

streamline

The Migrant Health News Source

Protocol: Lead Screening and Lead Poisoning Management in Pregnancy

Susanna Cohen, CNM, MS

Editor's Note: Screening of pregnant women for lead exposure is not a routine practice for most providers in the U.S. Clinicians working with populations at risk for lead exposure, however, may want to consider including such testing for their pregnant patients. The following protocol was written by a Certified Nurse-Midwife as a project during her 4-month placement at Hudson River Healthcare in Peekskill, NY with the 2006 MCN New Provider Practicum in Migrant Health.

Discussion: High maternal blood lead levels (BLL) ($> 10 \mu\text{g}/\text{dL}$) can lead to fetal lead exposure resulting in behavioral problems and learning difficulties in the child, and place the mother at risk for preeclampsia/HTN, spontaneous abortion, preterm labor, low birth weight. Studies in children suggest that the risk of neurological sequelae exists at lower BLL ($5 \mu\text{g}/\text{dL}$), previously thought to be safe. There is limited research on perinatal lead exposure, but theoretical risk suggests that interventions should be initiated at these lower BLL.

Pathways of lead absorption:

- **Ingestion** - principal route of lead absorption, through lead contaminated sweets, use of lead coated ceramics for cooking, home remedies and imported cosmetics, and pica.
- **Inhalation** - Lead-laden dust, aerosolized by home renovations, cleaning, vacuuming or sweeping.
- **Maternal-fetal** transfer via the placenta.
- With chronic exposure lead is deposited in bone. In pregnancy the body breaks down bone to mobilize calcium, which results in the release of lead into the bloodstream, making it available for transfer to the fetus.

Risk assessment:

1. Assess all pregnant women at first

prenatal visit for risk factors.

Risk Factors: Birth outside the US, use of imported remedies/foods/spices or cosmetics, glazed pottery, pica behavior, home renovation, occupational exposure (mechanics, foundry workers).

Risk Assessment Questions:

A. Were you born, or have you spent any time, outside of the United States?
¿Usted nació o estuvo algún tiempo fuera de los Estados Unidos?

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Lead Related Occupations and Industries

- Ammunition/explosives production
- Automotive repair shops
- Battery manufacturing and recycling
- Brass, bronze, copper or lead foundries
- Bridge, tunnel and elevated highway/subway construction
- Cable/wire stripping, splicing or production
- Ceramic manufacturing
- Firing range work
- Glass recycling, stained glass and glass manufacturing
- Home renovation/restoration
- Lead Abatement
- Lead production or smelting
- Machining or grinding lead alloys
- Manufacturing and installation of plumbing components
- Manufacturing of industrial machinery and equipment
- Metal scrap yards and other recycling operations
- Motor vehicle parts and accessories
- Occupations using firearms
- Plastics manufacturing
- Pottery making
- Production and use of chemical preparations
- Rubber manufacturing
- Sandblasting, sanding, scraping, burning or disturbing lead paint
- Use of lead based paints
- Welding or torch-cutting painted metal

Hobbies and Activities That May Cause Lead Exposure

- Making stained glass and painting on stained glass
- Copper Enameling
- Bronze Casting
- Making pottery and ceramic ware with lead glazes and paints
- Casting ammunition, fishing weights or lead figurines
- Collecting, painting or playing games with lead figurines
- Jewelry making with lead solder
- Electronics with lead solder
- Glassblowing with leaded glass
- Print making and other fine arts
- Liquor distillation
- Hunting and target shooting

- B. During the past 12 months, did you use any imported health remedies, spices, foods, ceramics, or cosmetics?
¿En los últimos 12 meses, ha usado cosas importadas como ollas o platos hechos de cerámica, remedios caseros, cosméticos, comidas?
- C. At any time during your pregnancy, did you eat, chew on, or mouth non-food items such as clay, crushed pottery, soil, or paint chips?
¿Durante su embarazo, ha comido o mascado algunas cosas como barro, cerámica, tierra o pedazos de pintura?
- D. In the last 12 months, has there been any renovation or repair work in your home or apartment building?
¿Durante los últimos 12 meses han habido trabajos de reparación en su casa o apartamento?
- E. Have you, or someone in your family, ever had a job or hobby that involved possible lead exposure, such as home renovation or working with glass, ceramics, or jewelry?
Ha tenido usted o alguien de su familia alguna vez un trabajo o pasatiempo que envuelva el plomo como trabajo de reparaciones caseras, trabajo con vidrio, cerámica, o joyería?

