

# Epi Notes



North Carolina Department of Health and Human Services ♦ Division of Public Health

Volume 2005-4

December 2005 - February 2006

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## **N.C. Public Health Team Returns to South Florida to Conduct Community Health and Needs Assessments Following Hurricane Wilma**

*Prepared by William Service, Industrial Hygienist, Office of Public Health Preparedness and Response*



On October 24, 2005, Hurricane Wilma, a category 3 storm made landfall in southern Florida. Ten deaths were attributed to the hurricane and more than 3 million households were left without electrical service. On

October 25, the Office of Public Health Preparedness and Response (PHP&R) began discussion with the Centers for Disease Control and Prevention (CDC) and the Florida Department of Health (FDOH) regarding deployment of a North Carolina team to south Florida to assist with a community health and needs assessment (CHNA).

Community Health and Needs Assessments (formerly Rapid Needs Assessments) have been successfully completed in NC following Hurricanes Isabel in 2003, and Charley in 2004 by PHP&R and the Public Health Regional Surveillance Teams (PHRST) (see Epi Notes Vol. 2003-3 and MMWR Vol. 53, No. 36, pp. 840-42). The CDC and FDOH requested support from North Carolina because of this experience and capacity to bring staff and materials to conduct the assessments. Additionally, the methods for the assessments have been modified by North Carolina public health to include the use of hand-held computers for field data collection and mobile Geographic Information Systems for navigation and sample selection (see Epi Notes Vol. 2005-2, p.7). Florida and CDC staff had seen presentations that described the North Carolina programs and methods and wanted to see the process used in the field.

The CHNA uses a “cluster sampling” method. The first step in the process involves selecting an area from which to collect an assessment; for example, a county or counties that have been particularly hard hit by a natural disaster. The next step is to randomly select a sample of 30 census blocks from all census blocks in the assessment area. Ten interview teams then navigate to those census

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*(Hurricane Wilma, continued from page 1)*

blocks using global positioning systems (GPS) equipped hand-held computers. The teams collect data on the hand-held computers from 7 household interviews at each census block or block group for a total of 210 interviews to represent from thousands, to hundreds of thousands of households. Household members are asked about household needs and conditions including food and water availability, access to medical care, and injury or illness. The data are compiled and analyzed and a field report is generated and reported back to public health and other response and recovery operations. The entire process, from initial planning and deployment to delivery of the field report, can be completed in 72 hours or less.

For the Florida deployment, a five person incident command team and 20 field staff were recruited. Local health departments from Alamance, Carteret, Davidson and Stokes counties provided staff members, as did Public Health Regional Surveillance Teams Three (Cumberland County) Four (Wake County), Five (Guilford County), Six (Buncombe County) and Seven (Mecklenburg County). The UNC Center for Public Health Preparedness provided a staff member and three student volunteers. Staff from the state Office of Public Health Preparedness and Response and the State Laboratory of Public Health rounded out the team. Dr. Keith Henderson, PHRST 3 team leader, was incident commander for the deployment.

On October 30, a 15-vehicle convoy drove from N.C. to Lantana, Florida. For the next four days the team slept on cots and worked out of a decommissioned section of AG Holley State Tuberculosis Hospital in Lantana, which happens to be the only active TB sanatorium in the US.

Upon arrival the technical team worked with CDC and FDOH staff to finalize the household sample selection and to make preparations to send interview teams into the field. Over a three-day period, the teams conducted two assessments and collected data from nearly 400 interviews.

The first assessment was conducted in Broward County, one of the most populous counties in the state with more than 1.7 million citizens. Teams navigated through urban and suburban streets to collect 210 interviews in a two-day period. Data from the report, which were reported to the FDOH on November 2, were representative of 375,580 households in the assessment area. Key findings included 45,000 (12%) households reporting not having access to a three-day supply of food, and 31% of 66,038 households without power were using generators. Data were reported the following day to FDOH.

On November 1, the teams drove more than 100 miles into the Florida Everglades to conduct assessments in two rural

communities in Hendry County. The sample for this assessment was devolved using a random sample of tax map parcels. One-hundred and sixty-six household interviews were collected to represent 1,567 households.

Recovery efforts were nearing completion in the rural assessment, with more than 88% of households having functioning electrical service. More than 50% of household respondents reported that their homes were damaged and in need of repair as a result of the storm.

The Hurricane Wilma deployment to Florida was an excellent opportunity for North Carolina public health staff to share resources and exchange information and expertise with partners from CDC and Florida. The process of deploying state and local public health staff enhances the training and experience of the North Carolina public health preparedness and response system and makes us better prepared to respond to future public health emergencies. ♦

### **First Laboratory Confirmed Rabid Opossum in North Carolina**

*Prepared by Peggy C. Brantley, Supervisor, Viral Culture/Rabies Laboratory, N.C. State Laboratory of Public Health*



The North Carolina State Laboratory of Public Health (NCSLPH) is the only laboratory in the state that performs routine rabies testing. NCSLPH has three staff members dedicated to rabies testing, with four additional staff members cross-trained to assist with high volume workdays, plus any required weekend and holiday testing. The rabies laboratory performs a number of routine tests for rabies, as well as tests for quality assurance. These tests include the rapid direct fluorescent antigen (DFA) test, the standard DFA test, murine neuroblastoma (MNA) cell line inoculation for quality assurance purposes, and monoclonal antibody strain typing. The laboratory plans to utilize molecular typing for rabies in the future. In the past two years, 8247 specimens were tested and of these, 1052 (13%) were positive for rabies. The most common animals submitted for testing were cats (2199), bats (1862), raccoons (1435), dogs (1510), foxes (334), and skunks (240). Of these animals, the three groups with the highest positivity rate were skunks (73%), raccoons (43%) and foxes (41%). All positive specimens, except for bats and raccoons, are typed using monoclonal antibodies for strain identification. The most common rabies strain found in rabid animals in North Carolina is the Eastern US Raccoon strain.

