



Eye on Farmworker Health

Current Developments in Research and Policy

Pesticide drift dangerous for farmworkers and other rural residents

Title: *Acute Pesticide Illnesses Associated with Off-Target Pesticide Drift from Agricultural Applications – 11 States, 1998–2006*

Authors: *SJ Lee, L Mehler, J Beckman, B Diebolt–Brown, J Prado, M Lackovic, J Waltz, P Mulay, A Schwartz, Y Mitchell, S Moraga–McHaley, R Gergely, GM Calvert*

Source: *Environmental Health Perspectives online (June 2011)*

Pesticide drift – the off-target movement of pesticides during or after application – is one of the most significant causes of pesticide exposure for humans, wildlife, and the environment. Pesticide drift has been reported to account for 37.68% of pesticide illnesses among U.S. agricultural workers. In this study, researchers aimed to estimate the magnitude and incidence of acute pesticide poisoning associated with pesticide drift from outdoor agricultural applications in the U.S. between 1998–2006. Additionally, the study describes the exposure and illness characteristics of pesticide poisoning cases arising from off-target drift. Results showed that while the incidence of acute illness from off-target drift exposure was relatively low during the period studied, pesticide drift disproportionately affected agricultural workers. These poisonings are preventable and efforts should be taken to reduce pesticide drift.

The study used data on acute pesticide poisoning cases from the National Institute for Occupational Safety and Health (NIOSH)'s Sentinel Event Notification System for Occupational Risks (SENSOR)–Pesticides program and California Department of Pesticide Regulation (CDPR)'s Pesticide Illness Surveillance Program. Participating surveillance programs identified cases from multiple sources including health care providers, poison control centers, and government agencies. They collected information on the pesticide exposure incident through investigation, interview, and/or medical record review.

A drift case was defined as acute health effects in a person exposed to pesticide drift from an outdoor agricultural application. Drift included off-target movement of pesticide spray, volatiles, and contaminated dust. Acute illness cases were characterized by demographics, pesticide and application variables, health effects, and contributing factors. A drift event was defined as an incident where one or more drift cases experienced drift exposure from a particular source. Both occupational (exposed at work) and non-occupational cases were included in this study. Data analysis and descriptive statistics were used to characterize drift events and cases.

The results of the study showed that during the period of 1998–2006, 2,945 cases associated with agricultural pesticide drift were identified from 11 states. The overall incidence rate of drift-related pesticide poisoning was 2.93/million person-years. The

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WHO ARE WE?

Eye on Farmworker Health: Current Developments in Research and Policy is an

rates of non-occupational and occupational drift-related pesticide poisoning were 1.56 and 2.89, respectively. Nearly half (47%) of drift cases had exposures at work, and 14% were children younger than 15. The annual incidence (in million person-years) was 114.3 for agricultural workers, 0.79 for other workers, 1.56 for non-occupational cases, and 42.2 for residents in 5 agriculture-intensive counties in California. The most common exposure location was private residences (44%) followed by farms/nurseries (37%).

Soil applications with fumigants were responsible for the largest proportion (45%) of cases. Aerial applications accounted for 24% of cases. Common factors contributing to drift cases included weather conditions, improper seal of the fumigation site, and applicator carelessness near non-target areas.

While the study indicates that the incidence of acute illness from off-target drift exposure was relatively low during 1998–2006 and involved cases of low severity, it disproportionately affected agricultural workers. Thus, one of the important conclusions this study reaches is that the risk of illness resulting from drift exposure is largely borne by agricultural workers, and the incidence (114.3/million worker-years) was 145 times greater than that for all other workers. Fortunately these poisonings may be largely preventable through proper prevention measures and compliance with pesticide regulations. The study notes that these findings highlight areas—such as aerial applications and soil fumigations—where interventions to reduce pesticide drift could be focused in the future.

Poor housing conditions for North Carolina farmworkers could impact health

Title: Migrant Farmworkers' Housing Conditions Across an Agricultural Season in North Carolina

Authors: QM Vallejos, SA Quandt, JG Grzywacz, S Isom, H Chen, L Galvan, L Whalley, AB Chatterjee, TA Arcury

Source: American Journal of Industrial Medicine, vol. 54, no. 7: 533–44 (2011)

Clinicians often have little information about the housing situations of their patients. Yet studies indicate that poor housing quality has a significant impact on health. For example, mold, insect, and rodent infestation, structural damage, and unsanitary facilities have been associated with respiratory disease, skin disease, infectious diseases, and injuries. This particular study focused on the housing conditions of migrant farmworkers in North Carolina. The goal of this study was to 1) describe the housing conditions in migrant farmworker camps across the agricultural season and 2) to identify the specific characteristics of the camps and residents as related to poor housing conditions. The study concluded that housing standards are not adequately enforced and a significant portion of migrant farmworker camps had significant problems that may impact health. The researchers suggest that post-occupancy inspection of housing could reduce the occurrence of substandard housing in migrant farm labor camps.

