Epi Notes

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Carolinas Poison Center Collaborates with NC State Laboratory of Public Health on Toxic Toy Case

Prepared by John L. Neal, Chemistry Manager, Environmental Sciences; Kaye Flood, Chemical Terrorism Coordinator; and Dr. Leslie Wolf, Director, NC SLPH

Testing at the NC State Laboratory of Public Health linked a Charlotte child's serious illness with an international toy recall. It also highlighted the importance of the partnership between public health and the Carolinas Poison Center.

In November a Charlotte child fell into a coma after consuming a large number of Aqua Dots™, Aqua Dots is a craft toy that consists of multi-colored plastic beads that fuse in contact with water. The toy, sold as Bindeez™ in Australia, had been linked to the serious illness in three Australian and two North American children. The product had been recalled in Australia.

Initial analysis of the beads indemonstrated that the products did not contain the non-toxic chemical 1,5-pentanediol (commonly used to manufacture glues), but rather contained the chemical 1,4-butanediol (commonly used as a solvent to manufacture plastics). Unfortunately, when metabolized by the human body, 1,4-butanediol becomes gamma-hydroxybutyric acid (GHB, also known as a date rape drug) which causes respiratory depression and other symptoms. Such serious health effects led the FDA to classify GHB as a Class I Health Hazard, meaning it can cause immediate, life-threatening harm. At the time of the recall, there was a significant difference in the price of the two chemical compounds, with 1,5-pentanediol costing more than three times as much as 1,4-butanediol

Although the Charlotte child recovered, it was important to confirm the toy as the source of the child's illness. Carolinas Poison Center staff purchased samples of the toy product locally and express shipped them to the NC State Laboratory of Public Health (NCSLPH) for arrival on November 8, 2007. Analysis began immediately upon receipt of the samples and was completed by November 9, 2007. Three methods were employed by NCSLPH, including acetone extraction and either Fourier Transformed Infrared (FT-IR) analysis or Gas Chromatography/Mass Spectrometry (GC/MS) analysis in addition to methanol extraction for Solid-Phase Micro-Extraction followed by GC/MS for volatile chemical analysis.

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(***Toxic Toy Case,*** *continued from page* 1)
FT-IR spectra from two samples analyzed by this method were compared to existing library entries and to the 1,4-butanediol standard purchased from Aldrich Chemical. The chromatograms and spectra from four samples extracted with acetone and analyzed by GC/MS were compared to the same standard and to the National Institute of Standards and Technology (NIST) Library entries. The chromatogram and spectra from one sample extracted using methanol and analyzed by SPME with GC/MS was compared to the standard, NIST and Wiley Library entries. Conclusions from these analyses performed by the Organic Chemistry and the Chemical Terrorism laboratories at NCSLPH indicated that the Aqua Dots™ beads contained 1,4-butanediol as suspected rather than the non-toxic 1,5-pentanediol. The analysis was expedited because a known compound was suspected in the child's illness.

The Consumer Product Safety Commission also issued a recall of the product in America.

General Information:
http://ap.google.com/article "Mom: Chemical-Laced Toy Made Son 'Drunk'", last accessed 11/9/2007.

N.C. Reports *Salmonella* Paratyphi B (var Java) Infections in Humans Associated with the Exposure to Turtles

Prepared by David Bergmire-Sweat, Nurse Epidemiologist, General Communicable Disease Control Branch

Introduction
Turtles and other reptiles have long been recognized as a source of human *Salmonella* infections (1). As part of public health efforts to decrease reptile-associated *Salmonella* in humans, sale and distribution of small turtles (those with carapace length of less than 4 inches) has been banned in the US since 1975 (2). However, small turtles remain available to the public from a variety of sources, including pet shops, flea markets, street vendors and online stores.

On August 26 and August 28, 2007, two teenage girls, a 13-year-old from South Carolina and a 15-year-old from North Carolina, developed symptoms of gastroenteritis, including bloody diarrhea, abdominal cramps, high fever, and vomiting.

Joint investigation by the North Carolina Division of Public Health and the Department of Health and Environmental Control (DHEC) in South Carolina revealed that both girls shared numerous exposures, including common picnic meals and they had both gone swimming together on August 24th in an in-ground pool belonging to the family of the 15-year-old. During the evaluation, the 13 year old from South Carolina tested positive for *Salmonella* paratyphi B L+ tartrate+ (var Java).

Several other state health departments subsequently reported human isolates with PFGE patterns indistinguishable from the outbreak strain. Interviews with patients revealed a possible association with reptile exposures. In North Carolina the family had recently purchased two baby turtles from a pet shop in South Carolina, and the turtles were permitted to swim in the unchlorinated family pool where the teenagers had been swimming together. A water sample collected from the pet turtle habitat yielded *Salmonella* paratyphi B L+ tartrate+ (var Java) matching the outbreak strain.

Multistate Investigation, Case Control Study, and Investigation Findings
As of November 30, 2007, 70 case patients in 28 states (Fig. 1) with isolates indistinguishable from the outbreak strain by PFGE were reported to CDC. Among 51 case patients asked about turtle exposure during initial follow-up interviews by local and state health department personnel, 30 (59%) reported being exposed to a turtle during the 7 days before illness onset. Thirty-six (51%) of the 51 case patients were 10 years of age or less (median age 9.5 years, range <1 to 87 years), and 36 (51%) were female.

