

streamline

The Migrant Health News Source

Screening for Pesticide Exposure

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Editor's Note: This article is excerpted with permission from a longer article which originally appeared in the Journal of Midwifery and Women's Health, Volume 51, Issue 1, Pages 3-11 (January 2006).

Abstract

Pesticide use is ubiquitous in the United States in both agricultural and urban environments. Although pesticide exposure can occur anywhere, migrant and seasonal farmworkers in medically underserved communities are at particular risk. Health care providers often feel ill-equipped to

recognize or manage pesticide exposure or pesticide-related illness. In 2002, the National Environmental Education Foundation (NEETF) published a series of reports that describe national goals for improving the recognition, management, and prevention of pesticide-related health conditions. This article illustrates how to diagnose and manage pesticide exposures by analyzing a pesticide exposure case using a framework suggested by NEETF. Basic screening techniques and available resources for use in the primary care setting are presented.

[See National Pesticide Practice Skills Guidelines on page 7.]

Introduction

Like many health care providers, midwives may feel unprepared to recognize pesticide exposure or provide high-quality care to persons with pesticide-related illness. In an unpublished study of nurse-midwives/midwives (CNMs/CMs) practicing in high pesticide-use counties along the US/Mexico border, this author found that only 40% of

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respondents routinely screened for pesticide exposures as recommended by the NEETF guidelines (Quackenbush, unpublished data, 2004). Most CNMs indicated that they did not feel that they had enough knowledge to counsel clients on how to avoid pesticide exposure or on what measures to take if an exposure occurred. In an unpublished study of 203 primary care providers, including pediatricians, physician's assistants, nurse practitioners, and pediatric nurses in the Washington, DC, metropolitan area and surrounding rural counties, only 4% of providers routinely asked questions about pesticide toxicity in patient histories (Balbus and Umeh, unpublished data, nd).

Although any person living or working in the United States may be exposed to pesticides, migrant farmworkers are at particular risk. Farmworkers experience the highest rate of toxic chemical injuries of any group in the United States.⁴ Health care providers caring for farm worker clients and families should be able to evaluate and provide appropriate care for individuals at risk for and those affected by pesticide exposures. This article illustrates how to identify and manage pesticide exposures by analyzing a case using the framework suggested by NEETF. Basic screening techniques and available resources for use in the primary care setting are presented.

Health Effects of Pesticide Exposure

All pesticides must be reviewed for safety and approved for use by the Environmental Protection Agency (EPA) before they can be sold in the United States. Each approved pesticide has a set "tolerance level," which is the maximum legal amount of pesticide residue that may remain in or on the food at harvest. When determining a tolerance level, the EPA considers factors such as the proportion of the food in the diet, the ages of the individuals consuming the food, and the toxicity of the pesticide in question.²

Groups considered to be particularly vulnerable to pesticide health effects include 1) children and fetuses, whose developing neurologic and other body systems may be highly vulnerable to insult; 2) women, primarily in regard to reproductive health risks; and 3) minority and economically disadvantaged persons, for whom home and environmental exposures are often higher.⁸

Types of Adverse Health Outcomes

A pesticide exposure is considered acute when the onset of symptoms occurs shortly after the time of pesticide exposure. Acute effects of pesticides are well documented in

the literature.³ Organophosphate and pyrethroid insecticides are the categories of pesticides most often implicated in acute pesticide-related illnesses reported to poison control centers.⁷ Acute pesticide poisonings vary in their degree of severity. Acute effects may present as respiratory problems, nervous system disorders, or aggravation of preexisting conditions such as asthma.¹⁰ Pesticides may cause irritation of the eyes, nose, and throat; burning, stinging, itching, rashes, and blistering of the skin; nausea, vomiting, and diarrhea; and coughing, wheezing, headache, and general malaise.¹⁰ Because these symptoms are similar or identical to those caused by other illnesses, acute pesticide poisoning is often misdiagnosed.¹⁰

Gender Differences

Some health effects of pesticides are similar in women and men, but differential effects exist because of gender. Women have proportionally more adipose tissue than men, and women also experience substantive changes in body composition with life events (such as pregnancy, lactation, menopause), as well as more frequent cycles of weight gain and weight loss.^{11,12} These body composition changes may create periods of greater risk as toxicants stored in fat are mobilized.

Some pesticides disrupt endocrine function by mimicking hormones, such as estrogen, and binding to the hormone receptor site, thus either blocking appropriate hormone activity or triggering inappropriate activity.¹³ This may be a factor in hormone-

related cancers, such as cancer of the breast, ovary, or endometrium.¹¹ There may be a long time lag between exposure and health effects, and effects of exposure may be cumulative over many years. For example, a recent epidemiologic study of non-Hodgkin's lymphoma in women found an association between pesticide use and later occurrence of non-Hodgkin's lymphoma.¹⁴ This association was greatest in women who began a job that involved pesticide exposure between 1950 and 1969 — 26 to 48 years prior to the diagnosis of non-Hodgkin's lymphoma. Having worked at the job for more than 10 years was another important predictor of risk.