2. Obtain a BLL (blood lead level) on all at risk women at initial prenatal visit.

3. Provide Prenatal and Intrapartal Follow-up (See Table 1)

4. Provide Postpartum care

- Obtain a maternal or umbilical cord BLL at delivery and another maternal BLL one month after delivery.
- Breastfeeding is generally safe for women with elevated blood lead levels.

If breastfeeding: carefully monitor infant's BLL:

1. At 2 weeks for baseline
2. Monthly as indicated

If the infant's BLL is 10 µg/dL or greater and rising, and no remediable environmental source of lead can be detected, breastfeeding should be discouraged.

- For information about the possible risks and benefits of breastfeeding to the newborn, consult a lead poisoning specialist.
- Coordinate care with Pediatricians

Education for postpartum women to prevent lead poisoning in infants:

- Breastmilk usually is best for babies, even if your blood lead level is elevated.
- If you are using formula, use cold tap water — not hot — to make it. Let the cold water run for at least a minute, to flush any lead picked up from the pipes. Purchase bottled water if the home's drinking water exceeds the Environmental Protection Agency's action level of 15 ppb (mcg/L).
- Provide a developmentally stimulating environment for your child.
- Explain normal mouthing behavior- children will put things in their mouths- watch out for paint chips in older house, clean toys of dust which may contain lead. House keys can also contain lead, do not let your child teethe on keys.
- Give your baby foods that protect against lead, such as iron fortified formula and cereals, and other foods that are high in iron and calcium.
- If your baby uses a pacifier, make sure it is attached to your baby's shirt. Wash the pacifier often to remove any lead dust. Wash your baby's hands and toys often.
- Regular health care visits and follow the health provider's lead test advice. All children should be tested by their first birth-day, and again when they're two.

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Recommended Blood Test Schedule for Lead-Exposed Newborns (Age 0-6 Months)		
Maternal / Umbilical Cord BLL At Delivery (µg/dL)	Initial Venous Test	Follow-up Venous Tests
0 – 5	None	Based on postpartum risk of exposure
5 – 14	Within 1 month	Every 3 months
15 – 24	Within 1 month	Every 1 – 3 months
25 – 44	Within 2 weeks	Every 2 weeks – 1 month
> 45	As soon as possible	Depends on clinical management by lead specialist.

The City of New York, Department of Health and Mental Hygiene. Guidelines for health care providers on the prevention, identification, and medical management of lead poisoning in pregnant women in New York City. June 30, 2006.

Table 1

Medical Management of Pregnant Women Based on Blood Lead Levels

(adapted from NY State and NYC protocols)

