

streamline

The Migrant Health News Source

Introduction to the Neglected Tropical Diseases

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The impact of globalization on human communities, from the transfer of resources, both human and material, is a millennia-old history closely coupled with the transfer of disease agents and vectors. These agents both within persons and vessels of transportation, have impacted human history from the earliest migratory populations of the fertile-crescent nomads of Central Asia, to the Crusaders of the Middle Ages, the New World explorers and the Triangle Trade of the Middle Passage, and recently the ever-increasing number of forced migrant populations. The recognition of the exponentially growing impact of globalization in our current age contributed to the creation of the United Nation's Millennium Declaration.¹ This declaration is focused on peace, human rights, development, and poverty eradication with the ultimate goal of addressing the underpinnings of poverty. To this effect the declaration was also written to confirm and reaffirm the United Nations' commitment to a more peaceful, prosperous, and just world.

The Millennium Declaration's lofty purpose resulted in direct action with the creation of the Millennium Development Goals (MDGs).² With an initial deadline of 2015, the MDGs have prompted an unparalleled outpouring of support from philanthropic sectors, as well as advances in public-private partnerships, and commitments from governments and NGOs alike to fund extraordinary efforts to improve health related development programs, in particular the Global Fund to Fight AIDS, TB, and Malaria. This accomplishment is no small achievement and a testament to the profound ability for many public and private entities to collaborate successfully when focused on a global partnership for development (MDG 8).

With unparalleled celebrity-based support, Millennium Development Goal 6 focuses on HIV/AIDS and malaria, as well as an undefined category of 'other diseases'. Since the initiation of the MDG 6, there has been an



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outpouring of support for advancing the diagnostic and therapeutic systems of care for the 'big three' (AIDS, TB and malaria), while relatively little attention has been paid to the fourth category of "other diseases". In recognition of this, the international health community created an intentional approach to prioritizing novel epidemiologic and R&D approaches for safe and effective therapies for the 'other diseases' now collectively appreciated as the Neglected Tropical Diseases (NTDs).

The early momentum in addressing the NTDs began with the formation of Médecins Sans Frontières' (MSF) Drugs for Neglected Diseases Initiative (DNDi).³ This land-breaking and collaborative approach set the model for global partnership for addressing the NTDs. The founding members of this partnership include:

1. Indian Council of Medical Research
2. Institut Pasteur (France)
3. Kenya Medical Research Institute (Kenya)
4. Médecins Sans Frontières
5. Ministry of Health (Malaysia)
6. Oswaldo Cruz Foundation/Fiocruz (Brazil)
7. WHO Special Programme for Research and Training in Tropical Diseases (TDR)-Permanent Observer

The formation of the DNDi R&D initiative as a model public-private partnership followed MSF's international honor of the 1999 Nobel Peace Prize. This initiative subsequently has led the way for the WHO Department of NTDs to form a department of neglected tropical diseases with a dynamic conditions list (though not all infectious, e.g., podocorniosis and snakebite).⁴

From WHO's Department of NTDs' current description, the infectious and non-infectious etiologies that comprise the NTDs share these common characteristics:

1. Chronicity
2. Low mortality
3. Capacity for stigmatization that results in the promotion or persistence of poverty
4. High prevalence
5. A causal link between occurrence and rural poverty
6. Ancient conditions, opposite to emerging infections ("the biblical conditions")
7. Chronic conditions
8. Cause disability and disfigurement (growth delays, blindness, disfigurement)
9. High disease burden but low mortality
10. Poverty-promoting features and other

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Spotlight on Dengue Fever

Rachel Die

Dengue fever is a disease that typically occurs in tropical climates and is not usually identified as being a health risk in the United States. Clinicians in the United States, however, do have cause to be concerned with this disease: the mosquito that carries the virus is migrating to areas other than Asia and Latin America, where it most frequently occurs. According to the World Health Organization there are currently about 2.5 billion people (40% of world's population) living in areas where Dengue fever is endemic.

The Centers for Disease Control and Prevention (CDC) reports that the vast majority of Dengue cases in the U.S. are among recent immigrants or international travelers. However it is also important to know that *A. aegypti*, the mosquito that carries dengue fever, has been documented as being present in the United States in the states of Florida, Louisiana, and South Texas. While the mosquitoes that have been seen in these areas do not necessarily carry the disease, with people migrating into parts of the southern United States, the prevalence of infected mosquitoes within this burgeoning population will likely increase.

The symptoms of Dengue fever are frequently difficult to recognize in patients. Many of the symptoms are flu-like; patients would likely not recognize that they were infected. If a patient contracts Dengue fever when they have a compromised immune system, how-

ever, the resulting symptoms can be life threatening. The most common symptoms of Dengue include: high fever, severe headache, severe pain behind the eyes, joint pain, muscle and bone pain, rash and mild bleeding (i.e. nose or gum bleeding). One way clinicians could potentially spot infected patients would be if the patient experiences significant bleeding and bruising in conjunction with typical Dengue symptoms. Testing for Dengue fever is very expensive; furthermore, due to the common, flu-like symptoms, frequently neither patients nor clinicians are recognizing or diagnosing the infection as Dengue fever.

In lieu of expensive testing for Dengue fever, there is an easier way to begin to ascertain whether Dengue fever is an appropriate diagnosis. Clinicians can consult with county level public health authorities who test for the presence of the *A. aegypti* larvae within mosquito populations. The monitoring of these mosquitoes can indicate when there are dramatic increases in the population, which could signal that an outbreak of Dengue cases would be probable. All clinicians working with immigrant populations or working in areas where there are *A. aegypti* mosquitos present should be on the look out for symptoms that could indicate possible Dengue fever. Clinicians should consult with public health officials in their area in the case of a suspected Dengue fever case.

Effective preventative measures can be undertaken at the personal level. Residents in areas that are seeing increased populations of *A. aegypti* can easily purchase cheap mosquito netting for their homes. Furthermore, special care should be taken to ensure that the netting is being used to protect those groups that are the most vulnerable, such as the young and the elderly. If those with susceptible immune systems were to contract Dengue Fever, the results could be lethal. Another larger-scale measure that can be taken is to spray pesticides in areas that are seeing large epidemics.

Spraying pesticides can create environmental and health hazards and may incur more harm than good over a long period of time. DDT was a pesticide that was used to control for mosquitoes that carried Dengue fever. However, this pesticide was revealed to be environmentally detrimental in later years. Even newer pesticides may carry health risks to those who are exposed to them frequently. Further more, the overutilization of pesticides as a means to prevent Dengue can result in creating more resistant mosquitos that carry the virus. In areas where Dengue fever is rampant, however, spraying could help to reduce the prevalence of infection. Another method to help control outbreak of Dengue cases is to reduce the number of places that mosquitoes can breed, such as standing pools of stagnant water. ■



Hansen's Disease Still an Issue for Migrant Populations

Sarah Martin

Hansen's disease (Leprosy) is still relevant to clinicians in the United States, evidenced by the fact that in 2009, 213 new cases of Hansen's disease were reported in the United States. Most cases occur in the Southern region of the United States, mainly Texas, California, Florida, and Louisiana; however, cases also occur in Hawaii, New York, and Massachusetts. The disease is caused by the bacteria *M. leprae*, though 95% of the human population is not susceptible due to built-up resistances in their immune systems. Thus, it is not necessary to isolate patients as was done in past decades. This accounts for why current patients are typically anomalous in that they are not usually known to infect those in their families or others they interact with on a regular basis. Antibiotic drugs are very effective, with early diagnosis, in treating patients. This treatment can be conducted on an outpatient basis after the patient becomes noninfectious after only a few treatments of medication.