Adverse Reproductive Outcomes

Exposure of women to pesticides may also affect pregnancy outcomes, including risk of pregnancy loss and infant congenital malformations.^{11,15} Bell et al.¹⁶ investigated late fetal and early neonatal deaths (20 weeks' gestation to 24 hours after birth) due to congenital anomalies, such as anencephalus, lung defects, and urinary system defects. In 10 rural counties of California, 73 fetal/neonatal deaths were identified over a one-year period (including 43 deaths of neonates). These were matched with 611 normal live births, with no congenital anomalies noted on the birth certificate. Living near the fields where pesticides are applied was associated with fetal/neonatal death. The risk was greatest if the pesticide was

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Table 1.
Screening for Occupational and Environmental Exposures

Obtain detailed history about:

- Occupation
- Occupations of household members
- Temporal relationship of client's symptoms to either home, school, day care, or work environment
- Known exposure of client to pesticides, solvents, or other chemicals
- Date, time, and location of exposure
- Specific work duties

Questions for farm workers:

- Is there spraying going on while you are in the field?
- Do you feel sick while in the fields?
- Were the fields wet when you were picking?
- Do your children play in the fields?
- Do you have lunch in the fields?
- What are your general job duties?
- Are you responsible for mixing or applying chemicals?

Adapted from: Reigart J, Roberts J.²⁵

applied within one mile of the pregnant woman's home and if it occurred during the critical period of organogenesis (third to eighth week of pregnancy). Smaller effects were seen for the first trimester as a whole. These effects occurred across all five classes of pesticides studied.¹⁶

In an ecological study, Schreinemachers¹⁷ found high rates of circulatory/respiratory and musculoskeletal/integument anomalies in infants born to women living in high wheat-producing counties in the northern Midwest, compared with infants born in low wheat-producing counties, especially when conception occurred in late spring, thus coinciding with peak use of chlorophenoxy herbicide. In a study of residential pesticide use among minority families in New York City, Whyatt et al.¹⁸ reported an association between insecticide levels in umbilical cord plasma and impaired fetal growth. Birth weights averaged 186 g less among highly exposed infants, compared with those with the least exposure. Although this study was conducted in an urban setting, the authors assert a particular relevance to pregnant farmworkers, because the pesticides of focus (now banned for residential use) are still commonly used in agriculture. In contrast to this report, Eskenazi et al.¹⁹ found no association between measures of pesticide exposure in utero and reduced fetal growth among Latina women in an agricultural community, but there was pronounced association with shortened duration of gestation, especially if the exposure occurred in the latter part of pregnancy. One possible explanation for this finding was neurochemical stimulation of uterine contraction from biologic

effects of the pesticide leading to premature initiation of labor.

Another concern relevant to the child-bearing cycle is mother-to-child transmission of toxic body burden, such as pesticide molecules or their metabolites, which can occur in utero or through breastfeeding. The high fat content of human milk facilitates bioaccumulation of pesticides that are soluble in fat. As the infant nurses, toxicants are transferred from mother to child. In addition, decreased duration of breastfeeding has been found to be associated with levels of pesticide metabolite in breast milk, possibly because the estrogen-like compounds inhibit the activity of prolactin on the breast, thus suppressing lactation.²⁰

Exposures to pesticides that occur prenatally or in early infancy may also have long-term effects in later childhood or adulthood, including impacts on neurobehavioral development and adult disease, such as cancer of the breast or prostate.²¹ Butterfield²² states that, "The child is the father of the man," in reminding us to look upstream, that is, to treat today's health problems while acting to prevent future problems.

Evaluation for Possible Pesticide Exposure

As with all health concerns, a thorough history based on an understanding of the problem under consideration is essential. In the case presented in this article, it is critical that the clinician recognize several key facts before she or he begins the history. First, the clinician should have a high index of suspicion that pesticide exposure(s) are a possible cause of symptoms. Unless a clinician specifi-

cally questions clients about potential exposures, most cases of pesticide-related illness will be missed. Second, it is critical that the clinician attempt to narrow the field of compounds being considered as possible cause(s) of the client's symptoms. Third, prompt evaluation is essential. Because many of the pesticides currently in use are water-soluble, biochemical markers of exposure may be found only relatively soon after acute exposure. In addition, if delays occur, workers may have already moved to another work site and will be lost to care. Questions to include in conducting a brief screening environmental history are shown in Table 1.

Few questions are needed to evaluate potential pesticide exposures. Although some clients may recognize that they were exposed to a pesticide and that the exposure might be responsible for their symptoms as in this case, others will not have considered such a cause.² Therefore, a brief screening environmental history should be obtained for all clients.

In general, farmworkers who mix or apply pesticides are at greatest risk for excessive exposures to pesticides, although other farmworkers who enter the fields to cultivate, irrigate, and harvest crops or to maintain farm equipment are also at risk. After application, residues remain in the soil and on foliage. Farmworkers who enter fields immediately after spraying are at higher risk, but exposures can occur throughout the growing season.

Other work duties also increase the risk of higher exposure. For example, it has been estimated that the exposure potential for crop weeding is nine to ten times higher than harvesting.²³ Likewise, thinning of orchards leads to higher exposure than does other orchard work.²³

Because many symptoms of acute toxicity are nonspecific, additional queries about whether coworkers or family members have similar symptoms can help differentiate pesticide poisonings from other common illnesses.

Some states require that health care providers report suspected pesticide-related illnesses. If the exposure incident is deemed a sentinel health event, a wider investigation may be triggered and result in protection of other farmworkers if systematic unsafe work practices on the part of farm owners or farmworkers are discovered.² Correspondingly, use of restricted pesticides must be reported by farm owners.

