

Hazard Communications for Agricultural Workers

October 2007

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Executive Summary



Pesticide exposure is one of the many occupational risks facing agricultural workers. Workers may be exposed to pesticides by preparing pesticides for use, applying pesticides, or working in fields where pesticides have been applied. The U.S. Environmental Protection Agency (USEPA) is responsible for implementing the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which includes the 1992 Worker Protection Standard (WPS) and the Certification and Training (C&T) requirements. FIFRA establishes standards for safe use of

pesticides and specific protections for agricultural workers from occupational exposure to pesticides under the WPS and C&T regulations.

The USEPA is currently reviewing the existing Worker Protection Standard in preparation for a formal rule-making process to revise, update and improve the regulations protecting agricultural workers. This research was undertaken to help USEPA and other federal and state agencies revise the WPS and C&T rules to better protect farmworkers and their families from pesticide exposure. This report is a follow-up to “Evaluation of the Effectiveness of Symbols and Hazard Communication Materials,” released in August 2006. This study probed deeper into two particular areas touched on in the original study: what kind of information farmworkers would like to know about pesticides and how they want the information transmitted. This study increased the size of the original hazard communication study group by 50% (from 54 participants to 83 total participants) and on the overlapping questions and themes, this two studies strongly supported each other.

Key Findings

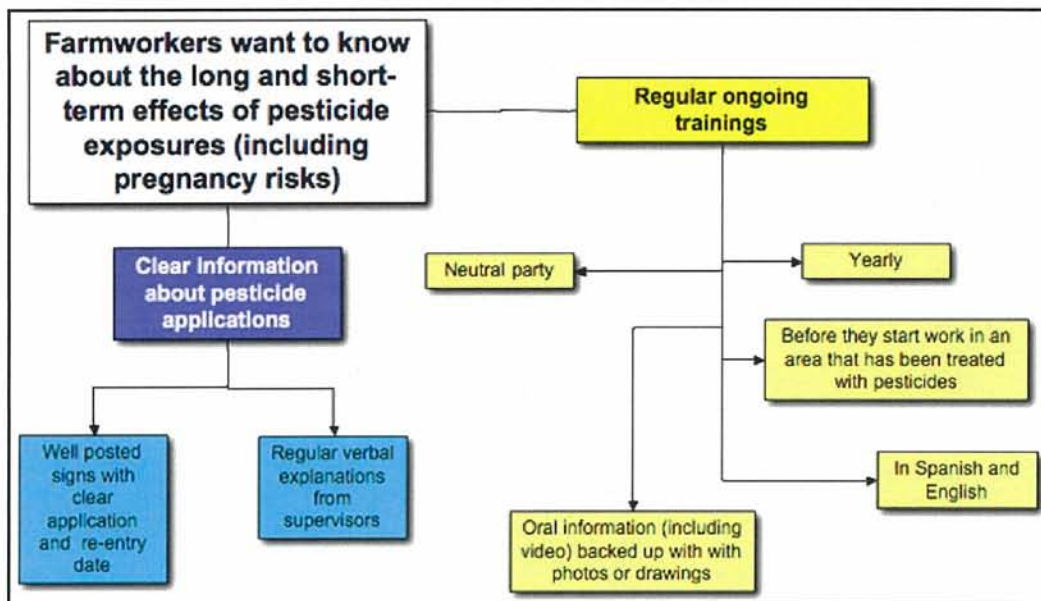
This study asked farmworkers what they wanted to know about pesticides and how they felt that information could best be communicated (Figure 1). Farmworker participants clearly wanted:

- 1. Information on short and long-term health effects of the pesticides they are working with, including the risks for pregnant women.** Above all other topics, participants worried about the long-term effects of pesticide exposure and had misconceptions about pesticide exposure. Some workers expressed the view that common pesticide exposure symptoms (like headaches, rashes, and upset stomachs) are simply normal consequences of daily farmwork, rather than an indicator of the need for urgent corrective action. The finding that chronic pesticide exposure is not well understood or respected reiterates the need for better information about health effects as well as other improvements in pesticide safety training noted below.
- 2. Annual pesticide safety training.** Farmworkers wanted regular ongoing trainings, preferably annually, before they start work in an area that has been treated with pesticides. Farmworkers want to receive this training in Spanish and English and from someone knowledgeable, certified, and independent of employers. They prefer to receive information verbally and on paper with simple drawings, or in a video. Throughout the workshops, participants revealed a variety of misconceptions about

pesticides that point to the need to increase the frequency of pesticide safety training. These misconceptions include the beliefs that acute symptoms of pesticide exposure are a normal by product of working in the fields and need not be taken seriously, misconceptions about the difference between a pesticide and a fertilizer, and a general lack of support or regular reinforcement for pesticide knowledge leading workers to focus less on safety.

3. **Specific information about pesticide applications.** Farmworkers wanted information on the specific danger levels of the pesticides they may be exposed to at work. If there is a re-entry interval in effect, they would like information from a supervisor about when the pesticides were applied and when it is safe to go back in.
4. **The Skull and Crossbones symbol.** Farmworkers agreed that the skull and cross bones was recognized as a universal sign for danger that keeps people out of areas and that benefits even those people who cannot read.
5. **Information on preventative measures and what to do in case of exposure.** Farmworkers wanted to know about the preventive measures they need to take both in general and with specific pesticides which they may be exposed to. Finally, they want to know what to do in case of exposure.