Among the 45 case patients interviewed with the case questionnaire, 28 (62%) reported exposure to a turtle during the seven days before illness onset, compared with two (4%) of 47 control subjects during the same period of time (matched odds ratio = 40.9, 95% confidence interval = 7.0 – unbounded, $p<0.0001$). Only 2 (5%) of 44 case patients versus 4 (9%) of 47 control subjects reported exposure to a reptile other than a turtle during the seven days prior to illness onset in the case patient (OR = 0.54, 95% CI = 0.09-3.13, $p=0.68$).

Twenty of 26 (77%) reported that the turtle had been owned less than six months, with 11 (42%) reporting ownership for less than one month. Eleven (44%) of 25 turtle-exposed case patients with purchase information reported purchasing their turtle at a pet shop, while five (20%) reported that the turtle had been given to them by a friend or relative; four (16%) reported purchasing the turtle in a flea market, four (16%) reported purchasing the turtle on the street, and one (4%) reported purchasing the turtle online. Eleven (29%) of 38 case patients versus 13 (29%) of 45 control subjects reported

(*continued on page* 3)

(Salmonella Infections in Humans, *continued from page* 3)
prior awareness of a connection between reptile contact and *Salmonella* infection (OR = 1.00, 95% CI = 0.39-2.60, p = 1.00).

Editorial note:
This nationwide outbreak of turtle-associated salmonellosis demonstrates the continued risk that small turtles and other reptiles pose to the public, and especially to young children. Fecal carriage rates of *Salmonella* among reptiles, including turtles, are estimated at greater than 90 percent, with reptiles excreting the bacteria intermittently in their feces (1). Direct or indirect reptile contact is associated with an estimated 11 percent of *Salmonella* infections in persons <21 years of age in the US, and six percent of *Salmonella* infections in the general US population (3).

Reptile-associated *Salmonella* infections are more likely to become invasive and therefore more likely to be fatal than other *Salmonella* infections (4). Although most reptiles carry *Salmonella*, because of differences in the perception of turtles versus other reptiles as pets, small turtles may carry a higher risk of transmitting bacteria to children. In contrast to the perceived hazard of a snake or an iguana, which may bite, scratch, or escape from a child, a turtle, due to its slowness, gentle nature, and ease of handling may be given directly to small children for play. A young child placed in charge of caring for a turtle may increase their risk of exposure in caring for the turtle's habitat. Many cases in this cluster occurred in children who cleaned the turtle habitat; the outbreak strain of *Salmonella* was isolated from the water in the habitat of a turtle in North Carolina.

Note: Most of the information in this article was published on January 25 2008 in CDC's *Morbidity and Mortality Weekly Report*.

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*National Molecular Subtyping Network for Foodborne Disease Surveillance.

Acknowledgements
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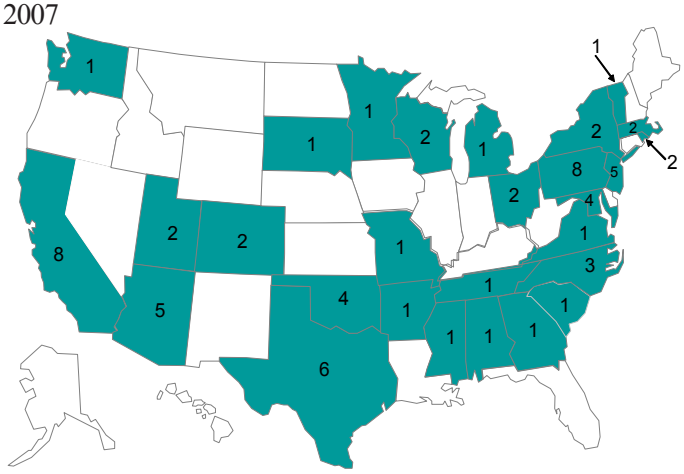
Figure 1. Map of *Salmonella* paratyphi B (var Java) cases in the US associated with this cluster as of November 30, 2007



Box. Recommendations for preventing transmission of *Salmonella* from reptiles and amphibians to humans. (7)

- Pet store owners, health care practitioners, and veterinarians should provide information to owners and potential purchasers of reptiles and amphibians about the risk of acquiring salmonellosis from their pets.
- Persons should always wash their hands with soap and water after handling reptiles and amphibians or their cages.
- Persons at increased risk for infection with serious complications from salmonellosis (e.g., children <5 years old and immunocompromised persons) should avoid contact with reptiles and amphibians.
- Reptiles and amphibians should be kept out of households containing children 5 years old or immunocompromised persons; families expecting a new child should give their pet reptiles and amphibians away before the infant arrives.
- Reptiles and amphibians should not be kept in child-care centers.
- Reptiles and amphibians should not be allowed to roam freely throughout the house.
- Reptiles and amphibians should be kept out of kitchens and other food preparation areas to prevent contamination; kitchen sinks should not be used to bathe pets or to wash their dishes, cages, or aquariums; if bathtubs are used for these purposes, they should be thoroughly cleaned afterward.

Results of a Study Examining Blood Mercury Levels in Fishermen Consuming Fish Caught with Fish Containing Elevated Mercury Levels

Prepared by Dr. Luanne K. Williams, Toxicologist, Occupational and Environmental Epidemiology Branch

A newly completed study of North Carolina fishermen found that they averaged higher blood mercury levels than the general population. The purpose of the study, which was funded by the Environmental Protection Agency (EPA) , was to provide baseline blood mercury levels prior to implementation of EPA's Clean Air Mercury Rule (CAMR).