On November 15, 2005 the NCSLPH rabies laboratory confirmed the first case of rabies in an opossum. The opossum was located in Cumberland County in the Fort Bragg

*(continued on page 3)*

*(Rabid Opossum in N.C., continued from page 2)*

area. The animal was exhibiting symptoms of rabies, including the classic indicator of excessive salivation. Three people handled the opossum, and thus were at risk of exposure to a potentially rabid animal. Because this was the first laboratory confirmed positive opossum in North Carolina, the laboratory staff repeated the test with the original tissue and with tissue that remained in the opossum's skull. The test results were again positive. Subsequently, the CDC was notified and tissue was sent to Atlanta, Georgia for final confirmation and strain identification. Following NCSLPH standard operating procedures, strain identification was initiated following the positive laboratory result. Further testing revealed the rabies virus strain was not the US Eastern Raccoon strain that infects the majority of the specimens in North Carolina, but rather a bat strain. CDC notified NCSLPH on November 19, 2005 to confirm the NCSLPH results demonstrating that the opossum was positive for rabies. The rabies virus strain was consistent with a variant found in *Lasiurus borealis* (Eastern Red Bats).

Opossums are considered low risk animals for contracting rabies. Laboratory studies have shown it takes 50,000 to 70,000 times the amount of virus to infect an opossum compared to a canid. There are two theories for the opossum's relative resistance to rabies virus infection. One explanation is the presence of a peptide in opossums called Lethal Toxin Neutralizing Factor (LTNF). This peptide combats a number of animal, plant, and bacterial toxins and is being produced synthetically for use in medical research. The second explanation for resistance to rabies is the opossum's body temperature. Opossums have a lower body temperature than other native mammals, which may inhibit growth of the rabies virus. Since January 1, 2000, the NCSLPH rabies laboratory has received a total of 193 opossums for testing. The opossum from Cumberland County was the first to test positive, while 131 others tested negative. Because certain criteria for testing must be met for low risk animals such as opossums, 34 of the opossums were not tested since these criteria were not met. Another 27 were tested and resulted as unsatisfactory due to the condition of the brain tissue upon receipt by the laboratory. These specimens were tested but the CDC recommends that decomposed brains or brains without the required anatomical sites be resulted as unsatisfactory if they are not positive.

How will this positive result in one opossum effect the future testing of opossums in our laboratory? Continued NCSLPH collaborations with Dr. Lee Hunter and Dr. Carl Williams, Public Health Veterinarians in the Occupational and Environmental Epidemiology Branch, led to the following updated recommendations:

- Opossums will still be treated as low risk animals for contracting rabies virus.
- Testing will be recommended for opossums that bite a person or unvaccinated pet or livestock. *Prior to this positive laboratory result, all opossums had to have approval before NCSLPH would test them.*
- Treatment of the patient generally is not recommended until laboratory testing is completed, unless special circumstances warrant treatment and/or testing.

The rabies laboratory is an area full of surprises and each day is an adventure! For example, NCSLPH has been called upon to test a bear, two tigers, and a monkey in the past. Live bats have emerged from shipping containers, and cans of flea and tick spray are kept handy. Because rabies infections are fatal, however, it is critical that laboratory testing on suspect animals be done quickly and accurately, and that laboratory results are reported immediately to the proper health officials. NCSLPH has an excellent staff that is well trained and very conscientious about following the CDC recommendations for rabies testing. The partnership NCSLPH has with public health veterinarians, local health departments and animal control personnel leads to a very effective rabies control program in North Carolina. ♦

### **Medical Monitoring Project**

*Prepared by Penelope Padgett, PhD, , Public Health Epidemiologist, HIV/STD Prevention and Care Branch*

HIV/AIDS surveillance programs function in all U.S. states and territories to collect a core set of information on persons diagnosed with, living with, and dying from HIV infection and AIDS. Supplemental surveillance projects have historically provided complementary information about clinical outcomes of HIV infection and behaviors of HIV-infected persons with respect to care seeking, utilization of care, and ongoing risk behaviors. The findings from three such earlier projects have been used to develop a new, in-depth supplemental surveillance system in order to assess treatment efficacy, risk behaviors, and the availability and accessibility of HIV care. This new surveillance system, called the Medical Monitoring Project (MMP) and described herein arose out of the need for a nationally representative, population-based surveillance system to assess clinical outcomes, behaviors and the quality of HIV care.

#### **Purpose and Scope**

The primary objectives of MMP are to obtain data from a national probability sample of HIV-infected persons receiving care in the US in order to:

- describe HIV care and support services being received and the quality of such services
  - describe the prevalence and occurrence of co-morbidities related to HIV disease
- (continued on page 8)*

## **Introduction to the N.C. Office of the Chief Medical Examiner**

*Prepared by Ruth E. Winecker, PhD DABFT, Chief Toxicologist, North Carolina Office of the Chief Medical Examiner*

The toxicology laboratory of the Office of the Chief Medical Examiner performs toxicological analyses for medical examiner cases from all 100 counties in North Carolina. Results of these analyses are then used to help establish cause and manner of death. Forensic toxicology is a quantitative science since anything can be toxic depending on the quantities ingested. In addition, there is no limit as to what can be ingested or administered. The laboratory is responsible for performing analyses for anything from routine therapeutic and illicit drugs to unusual analytes such as mothballs and aerosol propellants. The laboratory receives specimens from > 9000 medical examiner cases each year and has a staff of 9.5 full time employees.