Figure 1: What workers want to know about pesticides

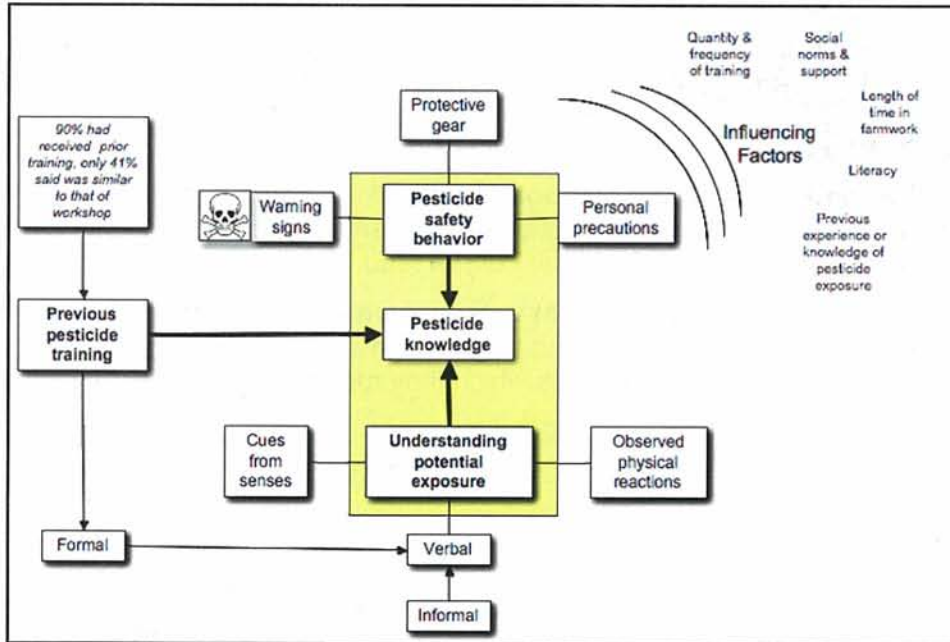


Based on workshop discussion with farmworkers, a number of factors likely influence an individuals ability to protect themselves from pesticide exposure (Figure 2). These factors include:

1. The amount and frequency of pesticide training;
2. Positive social norms around pesticide safety prevention;
3. The length of time spent in farmwork;
4. Social support for taking protective measures from coworkers, superiors, family, and friends;
5. Ability to understand spoken instructions as well as written materials in Spanish;
6. Knowing someone personally who has suffered from pesticide exposure.

As the USEPA revises and updates the pesticide safety standards and hazard communication regulations, these factors should be taken into account to ensure that proposed program reflects the needs, desires and realities of farmworkers.

Figure 2: Factors contributing to farmworker knowledge about pesticides



INTRODUCTION AND PURPOSE

According to the National Safety Council, agriculture is the most hazardous industry in the nation. And pesticide exposure is one of the many occupational risks facing of agricultural workers. Workers may be exposed to pesticides by preparing pesticides for use, applying pesticides, or working in fields where pesticides have been applied. The U.S. Environmental Protection Agency (USEPA) is responsible for implementing the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) FIFRA establishes standards for safe use of pesticides. FIFRA also includes specific protections for agricultural workers from occupational exposure to pesticides under the 1992 Worker Protection Standard (WPS) and the Certification and Training (C&T) requirements.

The WPS offers protections to approximately 2.5 million agricultural workers (people involved in the production of agricultural plants on farms, forests, nurseries and in greenhouses) and pesticide handlers (people who mix, load, or apply pesticides) that work at over 600,000 agricultural establishments nationwide. The WPS contains requirements for pesticide safety training, notification of pesticide applications, use of personal protective equipment, restricted entry intervals following pesticide application, decontamination supplies, and emergency medical assistance. Certain Pesticides may be applied only by or under the direct supervision of applicators trained in accordance with Federal C&T requirements. The C&T regulations establish standards for the training of certified applicators nationwide. While the WPS and C&T programs provide minimum national standards of pesticide safety, both regulations need revisions, amendments and improvements to ensure agricultural workers, pesticide handlers and the public are protected from pesticide exposures.

The USEPA is currently reviewing the existing WPS rules in preparation for a formal rule-making process to revise, update and improve the regulations protecting agricultural workers. This research was undertaken to inform USEPA and other federal and state agencies on a Federal Hazard Communication rule and revisions to the WPS. This report is a follow-up to the "Evaluation of the Effectiveness of Symbols and Hazard Communication Materials," released in August 2006. This study increased the size of the original hazard communication study group by 50%. This study also probed deeper into two particular areas touched on in the original study: what kind of information farmworkers would like to know about pesticides and how they want the information transmitted.

METHODS

Three pesticide workshops were conducted in two California communities, one in Delano (a central valley location) and two in Salinas (a central coast location). The two separate geographical locations were selected in order to have participation from workers from different agricultural sectors (field workers and nursery workers). Workshops were held in farmworker friendly locations. Each 2-hour workshop was conducted in Spanish and included a 20-minute presentation on pesticide safety. Refreshments were provided for all groups. Childcare was also provided during the women's workshop in Salinas. Each participant received an honorarium of \$50 for his or her participation. Participants in each workshop were as follows:

- **Workshop 1:** The Delano workshop consisted of 11 men who were currently employed in fieldwork. The average age of the men was 33, and they had an average of 10 years' experience in fieldwork. Ten of the men worked in the grape harvest and one worked

with the blueberry crop.

- **Workshop 2:** The Salinas workshop had 6 women participants, all of whom were currently employed in fieldwork. The average age of the women was 38, and they had an average of 19 years' experience in fieldwork. The women were currently working in the following crops: lettuce, strawberry, grape, and apple. Two of the women had previously worked in nurseries but only for brief periods (3 and 8 weeks).
- **Workshop 3:** The third workshop was held in Salinas and consisted of 12 women participants, 9 of whom were currently employed in nurseries and 3 in the field. The average age of the women was 42, and they had an average of 12 years' experience in fieldwork and nursery work. The women had varying work experience, with the majority of the nursery workers having worked previously in the field for a number of years or in packing houses.

The research design originally envisioned conducting just two workshops, one with male participants, and the other with female participants. The second workshop was intended to have a good mix of crop and nursery workers. Our standard recruitment procedures notwithstanding, we had a poor turnout for this workshop. While the data collected from the six participants who did turn out for this workshop was useful, we conducted a third workshop in order to obtain a high number of overall workshop participants and a more representative sample of nursery workers.