BLL (µg/dL)	Interventions	Time Frame for Interventions	Frequency of BLL Follow-up Testing
5 – 9	<ul style="list-style-type: none"> Assess for risk factors in greater detail. Provide risk reduction education and handouts. Evaluate for adequate intake of calcium, iron, and vitamin C.* CBC, TIBC, Serum Ferritin, Serum Iron to rule out concomitant Iron deficiency Monitor BLL. Coordination with Pediatrics for follow-up Anticipatory guidance regarding infant care 	Within 30 days	<p>Repeat after interval of at least 1 month to assess trend.</p> <p>Repeat each trimester.</p>
10 – 19	<p>Above actions, plus:</p> <ul style="list-style-type: none"> Consider occupational exposure Refer to an occupational health clinic if potential occupational exposure is found. Go to MCN’s website, www.migrantclinician.org/excellence/environmental for a list of occupational health clinics. Provide nutrition counseling to reduce absorption of ingested lead. Iron, Vitamin C and Calcium (non-bone) supplementation PRN. 	Within 30 days	<p>Repeat after interval of at least 1 month to assess trend.</p> <p>Repeat each trimester.</p> <p>Obtain a maternal BLL or umbilical cord lead level (UCLL) at birth if maternal BLL > 15 at anytime during the pregnancy.</p> <p>Rescreen for maternal BLL at 1 month PP if BLL > 15 anytime during the pregnancy</p>
20 – 44	<p>Above actions, plus:</p> <ul style="list-style-type: none"> Consider monitoring free erythrocyte protoporphyrin levels (FEP) or Zinc protoporphyrin levels (ZPP) when BLL >25µg/dL to help assess timing of exposure.‡ Elevated BLL/ Normal FEP/ZPP = Recent exposure 2-6 weeks. Elevated BLL / Elevated FEP/ZPP = chronic/ongoing exposure. Evaluate for other symptoms.† Refer woman to the local health agency (as listed below) for environmental investigation if occupational exposure, hobbies and folk remedies have been ruled out as a source of lead exposure. If blood lead level remains above 20 µg/dL, seek consultation an occupational clinic. For advice about patient counseling concerning teratogenic effects, consult a Teratogen Information Service such as: PEDECS: Perinatal Environmental and Drug Exposure Consultation Service University of Rochester Medical Center- Dept of OB/GYN Director: Dr. Richard Miller Tel: (716) 275-3638 Fax: (716) 224-2209 	Within 2 weeks	<p>Within 2 weeks and then monthly to assess efficacy of case management</p> <p>Obtain a maternal BLL or umbilical cord lead level (UCLL) at birth if maternal BLL > 15 at anytime during the pregnancy.</p> <p>Rescreen for maternal BLL at 1 month postpartum if BLL > 15 anytime during the pregnancy</p>
>45	<p>Above actions, plus:</p> <ul style="list-style-type: none"> Consult with lead poisoning specialist to consider hospitalization and chelation with CaNa2EDTA if pregnancy is in late 2nd or 3rd trimester. Monitor free erythrocyte protoporphyrin levels (FEP) to help assess timing of exposure.‡ Consider immediate removal from the contaminated environment may be indicated. 	Within 24 hours	<p>Within 24 hours and then at frequent intervals depending on clinical management and BLL trend</p> <p>Obtain a maternal BLL or umbilical cord lead level UCLL at birth if maternal BLL > 15 at anytime during the pregnancy.</p> <p>Rescreen for maternal BLL at 1 month PP if BLL > 15 anytime during the pregnancy</p>

*Adequate stores of calcium and iron may decrease gastrointestinal absorption of lead. Adequate stores of calcium may decrease mobilization of lead from maternal bone. Vitamin C may increase renal lead excretion.

† The majority of adults have no symptoms of lead poisoning. Symptoms including headaches, crampy abdominal pain, anorexia, constipation, fatigue, malaise, myalgias, and arthralgias typically occur at BLLs >60 µg/dL, but can occur at BLLs ?25µg/dL.

‡ The BLL reflects more recent exposure to lead, while the FEP/ZPP level reflects more chronic exposure. Once elevated, the FEP/ZPP remains elevated for several months even after exposure has ceased and the BLL has fallen. Protoporphyrin levels are only sensitive for high BLL and can be elevated in other medical conditions such as anemia of chronic disease and iron deficiency anemia.

Elevated Lead levels follow-up check list

- Risk Assessment
- Risk reduction counseling (nutrition, limit exposure)
- Re-check lead levels per protocol
 - 30 days after initial visit (2 weeks if > 15µg/dL)
 - Each Trimester (monthly if > 25µg/dL)
 - At birth (maternal serum or umbilical cord) (if > 15µg/dL, at any point in pregnancy)
 - 6 weeks Postpartum (if > 15µg/dL, at any point in pregnancy)

- Follow-up lab tests if indicated
 - FEP if > 25µg/dL
- Give “10 things you can do right now” handout, see page 5
- Give “If you are Pregnant, Get Ahead of Lead” handout
- Anticipatory guidance regarding infant follow-up/ breastfeeding
- Referral to Pediatrics
- Referral to Occupational/Public health

Resources

New York State Department of Health. *Physician’s Handbook on Childhood Lead Poisoning Prevention. Chapter*

Ten: *Lead Poisoning Prevention During Pregnancy.* <http://www.health.state.ny.us/nys/hoh/handbook/phc10.htm>. Accessed 10/30/2006.