In addition to its routine case work the laboratory averages 2 new or unusual analytes and 3.5 cases each month for which new methods may need to be developed and validated. The work is time consuming and requires one full time position for completion of these duties. One unusual case that recently presented to the laboratory was death by insecticide poisoning and aspiration of organic solvents. The case involved a young child who was found dead in her bed after complaining of not feeling well. The deceased was found with blood and vomit on her face and an unlabeled bottle of liquid nearby that had an odor of organic solvent. Upon further investigation, the child's guardian provided information that the liquid was Atroban, a horsefly repellent, with the active ingredient permethrin. The laboratory was challenged with developing a method for permethrin, the organic solvents that the permethrin was dissolved in and the metabolites of these compounds so that the deceased's bodily fluids and tissues could be tested for the presence of these agent as a potential cause of death. In order for these compounds to be positively identified and quantified, analytical standards must be procured. This is not entirely an easy process as drug companies are often reluctant to provide the laboratory with pure analytical standards of drugs and metabolites of newly released drugs and negotiations may take months. Another challenge that the laboratory faces is understanding what, if any, significance new or unusual compounds that are found may have and being aware that the suspect agent may no longer be present, but only its metabolites, and which biological specimen would be the most likely to contain them. Quantities of postmortem specimens may be limited and testing may only be able to be performed once before the specimens are consumed. The length of time between ingestion, death, and autopsy are all parameters to be considered when designing

methods such as these, and the subsequent interpretation.

The results of the case described above indicated that permethrin, xylene and ethylbenzene were present in the child's blood, liver, and gastric contents, and in the unlabeled liquid found at the scene. Additionally, the metabolites of xylene, ethylbenzene and permethrin were detected in the urine. All the methods and supporting documentation that went into this case had to meet forensic toxicology standards to be legally defensible so that a complete understanding of events and interpretation can occur so that the cause and manner of death can be ruled. ♦

## **Impact of Immunization Initiatives on Acute Hepatitis B Incidence in North Carolina (1991-2005)**

*Prepared by Patricia Poole, RN, Hepatitis B Coordinator, N.C. Immunization Branch, and Jean-Marie Maillard, MD, MSc, Medical Epidemiologist, General communicable Disease Control Branch.*

After reporting on the N.C. Perinatal Hepatitis B Prevention Program for the 2003 birth cohort in the preceding issue of EpiNotes, this article focuses on the long term benefits of hepatitis B control activities in North Carolina. Perinatal cases are not included in this analysis.

Hepatitis B is a common viral infection that can be acute or chronic. It is transmitted by mucosal or percutaneous exposure to the hepatitis B virus (HBV). In the U.S., most cases are the result of sexual transmission. Other risk categories include intravenous transmission through sharing needles and syringes for injection of illicit drugs, the second most frequent risk although far below sexual transmission, and household contact with a case, occupational transmission among unvaccinated health professionals, hemodialysis and blood transfusion. These last four categories account for only a small fraction of reported cases. HBV infection can also be transmitted vertically from an infected mother to her child in the perinatal period, in most cases during a chronic stage of infection which may or may not be known to the mother. This mode of transmission is becoming rare in the U.S. Infection is documented by detection of hepatitis B surface antigen (HBsAg) in the blood.

Prior to routine childhood hepatitis B vaccination, approximately 80% of acute infections in the U.S. occurred among adults, 8% among adolescents, 4% among children and 4% among infants. Approximately 10% of newly infected adolescents and adults fail to clear the infection, and develop chronic, lifelong infections. In contrast, 90% of babies infected in the perinatal period remain chronically infected,

*(continued on page 5)*

*(Hepatitis B Incidence, from page 4)*

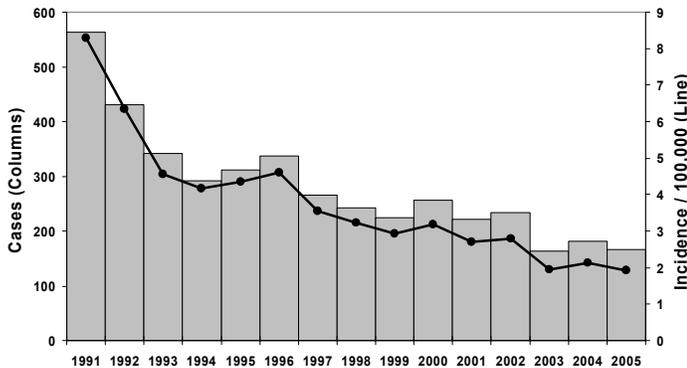
and this group represents a disproportionate 24% of all chronic infections. Chronic HBV results in complications such as chronic hepatitis, fibrosis, cirrhosis, and liver cancer.<sup>1</sup>

The incidence of acute hepatitis B virus (HBV) infections in the United States peaked in the mid-1980s at approximately 250,000-300,000 cases per year.<sup>1,2</sup> Of these, an estimated 24,000 cases occurred annually in infants and children.<sup>1</sup> After licensing of a safe and effective vaccine in 1982, initial disease prevention strategies targeted high-risk adults. Early strategies to identify and vaccinate only high-risk adults did not make a significant impact on HBV incidence. In 1991, 1995, and 1999 respectively, CDC added routine HBV immunization of infants born to infected women, adolescents and all children 0-18 years old to the national strategy for HBV disease prevention. Recent state and national data reflect the effectiveness of these hepatitis B immunization programs.