Some cases in the United States suffer from a lack of early diagnosis and treatment,

which can lead to severe complications and even deformity from nerve damage in the peripheral nerves of the body. The primary symptom of the disease is lesions on the patients' body that experience a loss of sensation. The lesion may either be a lighter color or also more red than surrounding skin. It is difficult to diagnose this disease just by looking at the lesions due to the fact that sometimes patients have lesions that are dissimilar in appearance. The loss of sensation in areas affected with the lesions is an important indicator of Hansen's disease. The only definitive way to diagnose the disease, however, is through a biopsy of the lesion.

Current treatment methods are effective with early diagnosis and treatment, and can prevent extensive nerve damage in patients. Developing research in this area is largely concerned with field studies that are comparing the different strains of Hansen's in the United States and how they compare to one another. This disparity in strains could be in part related to patients who come from countries with different strains of Hansen's.

Clinicians should be aware of the main countries of origin for their patient population in order to be aware of whether Hansen's disease is endemic in these areas. Countries with histories of Hansen's disease include: India, Vietnam, the Philippines, Brazil, as well as some of the smaller Pacific Island nations. In 2009, however, almost half of reported cases were native born U.S. citizens with no residence history outside of the United States. New studies have suggested that these infections could be due to zoonotic transmission from the nine-banded armadillos in these areas. Further research is still being done in this area.

The HRSA National Disease Programs' Office in Baton Rouge, Louisiana provides free processing of biopsy results of skin lesions and also will ship free antibiotics for clinicians with Hansen's disease patients in the United States. Clinicians need only contact 1-800-642-2477 weekdays 9 am to 5:30 pm ET or email mtemple@hrsa.gov. Further information on Hansen's disease can be found at <http://www.hrsa.gov/hansensdisease>. ■

Chagas Disease: “The New HIV/AIDS of the Americas”

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Endemic Chagas disease has emerged as an important health disparity in the Americas. As a result, we face a situation in both Latin America and the US that bears a resemblance to the early years of the HIV/AIDS pandemic. Neglected tropical diseases (NTDs) are among the most common conditions afflicting the estimated 99 million people who live on less than US\$2 per day in the Latin American and Caribbean (LAC) region.¹ Almost all of the “bottom 100 million” living in the Americas suffer from at least one NTD,¹ and according to some estimates, the NTDs cause a burden of disease in the LAC region that closely approximates or even exceeds that resulting from HIV/AIDS.² Chagas disease (American trypanosomiasis) is a vectorborne disease and a leading cause of the deaths and disability-adjusted life years (DALYs) lost that result from NTDs in the LAC region.² With approximately 10 million people living with Chagas disease, this condition is one of the most common NTDs affecting the bottom 100 million in the region, a prevalence exceeded only by hookworm and other soil-transmitted helminth infections.^{1,2} Moreover, among the NTDs in the Americas, Chagas disease ranks near the top in terms of annual deaths and DALYs lost.^{1,2}

While most of the world’s cases of Chagas disease occur in the LAC region, there is increasing recognition that many people with *Trypanosoma cruzi* infection also live in the US and Europe.³ In practical terms, the “globalization” of Chagas translates to up to 1 million cases in the US alone, with an especially high burden of disease in Texas and along the Gulf coast,^{4,5} although other estimates suggest that there are approximately 300,000 cases in the US,⁶ in addition to thousands of cases documented in Canada, Europe, Australia, and Japan.³ Among those living with Chagas disease around the world today, 20%–30% (roughly 2–3 million people) are either currently suffering from Chagasic cardiomyopathy or will develop this clinical sequela.⁷ Chagasic cardiomyopathy is a highly debilitating condi-



Photo courtesy of Kate Bero

tion characterized by cardiac arrhythmias, heart failure, and risk of sudden death from ventricular fibrillation or tachycardia or thromboembolic events.⁷ Another estimate suggests that up to 5.4 million people living today will develop Chagasic cardiomyopathy [8,9]. Damage to the gastrointestinal tract can also produce debilitating megaesophagus and megacolon.⁷

There are a number of striking similarities between people living with Chagas disease and people living with HIV/AIDS, particularly for those with HIV/AIDS who contracted the disease in the first two decades of the HIV/AIDS epidemic. Both diseases are health disparities, disproportionately affecting people living in poverty.^{1,2} Both are chronic conditions requiring prolonged treatment courses: a lifetime of antiretroviral therapy for HIV/AIDS patients, and one to three months of therapy for those with Chagas disease.⁷ Treatment for HIV/AIDS is lifesaving, although it seldom if ever results in cure, while for Chagas disease, the treatment has proven efficacy only for the acute stages of the infection or in children up to 12 years of age during the early chronic phase of the infection.¹⁰ For both diseases the treatment is expensive—in the case of Chagas disease, the expected cost of treatment per patient year is \$1,028, with lifetime costs averaging \$11,619 per patient.¹¹ Exacerbating costs, Chagas disease itself is a serious opportunistic infection of people living with HIV/AIDS, and is associated with meningoencephalitis, cerebral lesions, and high mortality.⁷ As with patients in the first two decades of the HIV/AIDS epidemic, most patients with

Chagas disease do not have access to health care facilities. A recent analysis indicates that many patients do not have access to the essential medicines for Chagas disease, in particular, the first line of therapy, the drug benznidazole.¹² According to Médecins Sans Frontières (MSF, Doctors Without Borders), many highly endemic countries, including Paraguay and Bolivia, face acute shortages of benznidazole, forcing thousands of newly diagnosed patients to postpone treatment.¹² Both diseases are also highly stigmatizing, a feature that for Chagas disease further complicates access to benznidazole and other essential medicines, as well as access to serodiagnosis and medical counseling. For some individuals with *T. cruzi* living in the US, immigration status presents an additional challenge to seeking care and prevention services. Just as stigma due to sexual orientation has been a barrier to HIV care and prevention, especially in the beginning of the epidemic, immigration status may function as a deterrent to Chagas disease care and prevention.

It is only appropriate to point out that there are important differences between Chagas disease and HIV/AIDS. Whereas HIV/AIDS is almost always a fatal condition in the absence of antiviral therapy, up to 70%–80% of people with Chagas disease do not progress to cardiomyopathy. Moreover, Chagas disease is a true NTD and there is a paucity of antiprotozoan drugs available for this condition, whereas HIV/AIDS can no longer be considered neglected in this sense

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socioeconomic consequences⁵ Although the conditions are characterized as “neglected”, the conditions affect more than one billion people worldwide and represent some of the most ancient described diseases that continue to establish cycles of poverty, especially in low-income populations of Africa, Asia, and the Americas. These conditions are particularly prevalent in populations that are historically hidden from media and outside of profit-generating centers.⁵ Hence, the “neglected” moniker reflects a stalled market for surveillance, prevention, and treatment. In 2011, an initial report and executive summary by the Department of NTDs⁶ of the WHO called for the acceleration of efforts to overcome the impact of neglected tropical diseases, greater prioritization by governments and international agencies, and rigorous and effective monitoring.^{7,8}

Fortunately, in the U.S. the CDC has taken a stand to promote and improve familiarity among health professionals to hasten appropriate diagnosis and improve methods for surveillance, treatment, and prevention of these “neglected” conditions. As the CDC has noted, anyone can become infected, although minorities, immigrants, and those from poor and disadvantaged communities appear to be the most at risk. Those diseases specified for further action, include Chagas disease, cysticercosis, toxocarioriasis, toxoplasmosis, and trichomoniasis due to the number of people infected, severity of the illnesses, poor pathophysiologic understanding by health care providers, and the ability to prevent them. CDC’s overarching goals are to assist in protecting people by:

1. Increasing awareness among physicians and the public
2. Synthesizing the existing data to help better understand these infections
3. Improving diagnostic testing
4. Advising on treatment, including distributing otherwise unavailable drugs for certain infections (e.g. Chagas disease)⁷

As the CDC takes a stand to promote and improve familiarity among health professionals with the particular presentations of these conditions, it promotes the potential for state and local health department augmentation with the anticipation that this will hasten appropriate diagnosis and champion improved methods nationwide for surveillance, treatment, and prevention.