Data for this study was collected during 2007–2008 in 11 eastern North Carolina counties, and focused on 43 migrant farmworker camps with 280 participants in 2007, and 27 migrant farmworker camps in 116 participants in 2008. There were some differences in characteristics between the 2008 and 2007 participants. For example, the 2008 residents compared to the 2007 residents were older, less likely to speak an indigenous language, more likely to have H2A visas, and more likely to have more than 7 years of work experience

electronic newsletter covering important recent developments in research and regulation on issues affecting the health and safety of migrant farmworkers.

It is a joint project of [Farmworker Justice](#) and [Migrant Clinicians Network](#), supported by the Health Resources and Services Administration's Bureau of Primary Health Care. Each issue includes summaries of recent articles and reports, as well as recommendations for using the information to help health professionals, outreach workers, promotores de salud, and advocates strengthen their efforts on behalf of farmworkers and their families.

The contents of this publication are solely the responsibility of Farmworker Justice and Migrant Clinicians Network and do not necessarily reflect the official views of the Bureau of Primary Health Care or the Health Resources and Services Administration.

STAY IN TOUCH

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in US agriculture. Camp characteristics also varied across the agricultural season due to frequent turnover in workers. The number of residents in the camps fluctuated across the agricultural season within most camps.

Data collection occurred through interviewer-administered questionnaires and interviewer observation. Housing was measured to fall into one of three separate categories: 1) Meeting Housing Standards 2) Moderately Substandard Housing and 3) Severely Substandard Housing. Results showed that a significant portion of the migrant farmworker housing was substandard. 2/3 of the labor camps had one exterior problem and 1/4 had two exterior problems. 82% of camps had between 1 and 5 interior housing problems. 56% had problems in the bathrooms, the most common of which was the presence of mold or mildew. 1/3 of camps did not have drains in the showers. When a more comprehensive set of housing standards was assessed in 2008, 89% of camps had more than one condition that violated the Migrant Housing Act. 20% were severely substandard.

The results of this study suggest that migrant housing standards are not being adequately enforced. Additionally, the risk of living in a camp with substandard conditions is unevenly distributed among farmworkers. Notably, camps that had one or more residents who spoke an indigenous language were about twice as likely to have three or more people sharing sleeping rooms and three times as likely to have inadequate facilities as were camps with no residents who spoke an indigenous language. Additionally, women, children, workers with fewer than 7 years experience working in US agriculture, and non-H-2A workers had a disproportionately high risk of being exposed to substandard housing conditions. Though this study does not address the health outcomes that result from the living conditions, it notes the importance of further research in this area.

Improved enforcement of migrant housing standards is needed in order to better protect the health of migrant farmworkers. Increasing the number of post-occupancy compliance inspections is one tactic that would likely improve housing conditions.

Crop workers suffer high occupational injury rates, and face dangers of lifting, use of hand tools, and falls

Title: Injuries to Hired Crop Workers in the United States—A Descriptive Analysis of a National Probability Survey

Authors: LA Layne, JR Myers, S Wang

Source: American Journal of Industrial Medicine, epub (June 2011)

Agriculture has been called one of the most dangerous occupations in the United States. In fact, U.S. Department of Labor's Bureau of Labor Statistics data has revealed that agriculture consistently ranks among the industries with the highest rates of injuries and fatalities on the job. The purpose of this particular study was to provide a descriptive analysis of the data from the National Agricultural Workers Survey (NAWS) injury module, to better understand the injuries faced by farmworkers. This study concluded that the use of hand tools, falls, and lifting overexertion injuries were significant concerns for workers. Additionally, individual characteristics, such as age, had significant effect on the likelihood of injury.

Data for this study were collected through the NAWS for the federal fiscal years 1999 and 2002–2004. NAWS is an ongoing national personal interview survey conducted by the US Department of Labor covering crop farm workers. For the purpose of this study, a work-related injury was defined as any injury to the worker in the 12 months prior to the interview

that 1) occurred on a farm they were working on in the US or while traveling to or from a farm for work and 2) resulted in one or more of the following: rendered the worker unable to work for at least 4 hours; required the worker to seek medical treatment; or required the worker to take strong medicine to keep working.