The City of New York, Department of Health and Mental Hygiene. Guidelines for health care providers on the prevention, identification, and medical management of lead poisoning in pregnant women in New York City. June 30, 2006.

Committee on Environmental Health. (2005). Policy Statement: Lead Exposure in Children: Prevention, detection, and management. *Pediatrics*, 116 (4), 1036-46.

“Lead poisoning associated with use of traditional ethnic remedies – California 1991-1992,” *MMWR* 1993; 42(27): 521-524.

Folk Remedies or Cosmetics that Have Been Found To Contain Lead	
Al Murrah	Used as a remedy for colic, stomach aches and diarrhea in Saudi Arabia
Albayalde or albayaidle	Used by mainly by Mexicans and Central Americans to treat vomiting, colic, apathy and lethargy
Alkohol(also known as kohl, surma or saooth)	A black powder used within Middle Eastern, African and Asian cultures as an eye cosmetic and umbilical stump remedy.
Anzroot	A remedy from the Middle East used to treat gastroenteritis.
Ayurvedic Remedies Guglu, Sundari Kalp, Jambrolin	A number of these may contain lead
Azarcon (also known as reuda, liga, coral, alarcon and maria luisa)	A bright orange powder used within Hispanic cultures to treat gastrointestinal upset and diarrhea.
Ba Bow Sen (Ba-Baw-Sen)	Used to detoxify “fetus poisoning” and treat colic, hyperactivity and nightmares in children in China.
Bali goli	A round, flat black bean which is dissolved in “gripe water” and used within Asian Indian cultures for stomach ache.
Bint al dahab, bint or bent	Used as a remedy for diarrhea, colic, constipation and general neonatal uses in Oman, Saudi Arabia and India.
Bokhoor (and noqd)	Burned on charcoal to produce pleasant fumes and calm infants in Saudi Arabia.
Cebagin	Used in the Middle East as a teething powder.
Chuifong tokuwan	A pill imported from Hong Kong used to treat a wide variety of ailments.
Cordyceps	Used in China as a treatment for hypertension, diabetes and bleeding.
Deshi Dewa	A fertility pill used in Asia and India.
Farouk	A teething powder from Saudi Arabia.
Ghazard (Ghasard)	A brown powder used within Asian Indian cultures to aid digestion.
Greta	A yellow-orange powder used within Hispanic cultures to treat digestive problems.
Hai Ge Fen (Concha cyclinae sinensis)	A Chinese herbal remedy derived from crushed clam shells.
Henna	Used as a hair dye and for temporary tattoos in the Middle East and India that may contain lead.
Jin Bu Huan	From China
Kandu	A red powder from Asia and India used to treat stomach ache.
Koo Sar Pills	Red pills from China used to treat menstrual cramps.
Kushta	Used for diseases of the heart, brain, liver, and stomach and as an aphrodisiac and tonic in India and Pakistan
Litargirio	A yellow or peach-colored powder used as a deodorant, a foot fungicide and a treatment for burns and wound healing particularly by people from the Dominican Republic.
Pay-loo-ah	An orange red powder used within Southeast Asian cultures to treat rash or fever.
Poying Tan	General Chinese remedy
Santrinj	Used as a teething powder in Saudi Arabia.

Grasshoppers as a source of lead exposure

Candace Kugel, CRNP, CNM, MS

We have been receiving reports from clinicians of an unexpected source of significantly elevated lead levels in their patients—grasshoppers! The phenomenon was also reported in a recent issue of the *American Journal of Public Health*.¹ Dried grasshoppers or *chapulines* are a treat imported from Oaxaca, Mexico, and are somehow contaminated with lead. The source of contamination is not certain, but could be from some aspect of the processing of this traditional snack food or from the soil where the grasshoppers are harvested. Bags of dried grasshoppers are sent from home in care packages or sold at markets and *tiendas* in immigrant communities in the U.S. Other foods imported from Mexico, including tamarind candies and lollipops dipped in chile powder, have previously been found to be contaminated with lead. Use of lead-glazed ceramics is another source that has historically been linked with elevated lead levels.