In recruiting for the workshops, we sought out potential participants with the following characteristics:

- Currently working in fieldwork (such as harvesting, pruning, caning, weeding, etc.) or nurseries/greenhouses, but not directly working with pesticides (such as mixing/loading, applying or otherwise handling pesticides)
- Previous participation in pesticide safety training¹
- Fairly new to fieldwork to prevent highly experienced workers from dominating discussions.
- Not members of the same household (family members, roommates etc.)
- From different places of origin (not everyone should be from same sending community)
- Monolingual Spanish speakers (minimally first language Spanish speakers)
- A range of ages (18-50)²
- Different literacy levels (including illiterate workers)
- Not too dissimilar education levels

SUMMARY OF WORKSHOPS

This section is organized by research question.

¹ This was asked as a screening question in a way that did not reveal the topic of the focus group.

² Participants' actual ages ranged between 20 and 40.

1. Knowledge of Pesticide Safety

Research Question #1: What do fieldworkers know about pesticide safety?

1a. Knowledge of pesticides

Summary of Key Findings

- Workshop Participants were aware of pesticides, but sometimes had an imperfect conceptual understanding of how they worked.
- Participants correctly understood pesticides as substances that are helpful when applied to crops but are harmful to humans.³

Detailed Findings

Workshop participants defined pesticides as chemicals that “hurt your body,” but useful to “kill weeds,” “combat insects so that the crop is not damaged,” “cover the fruit as a spray to cover and protect the grape,” “help the fruit grow,” and “protect oranges against freezing weather.” Female participants tended to discuss pesticides mostly as a product for combating pests: “Chemicals that they spray on plants to ward against any infestations.” Some of the men and women had misconceptions about the difference between a pesticide and a fertilizer. One participant, for example, said: “They throw chemicals on the grapes to make [them] grow, the grape, the bulb. The more chemicals they throw on, the more [they] grow . . . there are chemicals for that.”

1b. Knowledge of Pesticide Safety

Summary of Key Findings

Overall, workshop participants were aware of pesticide safety precautions that included:

- staying out of the fields after pesticide spraying
- wearing protective clothing or equipment
- taking personal responsibility for protecting themselves.

Participants understood the meaning of the skull and crossbones symbol and recalled seeing it in the fields.

Detailed Findings

Warning Signs. Workshop participants knew of the use of signs posted to ensure people stayed out of treated areas. They were all familiar with the signs with the skull (*calvera*) and crossbones on it⁴. They not only understood what this symbol of danger means, they recalled seeing it in the fields. They appreciated the need to wait a certain number of days before entering a pesticide-treated field. One participant stated: “We know how much time we have to

³ After participants shared their definitions of pesticides, the workshop moderator of each workshop provided this definition: “Pesticides are deemed as any chemical used to kill unwanted weeds or animals in a field, nursery or greenhouse.” (*Los Pesticidas se definen como cualquier químico usado para matar a malas hierbas o a animales indeseados en el campo o un invernadero.*)

⁴ California state regulations require use of the field posting sign with the skull and crossbones, not the Federal WPS field posting sign (with the ‘stern-faced man’).

wait because the supervisors, those in charge, have to put up a sign, a skull that announces it.”

Protective Gear. Many of the men shared their knowledge about the need to use proper protection and following certain rules when working in areas exposed to pesticides. The men mentioned masks, gloves, long-sleeve shirts, and closed shoes. Some reported being unable to smoke in certain areas due to the pesticides applied. Similarly, many of the nursery worker women mentioned using masks, bandanas, gloves, suits, boots and sometimes complete bodysuits. Participants were aware of the varying dangers among the pesticide chemicals used. They shared that the stronger chemicals require more protection. Regarding body suits, one female participant said, “Only when the chemical is really strong do they use a complete suit.” Participants were not always distinguishing between protective equipment worn by applicators, by early entry workers, or by workers entering areas treated with pesticides not under any entry restrictions.

Personal Precautions. Overall, both male and female participants mentioned personal responsibility for pesticide safety that included many precautions must be taken to not touch, contaminate, or be near family members or use other shared utensils/tools because the chemicals are very strong. One participant said, “Wash your hands before you eat or before using the bathroom.” Regarding safe drinking water, another said, “the water always has a filter, the one we drink. They have the hoses marked with signs, which one is the one [for using] with pesticides and which one is for drinking.”

1c. Pesticide Exposures

Summary of Key Findings

- Virtually all of the participants were aware of pesticide exposures that they themselves, or coworkers had experienced.
- A few shared what they perceived as severe consequences of pesticide exposure (cancer, miscarriage).
- Nursery workers surveyed claimed to be unaware of any actual pesticide exposures.

Detailed Findings

Male Farmworkers’ Experience. None of the male participants claimed to have personally suffered from pesticide exposure but some knew of coworkers who had. Symptoms that they have witnessed among other fieldworkers included those who got a skin rash “with a lot of bumps” due to the “sulfur” used on the grapes. One participant said, “I know some people who did not notice that before they entered that they had sprayed a strong chemical and they started to vomit . . . it was in the grape. There was a warning but the supervisor did not notice it.” Another participant noted skin concerns in relation to sulfur: “Right now that we are working in the field, we get full of rash spots because they use sulfur. They do not put signs when they use sulfur.” Some participants also told about coworkers who experienced dizziness, upset stomachs, vomiting, and diarrhea after eating fruit that had been treated with pesticides. Participants understood that they should not eat treated fruit, but as one explained, “Sometimes the fruit looks really good and it is treated, they get sick in the stomach with diarrhea because they eat it.”

Female Farmworkers' Experience. Many of the female fieldworkers and co-workers they know had suffered headaches, nausea, or rashes that they attribute to pesticide exposure. Two of these fieldworkers reported having been ill with skin rashes due to pesticide exposure. A third fieldworker reported knowing co-workers that have had bad skin rashes. Two women also shared their concerns about potentially severe consequences from exposure. One woman suffered a miscarriage several years back when she was working in a field near a pesticide treated area. She stated, "Many years ago I was pregnant and we were far away but there was a plane flying over but I think that [the pesticides] affected me because I got a pain in my stomach that same day and I lost my baby and another woman that was in the same place as I but in a different group that was nearby, she also lost her baby at the same time." Another woman thought her husband's experience with cancer was possibly a consequence of farmwork, noting "My husband got a cancer called lymphoma and they told him that it may have been where he got it and also that it could have been the chemicals. He worked for a time fumigating but they told him it may have been because of that, they are not sure."

