HHS Public Access

Author manuscript

*J Occup Environ Med*. Author manuscript; available in PMC 2016 December 01.

Published in final edited form as:

*J Occup Environ Med*. 2015 December ; 57(12): 1299–1304. doi:10.1097/JOM.0000000000000552.

# Heat Illness among North Carolina Latino Farmworkers

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## Abstract

**Objective—**Heat exposure is an important hazard for workers in manual occupations, including farmworkers. This analysis delineates the prevalence of heat illness among farmworkers, and the factors associated with heat illness.

**Methods—**North Carolina Latino male farmworkers completed interviews in August, 2013. They reported on heat exposure and behaviors over the previous 3 months while working both outdoors and indoors.

**Results—**A third (35.6%) of the participants reported heat illness while working outside, and 13.9% while working inside. Factors associated with heat illness while working outside included working in wet clothes and shoes, harvesting and topping tobacco, and spending after-work time in an extremely hot house.

**Conclusions—**Policy addressing heat illness is needed, as is more detailed research on occupational heat exposure that uses common measures.

## Introduction

Heat exposure, and resulting heat illness, is an important occupational health hazard for workers in manual occupations who are engaged in strenuous work outdoors, including farmworkers.[1,2] Health professionals have noted the importance of addressing heat illness among migrant and seasonal farmworkers.[2,3] At the same time, current OSHA regulations do not include a heat standard.[4] Two states, California [5] and Washington,[6] have implemented occupational health policies for heat exposure that apply to those working in

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**Disclosure Statement**: The authors report no conflicts of interests.

agriculture. Educational programs have been developed to inform agricultural workers about the dangers of heat exposure.[7]

Investigators have documented farmworker beliefs and knowledge about heat exposure and heat illness.[8,9] For example, Stoeckin-Marios and colleagues[8] report that farmworkers have only a moderate knowledge of heat illness, with knowledge of acclimatization and actual water consumption being low. Flocks and colleagues[9] report that female farmworkers believe that heat exposure can adversely affect adult and fetal health, but they feel that they lack control and training for heat exposure.

Few investigations have actually documented the level of heat exposure and heat illness among farmworkers in the US.[10–13] Spector and colleagues[10] used Washington state workers' compensation claims to show that heat-related illness claims were more common among agricultural workers relative to forestry workers. Mirabelli and colleagues[11] reported that over 90% of farmworkers interviewed in North Carolina (NC) reported working in extreme heat, with 40% of these workers reporting symptoms of heat illness. Changes in work hours and activities were associated with lower prevalence of heat illness among those workers with H-2A visas. Fleischer and colleagues[12] found that one-third of farmworkers interviewed in Southern Georgia reported 3 or more heat-related symptoms in the preceding week, but many farmworkers faced workplace barriers to preventing heat-related symptoms. Finally, Quandt and colleagues[13] assessed the heat index in houses located in 170 NC migrant farmworker camps and found that the heat index in most rooms was in the danger range of 80°F or greater. Most farmworkers used fans, and 45% had access to air conditioning in their houses.

Farmworkers are a vulnerable population; most are immigrants, with low incomes, limited educational attainment, and limited access to health care, who experience high rates of occupational injury and illness.[14–18] They feel they have little control of their workplace, and are reluctant to complain about unsafe work environments due to fear of job loss, harassment from authorities, and deportation. They are prone to ignore risk when faced with an unsafe work environment. Their acceptance of unsafe working conditions is bolstered by a belief system in which men are expected to accept risk and act as if they cannot be harmed.[19–23] Therefore, it is especially important to document the occupational hazards they encounter so that workplace policy can be developed to protect these workers.

The objective of this analysis is to delineate the prevalence of heat exposure, heat symptoms, and heat illness among farmworkers, and behaviors they use to reduce the effects of heat during an agricultural season from work outdoors and indoors. It determines factors associated with the prevalence of heat illness among these farmworkers.

