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Lessons Learned from Data Collection as Health Screening in Underserved Farmworker Communities

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Abstract

Background: *Girasoles* is an academic–community partnership investigating heat-related illness (HRI) among farmworkers. An unexpected outcome is health screening and intervention for participants without access to health care.

Objectives: We present a case of renal failure in a farmworker, detected during data collection, to illustrate how academic–community collaboration can result in clinical benefits for study participants.

Methods: *Girasoles* is examining physiologic responses to heat stress, associated vulnerability factors, and HRI symptoms. Data include blood pressure, fasting and non-fasting blood glucose, blood creatinine, blood urea nitrogen, and urine dipsticks. Participants with out-of-range findings are referred to local health care providers.

Results: During two summers, health screenings of 192 workers resulted in 71 referrals (37%) for conditions to be rechecked and treated. One of these referrals involved chronic renal failure requiring extensive follow-up by research team members.

Conclusions: The case of renal failure illustrates the value of collaborative research as a health intervention with vulnerable populations.

Keywords

Farmworkers, heat-related illness (HRI), renal failure, work, environmental health, community health research, health disparities, occupational diseases, vulnerable populations

In general, farmworkers are a vulnerable population owing to various social, economic, and political constraints. The physical environment of fieldwork can expose workers to hazards such as harsh weather, snake and insect bites, and workplace chemical exposure. Occupational and environmental conditions can increase risk for issues such as musculoskeletal disorders,¹ traumatic injuries,² and kidney disease.³ Farmworkers are seldom compensated with hazard or overtime pay, workday breaks, minimum wages, insurance coverage, or other protections afforded to workers in other professions.^{4,5} Instead of an hourly wage, they often are paid a piece rate based on the amount of product harvested. This pay

structure can cause physiologic risks if workers push themselves beyond their physical limits to earn as much as they can during inconsistent and irregular seasonal work schedules.^{6,7} Farmworkers, particularly those who are undocumented, may feel powerless to challenge harsh workplace conditions out of fear of losing their jobs and/or being reported to immigration authorities.⁸

Research has shown that the farmworker population does not receive regular or consistent health care,⁹ which can increase their risk for chronic diseases.¹⁰ Most farmworkers are not covered by employer-provided health care, are unable to buy health insurance, and are ineligible for coverage under

the Affordable Care Act; those who can obtain insurance, like H-2A guest workers, are often unaware of this benefit.¹¹ Health care providers who do see farmworkers often do not conduct occupational health histories, which could facilitate early diagnosis and treatment of work-related injuries and illnesses.¹² Furthermore, health care providers may be constrained by limited translation services and lack of cultural awareness.¹³ According to the National Agricultural Workers Survey from 2013 to 2014, only 32% of farmworkers claimed to speak English well and approximately 67% of farmworkers did not finish high school.¹⁴

The goal of community–academic collaborative research in public health is to address health disparities and environmental and social injustices in vulnerable, underserved populations, such as farmworker communities. These collaborations allow for community engagement in research design and implementation, knowledge dissemination, and impact assessment.¹⁵ For more than two decades, the Farmworker Association of Florida (FWAF) has been involved in various community–academic collaborative research projects focused on farmworker health and safety. The FWAF is a grassroots membership organization of more than 10,000 farmworker families predominately from Mexican, Haitian, African American, Guatemalan, and Salvadoran communities. Its goal is to empower farmworkers to respond to and gain control over the social, political, economic, workplace, health, and environmental justice issues that affect their lives.

