

## Recruiting a Community Sample in Collaboration with Farmworkers

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Few studies have examined health effects of pesticides in farmworkers, possibly because researchers perceive this population to be relatively inaccessible. We conducted an epidemiologic study of health effects among farmworkers in two towns in central Florida—Apopka and Pierson. Apopka is a suburb of Orlando with a diffuse farmworker community working in many crops, whereas Pierson is a small rural town with a tightly knit farmworker community working mainly in ferns. We collaborated with the Farmworker Association of Florida, a grassroots organization representing 6,700 farmworker families. We identified potential participants using membership lists of the Community Trust Federal Credit Union. Members of the Farmworker Association served as recruiters for the study, locating randomly selected Credit Union members and administering a screening interview to determine eligibility. In Apopka 90% of contacted workers were screened, and 79% of eligible workers participated in the study; corresponding proportions in Pierson were 94 and 85%. Farmworkers who had worked for 6–15 years and those who worked in a defined type of agriculture (nursery, citrus, or ferns) were more likely to enroll than others. Thus, while the response rate was good for a multistage recruiting process, study participants had a slightly different work history from those who chose not to enroll. We conclude that it is possible to conduct a study of health outcomes in farmworkers with a defined population and good response rates. Collaboration with the community is essential to the success of such a project, and community characteristics can affect response rates. *Key words:* community access, defined population, farmworkers, pesticides, response rate. — *Environ Health Perspect* 109(suppl 3):457–459 (2001). <http://ehpnet1.niehs.nih.gov/docs/2001/suppl-3/457-459kamel/abstract.html>

Farmworkers, among others, risk high exposure to pesticides (1,2). Nevertheless, few studies have examined health effects of pesticide exposure among farmworkers (2). One reason for the scarcity of such studies is that researchers perceive the farmworker population to be relatively inaccessible. Farmworkers may move frequently, making it difficult to define and enumerate a target population. Frequent movement, as well as immigrant status, lack of formal education, language barriers, and isolation from the larger community, may decrease response. In addition, the nature of agricultural work makes it difficult for occupational health researchers to gain access to the workplace. Because epidemiologic studies rely on identifying a defined population and achieving good response rates to minimize bias, all these factors contribute to the perception that farmworkers are difficult to study.

A potential solution to this problem is to engage the community in the study. Community participation makes it more feasible to define a target population, and involving the community is likely to increase response rates. This article focuses on three questions: a) Is it possible to conduct an epidemiologic study of health outcomes in farmworkers with a defined population and good response rates? b) What is the role of the community in such a study? and c) How do the characteristics of the community affect the study? To address these questions, we

describe methods and results of recruitment in a cross-sectional study investigating chronic pesticide exposure and neurologic dysfunction in farmworkers. Although the acute neurotoxicity of pesticide exposure is well documented, less is known about the effects of chronic exposure (2,3). We chose to study farmworkers because of their high risk of pesticide exposure and because we wanted to describe pesticide-related health effects in this underserved population.

Participants in the study came from two towns in central Florida—Apopka and Pierson. These towns have a relatively stable farmworker community. Some farmworkers join the migrant stream for part of the year, but most have permanent homes in Florida. Although this community is not necessarily typical of farmworker communities in the United States, its stability made it possible for us to define a target population, which is a major advantage to the study.

We contacted potential participants with the help of the Farmworker Association of Florida, a grassroots, nonprofit, farmworker membership organization with branches in Apopka and Pierson as well as in other towns in central and south Florida. Its mission is to confront "... issues of workplace and societal exploitation, discrimination, and oppression of agricultural workers..." Its members include over 6,700 farmworker families who are 94% Latino, 3% Haitian, and 3% African American. Members of the Farmworker

Association work on a variety of crops, including ferns, foliage (nurseries), citrus, mushrooms, vegetables, and sod. Our study included primarily individuals working on the first three crops.