## Methods

Data are from PACE4, a community-based participatory research project that is examining occupational and environmental health exposures of migrant NC farmworkers. Primary community partners for PACE4 are the NC Farmworkers Project (Benson, NC) and El Buen Pastor Latino Community Services (Winston-Salem, NC). The research protocol was

approved by the Wake Forest School of Medicine IRB; all participants gave signed informed consent.

## Participants

Participants were recruited from three agricultural counties in east central NC (Harnett, Johnston, Sampson). Hand cultivated and harvested crops in these counties include tobacco, vegetables (e.g., cucumbers, sweet potatoes, tomatoes), and berries (e.g., blueberries, strawberries) (http://www.ncagr.gov/stats/codata/index.htm). Almost all of the farmworkers in these counties were from Mexico. A large number of migrant farmworkers employed in these counties had H2-A visas which required that they work for a single employer and return to Mexico each year.

Participants were men aged 30 to 70 years; those younger than 30 years were excluded from the sample due to the larger study's focus on cognitive and neurological outcomes. All participants self-identified as Latino or Hispanic, were currently employed in agriculture, and had worked in agriculture for at least three years. Individuals were excluded if they reported being told by a healthcare provider that they had diabetes.

NC Farmworkers Project staff recruited the participants. They approached farmworker camps, explained the project to the camp residents, including inclusion and exclusion criteria, time commitments and incentives, and asked for volunteers. A total of 235 farmworkers completed the baseline interviews. Because groups of farmworkers were asked to volunteer, only the number who agreed to volunteer is available; generally, all of the farmworkers in a camp who met the inclusion criteria volunteered. However, individual farmworkers who did not want to participate could have avoided contact with project staff or may have indicated that they did not meet the inclusion criteria to avoid refusal.

Participants completed a baseline interview in May and June, 2012, with up to four monthly follow-up contacts each during 2012 and 2013. Follow-up contacts occurred in June, July, August, and September. Participants in this analysis include the 101 farmworkers who completed interviews for the August, 2013, follow-up contact.

## Data Collection

Data are from interviewer-administered questionnaires conducted with participants. The baseline interview (May-June, 2012) included personal and employment characteristics. The follow-up contact interview, completed in August, 2013, included items to measure heat illness and current work characteristics. Questionnaires were developed in English and translated into Spanish. When possible, existing Spanish items and scales were used. The Spanish and English versions were checked for comparable meaning for each item, and item wording was adjusted as needed. The Spanish versions of the questionnaires were pre-tested, and final corrections were made. Interviews were conducted by native Spanish speakers who were trained and supervised by the investigators. Participants were provided with a $30 incentive for completing the baseline contact, and a $20 incentive for completing follow-up contact. Study data were collected and managed using Research Electronic Data Capture (REDCap) electronic data capture tools hosted at Wake Forest School of Medicine.[24]

REDCap is a secure, web-based application designed to support data capture for research studies.

## Measures

We constructed measures for heat exposure, heat symptoms, heat illness, and behaviors to reduce the effects of heat. Heat exposure included three dichotomous measures assessing whether the participant had worked outside in extremely hot weather conditions, had worked inside in extremely hot weather conditions, and had spent after-work time in housing that was extremely hot, all in the previous three months. Dichotomous measures for symptoms reported while working outside or inside in extremely hot weather were whether participants had experienced sudden muscle cramps; nausea or vomiting; hot, dry skin; confusion; dizziness; or fainting (not reported by any participant). Heat illness from outside work indicated a participant reported any symptom while working outside; heat illness from inside work indicated a participant reported any symptom while working inside; any heat illness was based on experiencing any symptom while working outside or inside. Dichotomous measures of behaviors to reduce the effects of heat were whether participants drank more water; took breaks in shaded areas; went to air-conditioned places during breaks or after work; changed work hours; and changed work activities. Additional measures indicated whether participants changed work hours or work activities, or changed work hours and work activities. Finally, dichotomous measures for attempting to cool housing were whether participants opened windows or doors, had electric fans, had window air conditioning, or had central air conditioning.