From 2009 to 2013, the FWAF collaborated with Emory University on a community-based participatory research project focused on the reproductive health of farmworker women.^{16–18} This community-based participatory research project and other recent studies have revealed that workplace heat is a concern for farmworkers.^{5,19,20} The Centers for Disease Control and Prevention report that the average annual rate of heat-related death for agricultural workers is 20 times greater than for the overall U.S. workforce.²¹ From 2012 to 2013, Emory researchers and FWAF staff conducted a pilot study testing the feasibility of field-based physiologic biomonitoring of heat strain among farmworkers.²² Based on the results of this pilot study, FWAF and Emory researchers worked together to develop the 4-year *Girasoles* project to examine HRI among farmworkers at multiple locations and crop industries in Florida. The *Girasoles* protocol has been

reviewed and approved by Emory University's Institutional Review Board (IRB) and all research participants have provided informed consent. To date, the project has collected more than 7,000 hours of continuous biomonitoring data from 275 Hispanic and Haitian agricultural workers in Florida.²³

At each field site, the research team includes community health workers who conduct surveys about home and workplace factors in an appropriate language and academic partner members who conduct health assessments and monitoring of physiological responses during 3 consecutive workdays. Health assessments include measurement of body mass index, body fat, blood pressure, and blood and urine analyses. These data indicate the general health of participants and help to identify any preexisting conditions that may make them more vulnerable to HRI. Monitored data include core temperature, heart rate, work intensity, and microclimate captured every 30 seconds during the workday.

Although *Girasoles* is ongoing, reported results indicate that farmworkers experience high burdens of HRI symptoms that cluster in three overlapping groups: mild (heavy sweating), moderate (heavy sweating, headache, nausea, and dizziness), and severe (heavy sweating, headache, nausea, dizziness, muscle cramps). The accumulation of symptoms can escalate from mild to severe and life-threatening quickly if unrecognized and untreated.²⁴ Additionally, approximately one-third of *Girasoles* participants had acute kidney injury (AKI) on at least 1 study day according to criteria established by the Kidney Disease Improving Global Health Outcomes Working Group and the odds of a participant having AKI on at least 1 study day increased by more than one-third for every additional 5°F increase in the heat index.^{25–27}

One unexpected outcome of *Girasoles* has been the project's role in health screening and intervention for participants with unknown or untreated chronic conditions. At the end of every study week, participants are given their study results. Those with test results that fall out of range are referred to the local health care providers and documented as referred. This case study describes the status, assessment, and current care outcome for one research participant eventually diagnosed with chronic renal failure. It illustrates how the collaborative team reacted to a life-threatening condition and the lessons learned from the incident.

CASE STUDY

One summer evening, community partner members presented *Girasoles* at a participant recruitment meeting with workers in Central Florida's fernery industry. Fernery workers typically labor 8 to 10 hours per day, 7 days per week during peak harvesting seasons—which are the months leading up to certain holidays—December (Christmas), February (Valentine's Day), and May (Mother's Day)—when the demand for flower arrangements is high. After the recruitment meeting, fernery workers who agreed to participate reported to the study site, where they completed informed consents, baseline surveys, and health assessments. One of these workers was Carlos,* who claimed to be within the study age limit of 54 but seemed to be much older. As in similar studies with vulnerable populations, the IRB for *Girasoles* granted an exception to request identification for consent, thus the participant's age was unverifiable. Carlos had migrated to the United States from Mexico more than 15 years ago. He had less than a high school education and did not speak English. His work schedule at the time of the study was approximately 8 hours per day, 3 to 4 days per week. As an experienced fern cutter, he typically harvested between 120 and 200 bunches of ferns per day, earning a piece rate of 18 to 35 cents per bunch for a total of \$21 to \$70 per day.

Test results from Carlos's onsite blood analysis identified a creatinine level of 14.6 mg/dL (normal range, 0.7–1.3 mg/dL)²⁸ and a urea nitrogen level of 123 mg/dL (normal range, 6–20 mg/dL).²⁹ His blood pressure was 175/96 and his hemoglobin level was 7.8 g/dL (normal range, 13.8–17.2 g/dL).³⁰ Carlos, like many other participants with insufficient time or money for preventative screenings, had not seen a health care provider in years. He reported feeling healthy and able to complete his normal daily activities. However, when he returned the next morning for the second screening, abnormal levels were again observed. The research team scheduled a follow-up appointment at the local clinic. They also arranged for a health care discount card and translation services for the clinic visit. After he was assessed at the clinic, Carlos was quickly referred to the nearest emergency care facility, where he was admitted with acute renal failure and anemia, secondary to obstructed uropathy.