Nursery Workers' Experience. Interestingly, none of these workers reported having been ill or had seen ill co-workers due to pesticide exposure.

1d. Preventing Exposure

Summary of Key Findings

- Responses varied in terms of to what ~~extent~~ workers could do to prevent pesticide exposure.
- All mentioned personal behaviors which could minimize their exposure to pesticides.
- Many cited agricultural practices outside of their control and placed much of the responsibility for avoiding exposure on their supervisors.

Detailed Findings

Changes in Agricultural Practices. One participant suggested more organic farming would be the best way to prevent pesticide exposure. Another wanted pesticide applications to occur only at night, stating "I think that to avoid pesticides or chemicals they should apply those at night when there aren't people there. Because sometimes they spray in one area and there are workers in another and the wind still brings it over." Night applications are common in certain areas of California but do not prevent residue exposure from treated plants. This discussion clearly indicated a lack of understanding of how fieldworkers are potentially exposed to pesticides.

Supervisors' Responsibilities. Many farmworkers felt that the surest way to prevent exposure to pesticides is to stay out of the treated fields until it is safe to enter. Some of the male participants thought that it is the responsibility of the supervisor (*mayordomo*) to alert the workers when it is safe to go into a field to work. While the WPS regulations require workers to stay out of treated areas during the period of greatest risk (the Restricted Entry Interval, or REI), early entry is allowed in certain situations. Some of the female participants stated that they had been told to make sure that their supervisors take them to a different place to avoid pesticide exposure during pesticide applications. There was also a desire expressed to know more about the chemicals being used. Participants who had reported spraying chemicals for a brief time in

the past said that they were not told which pesticide they were applying, but just where to apply it. One of them said, “Last year I worked spraying pesticides . . . but they did not tell us what we were applying. They just tell us to put it down there . . . they give us a mask, gloves and protection.” (Federal and State regulations require employers to assure pesticide applicators and handlers know what pesticides they are applying and understand the label requirements).

Fieldworkers’ Responsibilities. Regarding measures that could be taken to minimize the risk of exposure, several of the men suggested washing the fruit before consumption to prevent stomach illnesses and diarrhea. Many of the women mentioned that they always wear protective gear while they work in the nurseries. The items mentioned include gloves, long sleeve shirts, hats, and handkerchiefs. One of the participants noted that some people have more sensitive skin than others and are still prone to skin irritations even when they wear protective gear: “There are people that are very sensitive, I am one of those people that, even though I have on long sleeves, I still get sick on my skin.”

2. Pesticide Safety Training

Research Question #2: What do fieldworkers know about any previous pesticide training?

2a. Previous Pesticide Training

Summary of Key Findings

- Nearly all (26 out of 29) of the workers in our workshops reported having received some type of pesticide training, but it was not always perceived as formal “training” when offered.
- There were differences of opinion about why and when these trainings were typically provided.

Detailed Findings

Extent and Timing of Training. Seven of the eleven men reported having been provided with pesticide training in the past. Four of them stated the last time they had received training was over a year ago, while the other three said that it had occurred over two years ago. All eighteen of the female participants reported having had received pesticide training sometime in the past. Participants also realized that the timing of trainings was dependent on different circumstances and was not consistent. Some participants pointed out that the information was provided when the pesticide application was occurring: “They have had meetings when they spray so that we do not go in. That if a person tells us that to go in a house and if the sign is there, we should not go in.” Another participant noted that the trainings appeared to be offered to meet their employers’ insurance requirements: “It is because the insurance demands it. Every month they give talks because of the insurance.” Others pointed out that the training occurred when they first began their job or once a year. As one of them noted, “For us, who work in the field, we get explanations when we first start the job. It is once a year.”

Workers’ Comprehension. There were varying levels of understanding regarding the level or depth of training that had occurred. For example, when initially asked this question, the women from the nursery did not recognize the process they had gone through as being a “training.” They described it more like a brief, informative chat or talk: “Training no, they give us chats.” This discussion mirrored the results of a study conducted San Luis Obispo County, California by the “Farmworker Safety Initiative” (FSI). Participants in the FSI study identified ‘information’ as the term used most often at the job site and participants regarded ‘information’ as less formal

than a 'training'. Advising a worker of the risk of contamination, how to use a tool or machines correctly, or how to reduce risks at work was considered 'information'. The San Luis Obispo study also found that while 80% of the farmworkers surveyed had received pesticide safety training, their overall knowledge of pesticide exposure, first aid measures, and routing decontamination was incomplete. (Source: Farmworker Safety Initiative, Phase II: Final Report.)

3. Pesticide Exposure Knowledge and Perceived Needs

Research Question #3: What kind of information do fieldworkers want to know about pesticides?

3a. How Farmworkers Know a Pesticide Application Has Occurred

Summary of Key Findings

- Farmworkers reported identifying a pesticide application through smell, physical reactions, observation, direct communication from supervisors.
- Farmworkers conceded that at times they could not tell for certain but suspected that pesticides had been applied.

Detailed Findings

Odor. Farmworkers reported identifying the application of pesticides through the sense of smell. Participants agreed that the smell is a sure sign that pesticides have been applied to a field. One of them stated, "Sometimes there are no signs. One time when I was working in watermelon, they had sprayed but there were no signs, but we knew they had sprayed because of the smell . . . we even told the supervisor, and he told us to just work there [anyway]." (Pesticide labels include Restricted Entry Intervals (REI) following pesticide applications during which time entry is prohibited, except with certain protections. Federal and State regulations do not require posting of fields for all pesticide applications.)

Visual Observation. Several farmworkers stated that they became aware of the use of pesticides by observing planes spraying far away. In these situations, the winds are liable to carry the pesticide towards them as they continue to work in their own location. One participant noted, "We see that they are there with the spray." Another point that a participant made was that there can be visual cues on the plants themselves: "Another thing is that [even] if they don't have the sign up, the plants have a white residue."

Verbal Warnings. Farmworkers reported that supervisors often post a sign with the date that a field was sprayed, and how long workers should keep away from that field. On this topic, one nursery worker said, "When we are working in a house that needs to be sprayed, they take us out. They tell us that they sprayer is coming and we exit to work in other houses."