Elevated lead levels in children pose serious dangers, causing behavioral and developmental delays and disabilities, kidney problems and even death. In pregnancy, lead is transferred from the mother to the developing fetus which can result in fetal

REPORTS FROM THE FIELD



brain damage as well as pregnancy complications such as miscarriage, preterm labor and low birth weight. Adequate calcium intake in pregnancy is important in helping to prevent lead absorption.

Clinicians need to be aware that patients who are Mexican immigrants, especially from Oaxaca, may unknowingly be at risk of lead poisoning from this food source, as well as from other sources. Discussion of this danger is encouraged, as is screening. Prenatal lead testing is not the national standard of care, though it is currently recommended in some locations, such as New York State.² Organizations serving pregnant immigrant women may want to consider doing risk screening or routine lead testing.

Susanna Cohen, CNM, participated in MCN's New Provider Practicum in Migrant

Health by working as a nurse-midwife at Hudson River Community Health in Peekskill, NY. As a special project during her 4-month placement there, she developed a lead screening protocol for the health center's prenatal patients [see pages 1-4]. She also helped to develop a simple patient education resource on lead exposure. To download this handout in English or Spanish go to our website: <http://www.migrantclinician.org/excellence/environmental>.

A promotor training curriculum and Spanish and English educational materials for migrant populations which include information about avoiding lead exposure are available from the Farmworker Justice Fund at <http://www.fwjustice.org/curriculum.htm>.

References:

1. Handley, Margaret A. et al. Globalization, Binational Communities, and Imported Food Risks: Results of an Outbreak Investigation of Lead Poisoning in Monterey County, California. *AJPH*. May 2007, Vol 97, No. 5, 900-906.
2. Screening for Blood Elevated Lead Levels in Childhood and Pregnancy: Updated Summary of Evidence for the U.S. Preventive Services Task Force. Originally published in *Pediatrics* 2006;118:e1867-95. December 2006. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.ahrq.gov/clinic/uspstf06/lead/leadsum.htm>

Lead Poisoning Patient Information

Cathy Gallagher, CNM; Maria Cosaro, CNM; Helene Dill, CNM; Mariella Comargo, CNM, Hudson River Community Health, Peekskill, NY

The following are key points to address with child-bearing age women regarding lead poisoning:

Lead can cause:

- High blood pressure
- Miscarriage
- Babies born too soon or too small
- Children with learning and behavior problems.

10 things YOU can do right NOW if your Lead test came back too high:

1. Eat a Healthy and Balanced diet everyday with:
Calcium – milk, cheese, yogurt, spinach, collards, tofu, salmon, ice cream
Iron – lean red meat, chicken, eggs, tuna, lentils, beans, peas, prunes, raisins, broccoli, spinach
Vitamin C – oranges, grapefruit, strawberries, kiwi, fruit juices, peppers, broccoli, tomatoes
2. Avoid an empty stomach. Eat small frequent meals.
3. Use only COLD tap water to drink or cook. Let the water run cold for 1

minute before you use it.

4. Avoid using imported pottery and ceramics to cook and serve food.
5. Wash your hands often especially when coming home from work.
6. Clean floors, windowsills, and dusty places often with a wet mop or wet cloth
7. Take off your shoes before entering the house; you can track in lead dust.
8. Stay away from any repair work being done in the home.
9. Tell your Midwife if you are eating dirt, clay or other things which are not food.
10. Continue to see your Midwife for prenatal care so she can check your lead levels

Lead gets in your body when you:

- Breathe lead dust (Houses built before 1978 have lead paint. Paint chips turn into dust and you breathe it into your lungs)
- Swallow lead – If you use imported ceramics for food, sweets, traditional medicines (Greta, Azarcon, Albalalde, Pay-loo-ah) or cosmetics (Ghasard, Bala Goli, Kandu, Kohl, Surma, Kajal).

MCN's website has a number of excellent clinical resources dealing with lead including the following:

Pesticide exposure and lead poisoning template for migrant clinicians

U.S. EPA, Region 5 developed this newsletter template to help clinicians integrate assessment and prevention into clinical practice.

