

**Occupational Dermatitis Among the Migrant  
Farmworker Population in Dover, Delaware**

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Population in Dover Delaware**

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## ABSTRACT

Occupational dermatitis is extremely prevalent in the agricultural industry. An interviewer administered questionnaire was conducted in farmworker camps in Dover, Delaware during June and July 1996 to determine self-reported prevalence of rash among migrant farmworkers. All the workers in the eight camps identified by the outreach workers of Delmarva Rural Ministries were approached for interviews resulting in a 91% participation rate. Data was entered into and analyzed using EpiInfo. Seventy-six percent of the population was male with an average age of 30. Fifty-nine percent was from Mexico, 21% from Puerto Rico, and the remaining 18% and 2% from continental United States and other Latin America countries, respectively. Out of the final sample of 121 farmworkers, 22 reported having rash while in the current job. Self-reported skin exposures to pesticides was associated with self-reported rash ( $\chi^2=5.27$ ,  $p=0.02$ ). In addition, thirty percent of the farmworkers reported having received pesticide training. A significant relationship was also found with having been trained on how to handle pesticides and the use of personal protective equipment (PPE), specifically long sleeved shirts ( $p=0.04$ ) and gloves ( $p=0.02$ ). Thus, data suggests training influences self-protective behavior. Although 70% of the farmworkers reported the use of pesticides on the crops that they work with, only 1 person could actually name the pesticide used on the crops. Of sixty-two participants who were asked specifically, 40 persons (68%), reported to have access to soap and water to wash hands within a quarter of a mile of their working area. Additional findings include 68% of the farmworkers had at least water to rinse their hands and 75% had a bathroom facility.

## INTRODUCTION

Dermatitis is the foremost occupational health problem in the agricultural industry and accounts for two-thirds of all occupational illnesses among farmworkers.<sup>1</sup> According to the United Agricultural Workers (UAW), though, ninety percent of all dermatitis can be prevented through industrial hygiene. The cause of dermatitis is often multi-factorial and can include one or more chemicals, friction, abrasion, changes in temperature and humidity, and ultraviolet (UV) radiation.<sup>2</sup> For individual workers, the risk of developing dermatitis may be modified by the specific job activity, the use of personal protective measures, hygienic measures (OSHA standards), and individual susceptibility.<sup>2</sup> Factors also such as deficient housing, sanitation, education, and access to preventive and medical care services may exacerbate occupational health risks.<sup>3</sup> Lack of adequate sanitation is associated with an increased prevalence of disease.<sup>3</sup> In this population, work-related exposures as well as safety and hygiene practices, education, and health care access play an important role in the development of skin disease.

Although plants are the leading cause of dermatitis, exposure to pesticides are of interest because farmworkers suffer from the highest rate of toxic chemical injuries of any group of workers in the US.<sup>4</sup> More than 50% of the farmworkers are hired for harvesting operations, which involve contact with foliage during high periods of pesticide application.<sup>1</sup> Dermatitis is of special concern because 98-99% of fieldworker exposure to pesticides is dermal. Not only are the farmworkers exposed to pesticides in the field but also when pesticides are sprayed by airplane or tractor rig and pesticide spray drifts into their temporary living quarters in the labor camps. They are also exposed to pesticides in the food they eat and the water they drink.<sup>5</sup> Sensitization to pesticides can lead to chronic, debilitating skin rashes, especially on the hands, which may force a farmworker to abandon agricultural work.<sup>1</sup> Temporary disabilities from work days lost to dermatitis lower the earning power of already poor farmworker families.<sup>1</sup> Furthermore, skin lesions can be a diagnostic clue to the presence of systemic toxicity.<sup>1</sup>

Therefore, pesticides have become a major concern when studying occupational skin rash among the farmworker population.

The precise prevalence and incidence of skin diseases in agriculture is unknown.<sup>2</sup> According to the Bureau of Labor Statistics, data does not exist to directly address the rate of dermatitis among hired farmworkers due to the under representation of hired farmworkers in BLS statistics and also because surveillance data for occupational skin disease depends on the affected worker seeking medical attention.<sup>2</sup> Often dermatitis is ignored by the farmworker because they may not want to lose work time nor money to see a doctor, especially if their symptoms are not severe, or they may fear they will be fired if they seek care and report it.<sup>5</sup>

Thus, the overall goal of this research study is to identify possible risk factors for skin rash in the migrant farmworker population of the Delmarva region in Delaware.