Consumption of contaminated fish is the major source of exposure to methyl mercury (form of mercury that accumulates in fish) in the United States (Trasande L, Landrigan PJ, and Schechter C 2005). The bioaccumulation of methyl mercury up the food web results in high concentrations of the toxicant in predatory fish (e.g., blackfish or bowfin, largemouth bass, chain pickerel or jack fish, warmouth, and catfish). These fishermen routinely consumed fish containing elevated mercury levels from local rivers as confirmed by fish tissue sampling done by the North Carolina Division of Water Quality. The fishing community included individuals that consumed fish with high mercury levels (average 0.4 mg/kg and higher of mercury) on a weekly basis from Big Swamp River, Waccamaw River, and Lumber River located in Robeson, Brunswick and Columbus Counties. Since this was a baseline study, there were no controls.

In July, August and December 2006, blood samples were collected from 100 fishermen age 18 to 81 years from Columbus and Brunswick Counties (27 females and 73 males). To be included in the study, the fishermen had to eat at least sux ounces of locally caught freshwater fish twice a week. The average number of fish servings per week (six oz serving size) was 4.70, and the mean number of servings of locally caught fish eaten per week was 2.68. Ninety percent ate locally caught fish from the Waccamaw River, 32% from Big Swamp, and 32% from Lumber River. All of these rivers have been shown to have multiple fish species with high levels of mercury. Twenty one percent of participants also ate fish from other local fishing locations. The most popular fish consumed the previous month by these fishermen were fish high in mercury including blackfish, bowfin, catfish, and largemouth bass. The geometric mean blood Hg level of the study participants was 2.02 ìg/L (95% CI: 1.49, 2.75) and ranged from less than limit of detection (LOD= 0.33 ìg/L) to 44 ìg/L (Wolkin A and Williams L, 2007).

As shown in Table 1, the mercury blood levels for this study population were compared to the 95th and 50th percentile blood mercury levels reported by CDC from the 1999 – 2002 National Health and Nutrition Examination Survey Results (NHANES) for women of childbearing age (16-49 years) (CDC 2004). The 95th percentile blood mercury level for the non-institutionalized women of childbearing age for 1999 – 2002 was reported as 6.04 ug/L (95% CI: 5.08-10.74) and the 50th percentile was reported as 0.86 ug/L (95% CI: 0.80-0.98). The 95th percentile level can be explained as the level at which 95% of the women tested had blood mercury levels at 6.04 ug/L and less or only 5% of the women tested nationally had blood mercury levels greater than 6.04 ug/L. The 50th percentile level can be explained as the level at which 50% of the women tested had blood mercury levels at 0.86 ug/L and less or 50% of the women tested nationally had blood mercury levels greater than 0.86 ug/L. Using national data, the expected percentage of people with blood mercury levels above 6.04 ug/L would be 5%. Instead of the expected 5%, this fishermen study showed twenty-three percent of the fishing study population with blood mercury levels greater than the NHANES 95th percentile level of 6.04 ug/L. Using the national data, the expected percentage of people with blood mercury levels above 0.86 ug/L would be 50%. Instead of the expected 50%, 71% of the fishing study population had blood mercury levels greater than the NHANES 50th percentile of 0.86 ug/L (CDC 2004; Wolkin A and Williams L, 2007).

The blood mercury results for the NC fishing study population were also compared to the blood mercury level that is established to be protective of the developing fetus. This level has been determined to be 3.5 ug/L. The level protective for adults is 20 ug/L (Mahaffey K 2004; Mahaffey, Clickner RT, and Bodurow CC, 2004; Wolkin A and Williams L, 2007). The blood mercury levels for the women of childbearing age ranged from limit of detection to 2.5 ug/L. None of the women of childbearing age in the NC fishing study population had mercury levels greater than the 3.5 ug/L level. Seven fishermen (six males and one female not of childbearing age) had blood mercury levels greater than the adult recommended level of 20 ug/L. Of those that had blood mercury levels greater than 20 ug/L, 100 percent ate catfish and 71 percent ate largemouth bass and warmouth, which are known to contain elevated mercury levels. There was no correlation between blood mercury levels and the number of servings of fish eaten per week.

Geometric Mean Blood Mercury Level of Fishermen	NHANES 95th Percentile Level	% Fishermen Greater than NHANES 95th Percentile Level	NHANES 50th Percentile Level	% Fishermen Greater than NHANES 50th Percentile Level
2.02 ug/L (95% Confidence Interval 1.49 – 2.75)	6.04 ug/L (95% Confidence Interval: 5.08 – 10.74)	23%	0.86 ug/L (95% Confidence Interval: 0.80 – 0.98)	71%

The areas near the Waccamaw River, Lumber River, and Big Swamp River have higher mercury deposition relative to other areas in the state, have high conversion of mercury to methylmercury (form of mercury that is accumulated in fish),

(*continued on page* 5)

(Mercury Levels in Fishermen, *cont'd from page* 4)
and high fish consumption where locals consume approximately five meals per week (on average) (Schliesser S and Crawford T, 2004). Based on the results of this study and the NHANES national data, a larger percentage of the fishermen that routinely consumed fish with high mercury levels had blood mercury levels greater than what was expected. Additional mercury monitoring and modeling are needed for these areas to determine the in-state and out-of-state mercury sources that may be contributing to mercury deposition. ◆

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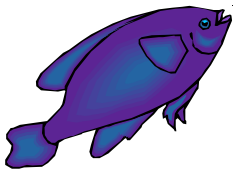
The Role of NC State Laboratory of Public Health in Fish Kill Investigations

Prepared by John L. Neal, Chemistry Manager, Environmental Sciences and Dr. Leslie A. Wolf, Director, NC State Laboratory of Public Health



Background

The Division of Water Quality (DWQ) in the Department of Environment and Natural Resources (DENR) investigates kills that involve more than 25 dead fish. Since 1997, the DWQ has provided an annual report of fish kills that gives location, cause and fish species. These reports can be found at http://h2o.enr.state.nc.us/esb/Fishkill/fishkillmain.htm. The web data are summarized below (see Table 1), but note that contributing factors to fish kills are not mutually exclusive.