Injury rates were expressed as the number of injuries per 100 week-based full-time equivalents, and a total of 13,595 farm worker interviews were used for analysis. 374 reported injury, leading to an overall observed injury rate of 4.3 injuries/100 FTE workers. Male workers accounted for 83.7% injuries, and had a higher injury rate than female workers. Crop workers younger than 20 had an injury rate of 5.2 injuries/100 FTEs. Though Mexican-born workers comprised the highest percentage of injuries (72.8%), US-born Latinos had the highest injury rate (6.9 per 100 FTE), followed by US-born blacks and whites.

The most common types of injury reported were sprains and strains at 38.8%, followed by cuts and lacerations at 21.2%, and fractures and dislocations (12.5%). Contact with objects, including being struck or caught by an object, accounted for 32.8% of injuries, while bodily exertion or overreaction accounted for 31.6%. Falls accounted for 16.2% of injuries, and exposure to substances/environment caused 10.3%.

The study's results support previous research in this area that demonstrated work injuries among hired farm workers occur to males; that inexperienced workers may be at higher risk of injury, and that existing health conditions impact injury risk. The study also came to conclusions that have not been seen in previous research on hired worker injury. Firstly, hired crop workers interviewed in the Southwest region of the US had the highest reported injury rates. Additionally, US-born workers were at highest risk for injury, particularly US-born Hispanics. Additionally, this study identified injuries from the use of hand tools, falls (from elevation), and overexertion from lifting as significant concerns for crop workers in the US.

While more needs to be done to identify potential risk factors for these types of injuries, this study can be seen as the initial step in better understanding occupational farm work injuries among hired crop workers in the US. The findings suggest that injury prevention initiatives directed at hired crop workers must be broad-based. They must focus equally on the overall health of workers and worker training. The high number of restricted work days reported by participants in the study ultimately indicates that more effective injury prevention measures are necessary and would be beneficial to workers and employers. The results of this study can be used to target injury prevention efforts and should spur future research in this area.

PESTICIDE POLICY UPDATE

EPA to hold October meeting on pesticide biomonitoring

Migrant clinicians often face significant hurdles in identifying and diagnosing pesticide poisoning. Though farmworkers may present symptoms associated with pesticide exposure, there are currently few diagnostic tests that can identify the particular type and quantity of pesticides present in the body. On October 11, 2011, the Environmental Protection Agency (EPA) will convene a meeting of clinicians, researchers, industry leaders, farmworker advocates, and other stakeholders to discuss the development of biomarkers and other tools for use in diagnosing and treating exposure to pesticides.

Accurate diagnosis of pesticide poisoning is necessary to ensure that patients are accurately treated and receive workers' compensation if they are entitled to it, and that authorities can

monitor public health hazards and link individual chemicals with their health effects. Accurate clinical diagnosis combines history, physical findings, and laboratory testing. In mild to moderate pesticide overexposures, a nonspecific clinical presentation is common. The availability of a diagnostic biomarker in these cases may confirm a clinical impression and may provide the objective confirmation of the work relatedness of an illness. Though they might take different forms, including measuring changes in DNA and traces of chemicals or their metabolites, biomarkers of exposure would generally be focused on specific pesticides or groups of pesticides with similar effects. The American Public Health Association (APHA), clinical organizations and other advocates have asked the EPA to require that pesticide registrants (chemical companies) develop and provide an effective biomarker as part of the registration process. For more information on this topic, see APHA Policy Resolution – Requiring Clinical Diagnostic Tools and Biomonitoring of Exposures to Pesticides, <http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1400>.

The October meeting will allow stakeholders to examine the issue of biomarkers and discuss the scientific and policy issues involved in their development. Farmworker Justice and Migrant Clinicians Network will continue to participate in this important conversation with the goal of improving farmworkers' health and workplace safety. Updates on the October meeting will be posted on the EPA website at <http://www.epa.gov/pesticides/ppdc/testing/index.html>.