Current president of the American Society of Tropical Medicine and Hygiene, Peter Jay Hotez, MD, PhD, brings attention to engaging research, policy makers, and civil society within the U.S. in much of his writing on the Neglected Tropical Diseases, and Neglected Diseases of Poverty. His championing of the



conditions presents a guiding example for many,

“NTDs are not exclusive to low-income countries. In the United States, such infections account for a sizeable but largely hidden disease burden among minority populations living in poverty... similar infections also occur in Europe. As efforts to control neglected tropical diseases expand throughout Africa, parallel efforts should also target poor and forgotten people in wealthy nations.”⁸

The Public Library of Science open-access journal *PLoS Neglected Tropical Diseases*⁹ is an important new resource that provides a freely accessible peer-reviewed source for evidence-based best practices in the realm of epidemiology, therapy, and prevention for the field as it relates to specified populations, such as the migrant poor. This database begins with the baseline assumption that a diverse array of neglected conditions originates respective to geography of origin, demography, and endemic risk groups. On a survey of NTDs identified in the U.S., dengue, chagas disease, cysticercosis, cutaneous leishmaniasis, amebiasis and the soil-transmitted helminths have some of the highest prevalence.^{10,12,13}

Looking forward, future MCN NTD articles will delve further into these individual etiologies as well as investigate existing migrant stream seroprevalence data, determination of major mechanisms of transmission and prevention, and existing population-based needs assessment in order to more accurately determine the domestic burden of disease and better prevent their transmission and debilitating impact on the

large populations of our neighbors and patients that aggregately comprise our migrant and mobile poor. ■

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4. (Incl. dengue, rabies, blinding trachoma, buruli ulcer, endemic treponematoses, hansen disease, chagas disease, human african trypanosomiasis, leishmaniasis, cysticercosis, dracunculiasis, echinococcosis, foodborn trematode infections, lymphatic filariasis, onchocerciasis, schistosomiasis, soil transmitted helminthiasis.)
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as there is an armamentarium of antiretroviral drugs currently available (although for both conditions, patients in developing countries suffer from lack of access to essential medicines). As another contrast between the two diseases, there is also evidence for oral-transmission of Chagas through food contamination in the Amazon basin.³⁰

Over the last three decades of the global HIV/AIDS pandemic, an aggressive and committed activist community has achieved success in promoting widespread access to antiretroviral drugs in developed and developing countries. As a result, at present millions of people living with HIV/AIDS receive antiretroviral therapy, and pediatric HIV/AIDS has been nearly eliminated as a public health problem in the US.³¹ Patient advocacy and global efforts to promote access to benznidazole and other therapies for Chagas disease, on the other hand, are at a much earlier

stage. In the last decade, MSF has launched efforts to screen more than 80,000 people in Bolivia, Colombia Guatemala, Honduras, Nicaragua, and Paraguay, having diagnosed and treated more than 6,000 and 4,000 individuals, respectively.¹² Other non-governmental organizations have also been engaged in Chagas disease treatments. Of great concern is a looming shortage of benznidazole, as well as the over-reliance on a single drug manufacturer, and inadequate international efforts to organize global production and distribution of the drug in Latin America.¹² Nifurtimox, another drug commonly used in the treatment of Chagas disease, should also be made available for the LAC region.

In parallel with global advocacy efforts, expansion of operational research activities is crucial to optimize the efficacy of existing control and elimination efforts, including the

testing of more field-adapted tools.¹² There are also requirements to expand vector control activities and health education in the communities affected by Chagas disease, in addition to providing

training for local health care providers in endemic areas.¹² The importance of a research and development agenda to develop new and improved Chagas disease drugs cannot be overlooked. As noted above, both antitrypanosomal drugs used for the treatment of Chagas disease, benznidazole and nifurtimox, require prolonged and expensive treatment courses; moreover, the efficacy of either drug for the treatment of late chronic infection and Chagasic cardiomyopathy still remains uncertain and unproven.^{32,33}

Toxicities and the frequency of side effects of both medicines frequently require patients to interrupt or halt treatments, and both drugs are contraindicated in pregnancy.³⁴⁻³⁶ In response to this crisis, the product development partnership (PDP) Drugs for Neglected Diseases initiative (DNDi) is accelerating the development of new Chagas disease drugs in the nonprofit sector, in parallel with a small group of academic laboratories that are pursuing several drug targets [37,38]. Finally, just as the International AIDS Vaccine Initiative (IAVI) PDP is developing several experimental HIV/AIDS vaccines, the Sabin Vaccine Institute PDP is accelerating the development of a new therapeutic Chagas disease vaccine in collaboration with several key universities and public sector biotechnology and manufacturing institutions in Mexico.¹ In further support of this research, a recent analysis by Lee and his colleagues confirms the potential cost effectiveness of Chagas disease vaccines.³⁹

Stark similarities exist between today's global Chagas disease epidemic and the first two decades of the HIV/AIDS epidemic. This translates into a humanitarian catastrophe for the poorest people in the Americas and elsewhere. This perceptible health disparity demands urgent attention by global health policy makers to prioritize Chagas disease and develop a comprehensive strategy for control and elimination efforts, blood screening and point-of-care testing, maternal and child interventions, health education, and parallel research and development. Successfully addressing the vast burden of Chagas disease will require overcoming the current lack of available drugs, together with expanding vector control strategies and developing new and innovative control tools. To this end, eliminating Chagas disease will require a commitment from international health agencies, governments of the disease endemic countries, PDPs, and patient advocacy groups. ■

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Field Study of Ticks Produces Lyme Risk Map

American Society of Tropical Medicine and Hygiene

A new map pinpoints well-defined areas of the Eastern United States where humans have the highest risk of contracting Lyme disease, one of the most rapidly emerging infectious diseases in North America, according to the U.S. Centers for Disease Control and Prevention. As part of the most extensive Lyme-related field study ever undertaken, researchers found high infection risk confined mainly to the Northeast, Mid-Atlantic and Upper Midwest and low risk in the South. The results were published in the February issue of the American Journal of Tropical Medicine and Hygiene. Given frequent over- and under-diagnosis of Lyme disease, the new map could arm the public and health officials with critical information on actual local risk.

"There has been a lot of discussion of whether Lyme disease exists outside of the Northeast and the upper Midwest, but our sampling of tick populations at hundreds of sites suggests that any diagnosis of Lyme disease in most of the South should be put in serious doubt, unless it involves someone who has traveled to an area where the disease is common," said Dr. Maria A. Diuk-Wasser, Assistant Professor at the Yale School of Public Health and the lead author of the study.

"We can't completely rule out the existence of Lyme disease in the South," she added, "but it appears highly unlikely."

The Lyme disease risk map was developed by researchers at the Yale School of Public Health in collaboration with Michigan State University, University of Illinois and University of California, Irvine, through a cooperative agreement with the CDC, which is seeking a better understanding of where Lyme disease poses a public health menace. Lyme disease is a tick-borne ailment with symptoms that range from a rash, headaches and fever to arthritis and Bell's palsy.