Fish kills occur for a variety of natural and man-made causes. One of the primary reasons for large fish kills involves low dissolved oxygen levels in the water. Low dissolved oxygen can result from single factors or a combination of factors. During periods of very warm weather, the temperature of the water rises and decreases the ability of the water to hold oxygen, thus the season for low dissolved oxygen fish kills is June through October. While aquatic plants are helpful in generating more dissolved oxygen in the water on sunny days, when cloud cover exists for an extended period of time, or during the night time, these plants consume more oxygen than they make available. Large amounts of decaying plant and animal matter in bodies of water also consume oxygen, leading to low dissolved oxygen levels. Algal blooms lead to low dissolved oxygen levels, and some algae species produce toxins that are harmful to fish and other species. Other weather-related events such as droughts and very heavy rainfalls can affect dissolved oxygen levels and can also lead to fish kills.

Two other natural causes for fish kills include a process known as turnover and infectious diseases. In the spring and autumn, surface water mixes with bottom water that has little to no dissolved oxygen. Toxic gasses typically remain in the lowest levels of the bottom water and ideally are gradually dispersed during this turnover process. Weather-related events such as rapid temperature changes, cold rains or strong winds may cause quick turnover, exposing fish and other aquatic life to higher concentrations of toxic gasses.

When the weather warms in the spring, levels of bacterial and parasitic pathogens increase. The fish surviving the cold winter weather and strenuous spawning activities are temporarily in a weakened state, making them more susceptible to infectious diseases. All of these natural occurrences can lead to fish kills, particularly in the spring.

Man-made events may also lead to fish kills. Fishing activities, such as a large amount of discards following commercial trawling or recreational fishing (known as bycatch), can cause low dissolved oxygen levels in the water due to the unusual load of decomposing materials. Spills from sewage systems, agricultural operations and other toxic chemicals have occurred over the past 10 years. Spills may lower dissolved oxygen or contain compounds that are toxic to aquatic life. Some of the documented toxic spills include pesticides and herbicides, such as organophosphate-containing compounds (chlorpyrifos, fenamiphos, and malathion), petroleum or gasoline products, hydrochloric acid, sodium hypochlorite (bleach), chlorine, sodium hydroxide, propionic acid, concrete and concrete sealer, runoff from facility fires, animal waste from processing plants, and copper containing algacides.

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*(**Fish Kill Investigations,** continued from page 5)*

Table 1. Summary of NC Fish Kill Events and the Likely Contributing Factors

Year	No. of Events	Dissolved Oxygen	Blooms	Spills	Bycatch	Other	Unknown
1997	57	21	11	17	0	2	16
1998	58	31	3	5	0	4	21
1999	54	16	6	8	2	2	19
2000	58	12	7	4	3	3	29
2001	77	26	3	4	1	7	35
2002	46	15	3	8	1	6	26
2003	43	19	0	4	0	1	19
2004	18	8	1	1	0	0	8
2005	19	6	0	3	2	0	8
2006	25	7	5	6	1	2	4
2007*	19*	6*	0*	3*	1*	0*	9*

NOTE: **indicates provisional designation pending final publication of annual report: data as of 9/11/07*

Role of the Public Health Laboratory

The role of the NC State Laboratory of Public Health (SLPH) in fish kills varies considerably. Because of the laboratory capacity within DENR, many times SLPH is not called upon to assist in these investigations. In some circumstances, the expertise of Inorganic and Organic Chemistry laboratories is used. The state-of-the-art instrumentation and methods currently used by SLPH are well-suited to detecting a wide variety of inorganic metals, nitrites and nitrates, as well as organic compounds such as pesticides, herbicides and petroleum products in water samples. The Environmental Microbiology laboratory can also test for microcystin, a toxin produced during certain harmful algal blooms, using an enzyme immunoassay.

On July 27 2007, DENR received a report of a fish kill event in the Mills River and its south fork. Mills River provides drinking water to more than 190,000 people in Henderson and Buncombe counties. Most of the area along the affected portion of the Mills River is residential or agricultural. Raw water samples were taken at the intake sites and treated water samples were taken from the public water systems, as well as from standing water in a field in the area of the fish kill, to determine if any contaminants were present. Evidence of pesticide mixing led state officials to suspect agricultural chemicals as the cause of the fish kill. Some of the suspect chemicals included chlorothalonil, cypermethrin, metribuzin, and 2,4-DB. Of particular concern to U.S. Fish and Wildlife Service biologists was the potential negative effect on the endangered Appalachian elktoe mussel.