Because the exact date of exposure and location of the farm were known in the case discussed here (see page 5), it was possible

to identify two different pesticides as likely culprits: metam-sodium and sulfur. Metam-sodium is used to fumigate soil prior to planting. Metam-sodium is the third most commonly used agricultural pesticide in the United States.²⁴ Metam-sodium fumigants are in the EPA's most hazardous acute toxicity category.²⁴ Mist from metam-sodium pesticide was applied to the cucumber field near where LR was working and drifted over the grape orchard. Although metam-sodium itself breaks down rapidly in soil, the main by-product, methyl-isothiocyanate (MITC), is highly toxic. MITC is an acute irritant to the eyes and upper airways. Symptoms of exposure include eye irritation, skin rash, headache, nausea, shortness of breath, and wheezing. Although MITC has been reported to smell like horseradish or vinegar, serious health effects can occur at concentrations too low to smell. In laboratory tests, exposure to metam-sodium has been shown to cause immunosuppression, cancer, fetal loss in pregnant animals, and birth defects. It is classified by EPA as a "probable human carcinogen" and a "developmental toxicant."²⁴

Elemental sulfur is an acaricide and fungicide widely used on grapes, orchard, ornamental, vegetable, grain, and other crops. It is prepared as dust in various particle sizes, formulated with various minerals to improve flowability, or applied as an aqueous emulsion or wettable powder. Elemental sulfur is moderately irritating to the skin and is associated with occupationally-related irritant dermatitis. Airborne dust is irritating to the eyes and the respiratory tract. Some people may develop an allergy to sulfur, which can manifest as severe skin rashes and even

asthma. In hot, sunny environments, there may be some oxidation of foliage-deposited sulfur to gaseous sulfur oxides, which is very irritating to the eyes and respiratory tract. Sulfur smells of rotten eggs, which can help workers identify this particular pesticide.²⁵ All pesticides have established reentry intervals, the time interval from application to when pesticide levels have declined to "safe" levels and workers can be allowed back into the field. Sulfur usually has a 24-hour reentry interval, which increases to 3 days from mid-May to the time of harvest in California when local temperatures are high. In hot weather, individuals' pores dilate when they perspire to cope with heat.

Vulnerability to pesticide exposure increases in such conditions.

Health Education to Mitigate Pesticide Exposure

Living conditions and work practices affect cumulative exposures. In a study evaluating pesticide exposures in Mexican American farmworkers in Texas, blood levels of three organochlorine pesticide metabolites were lower in those whose job duties had low exposure potential, in those who wore protective clothing, and in those who minimized their exposure by certain self-care and

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food-handling practices.²⁶ Many of these factors did not reach statistical significance, probably because of the small sample size of this study (N = 26). However, results suggest that certain work and lifestyle practices may be safer than others. Therefore, workers should be advised to

- 1) wash hands regularly (before eating, using the bathroom, or smoking);
- 2) wash all produce from the fields before eating;
- 3) change out of clothes worn in the fields and shower daily at the end of the workday;
- 4) change work clothes frequently and launder separately; and
- 5) wear clothing that minimizes dermal contact with soil or produce.

Farmworkers should also be taught how to read pesticide labels, which provide information on reentry intervals, chemical classifications, personal protective equipment guidelines, and health warnings.

Discussion

Agriculture work is consistently ranked one of the three most dangerous occupations in the nation.²⁷ Exposure to adverse weather conditions, pesticides, and dangerous equipment are common in farm labor. Falls, heat stress, dehydration, and pesticide poisoning are frequent injuries. However, agriculture is not subject to the safety legislation that protects workers in other industries.²⁸ Only recently has the Occupational Safety and Health Administration (OSHA) required employers of 11 or more farmworkers to provide toilet facilities or drinking water for workers in the fields.²⁹ Smaller farms with 11 or fewer workers are not required to comply with standards set by the Fair Labor Standards Act.²⁸

Although the EPA and OSHA require that workers receive comprehensive pesticide training, recent studies have found that many are not educated on safe pesticide handling.²⁸ Between 1992 and 1996, nearly one fifth of all hired crop workers had mixed or applied pesticides. Only 50% of these received training. In addition, language and educational barriers make training more difficult. Instructions about handling pesticides and reentry intervals are commonly published only in English. Results of the National Agricultural Workers Survey (2001–2002) indicate that 44% of farmworkers, whose median level of education is sixth grade, self-reported that they could not speak English “at all,” and 53% could not read English “at all.”³⁰ Therefore, agricultural workers are often inadequately prepared to protect

A Case of Pesticide Exposure

LR is a 24-year-old Spanish speaking woman, who is eight weeks pregnant. She and her husband came from Mexico and arrived in May to work as farm laborers in the San Joaquin Valley in California. Her obstetric history includes one prior preterm birth at 32 weeks and one uncomplicated spontaneous abortion. At her first visit today, on May 20, LR informs the clinician that she went to the local emergency room yesterday after inhaling mist from a pesticide.

She experienced burning eyes and shortness of breath, which ceased soon after leaving the fields, as well as nausea, vomiting, and a headache, which persisted for several hours. Her husband, who was working nearby, experienced similar symptoms. Today, LR complains of a mild headache, and she has a rash that covers her hands and between her fingers.