Adverse Physical Reactions. In some cases, farmworkers reported identifying the application of pesticides through physical reactions. In response to this question, workers discussed symptoms such as headaches, skin irritation, nausea, and dizziness.

Uncertainty. Farmworkers reported not always being able to identify when pesticides were applied. One of the men reported that there are not always signs posted after spraying and that he has been forced to go into a field and work even though he suspected that pesticides had been applied in that location. (Federal and State regulations do not require posting warning

signs for all pesticide applications.)

3b. How Farmworkers Recognize Exposure to Pesticides

Summary of Key Findings

- Workshop participants were vocal about the ways in which they are aware of exposure to pesticides.
- All participants were aware of common signs of pesticide exposure.

Detailed Findings

Participants agreed that signs of pesticide exposure include dizziness, headaches, teary or red eyes, sore throat, nausea, upset stomachs, vomiting, and skin irritation such as rashes. One worker said, "If you are dizzy, have teary eyes or dry throat, which means you've been exposed to pesticides." Another worker declared, "Most of us that work in the field have tired and red eyes. If you look at the eyes of a person that works in an office and then look at the eyes of a field worker, you'll know who's working where."

3c. What Farmworkers Want to Know about Pesticides

Key Finding

- Both male and female workers were concerned about the danger levels, long and short-term effects of any pesticides applied, preventive measures, and what to do in case of exposure.
- Some thought supervisors should be chiefly responsible for warning farmworkers about potential dangers from pesticide exposure.

Detailed Findings

Fieldworkers' Concerns. Several of the male participants wanted to know more about what pesticides were used in order to take appropriate preventive measures and to know what to do in case of exposure. Some male fieldworkers also expressed concern about long term safety of pesticides. One wanted to know "what the harm is to us once we have worked a long time at this job or how many years we can last [at this job] before it becomes harmful further down the line." Another said that he had heard reports about "workers that become sterile after 10 or 15 years or their children are born sick." One man said, "I think that we all want to make sure that it is really safe and that it won't affect us in the future." This concern about long-term health effects is in line with previous findings.⁵

Some thought supervisors should be responsible for warning workers of dangers. As one male participant stated: "[The supervisor] should let us know what type of chemical was used so that we can use the appropriate protection." The female participants also wanted to know the risks for pregnant women and how far into their pregnancies they should work because their supervisors were reluctant to send them home. Some of the male participants stated that the

⁵ Table 30: What kind of information would you like to know about the pesticides that may have been used in the field where you do farmwork? (P. 26) Glasnapp et al. (2006) Evaluation of the Effectiveness of Symbols and Hazard Communications Materials: Final Report: Phases I and II.

information they sought on pesticides should be provided by someone, such as a supervisor who knows who “knows how to speak well so that people can understand him.” They also reiterated that signage should always be posted where it can be seen.

Nursery Workers’ Concerns. The biggest concern for this group of women was whether pesticides will have long-term effects on their health. There was a lot of uncertainty about safety levels, even when they were being told it is safe to work around certain materials. One participant stated: “I would really like to know more about whether or not this will truly affect us in the future, in our health a few years down the line . . . we are working with a grass not fully grown (*zacatito*) which comes treated already, but we could be eating something during our mid-break and we are not washing our hands. (It was not clear whether they are not washing their hands because there is not time or access to water, or if they are simply choosing not to wash their hands. Either way, this discussion reiterates the need to improve training on preventing exposure through hand washing.)

4. Preferred Pesticide Training Methods

Research Question #4: *How would fieldworkers like to receive information about pesticides?*

a. How Farmworkers Have Received Information about Pesticides

Summary of Key Findings

- Participants had received pesticide information through both informal communications through friends and coworkers and formal notifications through supervisors and certified or professional outside trainers.
- Workers also mentioned the mechanisms by which they received this information, including didactic lessons, chats, pamphlets, and video presentations.

Detailed Findings

The male participants shared receiving information from coworkers, supervisors, trainers and other people that know about pesticides. Both genders stated that they generally received pesticide information orally, in classes or workshops, or from someone would come in to speak with them. The nursery workers referred to these as “chats.” One participant noted, “For us, there’s a person that comes here, someone who’s trained. I think they have a license for that and they gave us information and a book where they were reading from and we were reading along. Whatever the book said, that’s what they read and . . . it has words and photos.” Some participants also mentioned that they had been shown a movie on the subject and liked it because they could visualize the lessons in real life scenarios.

4b. How Farmworkers Would Like to Receive Information about Pesticides

Summary of Key Findings

- Direct, personal presentation was the preferred method of receiving pesticide information, while visual methods (through illustrated pamphlets with pictures or though videos) were as also preferred.
- Written materials should not be the sole method of communication with workers because

many workers do not know how to read or to read very well.

Detailed Findings

Participants preferred verbal warnings and visual presentations to written materials in order to understand pesticide exposure dangers. This is in line with previous findings.⁶

Direct, Personal Presentations. Participants stated that the preferred, most efficient method of receiving pesticide information was verbally and in person. As one participant stated, “If we have doubts, we can’t ask a pamphlet. Pamphlets are to have the information later.”

Written Materials. One participant warned against reliance on written materials distributed to workers: “They make us go to the meetings and the papers they give us sometimes end up misplaced somewhere, when we get home, we don’t even know where.” Another woman stated, “I don’t think that it should be written because many don’t know how to read and we’re embarrassed to say, ‘I don’t know how to read,’ and we take the paperwork they give us and we put it in our back pocket and we get home and we throw it away. I don’t know how to read [either, but] I’m not embarrassed to ask . . .” If written materials like pamphlets are to be used anyway, participants thought they should be in both English and Spanish, with either examples or pictures. Female participants noted that written materials should contain figures as few words as possible because most workers do not know how to read.

According to the National Agricultural Workers Survey (NAWS) 2003-2004 data, the majority of workers born in Mexico and other foreign-born Hispanics could not speak or read English “at all”. Considering 77% of the national hired crop labor force is foreign born (in California, 96% of the farmworkers are estimated to have been born in Mexico), high illiteracy rates should be expected.