*Names have been changed to protect participants' identities.

As a result of his kidney failure, Carlos spent 79 consecutive days in the hospital and underwent eight independent surgeries. At the time of this report, he continues to receive dialysis three times a week. Although Carlos' diagnosis and treatment likely saved his life, and represents a success story for *Girasoles*, the case was not without consequences. As an inpatient, hospital administrators urged Carlos to voluntarily repatriate to Mexico, which would have included cost of transportation, 3 months of dialysis, and enrollment in the *Seguro Popular*, a current initiative of the Mexican Government to cover uninsured workers, retirees, and their families. Yet, the insurance would not cover dialysis services indefinitely and Carlos had no social support in Mexico because he had become estranged from his family there. Thus, he refused repatriation and the hospital remained legally responsible for his well-being until he could be stabilized. As a result of his extended hospitalization and health condition, he was unable to work and was subsequently evicted from his employer-owned housing. With no remaining family connections, no transportation, and no housing, he must now rely on the farmworker community. The FWAf provides transportation to and from dialysis, a community health worker has provided him with housing, and other community members regularly provide him with food.

DISCUSSION

The incidence of chronic kidney disease among agricultural workers has increased globally,^{31,32} including within the United States.^{33,34} In recent years, an epidemic of chronic kidney disease of unknown etiology has gained increasing notice and is hypothesized to be associated with recurrent episodes of dehydration, volume depletion, and AKI caused by working in hot environments.^{35,36} It is important to note that the definitive cause of Carlos' condition is unknown to *Girasoles* researchers, but has not been ascribed to HRI. However, there are likely workers experiencing AKI that is related to occupational heat or to other factors, such as frequent urine retention, that are occupationally related. It will be paramount in the coming years to continue screening these workers, through community-based research partnerships, and address any trends found.

Although Carlos' case is an example of a serious condition, he has not been the only *Girasoles* participant to be referred to

a local clinic for out-of-range findings. During the summers of 2015 and 2016, project health screenings and physiological monitoring of 192 workers in three Florida communities resulted in 71 referrals. When considering the total number of participants divided by the number of participants who were referred for care, and accounting for individuals who had multiple conditions, this represents a 37% referral rate. Referrals were made for conditions including 45 cases of elevated fasting glucose, 22 cases of high blood pressure, 4 cases of low hemoglobin, 6 cases of urine dipsticks findings and symptoms consistent with urinary tract infection, 4 cases of elevated blood urea nitrogen, 2 cases of elevated blood creatinine, and 2 cases of urine dipstick findings and symptoms consistent with nephrolithiasis. In a few cases, such as those involving diabetes, participants were not surprised by the results. Other participants may have noticed changes in their health but never had the opportunity to be assessed. In most instances, however, the participants (like Carlos) were not aware of a health condition or what appropriate health care services were available to them.

Carlos' story illustrates how an academic–community research partnership can capitalize on the strengths of both partners to provide resources to a vulnerable population. The inclusion of health care providers on the research team has resulted in an increased, but unanticipated benefit for the study participants because accurate health information obtained from baseline and follow-up testing is communicated to each participant. The FWAF has established trust within the community and is able to provide a bridge for community members to health care providers and researchers. Although the study does not provide a comprehensive clinical assessment, there is value in accommodating workers' schedules, having a translator present, explaining results, offering preventive health care information, and providing referrals for follow-up care, as needed. In Carlos' case, the research team's involvement extended beyond collecting his data. The team helped him to understand the meaning of his test results, the urgency of follow-up care, and the means of obtaining proper support during his hospital stay and dialysis treatment. Team members provided or arranged for translation, legal consultation,

housing, transportation, financial resources, and emotional support as needed. Community health workers were hired for an extended period to ensure that Carlos received logistical support for his life-saving care. Because the *Girasoles* research team involves the participation of an active community partner, the FWAF, this extensive follow-up activity was feasible.