This rash has occurred intermittently since she began thinning grapes one week ago. She wonders if exposure to pesticides will adversely affect her pregnancy. On examination today, her vital signs are stable. She reports that she is informed that an OB ultrasound done in the emergency room revealed normal findings. Her heart rate and rhythm are regular. No murmur is heard. Her lungs reveal slight inspiratory wheezing bilaterally. Pulse oximetry reveals normal oxygen saturation. A sedimentation rate is ordered to rule out inflammatory process.

Circumstances of Exposure

LR has been working on a farm in California where grapes are under cultivation. LR was thinning grapes while spraying occurred in an adjacent field. Her exposure could have exceeded recommended levels, depending on the meteorological conditions (wind, humidity) present that day and the toxicity of the pesticide that was sprayed. LR's report that her husband experienced the same symptoms after working in the same general area suggests an increased likelihood of acute toxicity. The clinician obtained a basic environmental history and was highly suspicious that pesticide exposure(s) were causing the patient's symptoms. At this point, the clinician asked more detailed questions regarding the date, time, and location of the exposure, as well as LR's specific work duties. The clinician then contacted the local Department of Health and was advised to submit a Pesticide Illness Report to the Department of Environmental Health, as is required in California. The clinician also called the Office of the County Agricultural Commissioner.

Postexposure Counseling

LR is provided with the name of and a verbal summary of information about each pesticide to which she was exposed, in Spanish. She is informed that metam-sodium is classified by EPA as a “probable human carcinogen” and a “developmental toxicant.” She is carefully counseled regarding the timing of exposure at eight weeks' gestation, when the fetus is most vulnerable to teratogenic exposure. She is provided with pregnancy options counseling. LR chooses to continue the pregnancy. She is given the option to be off work for the remainder of the first trimester in order to prevent any further exposure. She is offered genetics screening and genetics counseling. She is provided with a handout in Spanish regarding how to read pesticide labels.

Later LR develops signs and symptoms of preterm labor at 32 weeks. She is prescribed tocolysis and rest, which effectively treats the preterm labor. At this time she is put on disability status for the duration of the pregnancy. In California, field workers become eligible for paid pregnancy disability status at 32 weeks' gestation, 4 weeks earlier than women working in other forms of employment.

LR had a normal spontaneous vaginal birth at 38-weeks gestation of a healthy 7-pound 2-ounce infant.

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themselves from the hazardous chemicals found around them.

Conclusion

Careful assessment and comprehensive education by health care providers caring for farmworkers can help uncover unsafe work and lifestyle practices, as well as pesticide-

related illnesses, and also provides an opportunity to reinforce lifestyle strategies that can prevent pesticide poisonings. This clinical work also lays the foundation for health care providers to identify widespread community practices that place their clients at risk and to advocate for needed change.

This attention to pesticide use may benefit

groups other than farmworkers. Individuals residing in medically underserved communities are also at greater likelihood of being exposed to higher levels of pesticides.³⁸ Expanding pesticide screening more generally may help to protect other vulnerable populations, as well as the general public, who use and apply pesticides at home. ■

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National Pesticide Practice Skills Guidelines for Medical & Nursing Practice

Six Practice Skills

Practice Skill I: Taking an Environmental History

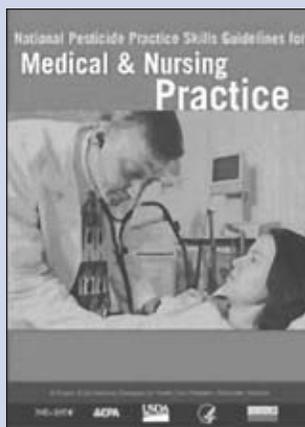
- I-1. Understand the purposes and general principles for taking an environmental history.
- I-2. Incorporate general environmental screening questions into routine patient histories.
- I-3. Be able to take a complete environmental exposure/health history for adults and children, covering occupational and non-occupational exposure factors.

Practice Skill II: Awareness of Community and Individual Pesticide Risk Factors

- II-1. Possess basic awareness of environmental aspects of communities in which patients live.
- II-2. Recognize high risk occupations for pesticide exposure.
- II-3. Develop community resource list.

Practice Skill III: Knowledge of Key Health Principles

- III-1. Demonstrate key principles of environmental/occupational health, epidemiology, and population-based health.
- III-2. Understand the dose-response relationship.
- III-3. Understand measures of morbidity/mortality and study designs.



National Pesticide Practice Skills Guidelines for Medical & Nursing Practice outlines the knowledge and skills that professionals in the health professions need to have about pesticides. This document is part of a national initiative aimed at ensuring that pesticides issues become integral elements of education and practice of primary care providers. *The National Strategies for Health Care Providers: Pesticides Initiative* has set forth a strategic direction for the nation to improve the recognition, management, and prevention of pesticide-related health conditions.

<http://www.neetf.org/Health/publications.htm#PestPractice>

Practice Skill IV: Clinical Management of Pesticide Exposure

- IV-1. Recognize the signs and symptoms of pesticide exposures (both acute and chronic).
- IV-2. Diagnose pesticide-related illness using appropriate testing procedures and treat pesticide over-exposures.
- IV-3. Treat and manage health conditions associated with pesticide exposure or refer patients to appropriate specialists and resources, and follow up appropriately.

Practice Skill V: Reporting Pesticide Exposure and Supporting Surveillance Efforts

- V-1. Understand the importance of surveillance and reporting.
- V-2. Know the roles of federal and state regulatory agencies with regard to pesticide exposure control.
- V-3. Report pesticide exposures as required.