North Carolina is in compliance with this national strategy, and in fact, the state's HBV prevention program preceded these recommendations. Since 1990, state law requires post-exposure immunoprophylaxis for infants born to HBsAg-positive women, and in 1994, North Carolina became a "universal" state, providing hepatitis B vaccine to all children at no cost. Additionally, state immunization law requires the hepatitis B vaccination series at birth for all children born since July 1, 1994. Because of the lag time before this intervention would provide results, e.g., when risk behavior would not result in HBV infection in persons immunized at birth, North Carolina launched in 1995 a statewide initiative to offer hepatitis B vaccinations to susceptible sixth-graders in school-site clinics. This would provide protection prior to the age of greatest risk of exposure to HBV.

**Hepatitis B, acute**

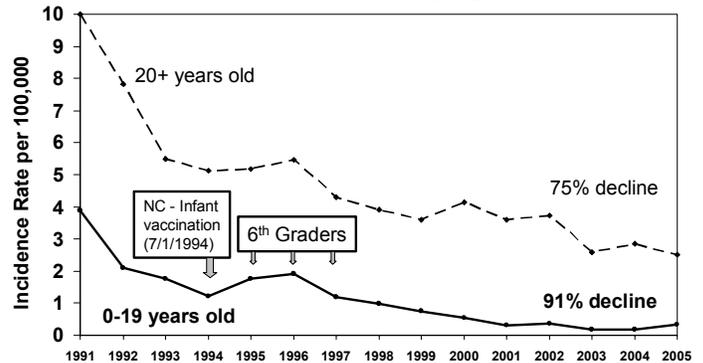
Reported cases and incidence/100,000 population North Carolina, 1991-2005



**Figure 1**

While acute HBV infections may be asymptomatic, in particular among children, a steady surveillance system can provide an indirect measure of the effectiveness of prevention efforts. In the 15 years between 1991 and 2005, the overall reported incidence rate fell from 8.3 to 1.92 per 100,000 population, a 77% decline. (Figure 1.) The greatest reduction was among the younger cases, with reported incidence rates going from 3.88 down to 0.34 per 100,000 population aged 0 to 19 years, a 91% decline, and from 9.99 down to 2.52 for cases aged 20 years or older, a 75% decline. (Figure 2.)

**Hepatitis B, acute**  
North Carolina, 1991-2005  
Reported Incidence Rate by Age Group



**Figure 2**

Immunization efforts have successfully reduced acute HBV infections in North Carolina. The full benefit of this lower incidence of acute hepatitis B, however, will result from reduced chronic liver infection, and also fewer births occurring among chronically infected pregnant women. Complications, such as cirrhosis and hepatocellular carcinoma are usually diagnosed after decades of HBV infection. The full effect of reduced number of acute HBV infections will become more evident as vaccinated infants and children reach advanced ages. The public health benefit of this immunization program will bring immeasurable dividends for years to come.

For more information about the North Carolina Hepatitis B Prevention Program, contact: Patricia Poole, R.N., North Carolina Immunization Branch, at 919.707.5573. ♦

**(Footnotes)**

1 CDC. Epidemiology and Prevention of Vaccine-Preventable Diseases (Pink Book), 2005, 191-212.

Shepard CW, Finelli L, Fiore AE, and Bell BP. Epidemiology of Hepatitis B and Hepatitis Virus Infection in United States Children, *Pediatric Infectious Disease Journal*, 2005;24:755-760.

## ***Mycobacterium marinum* Wound Infections**

Prepared by Mina Shehee, Ph.D., Coordinator  
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The Harmful Algal Blooms (HAB) Program receives telephone calls from concerned citizens regarding possible illness from exposure to algae and their toxins in fresh, estuarine, or ocean waters. However, not all calls are about algae. Some deal with skin infections incurred during an exposure of the injury or a preexisting skin lesion to water. Infections arising from water contact exposure are usually caused by direct contact with water harboring naturally occurring microorganisms. The four most common causes of aquatic wound infections are the bacteria *Aeromonas hydrophila*, *Erysipelothrix rhusiopathiae*, *Mycobacterium marinum*, and *Vibrio vulnificus*. Some of these bacteria are also associated with infections in fish.

Of the water contact skin infection calls received by the HAB program, *V. vulnificus* and *M. marinum* are the most frequently encountered. *V. vulnificus* wound infections can be rapidly life-threatening (25% case fatality), and the occurrence of the bacterium in clinical specimens and environmental samples is well-documented. By contrast, most *M. marinum* infections are slow-healing and self-limited. Little is known about the true incidence of human infection or the presence or concentration of *M. marinum* in North Carolina waters. It is the slow-healing nature of *M. marinum* infections which prompts calls by citizens to the HAB program.

*M. marinum* is an acid-fast bacterium that causes “Fish Tank Granuloma” or “Swimming Pool Granuloma.” It is also a natural fish pathogen causing granulomas with caseous necrotic centers in the liver, spleen, and kidney similar in appearance to tubercular granulomas. Fish infected with *M. marinum* may have ectodermal (skin) ulcers. Transmission directly between fish is unknown. In humans, the occurrence of *M. marinum* is probably underestimated: most laboratory-confirmed cases are located in the southeastern United States. Risk factors for *M. marinum* skin infections are water contact-related and include fishing, swimming, and aquarium-cleaning. People at risk are usually male, middle-age (35 – 42), and Caucasian. The median incubation period is 21 days after exposure of minor skin traumas (e.g. abrasions or lacerations) to fresh, brackish, or marine waters.