Measures of personal characteristics included age (in the categories 30–44 years, 35-44 years, 45 years or older), education (in the categories 0–6 years, 7–11 years, 12 or more years), and body mass index (BMI) as a continuous measure. Three measures were based on data collected in the 2012 baseline interview. The four-item CAGE was used to screen for alcohol abuse or dependence as defined by the DSM-IV.[25–27] Alcohol abuse or dependence was coded one if a respondent answered yes to two or more CAGE items, zero otherwise. Participant smoked tobacco was a dichotomous measure based on whether he had smoked in the previous month. Daily caffeinated beverage consumption had the values of none, 1–2 beverages, and 3 or more beverages.

Measures of work exposure were based on questions asking about activities in the 3 days prior to completing the 2013 interview. Personal protective equipment use measures were wearing work gloves or wearing a rain suit (farmworkers often wear rain suits to reduce exposure to nicotine when working in tobacco). Exposure measures were working in wet clothes and working in wet shoes. Hours per day worked had the values of less than 8 hours, 8.0–8.5 hours, 9–10 hours, and more than 10 hours. Dichotomous measures of tasks the participant had done included planted, harvested, topped tobacco (removed the flower from the tobacco plant), or placed tobacco in the barn for curing or loaded cured tobacco. Dichotomous measures of crops in which the participant had worked were tobacco and sweet potatoes.

### Analysis

Frequencies and percentages (or means and standard deviations as appropriate) were calculated for participant characteristics of interest as well as for their use of personal protective equipment, work conditions, and tasks in the last three days. The percentage of farmworkers with heat stress symptoms, heat illness, and related behaviors were described for the entire sample as well as for the sub-samples that worked outside and inside in extremely hot weather conditions. Associations between heat illness while working outdoors and exposure protection, work tasks, and housing conditions were assessed using chi-square tests for both the entire sample and the sub-sample who only reported working outdoors in extremely hot weather conditions. All analyses were performed using SAS 9.4 (SAS Institute, Cary, NC) and p-values of less than 0.05 were considered statistically significant.

## Results

### Heat Index

The heat index for the three counties in which participants worked for the months (June, July, and August, 2013) for which they were questioned about exposure to hot temperatures indicated an extremely hot work environment (Table 1). Few days (1.1% to 5.4%) had heat index temperatures of less than 80° F. The majority of days were in the Extreme Caution heat index range of 90° to 103° F in each of the counties. Sampson County had 9 days (9.8%) in the Danger heat index range of 103° to 124° F.

### Participant Characteristics

About one-third of the participants were aged 30–34 years, with another third aged 35-44 years, and the remainder aged 45 and older (Table 2). Most farmworkers had little formal education, with 42.6% having six or fewer years, and 8.9% having 12 or more years. The mean BMI was 29.6 (SD=4.3). One-third were problem drinkers. Almost one-third had smoked in the previous month. Most participants drank caffeinated beverages daily, with 27.7% drinking 3 or more such beverages. Most participants wore gloves (80.2%) and rain suits (65.4%) at work. About two-in-five worked in wet clothes (42.6%) and wet shoes (37.6%). A small percentage (15.8%) of participants typically worked less than 8 hours per day, with one-quarter typically working 8 hours per day, about half (46.5%) working 9 to 10 hours per day, and 11.9% working more than 10 hours per day. About one-in-five participants (21.8%) planted, two-thirds harvested, 23.8% topped tobacco, and 64.4% worked at the curing barn or loading tobacco in the previous 3 days. Participants worked largely in tobacco, with one-quarter also working in sweet potatoes; one participant reported working in cucumbers in the previous 3 days.