Practice Skill VI: Providing Prevention Guidance and Education to Patients

- VI-1. Engage in primary prevention strategies to promote health and prevent disease among patients.
- VI-2. Work proactively with patients and the community to prevent exposure, ensure early detection, and limit effects of illness. ■

The Health Network Helps You Prepare for Northward Migration

Sarah Henly-Shepard, MCN

As the seasons change and the weather gets warmer, many migrant families and individual migrant workers are getting ready to make the journey northward to work in the planting and harvesting of fresh produce that will be consumed in households across the United States and abroad. While migrants travel in a variety of circuits and patterns, many follow the crop seasons or a demand for seasonal service work and leave their residences in the southern states to move northward in the late spring and return to the south in late fall. Some will be returning to familiar places, while others may travel to new and foreign places. But migrant farmworkers aren't the only ones

preparing for the move; gearing up for their arrival are hundreds of clinicians and outreach workers who staff permanent, seasonal and mobile clinics to serve the diverse and at times complicated medical needs of this underserved population.

Identifying, understanding and treating the health needs of the migrant population demands a holistic and culturally competent approach to treatment, education and outreach, as well as excellence in practice. For that reason, the Migrant Clinicians Network offers clinicians a free and accessible tool to ensure referral, tracking and continuity of care for these mobile individuals: the MCN Health Network accepts enrollments from

clinicians of pregnant mobile patients, as well as those with diabetes, tuberculosis or who have been screened for breast, cervical or colon cancer. MCN encourages continuity of care and provides advocacy and bridge case management for these patients to connect them with services when they move. Additionally, the MCN Health Network provides clinicians with patients' medical records and case updates when they move between health providers. As the migrant season approaches, call MCN at **1-800-825-8205** to get more information on how the Health Network can assist your agency and your patients, and improve your success with continuity of care. ■

Picking Season Brings Ergonomics to Field

By Cara Anna, The Associated Press, April 3, 2006

COOPERSTOWN, N.Y. — Michael Rowland knows what he'll be seeing as a new farm season begins: Bag-toting orchard workers with sore backs. Rowland, an occupational medicine specialist with the Maine Migrant Health Program, has watched as pickers lift a 42-pound bag of fruit and then place that tipsy weight on a 16-foot ladder.

"We give them pain medication, and hope they get through the season," he said. Now some researchers like Rowland are chasing a better option. In efforts that reach from California's central valleys to New York's apple orchards, they're applying a practice better known to office dwellers: Ergonomics.

Why not farm work? It's repetitive and physical. When pay is by the piece, the temptation increases to work faster and under larger loads. And harvest work is usually compressed into a few weeks or months, as maturing fruit in a multi-billion-dollar industry waits for no one. Muscles pay the price.

This year's debate over tougher immigration law brings a new urgency. Concerns about a possible farmworker shortage means more pressure to keep existing workers healthy.

"I can't express how valuable each worker is now," says Al Mulbury, an apple farmer in Plattsburgh, N.Y. "If you mistreat them, they'll go someplace else."

His farm has tested a new fruit bag designed to reduce back and shoulder injuries. This season, wider testing is planned in other states.

In Washington state, the country's largest apple producer, the Pacific Northwest Agricultural and Safety Health Center is testing high-tech orchard ladders that sound an alarm when they risk becoming unbalanced.

And an orchard safety project is planned this season in California and southern Oregon by the Agricultural Ergonomics Research Center at the University of California at Davis. A 2003 study of California migrant workers found strains and sprains showed up three times as much as other injuries, or 31 percent overall.

The cost of such injuries is hard to measure. Paul Leigh with the Center for Health Services Research at the University of California at Davis estimates that sprains and strains cost the agriculture industry \$1.266 billion in 2005, about \$139 million of that from orchard work.

"Manual labor is probably here to stay,"

says Giulia Earle-Richardson, a researcher with the Northeast Center for Agricultural and Occupational Health in Cooperstown. "If we can make it less uncomfortable, we should do it."

A study by her office in 2003 shows neck and shoulder sprains are the top problems reported at migrant worker health centers in the Northeast, at 37 percent.

In New York, the country's second-largest apple producer, workers typically use bags weighing up to 42 pounds, or about a bushel, when full, with the weight swinging from just a shoulder strap or two. Earle-Richardson's redesigned bag helps anchor the weight near workers' waists.

Rowland hopes to test some of the bags in Maine this season. They might also work for citrus picking in places such as Florida, where bag loads can reach close to 80 pounds.

In any ergonomics project, the challenge is finding solutions cheap enough to interest farmers, and non-threatening enough to tell

workers the tools aren't taking their jobs.

It doesn't always work. One notable flop was a cart for low-lying crops that had workers lying and picking on their stomachs, as if they were swimming over the plants.

It erased the iconic image of farmworkers bending in the fields. But it was quickly rejected. Not a proper position for females, workers said.