The lesions of *M. marinum* appear on the extremities. Small, painless, and solitary papules develop into nodules in several weeks. Nodules may ulcerate with satellite nodules forming

from the initial papule resembling sporotrichosis. Underlying joint or bone involvement can occur. Disseminated infection is rare, but may occur in immunocompromised individuals. The lesions can spontaneously resolve after a few months or several years. Antimicrobial therapy (e.g. minocycline, trimethoprim-sulfamethoxazole, rifampin, and clarithromycin) for three months should resolve most infections. The bacterium is sensitive to heat, so heat lamp or bath treatment can be used to augment antimicrobial therapy. Surgical debridement may be necessary.



### ***Mycobacterium marinum* Lesion**

A patient was cut on a clam shell in the Neuse River about 7 weeks prior to the photo, and the infectious granuloma had grown over that time. Therapy with an antibiotic (for 3 months) as well as application of heat (heating pad x 30 minutes 2X/day) resolved this infection. Description and Photo Courtesy of Bill Burke, MD, ECU.

Biopsy material for histologic examination and microbiologic culture aids in confirming the diagnosis.

Growth on Lowenstein-Jensen media is optimized by incubating at 30-33°C. *M. marinum* is a photochromogen: carotenoid (yellow) pigments are produced when the organism is exposed to light and no pigments are produced in the dark. Pigmentation may help *M. marinum* resist the harmful effects of ultraviolet radiation in aquatic environments. Genetically, *M. marinum* is closely related to *M. ulcerans* sharing 99.8% 16S RNA sequence homology and *M. tuberculosis* complex at 99.4% homology. Although the genome of *M. marinum* is almost twice as large as *M. tuberculosis*, some of the additional genetic material may reflect niche-specific functions that help the microbe to survive in aquatic ecosystems. ♦

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## Hepatitis Task Force – North Carolina

*Prepared by Susan Thompson, RN, Hepatitis C Coordinator  
HIV/STD Prevention and Care Branch*

Hepatitis C virus (HCV) infection is the most common blood-borne viral infection in the United States. Studies done through the Centers for Disease Control and Prevention (CDC) show that 1.8% of Americans (about 4 million) are infected with HCV, most of whom are chronically infected (2.7 million). Many of these individuals are not aware of their infection and are not clinically ill or symptomatic. The consequences of chronic liver disease from HCV infection are serious, but may not become apparent until 10-20 years after infection. Roughly one in five patients develops cirrhosis, which can lead to liver failure. As a result, the need for liver transplants is rising and is expected to increase by over 500% by the year 2010. By the end of the decade, the annual death toll from HCV is projected to reach over 30,000—twice the toll that AIDS takes in America each year. The national cost of medical care for hepatitis C—not counting lost work time—will soon reach over \$10 billion annually.

What does this mean for North Carolina? Using the above statistics, it is estimated that over 150,000 North Carolinians are infected with HCV. More than 110,000 of these people are chronically infected and capable of spreading the disease to others. However, due to the insidious nature of the disease, it is likely that most of these North Carolinians are unaware of their HCV infection. Because of these undiagnosed, infectious thousands, Hepatitis C has been described as “the silent epidemic”.

In response to this growing problem, the North Carolina Viral Hepatitis Task Force was created in the fall of 2004. Membership in the task force is varied and includes representatives from a number of interested agencies and stakeholders including, private providers, local health department staff, public health agencies including the state laboratory, mental health and substance abuse centers, corrections, law enforcement, private and public hospitals and persons affected by the disease personally.

The primary focus of the task force is to increase hepatitis awareness and to provide education/training and linkages for Hepatitis services to the public and to health care professionals. Other objectives are to increase the access and availability of hepatitis services, to increase the screening and reporting of hepatitis C, to increase the number of high risk clients vaccinated for hepatitis A and B, to develop a written hepatitis strategic plan for the state, and to identify funds to implement the plan. Task force members are also currently partnering with PHICAS, Piedmont HIV Integrated

Community Access Systems, in planning the first North Carolina Symposium on Hepatitis C and HIV. PHICAS primarily focuses on the population living in the six counties of Person, Warren, Franklin, Vance, Granville, and Durham. The goal of PHICAS is to develop a collaborative network of providers through that region that will link and coordinate services for HIV infected individuals either co-infected with or at high risk for co-infection with Hepatitis C. The conference will be held on March 30 and 31, 2006 at the Sheraton Hotel in the Research Triangle Park. ♦

## A New Tool in the Toolbox for the N.C. State Laboratory of Public Health

*Prepared by John L. Neal, Environmental Sciences Unit  
Supervisor and Dale Turlington, Organic Chemistry  
Laboratory Supervisor, NC State Laboratory of Public Health*



The North Carolina State Laboratory of Public Health (NCSLPH) has taken a great step forward in laboratory preparedness efforts. In a partnership with the Bioterrorism and Emerging

Pathogens (BTEP) Unit, the Organic Chemistry Laboratory of the Environmental Sciences Unit has purchased a Fourier Transform-Infrared Spectrometer (FT-IR) Imaging System. This instrument will be a cornerstone in the identification of white powders and residues submitted for analysis.