Protocol: Lead Screening and Lead Poisoning Management in Pregnancy

Clinical protocols for dealing with lead and pregnancy.

Environmental Training Modules for Promotoras

Bilingual training modules on Asthma, Lead, Pesticides, Water and Sanitation and Popular Education. Produced by Farmworker Justice as part of their Clean Environment for Healthy Kids. Contributing authors include Amy Liebman, Shelley Davis and Virginia Ruiz.

Prenatal Patient Handout: Lead (Spanish)

One page Spanish handout to inform pregnant women about lead.

Prenatal Patient Handout: Lead (English)

One page English handout to inform pregnant women about lead.

To download any of these resources please visit our website at www.migrantclinician.org/excellence/environmental. You can find all of these resources by searching for "lead" in our site search box.



Hombres Unidos contra la Violencia Familiar

Erin Daley

MCN has just kicked off a groundbreaking effort to prevent the perpetration of violence with the Hispanic migrant population. In an effort to break the silence around both sexual and intimate partner violence with Hispanic migrant men, MCN has created the first curriculum dedicated to primary prevention with this population. In partnership with Community Health Partnership of Illinois, Keystone Health Center in Pennsylvania and Center for Multicultural Wellness and Prevention in Florida, over 100 migrant men will be reached by the program this summer. Although the first workshops were imple-

mented just one month ago, the program has already been successful in bringing the issue out into the open and starting to make some changes in the community. Esteban Moya, a facilitator from Florida, says that he was surprised that the men accepted this program "with open arms," expecting that there would be more resistance to talking about such a sensitive topic. Omar Fana-Tavarez, who facilitates the workshops in Pennsylvania, has observed that the workshops have really reached the men who have participated, saying "one man explained to the whole group that the workshops have truly affected him and that he thinks he is going to be a better father and husband when he reunites with his family." On a more personal note, Omar adds, "I'm glad to be part of this program. It feels awesome to be part of such a positive activity & more than an activity I think it's a life changing program."

The program covers topics such as gender roles, defining sexual and intimate partner violence, the causes and consequences of violence and building skills to prevent and respond to violence. It represents the culmination of many months of research and planning during which MCN conducted a survey of migrant men in five different states, including the three where workshops are currently being conducted. This survey of 249 men demonstrated a clear need for this type of project in many of the communities surveyed and also a desire on the part of the men interviewed to be a part of the solution to these problems. Approximately 60% of men surveyed thought rape was a big problem in their community, while 67% thought partner abuse was a big problem and 77% said they would like to help prevent rape and partner abuse in their community (see Figure 1 for a sample of reasons why respondents felt motivated to

participate in this effort).

For more information on this or other projects in MCN's Family Violence Initiative, visit <http://www.migrantclinician.org/excellence/familyviolence>.

calendar

Binational Policy Forum on Migration and Health

VII Binational Health Week
October 14 - 16, 2007
Los Angeles, California
<http://www.ucop.edu/cmhi/binational.shtml>
(510) 643-4087 or
emerito.lopez@ucop.edu

East Coast Migrant Stream Forum

October 18-20, 2007
Royal Plaza
Lake Buena Vista, Florida
<http://www.ncchca.org/>
(919) 469-5701

Fall 2007 Primary Care Conference

October 20 - 24, 2007
(206) 783-3004
Seattle, WA
<http://www.nwrpca.org>

National Advisory Council on Migrant Health Meeting

October 16-18 2007
Lake Buena Vista, FL
For more information contact: Gladys Cate
Health Resources and Services
Administration
Bureau of Primary Health Care
gcate@hrsa.gov
(301) 594-0367

Midwest Migrant Stream Forum

December 6-8, 2007
Omni San Antonio Hotel
San Antonio, TX 78230
<http://www.ncfh.org/>
(512) 312-2700

Figure 1

Respondent Motivation to Participate

- *I have children and if my community is better, that means a better future for my family.*
- *I think violence is a sickness that has always been in my family and I want that to stop.*
- *I would like to learn how couples should treat one another.*
- *To change the ideas that I used to have and prevent my daughters from suffering abuse at the hands of a man*
- *I have sisters and I don't want them or any other woman to be abused*
- *To end all the violence that exists [so that] I could live more peacefully [without] abuse against women and the family.*