Mobilizing Tick Hunters

The scientists involved in the study assembled a large field staff of more than 80 tick hunters. From 2004 to 2007, they combed through 304 individual sites from Maine to Florida and across the Midwest, dragging a one-meter by one-meter square of corduroy cloth in hopes of snagging the black legged tick *Ixodes scapularis* that is the main carrier of the Lyme disease pathogen, *Borrelia burgdorferi*. (The study did not examine risk in the West where Lyme disease is believed to be confined to areas along the Pacific Coast where a different tick species, known as *Ixodes pacificus* or the western black-

legged tick, carries Lyme.)

The goal of the field work was to provide doctors and public health officials with a better sense of where people are at risk of Lyme disease by using the presence of known Lyme-carrying ticks as the main indicator of danger.

Current geographical assessments of Lyme disease risk are heavily reliant on reports of human infections, which the study notes can be a poor predictor of risk. The researchers point out that using human cases to determine areas of risk can be misleading due to the high level of "underreporting and misdiagnosis" of Lyme disease. They also note that where someone is diagnosed with the disease is not necessarily where they contracted it.

In addition, the study found that infected *I. scapularis* ticks may colonize a region long before they actually infect a human with Lyme disease, which means risk can be significant even without a confirmed case.

"A better understanding of where Lyme disease is likely to be endemic is a significant factor in improving prevention, diagnosis and treatment," Diuk-Wasser said. "People need to know where to take precautions to

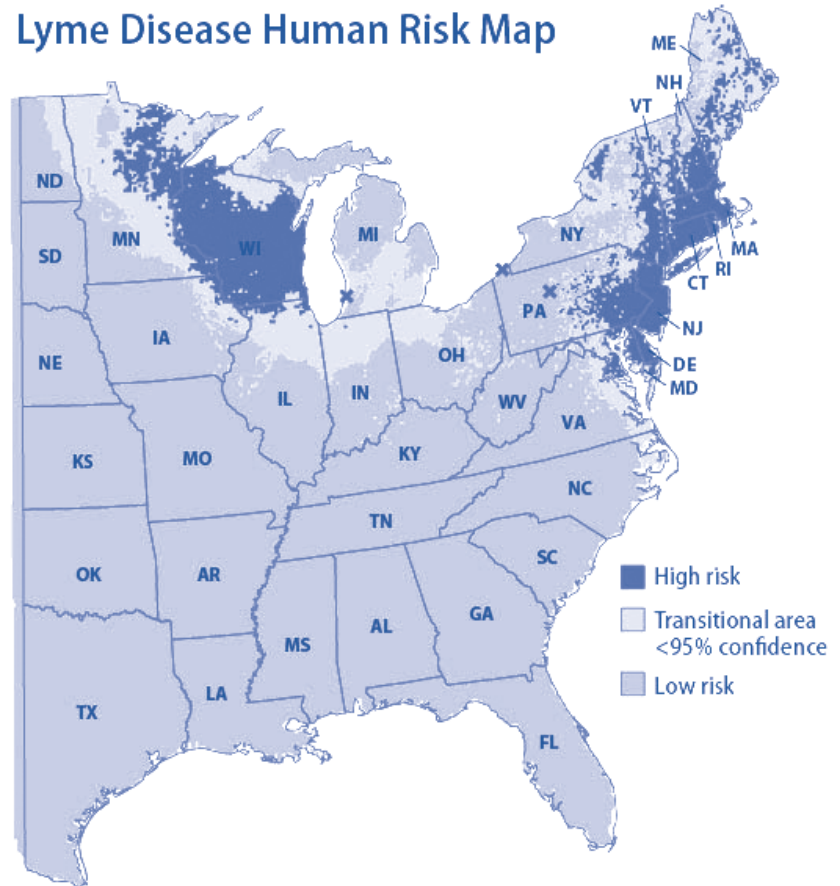
avoid tick bites. Also, doctors may be less likely to suspect and test for Lyme disease if they are unaware a patient was in a risky area and, conversely, they may act too aggressively and prescribe unneeded and potentially dangerous treatments if they incorrectly believe their patient was exposed to the pathogen."

The study notes that "accurate and timely" diagnosis is crucial to initiating antibiotic treatments that can help patients avoid the more serious complications of Lyme disease. At the same time, the authors point out that incorrectly suspecting Lyme disease has its own consequences, including potentially life-threatening complications from the antibiotics typically used to treat infections. (While the laboratory test for Lyme disease can produce both false-positives and false-negatives, false-positives are far more likely in non-endemic areas.)

Establishing a Map for Lyme Disease Risk in the Eastern United States

The maps that emerged from the tick survey show a clear risk of Lyme disease in large parts of the Northeast (including eastern

Lyme Disease Human Risk Map



Pennsylvania) from Maine going as far south as Maryland and northern Virginia, which is in the Washington, DC, metropolitan area. But while conditions could be favorable for the disease to spread into the Tidewater region of Virginia - the data collected for the study indicates the bulk of the South is free of Lyme disease-carrying ticks.

The researchers also identify a separate and distinct Lyme disease risk region in the upper Midwest. It includes most of Wisconsin, a large area in northern Minnesota, and a sliver of northern Illinois.

However, the scientists confirm that Lyme disease remains on the move as its preference for forests and deer is aided by a century-long re-planting of trees inland once cleared for agriculture, along with a resurgence of deer populations. Diuk-Wasser and her colleagues found evidence to support an "emerging risk" for Lyme disease along the Illinois/Indiana border, the New York/Vermont border, southwestern Michigan, and eastern North Dakota. Also, Diuk-Wasser said new, unpublished field work now underway indicates Lyme disease is probably moving into central Virginia.

Lyme Disease: the Southern Challenge

While the scientists involved in mapping the Lyme disease risk believe most of the South is relatively free of the disease, one challenge to delineating a southern risk frontier is the fact that there are *I. scapularis* ticks in the region. They were once thought to be a distinct species, Diuk-Wasser said, but scientists now consider them to be the same species, although there are biological differences.

Most notably, tick experts find the Southern *I. scapularis* exhibit a feeding behavior in the immature stages that is different than that of its northern cousins. The Southern ticks prefer, it appears, the blood of lizards and skinks to small mammals that are more likely to carry the bacteria and show no interest in feeding on humans, which scientists believe makes it unlikely they play an important role as Lyme disease carriers.

Diuk-Wasser noted that one reason some people in the South may believe Lyme disease is a risk in their region is that they may frequently encounter a species known as the Lone Star Tick (*Amblyomma americanum*) that is "very aggressive, very abundant" and whose bite can cause a rash that looks similar to the "bull's eye" lesion caused by Lyme disease. However, this disease, known as Southern Tick-Associated Rash Illness or STARI, does not feature the neurological and arthritis problems associated with Lyme disease.

Nonetheless, Diuk-Wasser stresses that scientists cannot rule out completely that Lyme disease exists outside of the areas identified in the mapping project. And she pointed out there are limitations to the tick sampling techniques she and her colleagues employed to create the risk map. For example, the field teams conducted their tick collecting in late May, June, July, and August, which is considered peak feeding time. But she said some areas might experience a population surge in early May or earlier. (The climate in April in parts of Tennessee is likely tick friendly, but Diuk-Wasser said other field studies conducted in Tennessee during the spring have not found any Lyme-infected ticks.)

"This is a useful tool that can help

physicians, nurses and policymakers make realistic resource decisions," said James W. Kazura, MD, President of the American Society of Tropical Medicine and Hygiene, which publishes the journal, and director of the Center for Global Health and Diseases at Case Western Reserve University. "The scientific research done to create this new risk map for Lyme disease is an example of what is needed in the U.S. today for a variety of diseases given its immense value in making clinical decisions and allocating scarce resources."