Video Presentations. Another favored method of receiving information, mentioned by both men and women, is through video presentations. One participant noted that videos are a good way to transmit information to non-readers: “It would be nice if the contractors and companies would show videos because there are many farm workers that know how to read a little but there are many that don’t know how to read at all.” Another participant noted that video is a good way to convey how other farmworkers have suffered consequences from pesticide exposure, stating “I have seen a video where a fellow worker is seen telling his experience about something that happened to him . . . an inspector from the company insurance brought us that video, I think it shows a person without fingers, they are real people that have suffered accidents.”

4c. How Often Farmworkers Want To Be Trained

Summary of Key Findings

- Workers believed that training was important, particularly for newcomers.
- They thought pesticide training should occur at a minimum once every year.
- Some workers believed that trainings should occur monthly.

⁶ Table 31: How would you like that information to be transmitted to you? (P. 26) Glasnapp et al. (2006) Evaluation of the Effectiveness of Symbols and Hazard Communications Materials: Final Report: Phases I and II.

Detailed Findings

Male Fieldworkers' Opinions. There was a range of opinion on the intervals between training. Six workers thought that pesticide training should occur once every year. Thirteen (including 12 nursery workers and 3 fieldworkers) thought it was needed twice as often, every 6 months. Others preferred even more frequent trainings: one said once every three months, and seven thought that trainings taking place monthly or every other month would be best because there are many new workers that come into the workforce so frequently that they would otherwise not be assured of receiving the training they need for safety's sake. One participant suggested, to general agreement, that trainings should be scheduled flexibly based on specific job tasks, the number of new employees, or the type of crop involved. He said specifically, "I think it depends on the work and what we need to do . . . sometimes there are new workers and they do not know [about pesticides]."

Female Fieldworkers' Opinions. The female participants stated that trainings would be best if they were mandatory and if they offered incentives for workers to show up to the trainings in order for them to take them seriously. One female participant said disapprovingly, "I get really sad when I see them separate themselves far away [when they're] giving us information for our own good and they're over there playing and joking and saying things . . . they don't take it seriously." Two of the fieldworker women also agreed that every 6 months for training was enough.

Nursery Workers' Opinions. All of the nursery participants preferred training every 6 months. They believed that would be sufficient since they did not come in direct contact with pesticides at their work site. They agreed that it would be needed more often if someone worked in spraying the pesticides herself or in the fields where they felt there is a higher degree of exposure to pesticides.

4d. Language Preferences for Pesticide Information

Summary of Key Findings

- Workers prefer pesticide information to be provided in Spanish (as well as in English).
- Special consideration should be given to those workers who speak only indigenous languages.

Detailed Findings

Spanish was the preferred language for receiving pesticide information among all workers, but both male and female participants agreed that pesticide information should also be provided in English. Providing information to workers in English reinforces the intended message. Some workers are bilingual, and their language preference (knowledge) depends on the topic being presented. Moreover, English versions allow for English learning and legitimize the information so that the workers are not receiving different information than the general public (English speakers). Another important point is that English words are commonly translated to not-so-commonly-used Spanish words. Instead, some of these "neologisms" are converted into "Spanglish". Such was the case with our learnings around the proper Spanish translation of pesticide (*plaguicida*). We found that "Spanglish" version (*Pesticida*) was better understood than the proper Spanish term *plaguicida*.

One of the male participants shared his concerns about coworkers that speak indigenous languages. Although the majority of them also speak Spanish, he stated that some do not and they struggle to understand things anyway they can. He said, "I know some that only speak their

dialect and they try to understand anyway they can. They help each other out among themselves.” Of special concern are farmworkers who cannot speak Spanish (or English), but are embarrassed to admit it. According to NAWS data, 20% of the workers in California in 2003/2004 were of indigenous origin (roughly 100,000 people) and this group likely speaks Spanish as a second language, if at all. In addition, the indigenous worker population is considered the fastest growing farmworker population in California, and likely the nation⁷

4e. Whom Farmworkers Prefer to Conduct Pesticide Trainings

Summary of Key Findings

Farmworkers want to receive pesticide training from someone who is:

- Knowledgeable
- Certified
- Independent from those for whom they work.

Detailed Findings

All the male participants and most of the female participants expressed more confidence if the person providing the pesticide training were an outside person, like an inspector, either male or female. One participant said, “Someone that comes from the outside that is not in favor of the company.” A couple of the female participants stated that it would be good for the supervisors to receive training as well as the workers “because some go from being workers to supervising.” This would ensure that everyone is equally informed. “The supervisor should be there so that he can also learn a little.” The female participants also stated that it would be convenient for them to do the trainings at the job site.

5. Field Posting Signs

Research Question #5: What do fieldworkers understand about field posting signs?

5a. The Best Ways to Notify Farmworkers about Pesticide Applications

Summary of Key Findings

- Participants said that they prefer to be told directly about pesticide dangers and want posted signs.
- Most believed that the skull and cross bones were recognizable as a universal sign for danger and using it benefits even those people who cannot read.

Detailed Findings

Verbal Warnings. Participants preferred being told personally by the supervisor when pesticides are applied and when it is safe to return to work. One participant said on the subject, “Since they let the supervisor know, where we are going to change fields, the ranch owner also should let him know with time that the field has been sprayed, and that way he knows he can’t

⁷ *The California Farm Labor Force: Overview of Trends from the National Agricultural Workers Survey*

take us there.” Another workers shared how it generally was supposed to occur at their job site: “The boss where I work comes and leaves a paper that says how long ago they applied the chemical, the supervisor comes, he tells him, and he tells us.”

Warning Signs. These were also a clear mechanism by which workers could understand that pesticides had been applied. Workers clearly recognized the skull and crossbones as a sign of danger³. As said by one participant, “They put a small skull and crossbones of death so that we won’t go in.” Participants liked the skull and cross bones as a means of communicating and getting attention. One said, “I think that the skull and cross bone is what calls to your attention.” One participant noted that simplified signs in conjunction with a verbal confirmation make the message clear: “I think that is enough [information] because we already recognize the signs and the supervisor tells us as well.”