On July 30, DENR's Public Water Supply (PWS) Sectiono asked the SLPH to test two treated water samples from the Asheville and Hendersonville public water supply systems. The SLPH employed EPA methods 508 and 525.2, which are multi-residue and synthetic organic chemical methods that detect pesticides, herbicides and fungicides using gas chromatography/electron capture detector and gas chromatography/mass spectrometry. DWQ laboratory results indicated that an agricultural fungicide known as chlorothalonil was present in the raw water sample from Mills River collected on July 27, 2007 at 0.31 parts per billion, and a water sample taken from a five day holding pond used by the Asheville water plant contained 0.1 parts per billion. The standing water sample taken from a field of tomatoes had levels of 309 parts per billion according to the DWQ laboratory. The SLPH results indicated that the chemical was also present on July 27, 2007 in the Hendersonville City water supply in low levels of 2.8 parts per billion. No detectable levels of chlorothalonil were found in the City of Asheville treated water samples collected on July 27, 2007 and submitted to the SLPH. Additional treated water samples were collected on August 2, 2007 from the cities of Hendersonville and Asheville and submitted to the SLPH. No detectable levels of the fungicide were detected at that time.

Chlorothalonil is very toxic to aquatic species such as fish and invertebrates and is typically used to control fungi that attack vegetables, fruit trees and other crops. While drinking such low levels of chlorothalonil-contaminated water is not a human health risk, some species of fish, such as trout, are sensitive to as little as 0.25 parts per billion of the chemical. Fortunately, all reports indicate that the endangered Appalachian elktoe mussel survived the spill. ◆

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3. http://www.hendersonvillenews.com, reports from July 27, 2007 through August 8, 2007, last accessed 8/22/07.

N.C.'s Expanded HIV Testing Program

Prepared by Jan Scott, CDC Public Health Advisor, HIV/STD Prevention and Care Branch

The Centers for Disease Control and Prevention (CDC) estimates that over 250,000 persons in the United States are not aware that they are infected with HIV. In response, a national initiative has been launched to expand access to HIV testing, particularly among minorities. The national goal is to test 1.5 million people. North Carolina's goal is to test 58,000 people, identify over 700 previously undiagnosed people with HIV infection and link them to care.

North Carolina will offer expanded HIV testing in clinical settings such as emergency departments and correctional

(NC's Expanded HIV Testing Program, cont'd from page 6)

health facilities. The main focus of the program will be to implement routine, voluntary HIV testing in these settings, where opportunities to screen patients for HIV are often missed. The primary goal will be to increase early HIV diagnosis among African Americans.

Another focus is the integration of HIV testing activities with screening and prevention activities for other infections, such as viral hepatitis, and other sexually transmitted diseases. Because populations disproportionately affected by HIV are also disproportionately affected by these infections, integrating these services can significantly improve health.

- **Jail Screening Program:** Since 2000, the North Carolina HIV/STD Prevention and Care Branch has supported syphilis screening efforts in jails in Durham, Forsyth, Guilford, Mecklenburg, Robeson and Wake Counties. From January 1, 2003 thought December 2006 23,446 incarcerated men and women were screened resulting in a syphilis seropositivity of 3.8 (899). Over 56 percent of all detainees screened were African American. Through the expanded HIV testing initiative, new testing sites in Cumberland, Hertford, and Hoke counties will be added. All sites will now include HIV and additional STD or hepatitis screening in addition to syphilis testing. Testing will be provided by health department staff and two community-based organizations.
- **Emergency Department Screening:** Many patients seen in emergency departments are uninsured, without access to care, and are using emergency departments for their primary health care. The uninsured population is higher among minority groups that are at higher risk for HIV. HIV screening will be conducted at both the UNC Memorial Hospital and Wake Medical Center Emergency Departments. Non-trauma patients will have access to voluntary, opt-out HIV testing.

North Carolina is one of 23 states and major metropolitan areas chosen to participate in this initiative. CDC funding will support HIV testing and related activities including linkage to care, partner counseling and referral services, and the purchase of HIV tests. For questions, contact Jan Scott at 919-733-2030 x.47. ◆

CD4 and Viral Load Lab Testing for Newly Diagnosed HIV Positive Individuals

Prepared by Amaka Flynn, Public Health Consultant, HIV/STD Prevention and Care Branch

Early HIV diagnosis and care are crucial to a good clinical outcome, but 30 percent of North Carolians are not diagnosed until they have full-blown AIDS. As a result of this late diagnosis and entry into care, these North Carolinians do not receive maximum benefit from available HIV treatments when compared to clients who are diagnosed and referred to care earlier in the progression of the disease. A new program aims to determine why so many North Carolinians wait so late for HIV testing.

The North Carolina HIV/STD Prevention and Care Branch has entered into a formal partnership with the University of North Carolina at Chapel Hill (UNC-CH) to conduct CD4 and viral load testing on all HIV clients newly-identified through publicly-funded testing agencies. The results of the tests will be provided to the client and will help the client's care provider determine the best treatment regimen. The test results will also be analyzed by UNC to try to understand the large percentage of late diagnoses occurring in the state. Funds for this study were made available by additional funds received by the Ryan White Part B HIV/AIDS Treatment Modernization Act.