### Heat Illness Prevalence and Behaviors

Heat exposure, heat symptoms, heat illness and behaviors to reduce the effects of heat are reported for the total sample (n=101), for those who reported working outdoors in extremely hot weather conditions (n=68), and for those who reported working indoors in extremely hot weather conditions (n=18) (Table 3). Two-thirds (67.3%) of the participants reported working outside during the previous three months in extremely hot weather conditions, and

18 (17.8%) reported working inside during the previous three months in extremely hot conditions. Over a third (35.6%) of the total sample, and over half (52.9%) of the sample that worked outside in extremely hot weather conditions had at least one heat illness symptom while working outside. Common symptoms were sudden muscle cramps (16.8% of total sample; 25.0% of those working outside in extremely hot weather conditions); hot, dry skin (21.8%; 32.4%); and dizziness (10.9%; 16.2%). Over a tenth (13.9%) of the total sample, and over three-quarters (77.8%) of the sample that worked inside in extremely hot weather conditions had at least one heat illness symptom while working inside. Common symptoms were sudden muscle cramps (5.0% of total sample; 27.8% of those working inside in extremely hot weather conditions); hot, dry skin (10.9%; 61.1%); and dizziness (5.0%; 27.8%). Seventy (69.3%) farmworkers for the total sample reported working outside or inside in extremely hot weather conditions; 39 (38.6%) individuals reported any symptom while working outside or inside in extremely hot weather conditions.

Common behaviors to deal with the heat while working outside were drinking more water (58.4% of total sample; 86.8% of those working outside in extremely hot weather conditions); taking breaks in shaded areas (59.4%; 88.2%); and going to air-conditioned places (19.8%; 29.4%). Common behaviors to deal with the heat while working inside were drinking more water (15.8% of total sample; 88.9% of those working inside in extremely hot weather conditions); taking breaks in cooler areas (10.9%; 61.1%); and going to air-conditioned places (5.9; 33.3%).

Over a quarter (26.7%) of participants reported spending their after-work time in housing that was extremely hot. Common ways farmworkers used to attempt to cool their housing were opening windows and doors (43.6%), electric fans (61.4%), and window air conditioning units (45.5%). Few (10.9%) used central air conditioning.

### Factors Associated with Heat Illness

None of the participant characteristics (age, education, BMI, being a problem drinker, being a smoker, number of caffeinated beverages) was associated with experiencing heat illness while working outdoors. Use of personal protective equipment (work gloves, rain suit) also was not associated with experiencing heat illness while working outdoors. However, several exposure and task measures were associated with experiencing heat stress while working outdoors (Table 4). A greater percentage of those working in wet clothes in the previous 3 days reported heat illness for the total sample (53.5% vs. 22.4%) and of those working outside in extremely hot weather conditions (67.7% vs. 38.2%). A greater percentage of those working in wet shoes in the previous 3 days reported heat illness for the total sample (50.0% vs. 27.0%). A greater percentage of those who harvested in the previous 3 days reported heat illness for the total sample (43.3% vs. 20.6%). A greater percentage of those topping in the previous 3 days reported heat illness for the total sample (58.3% vs. 28.6%) and of those working outside in extremely hot weather conditions (82.3% vs. 43.1%). A smaller percentage of those who reported working in the curing barn or loading tobacco in the previous 3 days reported heat illness for the total sample (27.7% vs. 50.0%). A greater percentage that had spent after-work time in an extremely hot house reported heat illness for

the total sample (66.7% vs. 24.3%) and for those working outside in extremely hot weather conditions (69.2% vs. 42.9%).

The small number of participants reporting heat illness while working indoors precludes bivariate analysis. Combining participants reporting heat illness while working outdoors and those working indoors produces bivariate results similar to those for those working outdoors alone.

## Discussion

The agricultural season in eastern NC is extremely hot, and most farmworkers report working in extremely hot weather conditions. Over one-third of the farmworkers reported symptoms indicating they experienced heat illness over 3 months of the agricultural season (June – August) while working outside, and more than one-in-ten reported symptoms indicating they experienced heat illness while working inside. One-quarter reported that their housing was extremely hot. Factors associated with heat illness while working outside included working in wet clothes and wet shoes in the previous 3 days, and harvesting and topping in the previous 3 days, with working in the curing barn or loading in the previous 3 days (the work activities of those not harvesting or topping) being inversely associated with heat illness. An important association is that of spending after-work time in an extremely hot house with reporting heat illness symptoms.