MORE ARTICLES

Migrant farmworkers experience high stress levels before migrating

Title: Stress in Migrant Farmworkers During Premigration

Authors: A Brown and EM Clingerman

Source: Biological Research for Nursing, epub (January 2011)

Stress can have a serious and dramatic impact on physical and mental health outcomes. Studies in the past have demonstrated high levels of stress in migrant farmworkers during migration periods. This study looked at the period before migration to further understand the nature of chronic stress and cumulative effects of stress on migrant farmworkers. Specifically, the study examined the relationship between migrant farmworker stress and salivary cortisol (sC) during premigration. The study found that migrant farmworkers experience significant stress levels during the period of premigration. Researchers concluded that further physiological measures of stress and measures of their effects on physical and mental health of vulnerable groups, such as migrant farmworkers, would contribute to the effort to ameliorate health disparities.

Previous studies have focused much effort on describing and understanding farmworker stress during migration. Acculturation, social isolation, job uncertainty, poor housing conditions, and migration itself have all been seen as contributors to stress for migrant farmworkers. Previous researchers have suggested that stress may lead farmworkers to distraction and contribute to higher rates of occupational injury. However, stress may not only occur during migration and periods of work for migrant farmworkers. This study focuses on stress in the premigration period (in spring, prior to migration), to understand the nature of chronic stress and the cumulative effects of stress on physical and mental health.

The study measured both perceived stress and physical biomarkers to determine stress levels in a sample of 40 migrant farmworkers in south Texas. Salivary cortisol (sC) is a commonly used biomarker of psychological stress and was used in this particular study. Additionally,

the MFWSI is a 39-item measure of perceived migrant farmworker stress. Total scores range from 0 to 156 with higher scores indicating greater severity of perceived stress and scores greater than or equal to 80 indicating high stress in migrant farmworkers. In the results of this study the scores ranged from 10 to 130 on the MFWSI scale. However, 50% of the sample scored above 80 indicating high stress levels during premigration. The worry regarding the lack of health insurance was the most substantial stressor identified.

One notable and concerning finding in this study was the high level of total perceived stress that migrant farmworkers experienced at a time when they were not actively migrating. In fact, the stress level in premigration was similar to the level of stress during migration. This finding suggests that even migrant farmworkers who are not migrating may be at risk for significant psychological health problems.

While this study faced limitations in small sample size, it nevertheless provides a baseline physiological data set pertinent to stress in migrant farmworkers' premigration. Findings from this study could potentially assist practitioners working with migrant farmworkers and assist in the development of targeted evidence-based interventions aimed at diminishing stress in migrant farmworkers and improving stress-related health outcomes. However, because relationships among stress, cortisol levels, and health outcomes are highly complex and varied, future research relating to stress in migrant farmworkers premigration is needed.

Intimate Partner Violence (IPV) an issue in farmworker communities

Title: Measuring Intimate Partner Violence Among Male and Female Farmworkers in San Diego County, CA

Authors: MR Duke and CB Cunradi

Source: Cultural Diversity and Ethnic Minority Psychology 2011, Vol. 17, No. 1: 59-67 (2011)

Intimate partner violence (IPV) refers to acts of emotional or physical aggression between adult married or cohabitating intimate partners. Though research increasingly links work- and stress-related variables, such as lower income and unemployment, with IPV, and recent studies have shown farmworkers to experience high levels of work and acculturative stress (see above), relatively little is known about intimate partner violence (IPV) among this population. This study estimates the prevalence of IPV among a mixed gender sample of farmworkers in San Diego County, California, and assesses the association of potential correlates (acculturation and work related stress, problem drinking, and impulsivity) to IPV.

IPV is a significant public health issue; annual prevalence estimates have ranged from 7.8% to 21.5%. Research among general population samples has shown that IPV prevalence is highest among younger couples, member of racial ethnic minorities, and couples with household indicators of lower socioeconomic status, such as unemployment, lower education and income levels. Each of these factors typifies farmworkers and their families and suggests that negative structural conditions can result in tensions between spouses or romantic partners. These tensions, in turn, may result in acts of physical or emotion aggression. Data from national family violence surveys indicate that women engage in IPV as often (or more often) than men. Women, however, are more likely than men to sustain injuries as a result of IPV.

This particular study focuses on a mixed-gender sample of stationary (non-migrating) farmworkers in San Diego and examines the gender-specific association between alcohol use, acculturative and work related stress, impulsivity, and IPV among male and female

farmworkers. Bilingual interviewers conducted survey data collection by interviewing 100 individuals using standardized instruments including the Revised Conflict Tactics Scale (measures partner aggression and victimization) and Migrant Farm Work Stress Inventory (assesses the quality and severity of stress associated with a migrant farmworker lifestyle). The sample consisted of 37 males, 61 females, with gender missing for 2 respondents.