The *Girasoles* collaborative approach has also fostered the development of culturally appropriate educational material for community stakeholders outside the partnership.³⁷ Local clinics have requested that the *Girasoles* team create health profiles of the study participant populations to better understand the health status of the study communities. Figure 1 is an example of a health infographic developed for local health care providers to show heat symptoms and biometrics of the study participants in one community.

Looking ahead, the ability of farmworkers, particularly undocumented individuals, to seek regular health care may decrease in response to changes in immigration policy. Farmworker health and national immigration policies cannot be separated. Those who live in daily fear of possible detention, deportation, and family separation because of their legal status may experience stress and anxiety³⁸ and may be reluctant to seek health care if they are afraid to present themselves to outside agencies. Researchers working with farmworker and immigrant communities can partner with community-based organizations to understand and address these issues. Research with farmworkers that potentially entails intervention can explore cost-effective strategies to connect participants to health care providers. For example, migrant workers can enroll in the Migrant Clinician Network's distance case management, which provides follow-up services for mobile patients in 111 counties.³⁹

Collaboration with medical and counseling departments at nearby colleges and university departments may also provide needed health care resources. In one *Girasoles* study community, the FWAF has collaborated with local colleges of medicine, nursing, counseling, and pharmacy to offer 1 day of free medical care three times a year to members of the community near the FWAF office. At one of these events, as many as 100 immigrants received health care in a single day