5b. Farmworkers’ Past Experience with Warning Signs

Summary of Key Findings

- Workshop participants all had seen posted warning signs in their work places, in Spanish only or in Spanish and English.
- Male workers recalled the information posted on the signs.
- All workers recalled common symbols (skull and cross bones) and key messages (danger) included on common signs.

Detailed Findings

All of the workshop participants reported having seen posted signs telling them not to enter a pesticide treated area.

Language. The majority of participants agreed that they have seen signage presented in both English and Spanish. Nursery workers indicated that the signage was mostly in Spanish. Two of the male participants stated that they have seen signs with warnings in English only.

Participants with limited reading skills said that they also depend on the supervisor to inform them of any dangers.



Content. The male participants reported the types of information presented on the signs as including the dates when the pesticide was applied, when the chemical is no longer active, and when it is safe to enter the area.

Symbols. Both male and female fieldworkers agreed that the signs posted have a skull and cross bones with “Danger” written below in both



posting sign with the skull and crossbones, not the Federal WPS field posting

Spanish and English. One of the male fieldworkers stated that “everyone knows what the skull is,” meaning that there is danger. The female nursery workers also stated that the warning signs have a skull, the word “danger,” or stop and a circle with a slash red line through it, all of which serve to warn them not to enter an area.

5c. Following Instructions from Posted Warning Signs

Summary of Key Findings

- All of the participants stated that they follow the instructions on posted signs, but also admitted that they have known coworkers who do not.
- Reasons for not following directions on posted signs included lack of comprehension and literacy, a desire to go the most direct route through the field, and varying levels of pesticide training among workers.

Detailed Findings

All of the participants stated that they follow the instructions on posted signs, but also admitted that they have known coworkers who do not. Reasons stated for possibly not following directions on posted signs include:

Lack of Comprehension and Literacy. Some of the female fieldworkers have worked with people that don’t understand what the signs say because they don’t know how to read. For those folks, the skull is their clue not to enter. “Some don’t know how to read but when they see the skeleton they know [not to enter].” Although one male fieldworker said that the majority of his co-workers understand and follow the signs posted, but there are some that do not. He said, “There are some [workers] that just don’t understand. Even though it is explained to them.”

Taking the Shortcut. One of the male fieldworkers stated that there are some that know the dangers but choose to cut through treated fields “to avoid walking all the way around a block of field” to get to the other side.

6. Increased Pesticide Awareness

At this point in the workshop, participants were given a short, 20-minute presentation on pesticide safety from an EPA staff member.

Research Question #6: *How do fieldworker-training experiences differ from that of the training provided during this workshop?*

6a. Similar Training Received

Summary of Key Findings

- Twelve of the 29 participants reported receiving similar trainings to the one they received at the workshop.
- The other participants reported differences in the amount of training received and in the depth of the content provided.

Detailed Findings

Less than half (12 or 41%) of the participants in our workshops had received similar pesticide training in the past. One of the women employed in fieldwork recognized the training book used during the workshop presentation from a previous training she had attended. There were complaints from some that previous trainings they had received were shorter in length and did not go into as much detail. The nursery worker women in particular thought that the “chats” that they had received were both shorter and less detailed, with one of them stating, “It is not like how [this presenter] explained things. [Our trainings were] very brief. They tell us that we have to wash our hands before using the bathroom and before eating.”

6b. New Pesticide Information Farmworkers Learned after Receiving the Workshop

Summary of Key Findings

Workshop participants said they learned many new things about working safely around pesticides from the workshop.

Detailed Findings

Many of the ideas the participants reported learning through the workshop are fundamental pesticide safety concepts that are covered in the pesticide safety training that fieldworkers are required to receive only every five years. The participants reported at least one or more of the following as new information:

Employers’ Responsibilities. Employers must post important information about the pesticides used, how harmful they are, and the name and address of the closest medical clinic.

Precautions When Working Around Pesticides. Workers who may be exposed to pesticides must understand that the skin is the largest organ of the body capable of absorbing poisons. They should always be careful around sprayed chemicals and realize that a supervisor cannot force anyone to work in a field that has been sprayed. One participant appreciated the importance of knowing “What they [employers] used the last 30 days . . . what they sprayed.” Employees also need to provide employers with emergency contacts and their doctors’ contact information.

The Importance of Cleanliness and Hygiene. One woman lamented, “What we always do first right after work is to go for our children, pick them up and give them a hug and a kiss,” realizing that by doing this without cleaning up first “we expose them to whatever we have from work.”

Specific Things to Do in Case of Exposure. Workers must make their own health their first priority and not wait for someone else to take action. One participant said he learned, “What to do in case we feel bad,” specifically, “that we should tell the supervisor as soon as possible and not wait for them to take us to the doctor.” Also important, as one participant realized is taking a pesticide tag [label] along to the clinic “so that they will know what chemical was used, so they know what to combat.”

6c. The Most Important Pesticide Safety Information Identified by Farmworkers

Summary of Key Findings

Personal safety and the safety of others (including family, and coworkers) were considered by workshop participants to be the most important pieces of information they had learned.

Detailed Findings

Participants understood how important pesticide safety was for themselves and for others. The participants realized it was important to think about the health and safety of their families as well as themselves. Some participants agreed that the pesticide trainings do cover important information but reiterated that some workers do not take the trainings seriously. Participants stated that in order to motivate participants to attend trainings and take it seriously, employers should make them mandatory and pay them for attendance, and stamp workers' training. Female participants in particular discussed at length the real-world challenged of practicing good hygiene. The women conceded that they knew a lot about the danger and the appropriate steps to take to protect their families, but often times it is too difficult to follow these recommendations. One big issue is the limited amount of time available between getting off work and having to pick-up their children from daycare. They do not have time to go home to bathe or change their clothes. Some are charged extra by the day care centers if they are a few minutes late. This creates a barrier between what they know they should do to protect their children and what they are actually able to do in practice. They also expressed a need to take into account cultural norms when they pickup their children from daycare providers looking like they had come straight from work rather than freshly bathed. One woman said, "We can't go bathe first because the other women will say 'look at her she went to get fixed-up first' before coming for her children."