Specifically:

1. To determine the point prevalence of self-reported skin rashes in the migrant farmworker population of the Delmarva region in Delaware.
2. To ascertain self-reported availability of sanitation facilities and training programs in the work site of farms in Dover, Delaware.
3. Determine self-reported skin exposures in the work site.
4. Determine whether possible risk factors and/or sanitation facilities availability affect the incidence of skin rash.
5. Report on data regarding farmworker perception of health care access in the Delmarva region according to the information provided by the migrant farmworkers.

## METHODS:

A questionnaire was given to a cross-sectional sample of migrant farmworkers working in the Delmarva region of Dover, Delaware. The questionnaire was formulated by the researchers following a literature review concerning migrant farmworkers and dermatitis, Occupational Safety and Health Administration (OSHA) standards, and Environmental Protection Agency (EPA) worker's protection standards against pesticide exposure. Following composition of the questionnaire in English, it was translated into Spanish and subsequently pilot tested for clarity and ease of administration on 10 migrant farmworkers during a registration clinic in Maryland. At the end of the testing process, questions were clarified and revised to make the interview period shorter. The final questionnaire was then administered to farmworkers working in the Dover, Delaware area between June 24 and July 11.

The campsites chosen to conduct our interviews were recommended to us by the Delmarva Rural Ministries Clinic. Interviews were conducted in eight farms that were associated with the clinic. A representative from the clinic accompanied us to the camps and introduced us to the farmworkers. Subject recruitment was accomplished by direct solicitation during the lunch hour and after dinner on workdays with the attempt to sample the entire population in each camp. Before interviewing, a signed IRB approved informed consent was obtained from each volunteer participant. The questionnaire was then interviewer administered in the farmworker's native language, Spanish or English, and took approximately 15 minutes to complete. The subjects were able to ask questions concerning the study or the questionnaire, and they were not compensated for participating.

The questionnaire was divided into five parts. The first part obtained demographic information and job related activities. The second part concerned finding present dermatitis and present exposures. The third part concerned finding past

dermatitis and the exposures relating to that past dermatitis. The fourth part was about the availability of sanitation facilities, decontamination facilities, and emergency equipment. The fifth part included questions about health care access, either to a clinic or an alternative source.

Of the 123 farmworkers interviewed, two records were discarded since one of the farmworkers was not currently working and the second due to a interview being administered twice to the same person. In addition, 11 farmworkers declined the interview thereby giving us a 91% participation rate. The final sample size for analysis was 121 farmworkers. The data collected was statistically analyzed using EpiInfo 6.02. Data analysis includes a descriptive analysis of demographics, self-reported rashes and risk factors. Dichotomous exposure and outcome was analyzed using chi-square tests.

## RESULTS:

Of the 121 participants in this study, 90 were male and 31 were female. The mean age was 30 years, ranging from 14 to 63 years old. Fifty-nine percent of the migrant farmworkers were from Mexico, 21% from Puerto Rico, 18% from the continental United States, and the remaining two percent were from other Latin American countries. (See Table 1) The participation rate was 91% with only 11 people declining an interview.

In the eight camps where we performed our interviews, the average years spent working in the agricultural industry was seven to eight years. On the average, the participants were working in these eight farms for more two weeks but for less than one month. The median hours for working outdoors for the entire population was eight hours, although, a large group who were canning and packing did not work outdoors. When the farmworkers who reported only working indoors were excluded, the mean hours for working outdoors was 8.3 with a range from two to 14 hours. The farmworkers performed multiple tasks in the farm. Eighty-one(67%) of the participants reported canning or packing , 76 (63%) reported harvesting, 12 (10%) reported preparing the soil, ten(8%) reported planting, eight(6.6%) reported seeding, and seven (6%) reported applying pesticides.

During the interview period the farms were working with seven main crops: cabbage, corn, cucumber, squash, apples, potatoes and peaches. Each of the farms work with one or more of these crops. Fifty-four (45%) of our participants reported working with cabbage, 29 (24%)with corn, 25 (21%) with cucumbers, 23 (19%)with squash, 19(16%) with apples, 14 (12%) with potatoes and one (0.8%) with peaches. For the farmworker population, contact with chemicals by way of either pesticides or fertilizers is a common exposure. Seventy percent of the participants reported that the crops that they were working with were exposed to pesticides.