The characteristics of the two towns where we worked were very different. Apopka is essentially a suburb of Orlando where the farmworker community lives among the larger population. The farmworkers work on several different types of crops. Pierson, on the other hand, is an isolated rural town about 70 miles from Orlando where the farmworker community is very tightly knit. Most of the people know each other and many are related to each other. Most of the farmworkers in Pierson grow and harvest ferns.

Our study is not an example of community-based research per se (4,5), as the research problem was initially defined by investigators from the National Institute of Environmental Health Sciences, who then approached the Farmworker Association for assistance. Initial contact was facilitated by mutual acquaintances in another farmworker organization. Following this contact, we had several meetings to explore the possibility of collaboration. These meetings fostered good will between the parties and allowed for discussion of the mechanisms for defining a population. Ultimately we agreed to work together.

Staff and members of the Farmworker Association made major contributions to the study essential to its success. In particular, their efforts were essential to the recruiting process. Contact with the farmworker community was made with the help of the Farmworker Association. They helped us gain

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access to the community and also helped motivate potential participants to enroll in the study.

## Methods

We conducted a cross-sectional study comparing pesticide-exposed farmworkers to unexposed controls. We defined our target population to be members of the Community Trust Federal Credit Union and their spouses. The Credit Union is a small local bank with branches in both Apopka and Pierson. It is affiliated with several community organizations, including the Farmworker Association. Many of its members are farmworkers, but it also has members from other organizations, including medical clinics and groups focused on housing, literacy, and community service. Conversations with staff members of the Farmworker Association and other community members suggested that Credit Union members were typical of most of the local farmworker community. Individuals with very high or very low incomes tended not to be members, the former because they chose to bank at a full-service institution, and the latter because they had less need of a bank or were unaware of its benefits. Results of a pilot study showed that some Credit Union members would be eligible to participate in the study as exposed farmworkers, while others could serve as unexposed controls. This was another important feature of the study: the exposed farmworkers and unexposed controls came from the same population, making it likely that they would have similar characteristics and therefore provide a better comparison.

Individuals 28–55 years of age were eligible to participate in the study. This criterion was used to reduce variation in neurologic function because of age. We recruited both men and women as well as people of any race or ethnicity. Participants had to be fluent in either Spanish or English. We excluded people with diabetes, epilepsy, or stroke, as these conditions can affect performance on the neurologic tests.

We also had eligibility criteria that involved work history. To qualify for participation as an exposed farmworker, the individual had to have worked for at least 5 years in one of the three types of agriculture that we focused on—ferns, nurseries, or citrus—or to have worked for at least 15 years doing any type of farmwork. To qualify for participation as an unexposed control, the individual must not have performed farmwork in the past year. In addition, controls must not have worked more than a total of 4 years in any type of agriculture. Some individuals were not eligible to participate either as exposed farmworkers or unexposed controls and were therefore excluded from the study.

To recruit participants, we randomly selected names from the Credit Union membership list. Often these names had no associated phone number. If there was a number, it was often out of date, or it was the number of a relative or neighbor. Frequently there was no street address, only a post office box. These factors made it difficult to contact some potential participants.

Recruiters were chosen by the Farmworker Association and were often farmworkers themselves. They needed to be literate, but some had relatively little formal education. The recruiters located the Credit Union members we had selected using their knowledge of the community and a variety of approaches. They talked among themselves and with other staff members of the Farmworker Association to determine if anyone knew the person. They also visited work sites, churches, schools, and neighborhoods to try to locate selected Credit Union members.

Once the recruiters had located the Credit Union member, they administered a structured screening interview, usually in person but sometimes by telephone. This interview established whether the individual needed to be excluded on the basis of language, age, or medical history. Several questions about work history were also included to determine whether the person was eligible to participate either as an exposed farmworker or as an unexposed control. Finally, the screening interview was used to determine whether the Credit Union member had a spouse and to contact the spouse if there was one. If recruiters established eligibility of an individual to participate in the study, they encouraged him or her to enroll, while emphasizing that participation was voluntary and that nonparticipation would not affect services offered by the Credit Union or membership in the Farmworker Association. If the person agreed to enroll, the recruiter scheduled an appointment at the testing center. This involved coordination with our other staff members, who made sure that an interviewer would be available at the time of the appointment.