Historically, residues such as white powders were screened for the presence or absence of biological agents of concern by the BTEP Unit. After pathogens of concern were ruled out, the samples were analyzed by more traditional organic and inorganic chemical techniques by the Environmental Sciences Unit. Techniques used for these analyses include physical chemistry determinations, phase contrast microscopy (PCM), polarized light microscopy (PLM), gas-liquid chromatography (GLC), gas chromatography/mass spectroscopy (GC/MS), inductively coupled plasma-mass spectroscopy (ICP-MS) and ion chromatography (IC). These techniques require time-consuming sample preparation steps, and at times, complicated and challenging analyses as well as interpretations. The FT-IR Spectrometer Imaging System adds a new level of speed and technical capability to these demanding analyses. The Universal Diamond Attenuated Total Reflectance (UATR) Accessory requires no sample preparation. The IR beam is focused through the diamond into the sample producing a high quality IR spectrum. Solids, liquids, thin films, pellets, strong acids, strong bases, plus samples containing water and powders can be analyzed using the UATR accessory. For trace evidence samples or when mixtures are suspected, the FT-IR microscope imaging technology is also helpful.

*(continued on page 8)*

(*New Tool, SLPH, continued from page 7*)

### **What is FT-IR? How does it work?**

Infrared spectroscopy is an established analytical technique that identifies compounds by the fingerprint of the light absorption spectra. The infrared region is the part of the electromagnetic spectrum stretching from about one micron (near-infrared) to 200 microns (far-infrared). A sample's molecular constituents are revealed through their characteristic frequency-dependent absorption bands. A typical FT-IR system consists of an IR source which includes the Michelson Interferometer, a beam splitter, a helium-neon laser for beam alignment and a detector to produce an interferogram. Using a mathematical process called Fourier Transformation (FT), the instrument's computer converts the interferogram into a spectrum. Infrared (IR) instruments have been used extensively for decades in laboratory settings. Because chemical bonds absorb infrared energy at specific frequencies (or wavelengths), the basic structure of compounds can be determined by the spectral locations of their IR absorptions. The graphical representation of a compound's IR transmission vs. frequency constitutes its chemical "fingerprint." When compared to reference spectra in the instrument's library, this chemical "fingerprint" leads to identification of the material. FT-IR spectrometers offer speed and sensitivity that are impossible to achieve with the earlier versions of wavelength-dispersive instruments. This capability allows rapid analysis of micro-samples down to the nanogram level in some cases, making the FT-IR unmatched as a problem-solving tool in organic and inorganic analysis.

In summary, the new FT-IR Imaging System will allow rapid identification of unknown substances including common chemicals, weapons of mass destruction agents, drugs and foreign white-powders. With this new tool in the toolbox, not only will the collaboration between BTEP and Environmental Sciences Units at NCSLPH will be further strengthened, but the ability of the laboratory to respond to concerns about unknown powders will be increased greatly.

◆

( *Medical Monitoring Project, continued from page 3* )

- determine prevalence of ongoing risk behaviors and access to and use of prevention services among persons living with HIV
- identify met and unmet needs for HIV care and prevention services in order to inform community and care planning groups, health care providers and other stakeholders

The MMP employs a three-stage cluster sampling design. In the first stage of sampling (conducted in 2004), jurisdictions were selected to conduct MMP. At the second stage of sampling, facilities providing primary HIV medical care will

be randomly sampled within each funded area by an independent contractor. In the third stage, patients will be sampled from selected facilities. In North Carolina, the goal is to interview 400 randomly selected patients in each of the three years of the project, beginning in 2006.

To be eligible for participation in MMP, a facility should provide primary medical care for HIV/AIDS and must have at least one patient receiving HIV care during the surveillance period. A facility providing primary medical care for HIV infection is defined as performing at least one of the following activities: monitoring of viral load or CD4 T-lymphocyte counts (post-diagnosis) and/or prescribing antiretroviral therapy (ART).

Collection of data from interviews with HIV-infected patients will provide information on the current levels of behaviors that may facilitate HIV transmission: patients' access to, use of, and barriers to HIV-related secondary prevention services; utilization of HIV-related medical services; and adherence to drug regimens. Ultimately, this surveillance project will produce data about met and unmet needs for HIV care and prevention services, which can be used to evaluate these services, and to direct future resources for HIV-infected patients.

The proposed study design will allow for national and state or local level estimates of certain characteristics that will be generalizable to the entire population of HIV-infected adults in care for HIV in the United States. In order for this to occur it will be necessary to obtain very high participation rates and enrollment rates of the sampled facilities and patients. The success of this important project hinges on full participation by selected providers. Participation is particularly important because selected providers will represent providers like themselves and their patients. Local health departments, disease interventions specialists and other public health employees will be called on to inform providers of this important project and to encourage participation in this project by both providers and patients.

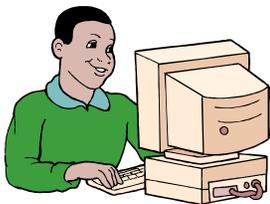
### **Collaborating Agencies/Stakeholders**

The MMP is being conducted through cooperative agreements between the CDC's Division of HIV/AIDS Prevention, Behavioral and Clinical Surveillance Branch and 25 state or independently funded local health departments. North Carolina is among the group of 25 funded jurisdictions. Stakeholders for this project include other agencies and groups such as: National Institutes of Health (NIH), Health Resources and Services Administration (HRSA), state and local health departments, HIV community planning groups, Ryan White Planning Councils, providers of HIV medical, care, and prevention services and HIV-infected persons.

The HIV/STD Prevention and Care Branch solicits and encourages ongoing support for this important activity from the Public Health community. ◆

## OEEB Focuses on Making Workplaces Safer

Prepared by Sheila Higgins, RN, MPH, COHN-S, Manager, Occupational Health Surveillance Unit and Kitty Herrin, Ph.D., Program Manager, Occupational and Environmental Epidemiology Branch



In North Carolina, the Occupational Health Surveillance Unit (OHSU) in the Occupational and Environmental Epidemiology Branch of the Division of Public Health is responsible for collecting information from a variety of

sources and monitoring trends in work-related injury and illness for the state.