For more information and resources go to the the American Society of Tropical Medicine and Hygiene website, <http://astmhpressroom.wordpress.com/journal/february-2012/>

Preventing Tick Bites Among Outdoor Workers

[Editor's Note: The following has been excerpted with permission from Occupational Health Watch, a regular online publication from the California Department of Occupational Health. The content here was developed specifically for California, but is relevant for workers across the United States]

Outdoor workers are at risk for tick bites and tick-borne diseases, even during winter months. Worksites with high, wild grass, mixed hardwood forests, bushes, and leaf litter are likely to have ticks. Ticks can transmit pathogens that cause Lyme disease and other illnesses.

Federal and state health agencies, recommend employers and workers take steps to prevent tick bites and become educated about what to do if workers are bitten.

Employers should have workers avoid working in tick habitats, when possible. If not possible, employers can ask workers to cut back tall grass or take other steps to reduce tick populations where they work.

The California Vector Borne Disease Section (VBDS) has developed a web page with resources for employers and workers that outline steps employers of outdoor workers can take to help protect them from tick bites. These steps include:

- Informing employees about how tick-borne diseases are transmitted, the risks of exposure and infection, and how to identify symptoms.
Training employees on what a tick looks like and how to remove an attached tick.
- Requiring the use of protective clothing: light-colored, long-sleeved shirts, long pants, and socks.
- Providing EPA-registered repellents (containing $\geq 20\%$ DEET) for use on skin and clothing, while ensuring that employees understand the potential health effects and follow all label directions.
- Stressing the importance of timely reporting of workplace illnesses and injuries, including tick bites.

Employees should do their part by checking themselves and co-workers frequently for ticks; showering and washing clothing soon after returning from a tick habitat; and seeing a doctor for symptoms within 30 days after a tick bite.

Women who are pregnant or planning to become pregnant should seek expert advice through their obstetrician regarding potential risks from using repellents.

For more information on tick-borne diseases, including a tick-bite poster for outdoor workers, go to <http://www.cdph.ca.gov/HealthInfo/discond/Pages/TickBorneDiseases.aspx>.

HEALTH NETWORK

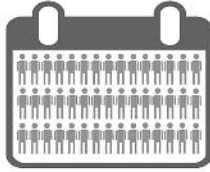
Health Network is designed and engineered to provide patient navigation to mobile populations around the world.

patients enrolled

620

patient and clinic encounters through Health Network

15,914



That's **45** encounters every day for a year!

PROGRAMS IN ACTION:

Creating practical solutions at the intersection of poverty, migration, & health.

A Year In Review

2011

FAMILY VIOLENCE

[hu] The Hombres Unidos contra la Violencia Familiar initiative is a male-to-male peer dialogue based intervention designed to promote nonviolent relationships and prevent sexual and intimate partner violence.

77.5%

of the men who participated in Hombres Unidos felt that they better understood how to prevent violence and promote respectful personal relationships.

"The truth is that my experience with the Hombres Unidos workshop had a huge impact on me. It taught me to control my emotions... it taught me to deal with my emotions and how to deal and talk to my family. Overall it was a learning experience in which I discovered new ideas and concepts in terms of family violence and how to avoid it at all costs."
 – Hombres Unidos (intimate partner violence prevention) participant

Countries Served by Health Network



"Health Network is a must for all of our diabetic patients, people with tuberculosis, our prenatal patients and anyone we screen for cancer. In the past we would have put off doing a mammogram for a woman we knew would be traveling soon, but since the advent of Health Network we know that we will be able to find the patient and get her in care if necessary." – Carolyn Davis, Beaufort Jasper Hampton Comprehensive Health Services, Inc. in South Carolina

"...the help from Health Network was all I had, I don't know honestly what I would have done without it" – Health Network prenatal patient

CANCER SURVIVORSHIP

Community Based Solutions

9 promotoras trained by MCN

80 community presentations

Impacting the knowledge of 1252 individuals in migrant communities

In 2010-2011 LIVESTRONG partnered with the MCN to ensure that cancer survivors who are also migrant workers have access to culturally-relevant tools and resources. To provide migrant workers access to resources, MCN trained a network of 95 Promotores from California, Texas, Florida, New Jersey and New York on cancer prevention and survivorship resources. Nine of the promotoras trained by MCN conducted an additional 80 community presentations on Cancer Prevention and Survivorship resources, impacting the knowledge of 1252 individuals in migrant communities.

ENVIRONMENTAL & OCCUPATIONAL HEALTH

Migrants work in some of the most hazardous occupations including agriculture and construction. MCN works to integrate environmental and occupational health (EOH) into primary care. Through training and technical assistance we assist clinicians in better recognizing and managing pesticide exposures as well as other EOH injuries and illnesses.

EOH resources distributed

182,000+

clinician's trained in EOH

365

10 Centers of Excellence in Environmental & Occupational Health



MENTORING

"My work with [MCN], solidified my passion for public health. My internship united my passions for environmental and social justice. After grad school, I hope to practice public health in a way that will positively impact the health of marginalized populations." – Julianna Humphreys

Work-related Injuries and Illnesses Carry Hefty Price Tag

Cost of Occupational Injuries, Illness and Death Surpass the Costs of Cancer, Coronary Heart Disease and Stroke

Michael Piorunski

[Editor's Note: The following is a summary of the article: Leigh, JP. Economic burden of occupational injury and illness in the US. (2011). *Milbank Quarterly* (89)4: 728 – 772.]

The cost of occupation-related injuries, illnesses and deaths in the US is estimated at \$250 billion, ranking second in cost only to cardiovascular disease among major injuries, illnesses and diseases, according to a recent study that examined such costs in 2007.

J. Paul Leigh, Ph.D, professor and researcher at the University of California Davis, estimates that in 2007 the US workforce suffered nearly 8,565,000 fatal and nonfatal injuries and more than half a million fatal and nonfatal diseases with a cost to the tune of \$250 billion. Cardiovascular disease, which carries medical and indirect costs near \$432 billion, is the only major illness with a higher cost. The \$250 billion price-tag of job-related injuries and diseases surpasses that of cancer (\$219 billion), coronary heart disease (\$151.6 billion) and stroke (\$62.7 billion).

In his study, Leigh calculates 59,102 workers died from an occupation-related injury or disease, more than deaths from motor vehicle crashes (43,945), prostate cancer (29,093), homicide (18,361) and HIV/ AIDS (11,295). The study appears in the December issue of the *Milbank Quarterly*.

Economics of Workplace Injury and Disease

Nonfatal injuries accounted for more than 99 percent of work-related injuries and nearly \$46 billion in medical costs. More than 70 percent of nonfatal injuries did not cause workers to miss days of work, though these injuries still incurred \$5.5 billion in medical costs. Permanent total disability injuries were the most costly injuries, bearing a price tag, on average, of more than \$700,000 in medical costs per injury, according to Leigh's analysis.

Cancers, chronic obstructive pulmonary disease (COPD) and circulatory disease were the three occupation-related diseases with the highest mortality rates in 2007. These fatal diseases accounted for just over \$14 billion in medical costs, with circulatory diseases having the greatest costs among fatal diseases - \$6.09 billion.