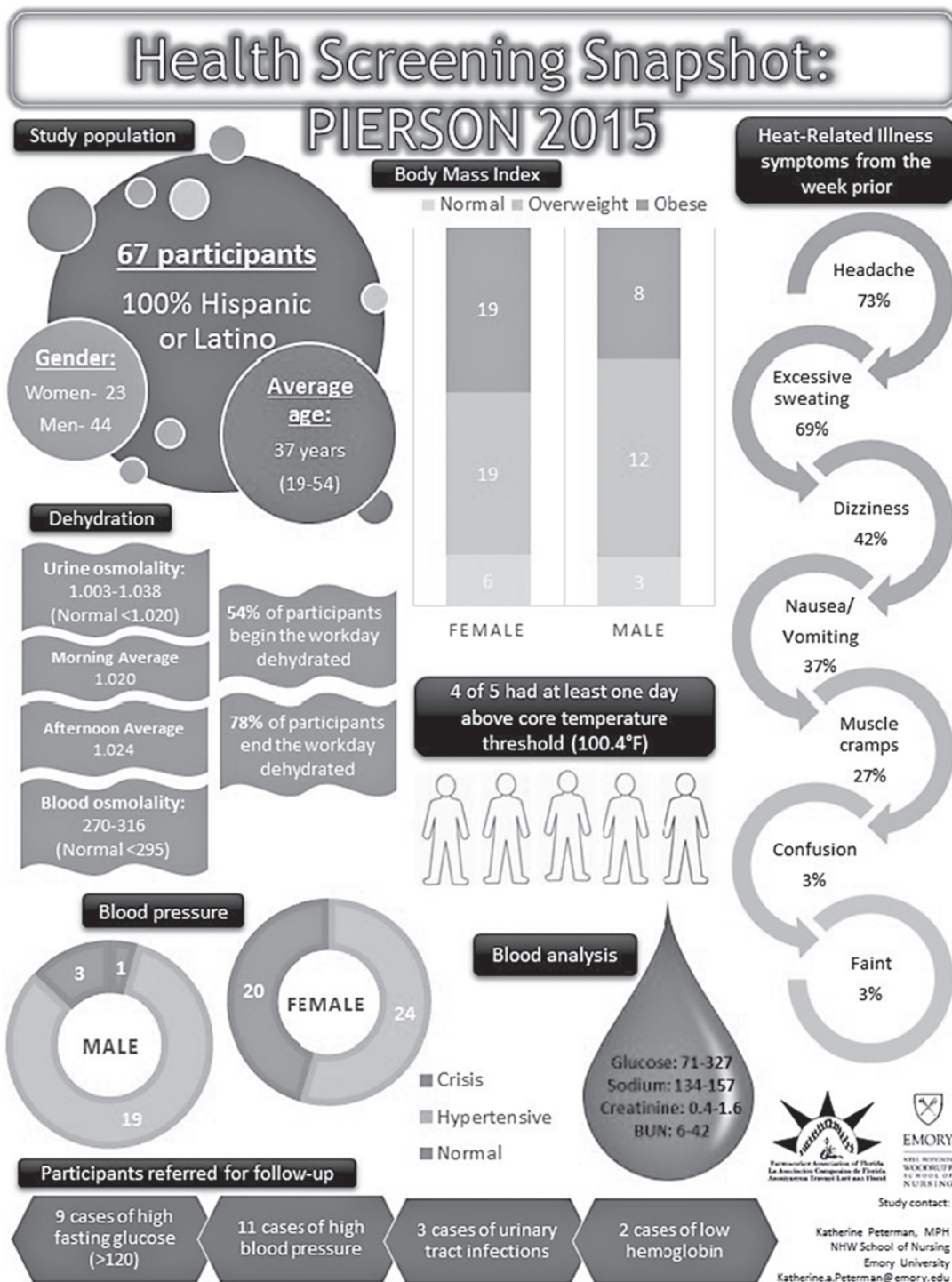


Figure 1. Infographic for local health care providers. BUN, blood urea nitrogen

in a safe environment. Although not a research project, this kind of collaboration can be a model for other communities.

LESSONS LEARNED AND CONCLUSIONS

There may be many farmworkers with health conditions as severe as Carlos' that remain undiagnosed and untreated. This case study describes how a systematic collaborative research project that includes a baseline assessment can increase health surveillance in a population without access to health care services. *Girasoles* researchers have discovered that access to health screenings and education on personal health care have been primary motivators for farmworkers to participate in the project. Partnering with a community organization has provided the opportunity to use research as a health intervention and to guide dozens of participants toward appropriate care.

When the *Girasoles* study was conceived, however, researchers were unaware they would discover the high number of abnormal health conditions found during data collection. According to the IRB-approved study protocol, participants with out-of-range findings are to be referred to local health care providers for medical evaluation. Because the FWAF had an established presence in the study communities and knew the most appropriate and cost-effective clinics, this pathway is in line with what would be sufficient for most research studies. In Carlos' case, the initial referral was for him to report immediately to the emergency department and this was sufficient to meet the approved IRB requirements. However, researchers had no precedent for how to respond to a long-term health emergency such as the one experienced by Carlos. His need for subsequent care raises important considerations for performing research with vulnerable populations. This case study highlights how standard research requirements can create an ethical dilemma when the continuance of care and support for a study participant is a life or death matter.

Because *Girasoles* has led to the discovery of medical issues beyond the original scope of investigating HRI, it is the responsibility of the research team to address those unexpected findings as much as possible to maintain all levels of trust. Once a relationship between researchers and a community is established, it is important to continue to foster trust. This

has long been part of the key principles of community-based research.⁴⁰ Trust is especially important when working with a vulnerable population such as farmworkers, particularly those who are undocumented. Although the *Girasoles* survey does not ask participants about their immigration status, the FWAF's deep knowledge of its communities indicates that many of the undocumented farmworker participants in the study are long-term residents with established roots in their communities and family members who are citizens or legal permanent residents. These community members' experience with and trust in FWAF has factored strongly into their willingness to participate in this study. In *Girasoles*, trust extends beyond the academic-community organization partnership and includes the relationships that FWAF has with other community agencies. For example, the local health care providers where participants are referred have a history of working with farmworkers; hence, there is a level of trust in those providers that might not exist with other mainstream medical services and/or institutions. A research approach that fosters partnership and trust with community organizations and members can help to alleviate the fear and increasing anxieties in farmworker communities owing to the current transition in immigration policy.⁴¹

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