Out of our sample size of 121 farmers, 22 persons reported currently having dermatitis, (18%). The rashes predominantly were on the hands and arms and occurred as frequently for men as for women. Fifty percent of the participants with dermatitis reported the rash

interfering with their work. One person had to miss work because of current dermatitis. Six participants out of the 22 afflicted with a rash received medical attention for the current rash. When the sixteen people (76%), who had not received medical attention for their dermatitis were asked why they did not receive medical attention, they listed the following reasons: the rash was not serious (50%); they did not want to miss work (23%); they were unaware of the services available (18%); they did not have transportation (14%); and "other" reasons (9%). Six people tried a home remedy including, hand cream, garlic, and rubbing alcohol.

The 22 individuals with rashes were asked to identify causal exposures. Fourteen of these cases attributed the rash to pesticide exposure, ten attributed it to plants, eight attributed it to the sun or weather, three attributed it to the soil, and three attributed it to other causes. Self-reported skin contact with pesticides on the current job occurred in ten workers, five of whom had rashes. Using chi-square analysis we found in this study a positive relationship between getting pesticide on their skin with the incidence of dermatitis on this job, ( $\chi^2 = 5.27$ ,  $p=0.02$ , O.R.=5.53, CI = 1.20 < or < 25.78) (See Table 2) No other self-reported cause or job-related exposures such as a particular crop, particular job or task, sun and weather, and soil was found to be statistically significantly related to the occurrence of dermatitis.

The farmworkers use of personal protective equipment (PPE) and its association to the prevalence of dermatitis was also investigated in this study. All participants wore shirts: 45% wore long sleeves, 55% wore short or no sleeves. Ninety-three percent of the workers wore long pants and 7% wore short pants. Sixty-nine percent of the migrant farmers wore hats. Fifty percent of the workers wore tennis shoes, 45% wore boots and 5% wore sandals. Ninety-four percent of the participants wore socks, and 45% wore gloves. Twelve percent wore other protective equipment, such as sunglasses and bandannas. There was no statistically significant relationship found between the use of PPE and the prevalence of dermatitis, using chi square analysis.

Thirty percent of the participants had been trained on handling pesticides in their current job. Chi-square analysis showed a statistically significant relationship between being trained on handling pesticides and the subjects wearing long sleeved shirts, ( $p=.04$ ). (see Table 3) Similarly, we found a statistically significant relationship between being trained about pesticides and wearing gloves, with a  $p=.02$ . (See Table 4)

Out of the 85 participants who reported working with crops exposed to pesticides only one person could actually name the pesticide with which they were working. Similarly, sixty-four percent knew that their crops were exposed to fertilizer, yet no one could name it. Sixty-five percent of the participants did not know how many hours they should wait before re-entering the field after pesticide has been sprayed. Thirty-eight percent waited less than one day, 36% waited from one to two days, and 27% waited more than two days. Growers reported to use Ambush (Pyrethroid), Bravo (Chlorothalonil), Counter (Organophosphate), Captan (Thiophthalimides) pesticides the most. Application of Ambush and Bravo require a reentry time of 24 to 48 hours. Counter and Captan, have a reentry time of more than two days. (See Table 5)

We also asked the migrant farmworkers about sanitation issues. Eighty-two out of 121 participants, (68%), reported to have at least water to rinse their hands within a quarter of a mile of their working area. Out of sixty-two participants who were asked specifically if they had soap and water within a quarter of a mile of their working area for washing their hands, 40 persons, (65%), reported having them. Ninety-four percent of the farmworkers used these handwashing facilities. Seventy-five percent of the participants reported to have a bathroom facility within a four minute walk. Twenty percent of the workers did not have a special place to eat, and therefore ate in their work areas. Ninety-two percent of the participants had at least water to wash near their eating area. Most of the farmworkers had separate work and non-work clothes (88.4%). On the average, the participants reported sharing their sleeping quarters with 4

other people. Using chi-square analysis, we found no statistically significant relationship between having sanitation or decontamination facilities and the prevalence of dermatitis.

Out of the 121 farmworkers, 111 said that if they feel sick or are injured on the job, they would seek medical attention at a clinic. Although 92% report that they would go to the clinic some do not know where it is located. In addition to the clinic, other alternatives included going home which 53% of the 121 interviewed said where they would go, and friend's houses which was answered by 35%. Forty-six farmworkers (38%), reported ever being sick or injured at work in the past. Eighty-four percent of these participants were treated in a clinic or hospital. Forty-one percent were transported by the clinic, 29% were transported by someone else. Eighty-six percent could communicate with whomever was treating them. Thirty-three percent paid for the medical services themselves. The employer paid for the medical services in 26% of these cases. Twenty-three percent reported medical services were free.