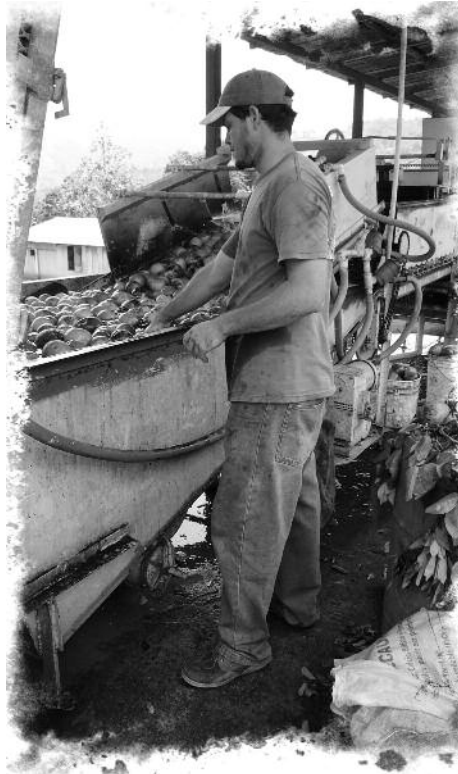


Photo courtesy of Jillian Hopewell

The direct and indirect costs of workplace injuries accounted for 77 percent of the \$250 billion bill for job-related injuries and diseases. Indirect costs, including lost earnings, fringe benefits and home production accounted for more than \$182 billion of the total cost of workplace injury and disease.

The cost of occupational injury and disease is substantial not only to workers and employers, but to society as a whole. Leigh states that workers' compensation benefits cover less than 25 percent of the costs associated with occupational injury and disease – in 2007, roughly \$55.4 billion in benefits was paid nationwide. The nearly \$200 billion balance of the costs from workplace injury and disease is paid by taxpayers through Medicare and Social Security Disability Insurance, employers and workers through higher health insurance premiums, families through out of pocket payments and lost wages and health centers and hospitals who provide care and receive little or no reimbursement. Approximately 92 percent of workers' compensation

payments go to cover injuries.

Leigh's analysis of the most recent injury, disease, employment and inflation data from the U.S. Bureau of Labor Statistics (BLS) and Centers for Disease Control and Prevention, as well as cost data from the National Council on Compensation Insurance and the Healthcare Cost and Utilization Project among other sources, shows the cost of occupational injury, illness and disease has risen an inflation-adjusted \$33 billion since his previous comprehensive analysis in 1992.

The current study improves on previous estimates by Leigh and others of the incidence and cost of fatal and nonfatal occupational injuries and illnesses as it relies on actual BLS data and includes unique estimates of injuries for farmworkers and the self-employed rather than BLS estimates which do not include the majority of these workers. Leigh's cost estimates include both direct and indirect costs of fatal and nonfatal injuries and illnesses including estimates of medical costs, lost wages and fringe benefits.

The Cost of Injuries and Illnesses among Agricultural Workers

Leigh shows that occupation-related injuries and diseases in agriculture also carry a significant economic burden. The 2007 U.S. Bureau of Labor Statistics Annual Survey of Occupational Injuries and Illnesses recorded 30,800 injuries among crop and livestock workers. Prior to adjusting for underreporting, Leigh estimates that an additional 39,913 nonfatal injuries occurred among employees and 31,212 among the self-employed on crop and livestock farms. He also estimates the BLS survey missed nearly 45 percent of nonfatal occupational injuries in agriculture.

In an unpublished appendix to the *Milbank Quarterly* article, Leigh shows that if agriculture is defined as work in crops and livestock, the estimated cost of fatal and nonfatal injuries and diseases in 2007 was \$10.4 billion. He said that if the definition of agriculture is expanded to include the occupations listed in the BLS category labeled as agriculture, occupations in crops, livestock, forestry, fishing and hunting, the 2007 estimated cost of fatal and nonfatal injuries and diseases is \$17.2 billion. ■

New NIOSH-Funded Center Focuses on Safety and Health in Changing Agricultural Landscape

Scott Heiberger, Bruce Alexander, PhD, Jeff Bender, DVM, MS, and Matthew Keifer, MD, MPH

Addressing potential safety and health problems in agriculture is a complex job due to the dynamic nature of the industry and changing demographics of the workforce. The new Upper Midwest Agricultural Safety and Health (UMASH) Center (<http://umash.umn.edu/>) is meeting these challenges with projects that will ultimately improve our understanding of the impact of these changes on the health of workers, and will develop tools available to clinicians in the care and prevention of injury and illness.

UMASH is one of nine Centers of Excellence in Agricultural Disease and Injury Research, Education, and Prevention funded by the National Institute for Occupational Safety and Health (NIOSH). The center is a collaboration of the University of Minnesota School of Public Health and College of Veterinary Medicine, the National Farm Medicine Center of Marshfield Clinic, and the Minnesota Department of Health.

UMASH is initially focusing on pork and dairy production through research, prevention, education and outreach programs. Eventually the center will expand to other commodities and build on knowledge gained across the programs. The center is adopting a One Health approach to occupational health in these industries. The One Health model seeks to evaluate the health of people in the context of animal health and environmental health. The practices used in animal agriculture are primarily driven by the needs of the animals, the various levels of production, and the economic and social drivers of agriculture. To understand how the work environment may influence a worker these other factors must be understood. The One Health model has widely been used for emerging zoonotic diseases, but is also relevant for most health issues related to agricultural work.

The Challenges

Agricultural operations often put workers in close, frequent contact with animals that can weigh many times that of a human being. Livestock-related injuries have been shown to be common in several studies and often result in work restrictions. Machinery, a ubiquitous presence in agricultural systems, presents another major hazard that adds signifi-



cantly to the high injury and death rate in agricultural work. Finally, illness caused by exposure to organic and inorganic dusts, chemicals and zoonotic pathogens represents another important category of health issues for workers in agriculture, one that is understudied.

Overall, it is likely that animal agriculture operations will continue to become larger with increases in work task specialization, leading to new occupational risk factors.

Language and literacy are also important risk factors for illness and injury in agricultural work, an issue magnified by the increasing number of immigrant workers in agriculture and other high-risk occupations in the US. Wisconsin dairies reflect this demographic shift with a workforce that is conservatively estimated at more than 40 percent Hispanic. Nationwide, between 2010 and 2030, first- and second-generation immigrants together are projected to account for all growth in the US labor force. Despite high rates of labor force participation, immigrants remain vulnerable and endure high occupational risks with limited health and safety training and protection in the workplace.

The work of UMASH will bring many perspectives and areas of expertise to address these issues. Improving agricultural safety and health is a challenge that requires partnerships among academics, producers, government and health systems.

Projects of Particular Relevance to Clinicians

These UMASH projects address issues that confront clinicians who care for agricultural working populations.

Facilitating Return to Work for Injured

and Ill Animal Agriculture Workers:

Serious, restrictive, non-fatal injuries are commonplace in large animal agriculture. A huge percentage of the employer and societal cost of workplace injuries is time-loss. Early and safe return to work for injured workers should be a goal of clinicians treating injured workers. Primary care clinicians are often poorly equipped to manage the complex process of returning injured workers to work. The Return to Work project, being conducted by the National Farm Medicine Center, is creating a mechanism to bring the realities of work on the farm into the clinic to assist clinicians to develop an appropriate transition plan.

The project is developing a compendium of agricultural tasks in dairy and pork production and designing and piloting an interactive clinically-driven software application designed for clinicians to guide early return-to-work planning for injured workers. Concepts for developing transitional work plans commonly used in non-agricultural industries are being applied to this project. To begin, functional job analysis is being conducted on dairy and pork operations and a robust database will be developed consisting of information on hazards, loads, exposure risks, photographs and descriptions of tasks, and necessary training or skills. This content will be incorporated into an interactive software application which will facilitate clear and effective communication between clinician, worker, employer and return-to-work specialist. The investigators will develop and test Light Duty Job Assemblies (LDJA) options for five common injury/ illness

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Protecting Children in Agriculture is Focus of 2012 National Action Plan

The *Blueprint for Protecting Children in Agriculture: The 2012 National Action Plan* takes an updated look at preventing childhood agricultural injury and death.