Participation in the study involved a structured interview that collected information on chronic pesticide exposure. It also involved a battery of neurologic tests that evaluated sensory, motor, and cognitive function. Participation took about 3 hr, not including travel time to and from the study site. We offered participants \$50 as compensation for their time. We also provided transportation and child care to make it easier for farmworkers to participate. Institutional review boards of the National Institute of Environmental Health Sciences and CODA approved the study, and all participants provided written informed consent.

## Results and Discussion

The recruiting process was generally successful (Table 1). We began with 894 individuals, either randomly selected members of the Credit Union or their spouses. We contacted 806 (90%) of these individuals and screened 732 (91%). Of the individuals we screened, 436 (60%) were eligible to participate in the study. Reasons for ineligibility included work history ( $n = 95$ ), age ( $n = 82$ ), medical history ( $n = 38$ ), did not speak Spanish or English ( $n = 38$ ), or other reasons ( $n = 42$ ). Of the eligible individuals, 352 (81%) participated in the study. One third of the 84 eligible non-participants were outright refusals. The other two thirds were individuals who did not keep their appointments, although at least three appointments were set up before an individual was classified as a refusal. The overall response rate, which describes how well the enrolled subjects represent our target population, is the proportion contacted multiplied by the proportion screened multiplied by the proportion of eligible individuals enrolled, or  $90\% \times 91\% \times 81\% = 66\%$ . We also calculated the overall response rate after correcting for the fact that 40% of those who were not contacted or screened would not have been eligible (6). The corrected rate was 72%.

We compared eligible individuals who participated to those who did not (Table 2). The two groups did not differ by age or sex. However, individuals who had performed farmwork for 6–15 years were more likely to enroll than those who had performed farmwork for either less or more time. Workers in one of the defined types of agriculture (nursery, citrus, or ferns) were more likely to enroll than either unexposed controls or those who had worked in various types of agriculture for 15 years or more. Thus, although the response rate was good for a multistage recruiting process, study participants had a somewhat different work history than those who chose not to enroll. Similar results are often found in epidemiologic studies, in which unexposed or healthy controls are typically harder to recruit than exposed individuals or diseased cases, as are individuals with lower socioeconomic status (7).

**Table 1.** Recruiting results for the entire study and in two locations, Apopka and Pierson, in a study of farmworkers in central Florida, 1996–1997.

	Entire study <i>n</i> (%) <sup>a</sup>	Apopka <i>n</i> (%) <sup>a</sup>	Pierson <i>n</i> (%) <sup>a</sup>
Individuals selected <sup>b</sup>	894 (100)	703 (100)	191 (100)
Individuals contacted	806 (90)	623 (89)	183 (96)
Individuals screened	732 (91)	560 (90)	172 (94)
Individuals eligible	436 (60)	301 (54)	135 (78)
Individuals enrolled	352 (81)	237 (79)	115 (85)

<sup>a</sup>Percents are calculated using the *n* of the preceding row as the denominator. <sup>b</sup>Individuals randomly selected from the Credit Union membership list or their spouses.

The results of the recruiting process in the two communities were very different (Table 1). At every stage of the process the proportions were higher in Pierson than in Apopka. Ninety-six percent versus 89% of the Credit Union members or spouses were contacted; 94% versus 90% of those located were screened; 78% versus 54% of those screened were eligible; and 85% versus 79% of those eligible were enrolled in the study. The corrected overall response rate was 78% in Pierson and 70% in Apopka.

There are several reasons for the differences between the sites. In Pierson most Credit Union members were also members of the Farmworker Association, whereas in Apopka many were from other organizations. The community in Pierson was more tightly knit and worked primarily in ferns, while the community in Apopka was more diffuse and worked on many types of crops. These characteristics made individuals in Pierson easier to locate and also more likely to be eligible to participate in the study. Additionally, we conducted the Apopka portion of the study first, so that by the time we moved to Pierson the recruiters were more experienced. They had developed strategies for identifying and locating Credit Union members who had limited contact information and had become more

efficient in administering the screening interview and interacting with CODA staff to make appointments for participants. Thus, participating in this study provided community members with valuable experience with the research process.