Few studies have actually tried to measure heat exposure, heat symptoms, and heat illness, or behaviors to reduce the effects of heat among farmworkers in the US. Although not directly comparable due to differences in measures, like the few existing studies,[11,12] we found working in extremely hot conditions and experiencing heat symptoms to be common. Mirabelli and colleagues[11] reported that 90% of farmworkers reported ever working in extreme heat, compared to our 67% who reported working in extreme heat while working outdoors in the previous 3 months. In addition, 18% of our participants reported working in extreme heat while working indoors in the previous 3 months. Fleischer and colleagues[12] found that one-third of their farmworker participants reported 3 or more heat-related symptoms in the preceding week.

Factors associated with heat illness were not consistent across the three studies. Mirabelli and colleagues[11] found that those who changed work activities had lower odds of heat illness, but only among workers with H-2A visas. The predictors Fleischer and colleagues[12] found were access to regular breaks, taking breaks in shaded areas, and access to medical care reduced odds for heat illness, and drinking more sports drinks and more soda increased odds for heat illness. We found working in wet clothes and wet shoes, and harvesting and topping in the previous 3 days to be associated with experiencing heat illness.

Behaviors farmworkers reported to limit the effects of working in hot conditions were similar across the studies, when we consider those who reported working in extremely hot conditions. Almost all workers in all three studies reported drinking more water. The Mirabelli and current studies found about 80% of workers taking breaks in shaded areas; 20% of the workers in the Fleischer study reported this. Many (30% to 40%) of the workers

in the Fleischer and current studies went to air-conditioned places during breaks or after work; almost none of the workers in the Mirabelli study reported doing so. A moderate number (20% to 25%) of workers in the Mirabelli and the current studies reported changing work hours; about two-thirds of the workers in the Fleischer study reported doing so.

Over a quarter of our participants reported spending time after work in housing that was extremely hot, and this factor had a significant association with the occurrence of heat illness. This reflects the analysis of Quandt and colleagues[13] who found that migrant farmworker camp houses had an assessed heat index in the Danger range (80°F or greater). Although most farmworkers used fans, only 45% had access to air conditioning in their houses. Fleischer and colleagues[12] reported that two-thirds of their participants lived in housing provided by growers, and this may have affected the levels of heat illness, as the workers had little control of their housing. Most of the farmworkers in that study had fans and air conditioning in their houses.

The few studies of migrant farmworker heat exposure, symptoms, and illness measure these factors differently. We found that several measures of work exposure (wet clothes and shoes), and work tasks (topping, harvesting) were associated with farmworkers reporting heat symptoms. These associations must be interpreted with caution, as participants were asked to report extreme heat and heat symptoms over the previous 3 months, while they were asked about working in wet clothes and shoes, and work tasks for the previous 3 days.

This study has other limitations that should be considered. Heat exposure and heat symptoms are based on self-reports. The study is based on cross-sectional data collected in a single year in one region of NC; it may not be generalizable to other regions, states, or years.

Although having limitations, this study has policy implications. First, OSHA should establish a heat standard. Second, individual states should institute regulations similar to those developed in California[5] which have been shown to improve specific heat illness prevention measures, and improve working conditions and employer actions to prevent heat illness.[28] Finally, like Quandt et al.'s[13] participants, our participants were all migrant farmworkers. This result argues for changes in the housing regulations in the Migrant and Seasonal Agricultural Worker Protection Act (MSPA; http://www.dol.gov/compliance/laws/comp-msawpa.htm; accessed June 10, 2014) requiring that farmworkers be provided cooled living spaces.