## DISCUSSION:

The data gathered had several limitations. The principal limitation was the small sample size of 121 participants. In addition, this study was based on self-reported answers and the investigators were not able to validate the data gathered. Therefore, there is a question of accuracy in self-reporting since no direct observations were made by the investigators. Also, under-reporting may play a factor due to recall bias. Despite the limitations of data, the five goals of this project were achieved.

The first goal was to determine the point prevalence of self-reported skin rashes in the migrant farmworker population in Dover, DE. The prevalence was determined to be 18% between the time of June 24- July 11, 1996. This, though, may be an underestimation of the true prevalence. The migrant farmworkers may be reluctant to report illness or problems for fear of repercussions they might incur, namely being fired or not given work. Also, interviews were given early in the crop season. If interviews had been performed during the height of the season, which is the time for harvesting, dermatitis may have been more prevalent. Harvesting is the time when there is the greatest amount of contact with the crop and the greatest amount of pesticides is applied. With longer exposure the prevalence of dermatitis may increase.

In addition, the determined occurrence of 32 past rashes is expected to be lower than what it actually is due to recall bias. It is possible that the farmworkers do not remember rashes that were not serious or rashes which did not cause them to lose time at work nor money. The farmworkers, though, are believed to be less fearful of reporting past rashes due to the lifting of the threat of repercussion from a past employer.

The second goal was to determine the availability of sanitation facilities and training programs in the work site. As OSHA requires one toilet and one handwashing facility (i.e. water, soap, and hand towels) for each 20 employees within 1/4 mile of the employee's work area in the field, there were sanitation facilities present in the work site for most of these farmworkers, but approximately 30% of the worksites lacked both a

handwashing and bathroom facility. (See Appendix A) In addition, the decontamination facilities EPA requires (i.e. water for routine and emergency whole-body washing and for eyeflushing, plenty of soap and single use towels, a clean overall, and water for drinking) were present for 33% of the farmworkers. (See Appendix B) EPA requires decontamination facilities, namely, water, soap and paper towels to be available within a four minute walk of the workplace. We found that the availability of sanitation facilities does not affect the incidence of skin rash. This result, though, may be due to the small sample size of the population interviewed. EPA also requires training on how to handle pesticides or precautions on how to deal with pesticide exposures. This training was provided at the worksite for only 30% of the participants. The data gathered indicates that there is a positive relationship between having been trained or warned about pesticide exposure and wearing personal protective equipment, namely gloves and long sleeve shirts. Thus, our data supports that training or warning farmworkers about pesticides does work in terms of protective behavior. However, training does not seem to make an impact in the ability to name pesticides.

In all the labor camps, shower and bathroom facilities were available. However in some of the labor camps, investigators observed unsanitary showering facilities which had a great number of people using each shower. There seems to be a common lack of cleanliness in the bathroom facilities and many people share a common bathroom and bathing facility.

The third goal was to determine self-reported skin exposures. The most often mentioned skin exposure which the farmworkers reported was plant material and pesticides. Other exposures included sun, weather, and soil. There was some overlap in exposures and since the farmworkers worked with various crops and different pesticides are used on each farm, these account for confounding variables. The most often mentioned skin exposure which the farmworkers with rashes attribute their dermatitis to was pesticides. Some farmworkers attributed their rash to more than one exposure. A

statistically significant relationship between getting pesticide on your skin in the present job and having dermatitis currently was found. This may be due to recall bias since people who have dermatitis are more inclined to remember or think whether or not they got pesticide on their skin, whereas those who did get pesticide on their skin and did not get dermatitis may not think too much about the question or may not remember if they actually got pesticide on their skin.

According to the Farmworker Justice Fund, plants are the leading cause of dermatitis. Also, a study done by the Michigan Department of Public Health in 1983 determined that pesticide-associated dermatologic conditions do not appear to be a significant health factor within the migrant farmworker population in Michigan. A limitation stated by the authors of the study was that the study was performed in the clinics, and the cases which were unreported and untreated were not included in the study. In this study, though, the migrant farmworkers were interviewed in the camps where they lived so as to avoid this possible limitation. Many participants in this study do not consider dermatitis serious enough to warrant a doctor's visit or miss work and therefore do not report it to the clinic.

Finally, the last goal was to report the farmworkers' perception of access to health care. Ninety-two percent of the participants reported that they would go to the clinic if they became sick or injured. Such a high percentage may be due to the fact that the camps which we interviewed in were associated with the Delmarva Rural Ministries Clinic. This differs notably from the 24% of those who had dermatitis and received medical attention. Most of the people ignored their condition and kept on working. Half of the cases reported said that the rash interfered with their work but only a few actually missed work or received medical attention. This gives an indication of the minor importance the farmworkers gave to skin problems and the greater need to earn money.