Published in April by the National Children's Center for Rural and Agricultural Health and Safety, the *Blueprint* outlines goals and strategies to improve and expand efforts in the collection of injury, disease and death data, health and safety interventions, and policy and research activities related to children and agriculture. The 2012 *Blueprint* offers an updated approach to ensure the safety of children who live on, visit and work on farms which reflects the changing agricultural industry and environment.

This report is the product of a multi-year process involving input from the general public as well as leading researchers and practitioners in childhood agricultural safety and health. Draft versions of goals and strategies were critiqued by nearly 100 stakeholders, and then posted online to solicit further public input. The 38-page report emphasizes the need for:

- Affordable, accessible and high-quality child care options for farm families and hired farmworkers.
- Increased involvement of employers, farm organizations and agribusinesses in creating a culture of safety.
- Improved injury and fatality data collection, with inclusion of under-represented populations such as migrant and seasonal farmworkers and the Amish and Mennonite communities.
- Increased attention to reaching young



Photo courtesy of Jennie McLaurin

farm parents and teen workers via social media outlets.

The *Blueprint* is addressed in the current issue of the peer-reviewed *Journal of Agromedicine* (Volume 17, Issue 2 - www.tandfonline.com) with 16 full-length manuscripts and accompanying editorials. In these papers, scholars in various disciplines generate recommendations for research, programs, policy, dissemination and other topics based upon their areas of expertise. This dedicated issue includes the article

"Unique Agricultural Safety and Health Issues of Migrant and Immigrant Children," authored by MCN's Jennie A. McLaurin, MD, MPH and Amy K. Liebman, MPA, MA.

To receive a print copy of the 2012 *Blueprint*, contact the National Children's Center, nccrahs@mcrf.mfldclin.edu or 1-800-662-6900. The *Blueprint for Protecting Children in Agriculture: The 2012 National Action Plan* is available on the MCN website at <http://www.migrantclinician.org/blueprintforkidsinag> ■

Database to Aid in Clinical Pesticide Training

A newly-launched website offers resources for educators of health professionals to incorporate pesticide-related issues into their curriculums. The Pesticide Health Effects Medical Education Database (PHEMED) provides ready-made teaching materials for use in lectures and class exercises.

Developed by the National Farm Medicine Center, Marshfield Clinic Research Foundation, Marshfield, Wis., and the University of Washington, PHEMED includes materials that focus on the most common pesticide groups found in the US and those

that cause the most human health issues.

PHEMED content is organized into four sections:

- **Tool box** – includes classroom exercises, health history forms and pesticide related guidelines.
- **Competencies** – Outlines professional competencies by health profession and links users to activities and lectures available on the site.
- **Topics** – Links users to lectures, fact sheets and other pesticide-related materials organized by topic.
- **Cases** – Provides 11 pesticide-related case

scenarios outlined with learning objectives and supporting materials which can be used in the classroom.

PHEMED is also a resource for health professions students and medical residents to learn about pesticides.

Several MCN resources are featured on the database, including MCN's Cholinesterase Monitoring Protocol for Healthcare Providers and Cholinesterase Testing Algorithm.

All the materials on the site are free to download and can be adapted. <http://www.pesticidemededucation.com/> ■

■ New NIOSH-Funded Center Focuses on Safety and Health continued from page 11

groups in each industry based on known risks in dairy and pork production.

Ultimately, the investigators will develop a prototype return to work software program with an interactive user interface to produce applicable LDJA.

Surveillance of Disease and Injury in Dairy Farmers and Workers: No practical surveillance mechanism exists that collects information on injuries and illnesses associated with agricultural activities for most farms in the US. This surveillance project focuses on injuries and illnesses in Wisconsin dairy farmers and workers, with particular emphasis on changes in the dairy industry and the effect these changes have on injury and illness patterns. The goal is to establish an active surveillance process using a recurring survey in order to inform policy and guide interventions designed to reduce the overall burden of injury and illness on this population. This project brings together a multidisciplinary team of investigators and builds on existing surveillance resources including the Wisconsin Department of Agriculture (USDA NASS), the Marshfield Epidemiologic Study Area (MESA) and Marshfield Clinic Electronic Medical Records (EMR). These resources will be used to further develop a surveillance system and identify high risk production practices related to injury and illness in dairy farmers and workers as well as information on changes in farming operations such as herd size, workforce, production methods, animal handling, and other work practices. Information and knowledge gained from the surveillance system will facilitate enhancement of the utility of the EMR by refining the search algorithms for studies using this valuable resource. This knowledge will help researchers envision the use of EMR in light of the national mandate for EMR development.

Surveillance of Zoonotic Diseases in Agricultural Workers: Numerous outbreak investigations and other scientific reports indicate that zoonoses are a frequent and important source of illness in agricultural workers and others exposed to food animal production and forestry settings. Common zoonoses concerns include methicillin-resistant *Staphylococcus aureus* infection, *Clostridium difficile*-associated disease, influenza, vector-borne diseases (e.g., Lyme disease, West Nile virus disease), blastomycosis, Q fever, animal rabies, and many other zoonoses. Recent studies also indicate that additional zoonoses may be emerging in food animals and agricultural workers. However, comprehensive data on the frequency of the occurrence of zoonoses in agricultural workers, and specific risk factors



for infection, are lacking.

This project utilizes the Minnesota Department of Health (MDH) and its existing infectious disease surveillance system to characterize the occurrence of zoonoses in agricultural workers, their families, and others exposed to agricultural settings in Minnesota. As part of this effort, MDH is surveying all veterinary personnel in Minnesota about work-related illness and injury. The long-term objective of the project is to reduce the occurrence of zoonoses among agricultural populations related to occupational exposures. MDH is uniquely suited to achieve these specific aims because it already conducts centralized surveillance for most pathogens of concern to agricultural populations.

Seguridad en Las Lecherías: Immigrant Dairy Worker Health and Safety: The increasing number of immigrant, Hispanic workers in the Wisconsin dairy industry with unaddressed language barriers and training needs, necessitate a focus on culturally and linguistically appropriate education in agricultural health and safety. The *Seguridad en las Lecherías* project, a joint National Farm Medicine Center/Migrant Clinicians Network initiative, will employ a popular education model that builds on experiential learning approaches relevant to the everyday lives of workers. The goal of this project is to bridge the gap in worker health and safety training in dairy production by testing a culturally appropriate occupational safety and health intervention to reduce worksite hazards and to improve knowledge and practices among immigrant dairy workers in Wisconsin. The project applies evidence-based research findings as well as culturally appropriate popular education (CAPE) approaches. The project will pilot a bilingual safety curriculum for Hispanic workers and utilize Promotores de Salud or lay health workers to employ a “train-the-trainer” approach to educate workers. This use of promotores is a proven approach in community health promotion but it has not been utilized among the new dairy workforce in Wisconsin and its previous application in a workplace setting has been limited. The project is engaging dairy producers, farm managers, workers, clinicians

and health and safety professionals to raise awareness and increase understanding of strategies to improve the occupational health and safety of immigrant workers.

MRSA Colonization and Infection in Swine Veterinarians: This project will explore the frequency of colonization and the incidence of infections among swine veterinarians. This will advance our clinical understanding of the frequency of these events and will serve to alert clinicians to the risks swine workers face for MRSA infections from swine.