Light Duty: Only Recommend When Available and Appropriate

Shelley Davis, *Farmworker Justice*, Mike Rowland, MD, MPH, *Maine Migrant Health Program* and Rafael Albarran, *TheWatsonville Law Center*

Determining when to recommend that a farmworker return to work after an employment-related injury is one of the challenging decisions a clinician must make in a workers compensation case. To limit costs for temporary disability, an employer may put pressure on the clinician to direct an early return to work. Similarly, a worker may request an instruction for return to light duty because of financial need or concern about losing the job. To accommodate a return to work request when healing is not yet complete, the clinician may choose the middle ground of prescribing a return to "light duty."

Strategic use of light duty is a standard practice across all industries, and is based on good data that, when properly done, it results in faster recovery, less long-term disability, and lower costs. This is especially true in the case of low back pain, the single most common and costly work injury. While light duty can be a reasonable option in some instances, it is important to recognize that in many agricultural workplaces, light duty jobs do not exist. As a consequence, a supervisor may tell a worker to "take it easy," and direct her to get back to the old job. After a few days, the worker may find that pain or incapacity prevents her from doing that job. In such circumstances, the worker is likely to quit or be fired. Either alternative may result in the loss of workers' compensation benefits.

Alternatively, an employer may create a light duty job, even though a company has no obligation to do so, just to reduce the payments for temporary disability. In agriculture, such jobs may consist of picking up trash or providing security for vehicles in the parking lot. Instead of making \$10/hour at a piece rate, however, the worker may be making \$5.15 per hour at the federal minimum wage. In such circumstances, the worker may insist on returning to the old job, despite being unready to do so. Here again, the result may be disastrous, with the worker suffering further injury, quitting or being fired and putting her workers' compensation benefits in jeopardy.

Additionally, clinicians cannot assume that workers will have workers compensation coverage due to the patchwork of state-by-state exemptions of seasonal agricultural workers, and the "equivalent coverage" language of the H2-B visa. In these cases, the worker and provider have less leverage, and light duty may not be made available at all.

To avoid these pitfalls, a clinician should consult the patient to determine the degree of recovery, including on-going pain and

perceived ability to return to work. In addition, the clinician should inquire into the physical demands of the job and ascertain whether any light duty jobs exist at that establishment. If light duty is available and appears appropriate, the clinician should specify the conditions under which such duty may be performed, e.g., amount of weight which can be lifted, number of hours that the worker can stand, whether work can

be performed in a stooped position, etc.

Finally, the clinician should advise the worker to return to the clinic if injury prevents her from performing light duty. In such circumstances, the clinician, after an examination, can make a determination that temporary disability requires time off from work. When handled in this manner, a worker should be able to receive workers' compensation benefits for the additional time period needed for recovery. ■

Environmental/Occupational Health Newsflashes

N.C. Division of Public Health Seeking Reports of Acute Pesticide Illness and Injury

The North Carolina Division of Public Health, Occupational and Environmental Epidemiology Branch (OEEB), wants to learn more about how pesticides affect workers and citizens in North Carolina as part of the new Acute Pesticide Illness and Injury Surveillance Program. Rural health centers, free clinics and migrant and community health centers are important sources of reports. A new N.C. mandatory reporting law requires doctors, physician assistants, and nurse practitioners to report suspected or confirmed cases of acute pesticide-related illness and injury to Public Health. Nurses and other support staff, under direction of the treating provider, can also report. Reporting is easy. Call the state poison control center, 24/7, at 1-800-222-1222 and pick option 5. No paperwork is involved. Poison control specialists have been trained to ask questions that will fulfill reporting requirements. Advice regarding recognition and treatment of pesticide illness is also available from staff at the poison center. Only aggregate information, without identities, is shared with the public and outside agencies. Learn more about pesticides and the Acute Pesticide Illness and Injury Surveillance Program at www.ncdhhs.gov (click P for Pesticides under the topic index), or call (919) 707-5900, fax (919) 870-4810.