## CONCLUSION:

First, exposure of skin to pesticides seems to be a risk factor for dermatitis in this population.

A positive correlation between education and the use of PPE (long sleeved shirts and gloves) was found, thereby suggesting that education, although scarce, does have an effect on self-reported behavior. However, education did not result in the farmworkers being able to name the pesticide with which they were working.

Data also suggests that migrant farmworkers in Dover, DE are aware of health care services available to them, yet only a fraction of them make use of these facilities for dermatitis.

Finally, data suggests that most of the farmworkers are working in sites that are not in complete compliance with OSHA field sanitation standards.

**Bibliography:**

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- 3 Coye, Molly Joel. "The Health of Agricultural Workers." Journal of Public Health Policy. Vol. 6, No. 3, Sept. 1985.
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## **APPENDIX A:**

### **E.P.A. (Environmental Protection Agency)**

#### **Worker Protection Standard: Basic Elements**

Summary of W.P.S. requirements:

##### **\* Protection during applications**

Handlers are prohibited from applying pesticides in a way that will expose workers or other persons; workers are excluded from areas during treatment with pesticides.

##### **\*Restricted-entry intervals (REIs)**

REIs are established for all pesticides used in the production of agricultural plants, ranging from 12 to 72 hours, depending on toxicity. Workers are excluded from areas under REI, with only narrow exceptions.

##### **\*Personal protective equipment (PPE)**

PPE must be provided and maintained for handlers and early-entry workers.

##### **\*Notification of workers**

Workers must be notified about treated areas so they may avoid inadvertent exposures.

##### **\*Decontamination Supplies**

Handlers and workers must have an ample supply of water, soap, and towels for routine washing and emergency decontamination.

##### **\*Emergency assistance**

Transportation must be made available to a medical care facility if a worker or handler may have been poisoned or injured. Information must be provided about the pesticide to which the person may have exposed.

##### **\*Pesticide safety training and safety posters**

Training is required for all workers and handlers, and a pesticide safety poster must be displayed.

##### **\*Access to labeling and site of specific information**

Handlers and workers must be informed of pesticide label requirements and information. Central posting of recent pesticide applications made on the agricultural establishment is required.

**APPENDIX B:**

**OSHA Field Sanitation Standards:**

1. Potable drinking water, cool and in sufficient amounts, dispensed in single-use drinking cups or by fountains.
2. One toilet and one handwashing facility for each 20 employees or fraction thereof, within 1/4 mile of the employee's work area in the field.

**TABLES:**

**Table 1: The countries of origin of the farmworkers interviewed.**

<b>Country of Origin</b>	<b># of Farmworkers</b>	<b>%</b>
Mexico	71	59
Puerto Rico	25	21
Continental United States	22	18
Other Latin American Countries	3	2

**Table 2: Pesticides and Dermatitis in Migrant Farmworkers of Dover, DE**

	<b>Current Dermatitis</b>	<b>No Current Dermatitis</b>	<b>Total</b>
<b>Pesticide on skin</b>	5	5	10
<b>No pesticide on skin</b>	15	93	108
<b>Total</b>	20	98	118

p=0.012

**Table 3: Training and Personal Protective Equipment (PPE) in Migrant Farmworkers of Dover, DE**

	<b>Trained in current job</b>	<b>Not trained in current job</b>	<b>Total</b>
<b>Long sleeves</b>	23	32	55
<b>Short sleeves</b>	14	52	66
<b>Total</b>	37	84	121

p=0.04

**Table 4: Training and Personal Protective Equipment in Migrant Farmworkers of Dover, DE**

	Gloves	No gloves	Total
Trained in current job	23	14	37
Not trained in current job	31	53	84
<b>Total</b>	<b>54</b>	<b>67</b>	<b>121</b>

p=0.02

**Table 5: Most Frequent Chemicals and Reentry Time Used in Each Farm**

<u>&lt; 1 day</u>	<u>1 or 2 days</u>	<u>&gt; 2 days</u>
Bladex 90 DF (Cyazine)	Ambush (6) (7)	Counter (6) (7)
Dual	Bravo (6) (7) (1)	Captan(2) (3) (4)
Dipel ES	Basagran	
	Goal	
	Counter	

- Camp (1)
- Camp (2)
- Camp (3)
- Camp (4)
- Camp (5) no pesticides used
- Camp (6)
- Camp (7)
- Camp (8)