Victor Duraj with the University of California at Davis chuckles at the memory. "I think we've already taken it apart for parts," he says. ■

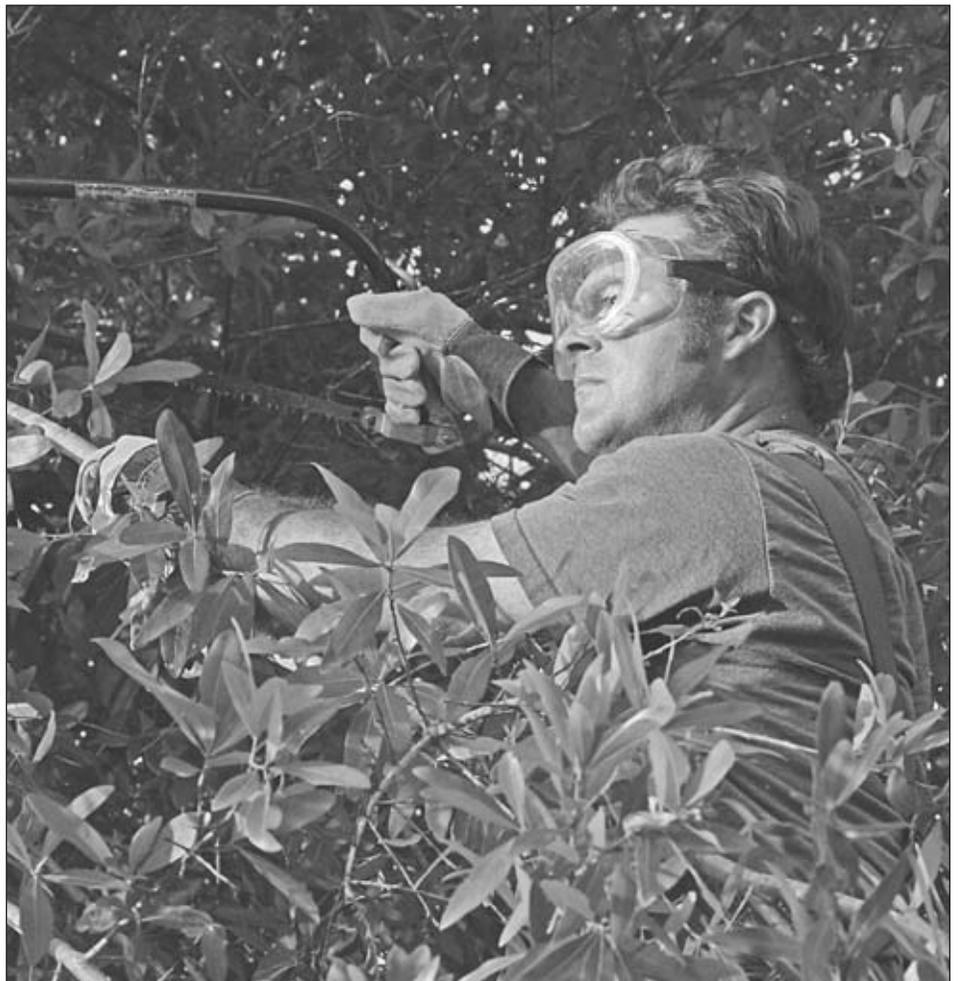
On the Net:

Northeast Center for Agricultural and Occupational Health:
<http://www.nycamh.com/>

Agricultural Ergonomics Research Center:
<http://ag-ergo.ucdavis.edu/>

National Ag Safety Database:
<http://www.cdc.gov/nasd>

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MCN's Medical Director Testifies Before Congress

The US House Appropriations Subcommittee on Labor, Health and Human Services, Education and Related Agencies each budget year requests outside witness testimony before the committee. This year over 700 agencies submitted requests to testify. The American Lung Association/American Thoracic Society (ALA/ATS) was one of only 30 agencies granted a time slot. Dr. Edward Zuroweste, the Chief Medical Officer, of the Migrant Clinicians Network, in his role as the Chair of National Coalition for the Elimination of Tuberculosis (NCET) was asked to give the ALA/ATS testimony on Capital Hill March 27, 2006. Dr. Zuroweste's task was to try to convince the Committee that the President's Budget FY 2007 that includes a one million dollar decrease to the CDC Division of Tuberculosis Elimination is short sighted and a public health danger. The ALA/ATS instead requested an increase of \$115 Million dollars for FY 2007. Excerpts from Dr. Zuroweste's testimony follow:

Mr. Chairman, my name is Dr. Ed Zuroweste. I am the Chief Medical Officer, of the Migrant Clinicians Network. For over 25 years as a practicing rural family physician, I have provided primary health care to a large number of migrant farmworkers and other mobile rural poor populations. At the local, state, national, and international level I have

had the opportunity to witness first hand the tremendous health burden of tuberculosis. I have grown to understand the ongoing importance of a strong local and national public health system and the need for continued research to develop clinical tools to eventually eliminate tuberculosis. Today I appear before you as the Chair of the 85 member National Coalition for the Elimination of Tuberculosis, the U.S. Stop TB Partnership.

Mr. Chairman, if you think tuberculosis is under control in the U.S. today you would be wrong. In fact in your state, Ohio, there was an 18.6% increase in cases from 2004 to 2005. Today we are able to cure most patients despite the need to treat patients for at least six to nine months with effective but poorly tolerated drugs. Health departments are able to protect most of those who are exposed to infectious tuberculosis using the century-old and cumbersome tuberculin skin test and a nine-month course of treatment that has not been improved in 50 years. Ominously, the slowing rate of decline may be catching up with us—we may be reaching the limits of what can be accomplished with the resources we have at hand.

