venenoso. Poisonous if breathed.</p>		
 <p>Esto es venenoso por medio de contacto con la piel. Poisonous by skin contact.</p>		
 <p>El tomar esto es venenoso. Poisonous if swallowed.</p>		

Otros fungicidas usados son/ Other fungicides used are: Mancozeb, Maneb, Triadimefon, Copper hydroxide, Triforine, Zyban, Vinclozolin, PCNB.

* PRODUCTOS DE USO GENERAL
* Commonly used product