Results of the study indicated that in the past 12 months approximately 16% of female individuals and 32% of male individuals reported partner violence perpetration, victimization, or both. 18.9% of men and 9.8% of women reported at least one act of aggression against their partner. Among men who reported any IPV perpetration, 71.4% of cases were characterized as only “moderate” acts of IPV. While male farmworkers had twice the rate of any past 12 month IPV compared with female farmworkers (32% vs 16%), this did not amount to statistical significance ($p=.065$). The study concluded that married or cohabiting farmworker men and women experience IPV at rates that are within the range seen in community based or general household population samples.

This study concludes that although IPV has been historically associated with violence against women, there has been substantial recent evidence that points to IPV as dyadic behavior (i.e. in which perpetrators or victims may be of either gender). Although the small sample size limits the generalizability of this study, the results suggest that most aggressive acts reported by this sample reflect common couple or situation violence (i.e. in which dyadic conflict results in physical aggression) rather than intimate partner terrorism, in which one partner—typically the male—uses violence in a psychological effort to control his partner.

Additionally, this study cites a significant correlation between farmwork-related stressors and IPV. Significant correlates of IPV were problem drinking (among males) and impulsivity (among females). Heavy alcohol use by one or more romantic partner substantially increases the likelihood that couple conflict will result in physical violence. However, despite the empirical evidence that links alcohol to IPV, it is important to note that alcohol is neither a necessary nor sufficient cause of violence between intimate partners. IPV occurs in cases where alcohol is not a factor and other variables may be of critical importance in understanding why alcohol contributes to IPV for some couples under some circumstances but not for others. The study also indicated that both males and females experience high, but fairly equal, levels of stress. However, it is acknowledged that additional mixed-method research, with larger sample sizes, is needed. The results of future studies could help clinicians and others develop evidence-based IPV prevention efforts.

Partnerships between medical centers and faith-based community groups one model for increasing cervical cancer screening

Title: Increasing Cervical Cancer Screening in a Hispanic Migrant Farmworker Community Through Faith-Based Clinical Outreach

Authors: JS Luque, D Martinez Tyson, T Markossian, J Lee, R Turner, S Proctor, J Menard, CD Meade

Source: Journal of Lower Genital Tract Disease, Vol. 15, No. 3: 200–204 (2011)

Low income, lack of access to healthcare, and cultural barriers such as language and the perception of cancer as universally fatal contribute to the disproportionately high occurrence and mortality rate of cervical cancer in Hispanic farmworker women. In order to address these obstacles to screening and treatment, a cancer center in Florida formed a partnership with

Catholic Mobile Medical Services (CMMS). This faith-based clinic brought gynecologic screening services to a rural community in central Florida and succeeded in increasing cervical cancer screening for farmworker women.

Researchers at CMMS examined both clinical and demographic data for 222 women who received Pap tests at the clinic in order to find any associations between medical and personal history and adherence to cervical cancer screening guidelines. The data included sexually transmitted infections and family medical history, as well as education, length of time spent living in the United States, employment status, marital status, and ethnicity. On average, these patients had lived eight years or less in the US, had received eight years of education, and were Hispanic. The majority of patients (68%) were born in Mexico, and currently unemployed (58%). Though most women worked on farms, some were employed in housekeeping, seafood processing, and retail.

Of the many demographic variables examined, only length of time residing in the United States and marital status were significantly associated with greater adherence to screening recommendations. Women who had lived in the US for more than five years were far more likely to follow the cervical cancer screening guidelines than were women who had lived in the US for less than five years. The lack of support and access to resources for more recent immigrants may account for this disparity. Marital status, too, proved to be linked to the likelihood of following screening recommendations—married women adhered to the guidelines significantly more than did unmarried women.

Two other research endeavors in this medically underserved, rural area have supported the conclusion that community-based partnerships are necessary and effective. Researchers studied the patients' knowledge about cervical cancer and found that Anglo-American and Puerto Rican women were more familiar with the facts about cervical cancer than were Mexican and Honduran women. This difference in awareness speaks to the need for further community outreach. Another research program funded and studied the work of a cervical cancer patient navigator, a professional familiar with the community who could support the needs and coordinate the treatment of patients. This approach proved effective in recording the follow-up care for migrant farmworker patients whose screening adherence after visiting CMMS had not previously been known due to their change in location. Taken together, this evidence demonstrates the power of community partnerships in improving medical outcomes for farmworker women.

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