According to Cynthia Gay, UNC's principal investigator, the objectives of the study include:

- Characterizing the degree of immunosuppression in individuals newly diagnosed with HIV as reflected by initial CD4 cell count (cells/mm^3).
- Comparing the initial CD4 cell counts (cells/mm^3) in individuals newly diagnosed with HIV at STD clinics to the initial CD4 counts of those newly diagnosed at other types of testing sites.
- Characterizing the proportion of individuals newly diagnosed with HIV infection who meet criteria for initiation of antiretroviral therapy at the time of HIV diagnosis.
- Identifying risk factors for late HIV diagnosis, as defined by CD4 cell count (cells/mm^3), in individuals newly diagnosed with HIV
- Characterizing the initial HIV RNA level (copies/mL) in individuals newly diagnosed with HIV.
- Comparing the initial HIV RNA levels (copies/mL) in individuals diagnosed at STD clinics to viral loads of those diagnosed at other types of testing centers.
- Comparing the prevalence of AIDS-defining illnesses in those newly diagnosed with HIV by type of HIV testing site.
- Providing initial CD4 cell count and viral load results to individuals newly diagnosed with HIV.
- Facilitating entry into HIV care by providing CD4 cell count and HIV viral load results to individuals newly diagnosed HIV individuals.
- Evaluating what percentage of clients who receive CD4 count and viral load results enter into HIV care within 3 months, and cited knowledge of their CD4 and/or

(*continued on page* 8)

*(**CD4 and Viral Load Lab Testing,** continued from page 7)*

viral load results as a factor which influenced their decision to enter into care.

- Comparing the initial CD4 cell count of study participants to the initial CD4 cell count of individuals presenting for HIV care to the UNC infectious diseases clinic and collaborating care centers (Moses H. Cone Memorial Hospital, Wake County Human Services, Duke University Medical Center and Wake Forest University Baptist Medical Center).

Currently in North Carolina all individuals who test positive for HIV/AIDS are notified, counseled and undergo an interview conducted by North Carolina Department of Health and Human Service Disease Intervention Specialists (DIS), generally within 14 days of the receipt of test result. This interview collects detailed information including demographics, risk behaviors and partners. With implantation of the CD4 and viral load testing, DIS will inform all newly-diagnosed individuals who tested at Local Health Departments or publicly funded testing sites during their standard interview that the NC DHHS HIV-STD Prevention and Care Branch is conducting a program evaluation with UNC-CH to improve HIV testing by providing free and confidential CD4 cell count and viral load testing to all newly-diagnosed individuals. Individuals interviewed will be told that their CD4 count and viral load results will be kept confidential, and that all data collected for the program evaluation will be de-identified and pooled with all other results for data analysis. Unless individuals refuse phlebotomy, DIS will draw 8 ml of blood (200ìl for CD4; 4 mL for HIV RNA; 5mL for storage (1 mL for future genotyping; 200ìl for future phylogenetic analysis) in the field at no charge to the individual.

New HIV cases interviewed by DIS will be told that CD4 cell count provides information regarding how advanced their HIV infection is, and when treatment should be initiated. All individuals who receive CD4 and viral load testing will be offered the opportunity to receive their CD4 count and viral load results by calling a toll-free contact number provided at the time blood is drawn for testing. Personnel who staff the toll-free number will be trained to provide CD4 count and viral load results based on a prescribed script. All individuals who undergo CD4 count and Viral Load testing will be given the contact number to access their results and assistance with HIV care referral for up to 3 months from the date of testing. Individuals who are counseled on their CD4 count and viral load results will be offered a timely appointment for evaluation at the UNC Infectious Diseases clinic, or assistance with making an appointment at another facility of their choice.

The number of contacts with individuals who receive CD4 and viral load testing will depend upon whether they choose to access their CD4 count and viral load results, and accept assistance with HIV care referral. However, individuals with a CD4 cell count result of d"200 cells/mm^3 who do not access their results within 4 weeks from the date of testing will be contacted by Disease Intervention Specialists (DIS). The DIS will notify the individual of their CD4 count result and encourage the individuals to seek prompt HIV care for consideration of treatment. The DIS will also provide the individuals with a toll-free contact number where they can receive additional counseling and assistance with referral to HIV care.

At the time individuals call the toll-free number they will be asked to provide verbal informed consent to be contacted by phone three months from their date of testing to complete a brief questionnaire regarding their HIV care. The questionnaire will be administered over the phone only after confirming the subject's identity and that privacy is ensured in their location. The questionnaire will assess whether patients have entered into HIV care at any facility, whether knowledge of their test results affected their decision to seek care, and any perceived barriers to accessing HIV care.

By implementing these procedures, North Carolina hopes to better target individuals with low CD4 count and link them into care; to identify testing sites where HIV positive individuals are diagnosed late and implement outreach programs to address late diagnosis; and/or to identify testing sites where HIV positive individuals are diagnosed early and linked into care. North Carolina's ultimate goal is to greatly reduce the number of individuals who present to care with an AIDS diagnosis.◆

N.C. Purchase of Antivirals

Prepared by Amanda Fuller, PharmD, SNS Coordinator, Office of Public Health Preparedness and Response

In an effort to help states be more prepared for pandemic influenza, the federal Department of Health and Human Services (DHHS) negotiated a contract with the antiviral manufacturing companies Roche and GlaxoSmithKline. Although not a cure for influenza, pandemic or seasonal, antivirals can reduce severity and decrease duration of the illness. Through the contract DHHS will subsidize the cost of purchasing antivirals.

Each state was allotted a certain number of antiviral regimens based on population. The overall goal is to have enough antivirals available for 25 percent of the United States population.. The Strategic National Stockpile will house approximately 60 percent of the antivirals and states will purchase and house the remaining 40 percent. In North Carolina, the legislature generously allocated over nine million dollars to be used for purchase and storage of antivirals over the next two fiscal years. This will allow North Carolina to purchase over 600,000 antiviral regimens. A regimen is 10 doses; directions for use vary based on the situation and the antiviral. North Carolina will follow the lead of the federal government and purchase 80 percent Tamiflu® and 20% Relenza®. These antivirals will be stored in warehouses across the state. By February, over 500,000 regimens will be located within the state. The remaining regimens funded by the legislature will be purchased in June and July.◆

Spay Neuter Program Update

Prepared by Carl Williams, DVM, DACVPM, State Public Health Veterinarian

In 2006, 74 percent of the domestic dogs and cats entering North Carolina municipal shelters never left – they were euthanized. That's according to the North Carolina Spay Neuter tracking program. One way to reduce this sad rate is with a well-funded centralized spay neuter program.