This study further documents the heat exposure and heat illness experienced by farmworkers in the US. All three of the studies in which heat illness of farmworkers has been measured have been conducted in the Southeast (Georgia, NC). These three studies present inconsistent results in the levels of heat illness reported and factors associated with heat illness. They also differ in the behaviors farmworkers report to address heat exposure. Therefore, in addition to the policy implications we have discussed, these results indicate a need for further research on heat exposure and heat illness among farmworkers in which consistent measures are used.

## Acknowledgments

Funding was provided by grants from the National Institute of Environmental Health Sciences (R01-ES08739).

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**Table 1**

Heat Index For Harnett, Johnston, and Sampson Counties, NC, for June, July, and August, 2013.

| Heat Index | Number of Days by County | | | | | |
|---|---|---|---|---|---|---|
| | Harnett | | Johnston | | Sampson | |
| | n | % | n | % | n | % |
| Less than 80°F | 3 | 3.3 | 5 | 5.4 | 1 | 1.1 |
| Caution: 80°F - 90°F | | | | | | |
| Fatigue possible with prolonged exposure and/or physical activity | 37 | 40.2 | 38 | 41.3 | 23 | 25.0 |
| Extreme Caution: 90°F - 103°F | | | | | | |
| Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity | 52 | 56.5 | 49 | 53.3 | 59 | 64.1 |
| Danger: 103°F - 124°F | | | | | | |
| Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity | - | | - | | 9 | 9.8 |
| Extreme Danger: 125°F or higher | | | | | | |
| Heat stroke highly likely | - | | - | | - | |

**Table 2**

Participant Characteristics, and Use of Personal Protective Equipment, Work Conditions, and Tasks in the Previous Three Days (n=101).

| | n | % |
|---|---|---|
| Age | | |
| 30 to 34 years | 36 | 35.6 |
| 35 to 44 years | 37 | 36.6 |
| 45 years or older | 28 | 27.7 |
| Education | | |
| 0 to 6 years | 43 | 42.6 |
| 7 to 11 years | 49 | 48.5 |
| 12 or more years | 9 | 8.9 |
| BMI (mean, SD): 29.6 (4.3) | | |
| CAGE: problem drinker at baseline | 35 | 34.7 |
| Smoked in the last month at baseline | 31 | 30.7 |
| Daily caffeinated beverages at baseline | | |
| None | 13 | 12.9 |
| 1–2 | 60 | 59.4 |
| 3 or more | 28 | 27.7 |
| Use of Personal Protective Equipment (PPE) in Previous 3 days | | |
| Work gloves | 81 | 80.2 |
| Rain suit | 66 | 65.4 |
| Worn in the Previous 3 days | | |
| Wet clothes | 43 | 42.6 |
| Wet shoes | 38 | 37.6 |
| Hours per Day Typically Worked in Previous 3 days | | |
| Less than 8 | 16 | 15.8 |
| 8 to 8.5 | 26 | 25.7 |
| 9 to 10 | 47 | 46.5 |
| More than 10 | 12 | 11.9 |
| Tasks* | | |
| Plant | 22 | 21.8 |
| Harvest | 67 | 66.3 |
| Top tobacco | 24 | 23.8 |
| Barn or load tobacco | 65 | 64.4 |
| Crops | | |
| Tobacco | 97 | 96.0 |
| Sweet potatoes | 25 | 24.8 |

*Participants could report more than one task in the previous 3 days.