It is interesting to compare our results to those from three other studies that have investigated chronic effects of pesticide exposure on neurologic function in farmworkers. Two of these studies (8,9), which were designed to investigate the sequelae of organophosphate poisoning, used hospital or state records to identify farmworkers with a diagnosis of poisoning. These individuals were traced, contacted, and administered a battery of neurologic tests after 1–3 years in one study (8) or up to 10 years in the other (9). Both studies used friends or siblings as unexposed controls, and both excluded women. Overall response rates were 69% (8) and 49% (9) when calculated using the first method described above. Many farmworkers exposed to pesticides never receive a formal diagnosis of pesticide poisoning even when they have been seriously ill; in some cases, they avoid medical care for fear of losing their jobs (1). In addition, pesticide poisoning may resemble other conditions such as allergy, heat stroke, or green tobacco sickness, and therefore is misdiagnosed (2). Thus, these two studies do not address the effects of pesticide exposure among farmworkers lacking a diagnosis of pesticide poisoning.

The third study (10) identified pesticide-exposed farmworkers and unexposed controls at two community health centers serving migrant farmworkers. This study had a response rate of 95%, but did not use a multistage process to recruit from a defined population. Moreover, participation involved only a brief questionnaire administered at the time of recruitment and so was considerably less demanding. Although the study selected participants from the health centers in an unbiased manner, the underlying population was not defined, and healthy individuals or those with only minor illnesses were likely excluded.

Compared to these studies, ours has several advantages. We used a defined population typical of the local farmworker community, and we included women as well as men and individuals without a diagnosis of pesticide poisoning. We recruited farmworkers and unexposed controls using the same techniques and the same target population. We achieved good response rates despite use of a multistage recruiting process and a demanding protocol.

All these accomplishments relied on the collaboration of the farmworker community.

We conclude, first, that it is possible to conduct a careful epidemiologic study of pesticides and health outcomes in farmworkers, with a defined population and good response rates. Second, although our study is not an example of community-based research per se (4,5), collaboration with the community is essential to its success. Third, the characteristics of the community affected the success of the project, having a major impact on response rates.

We were able to work successfully with recruiters who were community members. The recruiters' experiences with the community gave us access to the community and helped motivate people to participate in the study. The recruiting process was complex but was nevertheless successfully accomplished by recruiters with little or no research training. It is important for academic researchers to realize that community members can collaborate in this way. Our results suggest that creativity in devising new approaches based on specific situations is essential to recruiting valid samples from less-accessible populations such as farmworkers.

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**Table 2.** Comparison of eligible individuals who enrolled with eligible individuals who did not enroll in a study of farmworkers in central Florida, 1996–1997.

	Enrolled n (%)	Not enrolled n (%)	Chi-squared (p)
Age (years)			
28–35	143 (80)	35 (20)	2.96
36–40	88 (79)	23 (21)	(0.57)
41–45	56 (81)	13 (19)	
46–50	41 (89)	5 (11)	
51–55	24 (75)	8 (25)	
Gender			
Male	184 (78)	52 (22)	2.53
Female	168 (84)	32 (16)	(0.11)
Years of farmwork			
0	76 (75)	25 (25)	15.95
1–5	24 (65)	13 (35)	(0.007)
6–10	77 (89)	10 (11)	
11–15	61 (90)	7 (10)	
16–20	65 (76)	20 (24)	
21+	45 (83)	9 (17)	
Type of farmwork <sup>a</sup>			
Control	95 (74)	34 (26)	84.56
Nursery	69 (86)	11 (14)	(<0.0001)
Citrus	73 (92)	6 (8)	
Ferns	118 (97)	4 (3)	
Various (> 15 years)	25 (44)	32 (56)	

<sup>a</sup>Some individuals did more than one type of farmwork and are therefore represented in more than one group.