State law (General Statute 19A-65) requires that "every county or city animal shelter, or animal shelter operated under contract with a county or city or otherwise in receipt of State or local funding shall prepare an annual report setting forth the numbers, by species, of animals received into the shelter, the number adopted out, the number returned to owner, and the number destroyed. The report shall also contain the total operating expenses of the shelter and the cost per animal handled. The report shall be filed with the Department of Health and Human Services by August 1 of each year."

Data collection for the calendar year 2006 is complete and summary information for dogs and cats only for the years 2001 through 2006 is presented below. It should be noted that this is self reported data.

Year	# Received into Shelter	# Euthanized	% Euthanized	# Agencies Reporting
2001	293,258	226,363	77%	82
2002	339,562	263,883	78%	86
2003	281,330	218,385	78%	67
2004	284,402	219,311	77%	70
2005	319,901	243,656	76%	84
2006	288,984	214,091	74%	72

At the inception of this program a survey was conducted at which time it was determined that 104 animal shelters in North Carolina would be required to report based on the statute. Not all agencies report every year. Nonetheless, this data provides an approximation of the companion animal euthanasia rate at animal shelters in North Carolina. Annual total operating expenses are also provided by reporting shelters. Below is a summary of animal shelter total operating expenses, by year.

Year	Total Operating Expenses
2001	$ 42,040,745.88
2002	$ 24,276,905.02
2003	$ 21,444,310.12
2004	$ 21,794,876.77
2005	$ 28,040,727.42
2006	$ 28,961,217.68

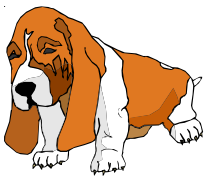
A great deal of money is expended annually in NC on animal sheltering operations. Creating a centralized state Spay Neuter (SN) program with sufficient funding to reduce the companion animal euthanasia rate at shelters and the total operating expenses of animal shelters is the principal goal of the SN Program. Unfortunately, funding for the SN Program is often inadequate and county requests for reimbursement are not being met. Under the NC SN Program Cities and counties are eligible to apply for reimbursement of direct costs of spays and neuters of cats and dogs owned by low-income persons. The Program cannot provide reimbursement to individuals or private organizations such as humane societies or SPCAs. Cities or counties may receive reimbursement for the direct cost of an eligible procedure. Reimbursable costs shall include anesthesia, medication and veterinary services. Administrative costs are not reimbursable. Capital expenditures for facilities and equipment associated with the provision of the procedure are not reimbursable.

In the past two quarters participating cities and counties have requested over $59,000.00 in reimbursement from the state SN Program less than $34,000.00 was available in the SN account. This trend has been ongoing since 2004 and the cities and counties have been resourceful in identifying alternative sources of funding to help their spay/neuter efforts.

Until recently funding was voluntary and derived primarily from two sources – special I Care rabies tags in lieu of the standard rabies tags and the I Care **car** license plate. The **I Care** rabies tag cost 50 cents more than the regular tag, with the difference going to the SN fund. Each **I Care** car license plate purchased resulted in a 10 dollar deposit to the fund. , While the license plate proved popular, less than 15,000 of the rabies tags were sold annually. As a result last year the General Assembly eliminated the **I Care** rabies tag and added a 20 cent fee to all regular tags, with the 20 cent going to the SN fund. Almost a million regular rabies tags are sold annually.

The Veterinary Public Health program seeks your support of this program. It has great potential and with proper funding, which this new legislation may deliver, could be a key component to reducing the companion animal euthanasia rate at NC shelters.

Additional information on the Spay/Neuter program can be found at http://www.rabies.ncdhhs.gov. ◆



Reported Communicable Diseases, North Carolina, January-December 2007 (by date of report)*

Disease	Year-to-Date (Fourth Quarter)			4th Quarter 2007	Comments / Notes
	2007	2006	Mean (2002-2006)		
Botulism Food	3	1	0	3	
Brucellosis	6	2	2	0	
Campylobacter	629	807	724	177	
Chlamydia laboratory reports	30,616	33,615	28,920	8,037	
Creutzfeldt-Jakob Disease	5	1	1	0	
Cryptosporidiosis	132	101	73	64	
Cyclosporiasis	4	3	2	1	
Dengue	11	7	6	6	
E. coli Shiga Toxin-producing	153	129	127	39	
Ehrlichiosis, Granulocytic	4	1	4	3	
Ehrlichiosis, Monocytic	53	54	32	14	
Ehrlichiosis, Other	3	3	2	2	
Encephalitis, Arboviral, other	1	0	0	1	
Encephalitis, California Group	9	18	20	7	
Encephalitis, West Nile	4	1	5	4	
Foodborne, C. Perfringens	3	9	3	0	
Foodborne, Other	64	494	346	2	
Foodborne, Staphococcal	1	1	36	0	
Gonorrhea	16,665	17,311	15,603	6,585	
Haemophilus Influenzae	59	61	54	14	
Hemol.Urem.Syn/TTP	12	8	6	4	
Hepatitis A	66	104	126	22	
Hepatitis B	128	159	181	32	
Hepatitis B Carrier	898	827	870	185	
Hepatitis B Perinatal	1	2	3	0	
Hepatitis C, Acute	17	19	19	4	
HIV/AIDS	1,947	2,147	1,865	316	Note 1
Legionellosis	53	42	35	16	
Leptospiosis	1	1	0	1	
Listeriosis	33	25	22	11	
Lyme Disease	53	31	99	14	
Malaria	22	32	28	5	
Measles	3	1	1	0	
Menincoccal Invasive Disease	22	34	35	7	
Meninigitis, Pneumococcal	44	43	33	8	
Mumps	28	43	13	3	
Q Fever	4	4	3	0	
Rabies	474	521	607	91	
RMSF	664	852	527	173	
Salmonellosis	1845	1696	1629	704	
Shigellosis	105	174	599	38	
Strep A	168	164	129	28	
Syphilis, Total	572	602	511	160	Note 2
Toxic Shock Synd.,Strep	7	10	5		
TSS	7	8	4	1	
Tuberculosis	346	374	378	125	
Tularemia	1	1	1	0	
Typhoid, Acute	8	3	6	5	
Typhus Epidemic	1	3	1	0	
Vibrio Vulnificus	2	5	5	1	
Vibrio, Other	17	18	13	10	
Whooping Cough	326	334	150	99	