The Institute of Medicine issued a report in 2000, *Ending Neglect: The Elimination of Tuberculosis in the United States*. The report stated that the resurgence of tuberculosis in

the U.S. was the price of neglect reflected in earlier funding reductions and concluded that, with proper funding, improved prevention and control activities, and research to develop new tools, tuberculosis could be eliminated as a public health problem in the U.S. The National Coalition recommends an increase of \$115 million to \$252.4 million in project funding for CDC's Division of Tuberculosis Elimination to undertake an unprecedented initiative — **Intensified Support and Activities to Accelerate Control (ISAAC)** — to enhance, maximize and target resources to sustain the momentum of tuberculosis control and elimination in the U.S.

ISAAC has four components. First, \$38 million is needed to target resources to intensify tuberculosis control activities for persons who regularly cross the U.S.-Mexico Border. The incidence of tuberculosis along the border is more than 50% higher than the national rate in either Mexico or the U.S. In addition, tuberculosis in the foreign born now represents 53% of all cases in the U.S.

The second component of ISAAC is to intensify efforts to prevent, detect, and treat tuberculosis in African Americans and reduce the racial disparity in the incidence of tuberculosis in this population. This effort will

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William Rom, MD, MPH Professor of Medicine and Environmental Medicine; Director, Division of Pulmonary and Critical Care Medicine, New York University School of Medicine and Edward Zuroweste, Chair of NCET and Chief Medical Officer of the Migrant Clinicians Network testifying before Congress.

MCN Honors Linda Gorey with a Lifetime Achievement Award

MCN is both pleased and saddened to honor the late Linda Gorey, former CEO of Clinica Adelante in Arizona, with its first Lifetime Achievement Award for dedication to migrant health. Ms. Gorey passed away last year. Her legacy of dedication to migrant workers and their families, however, continues at Clinica Adelante, the migrant health center she cared for so deeply. The following is a tribute to Linda Gorey written by Matthew King, MD the Medical Director of Clinica Adelante.

Remembering Linda

The richness of any life is not measured by the length of time one spends on this earth, or the amount of material goods one leaves behind upon death. Rather, it is the way in which one lives, and the legacy one leaves that speak to the quality of life.

Linda did not live an extraordinarily long life or accumulate excess riches, but she will be remembered and her legacy will endure.

I met Linda in 2000, when I interviewed for the Medical Director position at Clinica Adelante, Inc. I found her quiet, competent, intelligent, mission-driven, and very honest. She didn't live on the raw edge of comedy; nevertheless, she enjoyed my jokes with laughter and occasionally struck with her quick wit. Working with Linda through the next 5 years strengthened my original observations, except I realized her sense of humor was much deeper. I also learned she was loyal, nonjudgmental and patient. Best of all, she was a true friend.

Linda was an introvert by nature, but she never let that interfere with her ability to lead the clinic. She ran meetings competently, cultivated key contacts skillfully and never failed to speak out and represent the concerns of her clinic in a coherent, persuasive manner. Once you really got to know Linda, you would feel comfortable in her presence and need not concern yourself with social banter to fill a silence.

Linda was blessed with high intelligence and amazing recall. Her written skills were remarkable. Imagine writing a federal community health center grant with absolutely no prior experience and not only getting

funded, but assuming the CEO position with a 4 year English degree! She was able to leverage her talents to become an extremely competent health center leader. The number of details she kept in her head regarding the clinic business was unbelievable. She knew all the steps and regulations regarding clinic startup and operations by heart with total recall. The health care industry is perhaps the most regulated industry in the United States. Community Health Centers must deal with even more bureaucracy than private practices because of their federal, state and grant funding, as well as their nonprofit status. Over the decades, Community Health Centers have evolved into credible business structures, relying upon sound business practices, applied metrics, continuous quality improvement and skilled leadership. The environment is fast-paced, dynamic and competitive. Linda was able to grow personally to meet these challenges.

In spite of the mandate to run her Community Health Center like a business, Linda never once strayed from the original mission. As a young adult, while most people walked in supermarkets with perfect produce arranged neatly in endless aisles for unbelievably low prices; Linda trudged to the front of the produce chain- the farms. She didn't like what she saw: The hardship of back-breaking work for near-worthless wages; the exploitation and marginalization of an entire class. She saw workers that sweat and bled every day so Americans could have cheap produce. If they were injured or sick, they would be left broken, spent and hopeless, turned away by Emergency Rooms and Hospitals. Their dreams of a better life shattered, their family left in quiet, unseen destitution.

Linda was not content to turn away to more pleasant pursuits. Nor was she content to only rile about the injustices. Instead, she rolled up her sleeves and went to work. She began her career by dedicating herself to improving the health and lives of some of America's most invisible, needy and unpopular workers. Forsaking other more lucrative career paths that her skills and education would allow, she accepted low paying jobs,



Linda Gorey

long hours and often just volunteered her services for the betterment of farmworker conditions.

As the Phoenix Area became suburbanized, the farms disappeared and the workers moved further and further out. Linda never forgot them. She used vans to bring them into the clinic and maintained 2 rural health teams to bring health care to them. As recently as this year, she was able to use donated funds and grants to purchase a mobile clinic. The plans are to extend our clinic presence right into the farmworker camps and fields.

Linda never forgot the mission. She was very interested in running an efficient clinic, because she understood that meant more of the undeserved would be seen. She wanted insured patients because she knew insured patients have a choice; they are a surrogate marker for good customer service. In addition, she knew that seeing both insured and uninsured patients together reduces the marginalization of the uninsured and raises the quality of their care. She also knew the "profits" from the insured groups could be used to further fund services for the poor. She was proud that for every dollar Clinica received from the federal or state grants, she was able to spend \$1.50 for the uninsured.