## Table 3

Farmworker Experience Heat Exposure, Heat Symptoms, and Heat Illness, and Behaviors to Reduce the Effects of Heat in the Previous Three Months.

| | N | Percent of Total Sample n=101 | |
|---|---|---|---|
| Worked outside in extremely hot weather conditions | 68 | 67.3 | |
| Symptoms while working outside in extremely hot weather conditions | | | Percent of those working in extremely hot weather conditions outside n=68 |
| Sudden muscle cramps | 17 | 16.8 | 25.0 |
| Nausea or vomiting | 7 | 6.9 | 10.3 |
| Hot, dry skin | 22 | 21.8 | 32.4 |
| Confusion | 9 | 8.9 | 13.2 |
| Dizziness | 11 | 10.9 | 16.2 |
| Heat illness from outside work | 36 | 35.6 | 52.9 |
| Behaviors | | | |
| Drink more water | 59 | 58.4 | 86.8 |
| Take breaks in shaded areas | 60 | 59.4 | 88.2 |
| Go to air-conditioned place during breaks or after work | 20 | 19.8 | 29.4 |
| Change work hours | 17 | 16.8 | 25.0 |
| Change work activities | 14 | 13.9 | 20.6 |
| Change hours or activities | 20 | 19.8 | 29.4 |
| Change hours and activities | 11 | 10.9 | 16.2 |
| Worked inside in extremely hot weather conditions | 18 | 17.8 | |
| Symptoms while working inside in extremely hot weather conditions | | | Percent of those working in extremely hot weather conditions inside n=18 |
| Sudden muscle cramps | 5 | 5.0 | 27.8 |
| Nausea or vomiting | 4 | 4.0 | 22.2 |
| Hot, dry skin | 11 | 10.9 | 61.1 |
| Confusion | 4 | 4.0 | 22.2 |
| Dizziness | 5 | 5.0 | 27.8 |
| Heat illness from inside work | 14 | 13.9 | 77.8 |
| Behaviors | | | |
| Drink more water | 16 | 15.8 | 88.9 |
| Take breaks in cooler, but non-air-conditioned areas | 11 | 10.9 | 61.1 |
| Go to air-conditioned place during breaks or after work | 6 | 5.9 | 33.3 |
| Change work hours | 3 | 3.0 | 16.7 |
| Change work activities | 3 | 3.0 | 16.7 |
| Change hours or activities | 4 | 4.0 | 22.2 |
| Change hours and activities | 2 | 2.0 | 11.1 |
| Spent your after-work time in housing that was extremely hot | 27 | 26.7 | |
| Attempted to cool housing with | | | |

| | N | Percent of Total Sample n=101 |
|---|---|---|
| Opening the windows or doors | 44 | 43.6 |
| Electric fans | 62 | 61.4 |
| Window air conditioning units | 46 | 45.5 |
| Central air conditioning | 11 | 10.9 |

## Table 4

Associations Heat Illness While Working Outdoors with Exposure, Task, and Housing.

| | Number with Heat Illness | Total Sample n=101 | | Those Reporting Working Outdoors in Extremely Hot Weather Conditions N = 68 | |
|---|---|---|---|---|---|
| | n | % | p-value | % | p-value |
| Wore in the Previous 3 Days | | | | | |
| Wet clothes | | | 0.0013 | | 0.0280 |
| No | 13 | 22.4 | | 38.2 | |
| Yes | 23 | 53.5 | | 67.7 | |
| Wet shoes | | | 0.0193 | | NS* |
| No | 17 | 27.0 | | 43.6 | |
| Yes | 19 | 50.0 | | 65.5 | |
| Task in Previous 3 Days | | | | | |
| Harvest | | | 0.0244 | | NS |
| No | 7 | 20.6 | | 35.0 | |
| Yes | 29 | 43.3 | | 60.4 | |
| Top tobacco | | | 0.0079 | | 0.0057 |
| No | 22 | 28.6 | | 43.1 | |
| Yes | 14 | 58.3 | | 82.3 | |
| Barn or load tobacco | | | 0.0250 | | NS |
| No | 18 | 50.0 | | 62.1 | |
| Yes | 18 | 27.7 | | 46.2 | |
| Housing | | | | | |
| Spent after-work time in extremely hot house | | | <0.0001 | | 0.0464 |
| No | 18 | 24.3 | | 42.9 | |
| Yes | 18 | 66.7 | | 69.2 | |

*NS: not significant