Study Indicates that Exposure to Pesticides is Linked to Risk for Parkinson's Disease

Exposure to pesticides is associated with risk for Parkinson's disease, according to the results of a case-control study reported in the May 30 Online First issue of *Occupational and Environmental Medicine*.

"It seems likely that Parkinson's disease is not a single disease but a number of phenotypically

similar illnesses," write F.D. Dick, from the University of Aberdeen in Scotland and colleagues from the Geoparkinson study group. "A variable range of genetic and environmental interactions may produce these conditions and it may be that any individual risk factor will only affect susceptible subjects. The discovery that 1-methyl-4-phenyl tetrahydropyridine, a contaminant of a synthetic opiate, can cause parkinsonism through its neurotoxic metabolite, 1-methyl-4-phenylpyridinium, stimulated interest in environmental chemical exposures as risk factors for Parkinson's disease."

This case-control study included 959 prevalent cases of parkinsonism (767 with Parkinson's disease) and 1989 controls in Scotland, Italy, Sweden, Romania, and Malta. Cases were defined using the UK Parkinson's Disease Society Brain Bank criteria; those with drug-induced or vascular parkinsonism or dementia were excluded.

Interviewers administered a questionnaire about lifetime occupational and hobby exposure to solvents, pesticides, iron, copper, and manganese. Using a job-exposure matrix modified by subjective exposure modeling, lifetime and average annual exposures were estimated blind to disease status. Multiple logistic regression analysis adjusted for age, sex, country, tobacco use, head trauma resulting in loss of consciousness, and family history of Parkinson's disease.

Hypnotic, anxiolytic, or antidepressant drug use for more than 1 year and a family history of Parkinson's disease were also associated with significantly increased ORs, whereas tobacco use was protective (OR, 0.50; 95% CI, 0.42 - 0.60).

Analyses excluding subjects with forms of parkinsonism other than Parkinson's disease yielded similar results.

"The association of pesticide exposure with Parkinson's disease suggests a causative role," the



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authors conclude. "Repeated traumatic loss of consciousness is associated with increased risk."

Study limitations include possible recall bias, possible differences across the 5 centers in methods of case ascertainment (neurologist review vs note-based classification), lack of data on specific pesticide exposure, and probable underestimate of pesticide exposure because of the seasonal nature of pesticide use.

"This study has provided important evidence of the increased risk of Parkinson's disease in relation to exposure to pesticides," the authors conclude. "The exposure-response relationship suggests that pesticide exposure may be a causative and potentially modifiable risk factor."

Pesticide Safety and Childbearing for Latina Farmworkers

Investigators at Wake Forest University School of Medicine have expanded their promotora pesticide safety educational materials to include pesticide safety for Latina farmworkers who are or may become pregnant. These educational materials have been developed in Spanish and English. They include a single page hand-out (in 8.5 x 11 inch format) that can be given to women, a poster (in 11 x 17 inch format) that can be displayed during an educational session or in a clinic, school or other public place, and a

lesson plan that is tied to the new materials, as well as to their existing promotora pesticide safety educational materials.

These new materials, as well as their other promotora pesticide safety educational materials, are available on on-line at www1.wfubmc.edu/fam_med/Research/Educational/. The new lesson plan is called:

Lesson 7: Pesticide Safety and Child Bearing
Lección 7: El Embarazo y el Cuidado que se Debe Tener con los Pesticidas

The new print materials are called:

- Pesticide & Pregnancy Hand-out (English)
- Pesticide & Pregnancy Hand-out (Spanish)
- Pesticide & Pregnancy Poster (English)
- Pesticide & Pregnancy Poster (Spanish)

The promotora pesticide safety educational materials are also available on CD by contacting: Thomas A. Arcury, PhD, Department of Family and Community Medicine, Wake Forest University School of Medicine, Winston-Salem, NC 27157-1084, e-mail: tarcury@wfubmc.edu.

The development of these new pesticide safety and childbearing promotora pesticide safety educational materials was supported by a grant from the North Carolina Pesticide Environmental Trust Fund Project Proposal, North Carolina Department of Agriculture and Consumer Services. ■



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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