* Preliminary data, as of 12/31/2007. Quarters defined as 13 week periods. Diseases reported in 2007 define those listed in this table. Notes: 1. Earliest report with HIV infection or AIDS diagnosis; 2. Includes primary, secondary and early latent syphilis.

Dr. Mina Shehee Promoted to be the Supervisor of the Medical Evaluation and Risk Assessment Unit in the OEE

Prepared by Dr. Douglas Campbell, MD, Head, Occupational and Environmental Epidemiology Branch

Dr. Mina Shehee became supervisor of the Medical Evaluation and Risk Assessment (MERA) Unit for the Occupational and Environmental Epidemiology Branch (OEEB) on of December 1. She replaces Bill Pate who retired earlier this year.

Dr. Shehee has been working for OEEB since July 2003 when she was hired to be the Program Coordinator and Principal Investigator for the Harmful Algal Blooms (HAB) program. The HAB program has been funded by the Centers for Disease Control since the late 1990's. Dr. Shehee has provided consistently excellent leadership to the HAB program by providing vision, ideas, and energy to this program and making it a model for other states to emulate. Her ideas and projects have provided valuable information to the CDC and has helped them develop the HAB program nationally. She was instrumental in obtaining funding from the Agency for Toxic Substances and Disease Registry (ATSDR) to carry out a new program in OEEB to evaluate toxic pollutants and educate about the risk posed by these pollutants. She has been the supervisor of this program for the past year.

Dr. Shehee received her BA from St. Cloud University in Minnesota, a Master's degree in Clinical Microbiology from Emory University in Atlanta, Georgia, and a PhD in Environmental Sciences and Engineering from the University of North Carolina at Chapel Hill. She worked as a research associate at UNC to evaluate the survival and reduction of pathogens in municipal biosolids. She has taught environmental issues to undergraduates at Campell University and was a teaching assistant at Emory University. She received the "Employee of the Quarter" award from the Epidemiology Section in 2007.

The MERA unit deals with many complex and difficult issues, which are usually new and not well characterized and require close attention to detail and foresight in evaluating and responding to them. We are very happy to have Dr. Shehee as the supervisor of this program, and we look forward to having her energy, vision and guidance in leading this group.◆

Employee Recognition: Joey Johnson Employee of the Quarter

Prepared by Patsy West, Administrative Assistant, Epidemiology Section

Joey Johnson is the recipient of the Epidemiology Section's Employee Recognition Award for the fourth quarter of 2007. Johnson was nominated in the Service Excellence category.

In 1998, Johnson joined the State Laboratory of Public Health as a Medical Laboratory Technologist I in the Viral Culture/ Rabies Laboratory and soon advanced to lead technologist positions and continued his work as Medical Laboratory Specialist for West Nile Virus testing. He has served as the supervisor of the Special Serology Laboratory since 2004 where testing is performed for West Nile Virus and other arboviruses, tick-borne diseases such as Rocky Mountain Spotted Fever and other viral and bacterial pathogens.

Johnson is an outstanding member of the public health team. He has represented the State Laboratory of Public Health on the multi-disciplinary Vector-Borne Disease Task Force where he was instrumental in helping to develop public health policies and testing strategies to reduce the seasonal incidence of vector-borne diseases. Johnson has presented information at various professional meetings such as the Southeastern Center for Emerging Biologic Threats (SECEBT) Conference, "Vector Borne Diseases of the Southeastern U.S.", and the Public Health Training Information Network (PHTIN) Conference, "Arthropod-Borne Zoonotic Diseases". Johnson also compiles laboratory data for the seasonal biweekly Arboviral Report and soon to be released biweekly Tick-Borne Diseases Report. He is leading the Virology/Serology Unit of the State Laboratory of Public Health in the conversion to the new laboratory information management system (STARLims). He has also been very active in the planning of the new State Laboratory of Public Health facility..

By virtue of Johnson's hard work and dedication, he is well respected by his fellow colleagues and other public health partners. There is no obstacle too large or too small for him to tackle. He serves as a positive role model to develop a spirit of teamwork and cooperation among his staff and others who may need his assistance.

In addition to receiving the Epidemiology Section's Employee Recognition Award, he was presented with a gift certificate to a local restaurant from the Epidemiology Section Management Team.◆

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