Discussion

Power dynamics and social norms

Demonstrated pesticide safety knowledge among workers does not necessarily translate to healthy decision making around pesticide safety practices. Although many of our participants were aware of pesticide safety measures, they may not practice it in the real world. Some of the men noted that when they were younger they violated many safety precautions (e.g., by eating fruit treated with pesticides, not wearing protective material, not washing up). We know that for many new and young workers, the need to earn money motivates some of them to accept or volunteer to do work such as spraying pesticides that they are not properly trained to do. It is also important to note that crews do not always have the same workers throughout the season. New workers may join a crew mid-season and work without benefit of pesticide-safety training which is often only given at the beginning of the of season (though, legally employers must verify that every worker has received pesticide safety training before the first day of work in a treated area). These new workers are also vulnerable because they depend on other crew members for information about pesticides. This underscores the need to provide pesticide safety training to the newest and most vulnerable farmworkers, who being the youngest often think they are "invincible."

Power dynamics and social norms seem to affect whether farmworkers seek additional information from coworkers or superiors or whether they adopt positive preventive behaviors to prevent and/or limit pesticide exposure. The fact that workers receive information about pesticides through informal social mechanisms is important because the knowledge and social norms of workers who have either been at the job site for longer periods, or have a longer work

history, help determine what newer workers know about pesticides and how they behave to minimize their exposure.

There was an underlying current of dissatisfaction among the participants with the level of information provided by superiors about pesticides and some doubted the accuracy of that information. Yet despite the fact that workers have the right to know this information, they are not likely to proactively seek it out because of concerns that inquiries might alienate them from their employers and limit future work opportunities. Even when the employer or crew leader provides pesticide-safety instructions, workers do not necessarily understand everything and fail to ask for clarifications or additional information, either because they are intimidated or fear of embarrassment (i.e., demonstrating "ignorance" in front of other workers). This is why participants requested during the workshops that pesticide trainings be conducted by neutral persons to whom they could relate with *confianza* and ask questions without hesitation.

Perhaps the most important implication of how social norms impact behavior was the example that one female participant brought up regarding bathing after work. The women in the workshop were reminded after the presentation about the importance of bathing before collecting their children after work, yet as noted in our report above, there are social and financial obstacles to doing it (such as being obliged to pay extra fees for children picked up after a particular time) and these are affecting decision making around pesticide safety practices. In addition, we learned that women feel obliged to look like working women—which they are—when collecting their children from daycare providers (many unlicensed enterprises or just friends or family members), whom they feared might resent them (or expect more compensation) if they were mistakenly thought, based on superficial appearances, that they were not.

Hazard Communication

The issue of language, communication, neutrality, directness, and timing came up with regard to training and ongoing communication regarding pesticides. There is a dichotomy between how workers actually received information about pesticides and how they preferred to receive this information. As was noted by the male participants, they typically received pesticide information from coworkers. We saw that language plays a role in pesticide safety and that written instructions are not enough because the reading skills of many workers are limited (due to low educational levels in Spanish). Written materials, therefore, must be accompanied by verbal instructions. In addition, not all members of indigenous populations know enough Spanish to understand pesticide instructions conveyed in that language. They obtain their information from those indigenous members who have more knowledge of Spanish or have more practical knowledge about pesticides by virtue of being more seasonal in their farm working careers. It was clear that workers overwhelmingly felt that they preferred personalized information and, moreover, from a neutral (non-employer related) party for general training events. Secondly, workers also felt, that in addition to training provided by a neutral party, that supervisors should play a more direct role in communicating about pesticide used.

Workers also valued and appreciated the importance of clearly marked and properly located signage for keeping informed about pesticide dangers. Workers understood the key messages in posted signs (symbols like the skull and crossbones and words such as "danger"). Farmworkers declared that they were not always satisfied with the placement of these signs, however, nor did they believe that the messages were sufficient in terms the information supplied (e.g., dates when the pesticides were applied). Given that we know from our research work that respondents tend to provide answers that please the interviewer, it was interesting that workshop participants often claimed to know people who did not follow directions regarding

posted hazard information even though they asserted that they themselves were careful to do so. This suggests the possibility that they also disregarded warnings despite their reluctance to acknowledge this explicitly.

Although some of our participants reported receiving previous training similar to that provided in our workshops, they also claimed to have learned new things at our presentations. It is hard to know how to reconcile these reports. Previous trainings may have been more cursory, or farmworker retention of what was presented may have been low over time (the last pesticide safety training they had could legally have been five years ago). It is also possible that the discussions around pesticide safety in our workshops engaged workers and reinforced pesticide safety information they had heard previously. The Farmworker Safety Initiative in San Luis Obispo identified a similar issue. In their study, 80% of farmworkers surveyed had received pesticide safety training, however the research also found that completion of training requirements may not result in farmworkers' understanding of pesticide safety.

Rather worrisome and worth more exploration was the view expressed by some workers that common pesticide exposure symptoms (like headaches, rashes, and upset stomachs) are simply normal consequences of daily farmwork and not serious symptoms that ought to be taken seriously. At least one participant expressed the view that limited pesticide exposure is probably acceptable up to a point, but that these exposures build up ("What the harm is to us once we have worked a long time at this job or how many years we can last [at this job] before it becomes harmful further down the line"). As noted, another participant reported stories that "there are workers that become sterile after 10 or 15 years or their children are born sick." These reports suggest that workers are not insensitive to the threat pesticide exposures pose to their long-term health, but the focus on long-term outcomes to the exclusion of short-term impacts is a cause for some concern.

Concluding Points

From our workshops with farmworkers, it would appear that many factors influence positive protective behavior around pesticide prevention. Primary factors influencing an individual's ability to protect themselves from pesticide exposure include:

- The amount and frequency of pesticide training;
- Positive social norms around pesticide safety prevention;
- The length of time spent in farmwork;
- Social support for taking protective measures from coworkers, superiors, family, and friends;
- Ability to understand spoken instructions as well as written materials in Spanish;
- Knowing someone personally who has suffered from pesticide exposure.

As the USEPA revises and updates the pesticide safety standards and hazard communication regulations, these factors should be taken into account to ensure that proposed program reflects the needs, desires and realities of farmworkers.