Workers' health can be compromised by a variety of occupational exposures categorized as chemical, biological, ergonomic, environmental/mechanical, physical and psychosocial. The goals of surveillance activities are to determine the number of work-related injuries and illnesses, identify workers at greatest risk, and establish prevention priorities. Data are also necessary to measure the effectiveness of prevention activities and identify workplace health and safety problems that need further investigation. In the past, OHSU has used data collection to protect workers' health by identifying and controlling occupational exposures to traumatic farm injuries, lead, asbestos, silica dust, and other hazards.

Currently OHSU has several programs in place to collect data on the health of workers. North Carolina is one of 13 states participating in a collaborative project with the Council of State and Territorial Epidemiologists (CSTE) and the National Institute for Occupational Safety and Health (NIOSH) to enhance occupational health data collection systems and capacity. Together, this group just released a report on 19 occupational health indicators (based on public health importance) that provides a snapshot of the health of workers in North Carolina and the 12 other states. An occupational indicator is a specific measure of a work-related disease or injury or factors associated with occupational health such as economic impact and health care delivery. These measures allow states to uniformly define, collect and report work-related illness, injury and risk data and also serve as a basis for more in-depth analysis for those conditions important to our state. The report, "Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000" is available on the CSTE Web site at [www.cste.org](http://www.cste.org). Other OHSU programs include the Adult Blood Lead Epidemiology and Surveillance Program (ABLES); maintaining a data base on reports of asbestosis, silicosis and traumatic farm injury; acting as a liaison for DHHS on occupational health issues; and providing occupational health

consultation to outside businesses upon request in the form of telephone consults or onsite visits.

Through the efforts of state public health, regulatory and other agencies, data have been collected that show North Carolina is making progress in making workplaces safer. North Carolina has experienced a decline of workplace injuries and illnesses in recent years. Nonfatal injury and illness declined from a rate of 6,000 per 100,000 workers in 1998 to a rate of 4,200 per 100,000 workers in 2003, the latest year for which data are available. Fatality rates in the workplace have also declined from 6.2 deaths per 100,000 workers in 1998 to 4.7 deaths per 100,000 workers in 2003, according to data from the Bureau of Labor Statistics.

While much progress has been made in reducing occupational hazards workplace, injuries and illnesses are still a problem. In 2003, 128,200 North Carolina workers — about 4 out of every 100 workers — were injured on the job and over 4,000 of these were hospitalized. In 2003 the top five industries responsible for the highest injury incidence rates (per 100 workers) were:

### Private Industry:

Arts, entertainment and recreation	(7.4)
Transportation and warehousing	(6.3)
Health care and social assistance	(5.3)
Manufacturing	(5.1)
Retail trade	(4.6)

### Public Industry (state and local government):

Health care and social assistance (state)	(13.1)
Transportation and warehousing (local)	(10.9)
Arts, entertainment and recreation (local)	(9.3)
Public Administration (local)	(6.6)
Health care and social assistance (local)	(6.5)

An average of three to four workers are fatally injured each week in the state, which places North Carolina just above the national average in 2003. Forty-three percent of workers death in 2004 occurred from transportation-related incidents. The transportation and construction industries accounted for half of all fatalities. Through monitoring of trends and collaboration with partner agencies, OHSU will continue to learn more about issues critical to our state and determine ways to improve the health and safety of our workers. For more information about occupational health please visit our website at [www.epi.state.nc.us/epi/oii/html](http://www.epi.state.nc.us/epi/oii/html) ♦

### Sources:

U.S. Department of Labor, Bureau of Labor Statistics, in cooperation with state and federal agencies, Census of Fatal Occupational Injury, 2003, 2004

U.S. Department of Labor, Bureau of Labor Statistics, in cooperation with state and federal agencies, Survey of Occupational Injuries and Illnesses, 2003, 2004

**Reported Communicable Disease Cases, N.C., January-December 2005 (by date of report)\***

Disease	Year-to-Date (Fourth Quarter)			4 <sup>th</sup> Quarter 2005	Comments / Notes
	2005	2004	Mean (2000-2004)		
Botulism, Foodborne	1		0	1	
Brucellosis	3		2		
Campylobacter	672	618	631	148	
Chlamydia, laboratory reports	31183	28999	24832	6715	
Cryptosporidiosis	92	76	46	25	
Cyclosporiasis	2	1	1	1	
Dengue	13	5	3	4	
E. coli, Shiga toxin-producing	64	158	118	21	Note 1
Ehrlichiosis, granulocytic	4	10	3	2	
Ehrlichiosis, monocytic	29	35	20	13	
Ehrlichiosis, unspecified	4	2	-	1	Note 2 & 3
Encephalitis, California group	23	13	14	23	
Encephalitis, Eastern equine	1		1		
Encephalitis, West Nile Virus	2	4	5	2	
Foodborne, clostridium perfringens	1	4	2		
Foodborne, other	213	571	181	36	
Foodborne, staphylococcal	9	9	35		
Gonorrhea	15075	15198	16073	3394	
Haemophilus influenzae	74	62	42	7	
Hepatitis A	84	105	167	19	
Hepatitis B, acute	167	182	211	39	
Hepatitis B, chronic	847	756	792	151	
Hepatitis B, perinatal	2	6	-	1	Note 2 & 7
Hepatitis C, acute	21	12	19	6	
HIV/AIDS	1806	1636	1659	511	Note 4
HUS / TTP	6	10	4	2	
Legionellosis	36	40	24	13	
Listeriosis	34	26	12	14	Note 5
Lyme disease	49	122	101	7	
Malaria	40	23	25	16	
Meningococcal disease	32	37	42	4	
Meningitis, pneumococcal	32	29	39	3	
Mumps	13	5	5	4	
Psittacosis	1	1	0		
Q fever	6	2	1		
Rabies, animal	455	582	640	75	
Rocky Mountain Spotted Fever	625	535	285	269	
Salmonellosis	1701	1647	1454	533	
Shigellosis	202	484	675	53	
Strepto. A, invasive	124	125	119	21	
Syphilis, total	489	453	701	134	Note 6
Tuberculosis	329	381	407	126	
Toxic Shock Syndrome (TSS)	4	2	4	1	
TSS, streptococcal	8	5	-		
Toxoplasmosis, congenital	1		0		
Typhoid, Acute	6	8	5	3	
Typhus, Epidemic	1		0	1	
Vibrio, other	14	15	11	4	
Vibrio vulnificus	3	6	5	1	
Whooping cough	127	101	99	50	