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Hence, by attracting insured patients, Linda was able to leverage her mission of providing even more care to the underserved.

Linda's unwavering loyalty to her mission was an external sign of her loyalty to her family and friends. Adopting the mission that Linda did and maintaining it all these years is no easy task. Over time, she experienced the consequences of her loyalties including lost financial opportunities and political disagreements with friends or family...Arizona is a tough state to have a big heart. Sometimes, even as she became more effective and successful, her motives were

questioned by colleagues within the movement. When I asked her if that made her rethink her life's work, she was quick to say no. "Matt," she said, "being highly suspicious of persons in power is part of the culture, fueled by the persistent corruption found in the Mexican political system. You just have to get used to it." I thought her response was just another example of her loyalty and patience.

Obviously, Linda set the highest standards for herself. She always applied due diligence and honesty to her work. She was careful to fulfill her grant requirements in the spirit as

well as the letter of the law. She always applied the "What's best for the patient" principle in all her decisions. Her business ethics were beyond reproach, sometimes painfully so.

A reflective introvert, quietly speaking the truth; what a difference her small voice made in this world! Linda is an example to all of us. She taught us so much by both word and deed. She truly lived an extraordinary life. Her memories will live in us and quality health care she built in the Phoenix area for those who need it most will continue. ■



MCN is pleased to announce the arrival of The Prenatal Health Network Project!

MCN has received a generous donation from the Denver Foundation which has allowed us to add a prenatal component to the MCN Health Network.

Beginning February 1, 2006, any prenatal patient whom you suspect may move out of your area before giving birth is eligible to be enrolled in the Health Network. We will work with her throughout the course of her pregnancy, up until her postpartum visit, to help ensure that there are no gaps in her health care.

The enrollment process is the same as for the other Health Network projects (TBNet, Diabetes Track II, and CAN-track). 2006 Health Network forms, listing the Prenatal option, may be downloaded from www.migrantclinician.org or obtained by calling **512-327-2017**.

For more information please contact Carmel Drewes, Director: Health Network carmel@migrantclinician.org or 512-327-2017.

calendar

Cancer, Culture & Literacy: Solutions for Addressing Health Disparities through Community Partnerships

May 18-20, 2006

Sheraton Sand Key Resort

Clearwater Beach, FL

Moffitt Cancer Center

813-745-1445

http://www.moffitt.usf.edu/about_moffitt/calendar/events/200605.asp

2006 National Farmworker Health Conference

May 20-24, 2006

San Antonio, TX

National Association of Community
Health Centers

301-347-0400

www.nachc.com

National Rural Health Association's 2006 Annual Conference

May 15-19, 2006

Reno, NV

National Rural Health Association

703-519-7910

<http://www.nrharural.org/conferences/sub/AnnConf.html>

The National Institute for Farm Safety, 2006 Annual Conference

June 25 - 30, 2006

Blue Harbor Resort

Sheboygan, WI

National Farm Medicine Center

800-662-6900

<http://www.marshfieldclinic.org/nfmc/>
and click on "Education and Training."



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MCN's Medical Director Testifies Before Congress

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require \$10 million to continue program activities. The proportion of tuberculosis cases in African Americans represents 47% of all cases in U.S. born cases.

The third component of **ISAAC** is intensifying the utilization of Universal Genotyping — DNA fingerprinting — of all reported cases of tuberculosis in the U.S. To do so will require an additional \$17 million. The tool of DNA fingerprinting is helping TB controllers identify links between cases even when they are widely separated in time and/or place. In this way an outbreak can be limited and prevented from spreading.

The final component of **ISAAC** is the intensification of research efforts for new tools for the diagnosis and treatment of tuberculosis. We have estimated that \$50 million is necessary to begin this component. CDC supports several applied research programs including the Tuberculosis Trials Consortium and the Tuberculosis Epidemiologic Studies Consortium. The Trials

Consortium is evaluating the use of moxifloxacin, a fluoroquinolone, to decrease the infectious period of tuberculosis. This has the potential to shorten and or simplify the treatment of tuberculosis.

Mr. Chairman, at a time when the U.S. should be redoubling its tuberculosis control efforts, the Division of Tuberculosis is facing its most severe budget crisis in years. The current FY 06 funding level of \$137. 4 million represents a 23% decrease over the past decade when adjusted for inflation. Even with **ISAAC** in place, it will take decades beyond the target date of 2010 to reach tuberculosis elimination in the U.S. We appreciate the fiscal challenges this country faces, but a short-sighted approach to balancing the budget undermines our public health obligation to eliminate tuberculosis. The approach we have presented provides additional resources needed for both local and state control programs and research for new tools to enhance and improve our ability to eliminate this ancient scourge. ■



Acknowledgment: *Streamline* is published by the MCN and is made possible in part through grant number U31CS00220-09-00 from HRSA/Bureau of Primary Health Care. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of HRSA / BPHC. This publication may be reproduced, with credit to MCN. Subscription Information and submission of articles should be directed to the Migrant Clinicians Network, P.O. Box 164285, Austin, Texas, 78716. Phone: (512) 327-2017, Fax (512) 327-0719. E-mail: jhopewell@migrantclinician.org

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