Other Projects within UMASH

Occupational Hazards in Pork Production Associated with Production Practices: The overall objective is to determine how different practices implemented by farmers when raising hogs impact the working environment and exposure to workers. The focus of this project is to characterize risks to pork production workers associated with two main occupational health issues: injuries and airborne exposures in the working environment. Production practices in the pork industry have evolved over the last two decades and continue to change to meet consumer demand. The practices adopted by producers are primarily to improve production and maintain a healthy population of animals. These practices may also change the work environment which has implications for the workers. This project will examine how worker health and safety are influenced by different methods of raising hogs.

Multidisciplinary Network to Address Agriculture Worker Health and Safety Issues: The goal of this project is to develop a functional, multidisciplinary network to address occupational health and safety issues among livestock workers. The network will build on the group’s diversity of skills, experiences, and knowledge in order to translate research, deliver education, and act as a surveillance stream for emerging occupational health and safety concerns in livestock production.

Pilot Projects Program: UMASH also is sponsoring a small grants program to develop innovative ideas and new partnerships to address health and safety issues important to agriculture workers and their families. This program is focused on building capacity to address current issues in agricultural health and safety research, prevention and education in the Upper Midwest and to respond to emerging problems encountered as the practice of providing food changes.

For information, e-mail umash@umn.edu, or phone 612-625-8836. ■

New Resources Now Available

MCN partnered with the National Farm Medicine Center, Agrisafe Network, the Northeast Center for Agricultural Health and the National Children's Center for Rural Agricultural Health and Safety to develop exciting new tools and resources for clinicians and other service providers to protect the health and safety of farmworkers and their families.

Clinical Tools for Cholinesterase Monitoring

In March, MCN unveiled our latest pair of clinical tools, developed in partnership with Agrisafe Network and the National Farm Medicine: the Cholinesterase Testing Protocol for Health Care Providers and the Cholinesterase Testing Protocol Algorithm. The protocol and algorithm provide a concise and simple format for clinicians to use

as guides in managing care for patients working with Class I and Class II organophosphates (OP) or OP and N-methyl-carbamates.

Carolyn Sheridan, RN, BSN, Clinical Director at Agrisafe Network and Matthew Keifer, MD, MPH, Director of the National Farm Medicine Center, reviewed seven cholinesterase monitoring protocols to develop a more comprehensive tool. The pair received additional support from MCN's Amy K. Liebman, MPA, MA.

Experts in environmental and occupational health, migrant health and agricultural health and safety reviewed the protocol and algorithm, which also received the endorsement of MCN's Environmental and Occupational Health Advisory Committee.

To introduce the tools MCN presented a national webinar, the *Nuts & Bolts of*

Cholinesterase Monitoring for Farmers, Ranchers and Agricultural Workers, in partnership with NFMC and Agrisafe Network. This webinar – available on the MCN website – provides a comprehensive overview of cholinesterase monitoring and its application in the practice setting, including a review of the history of cholinesterase monitoring, best practices for whom and when to test, types of cholinesterase and tests, obtaining baselines, the role of the clinician in protecting workers and reporting pesticide exposures.

To access the Cholinesterase Monitoring Protocols for Healthcare Providers, Cholinesterase Testing Algorithm and the Nuts and Bolts of Cholinesterase Monitoring webinar, visit www.migrantclinician.org/nutsandboltsresources ■

Cholinesterase Testing Protocols for Healthcare Providers

Whom to Test?

Cholinesterase-inhibiting Pesticides

Test if working with Class I and Class II organophosphates (OP) or OP and N-methylcarbamates for greater than a total of 30 hours in 30 consecutive days.

N-methyl-carbamates

If only working with N-methyl-carbamates, cholinesterase testing is not likely to be beneficial.

Baseline

Baseline Determination

Obtain baseline measures prior to working with cholinesterase-inhibiting pesticides. When obtaining the baseline, ensure that at least the previous 30 days were free of OP exposures.

Ensure that cholinesterase-inhibiting pesticides had not been handled in the immediate 30 days prior to testing.*

Establish baselines annually.

2nd Baseline

A second baseline is recommended for improved precision but not essential. If a 2nd baseline is obtained, average the two values. When obtaining the 2nd baseline, wait to test until at least 3 days after the baseline, but within 30 days and ensure no pesticide exposures during this time period.

Working Baselines

Working baselines (baselines that are

established when a 30-day period free of OP exposure is not possible) are likely to increase false negatives. Perform a second baseline after halting exposure (the longest practicable exposure-free period available is recommended, with a one-week exposure-free period at a minimum). If values differ by more than 10%, obtain a third baseline. The highest value should be used as the baseline.

Testing

Test Types

Measure both acetylcholinesterase (red blood cell cholinesterase-AChE) and butyryl cholinesterase (plasma cholinesterase-PChE). AChE and PChE tests recommended; PChE if only performing 1 test.

Laboratory Services

Use the same laboratory and the same methodology for all testing so that results may be accurately compared.

Post Exposure Testing

Conduct post exposure test each time worker exceeds or reaches 30 hours of exposure within any 30-day period after the baseline or last post exposure test.

Medical Removal

Remove from handling cholinesterase-inhibiting pesticides with 30% or more reduction in cholinesterase activity (depression) of RBC or 40% or more reduction of

plasma cholinesterase activity (depression).

Level to Return to Handling

Return to Handling

Return to handling when test result is greater than or equal to 80% of baseline.

Retest for Return to Work

Days to repeat test is determined by degree of reduction in cholinesterase activity.

For RBC AChE: (% depression – 20) / 0.83 = # of days to repeat test

For Plasma PChE: (% depression – 20) / 1.2 = # of days to repeat test

Review of Handling Practices

Review pesticide handling practices when test results are less than 80% of baseline.

* Handling of pesticides refers to tasks such as mixing, loading, transferring or applying pesticides; handling open containers of pesticides; acting as a flagger; cleaning, handling, adjusting or repairing pesticide

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New Comic Book for Injury Prevention



MCN is excited to announce the availability of a new set of bilingual patient education resources aimed at preventing musculoskeletal injuries among farmworkers. ¡CUIDATE! Una guía para prevenir lesiones musculares en el trabajo is an easy to use guide in a comic book format, providing workers with strategies for preventing musculoskeletal injuries. Developed in partnership with the Northeast Center for Agricultural Health and Safety in New York, ¡CUIDATE! utilizes detailed images paired with simple and concise descriptions to lead workers through a series of stretches to lessen the impact on the body of the repetitive and strenuous activity commonplace in agricultural work. Available in English and Spanish, the comic book provides strategies for safely performing common agricultural tasks, including tips for safe lifting and bending.

The comic book is available for download at <http://www.migrantclinician.org/cuidatecomicbook>



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calendar

Bringing Palliative and Hospice Care to Migrant and Mobile Poor Populations

MCN Webinar
August 22, 2012 (10am PST, 11am MST, Noon CST, 1pm EST)
<http://www.migrantclinician.org/services/education/webcasts.html>

Organizing for the Changing World of Donated Medicine

August 22-23, 2012
Nashville, TN
<http://www.dispensaryofhope.org>

25th Annual East Coast Migrant Stream Forum

October 18-20, 2012
Virginia Beach, VA
www.nochca.org

APHA 140th Annual Meeting and Exposition

San Francisco, CA
October 27-31, 2012
<http://www.apha.org/meetings.htm>

The 22nd Annual Midwest Stream Farmworker Health Forum

November 8-10, 2012
San Antonio, TX
www.ncfh.org