\*Preliminary data, as of 1/20/2005. Quarters are defined as 13-week periods. Only diseases with cases reported in the year 2005 are listed in the table.  
**Notes:** 1. Including E. coli O157:H7 ("E. coli O157:H7" was disease name until 2/15/2003); 2. Not reportable, or not reportable as such, in this entire time period; 3. Became reportable effective 1/1/2005; 4. Earliest report with HIV infection or AIDS diagnosis; 5. Reportable since 7/2001; 6. Primary, secondary and early latent syphilis; 7. Coded as such since 2002.

## NC EDSS Contract Awarded

*Prepared by Allison M. Connolly, M.A., M.P.H., NC EDSS Coordinator, General Communicable Disease Control Branch*

In January, a five-year contract to design and implement the North Carolina Electronic Disease Surveillance System (NC EDSS) was awarded to Consilience Software. This new system will automate surveillance, investigation, and reporting from the LHDs to DPH for all communicable diseases and several non-communicable diseases/conditions. After completing the system requirements last February, the Epidemiology Section is very excited to finally begin building the system. Consilience is expected to start work on-site in Raleigh by the end of January.

The following diseases/programs will be part of NC EDSS: TB; HIV and STD; General Communicable Diseases; Vaccine-Preventable Diseases; Animal Rabies; Adult Blood Level Surveillance; and Violent Death Reporting. (The latter two programs are administered entirely at the state level.) In addition, the Department of Environment and Natural Resources (DENR) is considering NC EDSS for reporting and follow up of childhood lead exposure. NC EDSS will also have contact tracing and outbreak management capabilities, which will be available for use by all diseases/conditions. Furthermore, NC EDSS will have an interface to the NC Immunization Registry, GIS mapping, the ability to generate letters and the ability to receive laboratory reports electronically. It will be possible to use the system in the field on a tablet PC.

Since the system will be designed and implemented over a few years, several of the diseases and functionalities mentioned above will not be available for some time. After DPH and the vendor finalize the project plan in the spring, I will be able to provide more details about the timeline. It has already been determined that the first disease to migrate to NC EDSS will be tuberculosis.

The Massachusetts Department of Health has also selected Consilience's product, known as MAVEN, for its surveillance and reporting needs. North Carolina and Massachusetts will work collaboratively so that we learn from each other's successes and mistakes, while developing our respective systems in the most efficient manner possible.

For more information about Consilience, please visit [consiliencesoftware.com](http://consiliencesoftware.com). Please contact Allison Connolly for more information about the NC EDSS project: 919 715-1642 or [allison.connolly@ncmail.net](mailto:allison.connolly@ncmail.net). ♦

## Employee Recognition:

### Linda Perry - Employee of the Quarter

*Prepared by Patsy West, Administrative Assistant  
Epidemiology Section*



Linda Perry received the Epidemiology Section's Employee Recognition Award for the fourth quarter of 2005. Ms. Perry was nominated in the category of Service Excellence.

Ms. Perry began her career in state government in 1983 and since 1989, she has been with the Occupational and Environmental Epidemiology Section. Ms. Perry is the primary administrative assistant for the Veterinary Public Health (VPH) and Spay/Neuter (SN) programs and has numerous responsibilities. In these two programs, Ms. Perry deals with many people including private citizens, veterinary and public health communities every day. Her day involves taking orders for materials, receiving requests for services, sending bills and receiving payments. Her knowledge of the programs allow her to meet and anticipate the needs of those served by the programs and she receives praise for a job well done from those she serves.

During 2005, Ms. Perry coordinated the sale of over 850,000 rabies tags to over 900 veterinary clinic and animal control agencies which resulted in the Veterinary Public Health program creating and distributing 15,000 rabies education and risk assessment posters to clinicians and hospitals. Recently, Ms. Perry coordinated the distribution of 17,000 rabies educational brochures, coloring books and spay/neuter brochures to ensure that the message to protect one's pet is always in public view.

Ms. Perry not only gives her best to the Veterinary Public Health Program, but is always willing to help where every the need may arise. Recently, Ms. Perry organized the OEE Branch move from one location to another and through her planning, there was very little down time.

Ms. Perry received a certificate of recognition for the service excellence she has made to her work unit and a gift certificate to a local restaurant from the Epidemiology Section Management Team. ♦

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Epidemiology Section • [www.epi.state.nc.us/epi/](http://www.epi.state.nc.us/epi/)

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500 copies of this public document were printed at a cost of \$265.17 or \$.53 per copy using non-state funds. 11/05 ☼