

# Epi Notes



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## 2008 Vectorborne Disease Activities

*Prepared by Dr. Carl Williams, State Public Health Veterinarian and Lead Investigator for Vectorborne Disease Surveillance, Occupational and Environmental Epidemiology Section*

### REORGANIZATION

The Veterinary Public Health Program is moving! Recent changes in the Epidemiology Section unite the former HIV/STD Prevention and Care Branch with the General Communicable Disease Control Branch to form the Communicable Disease (CD) Branch. The reorganization also moves Veterinary Public Health from the Occupational and Environmental Epidemiology (OEE) Branch to the new CD branch. Carl Williams, DVM, is the State Public Health Veterinarian and heads the Veterinary Public Health Program. This program historically supports the

- Rabies Education and Prevention Program,
- Spay/Neuter Program, and
- Interstate Companion Animal Movement Program.

As part of the reorganization, Dr. Williams also assumes responsibility for vector-borne disease surveillance. With newly appropriated state funds, the branch is currently recruiting a nurse epidemiologist to assist Dr. Williams and provide support to local health departments for tick-borne and mosquito-borne disease activities.

Funding for this position comes from the 2007 N.C. General Assembly House Bill 1473. This bill provides funding for two nurse consultant/epidemiologist positions, one focusing on food-borne diseases and one focusing on tick-borne diseases. Additional funding also provides public health with \$25,000 annually for tick-control demonstration projects, as well as funding for the Department of Environment and Natural Resources (DENR) to conduct tick-control demonstration projects.

### STARI PROJECT:

A portion of the funding will be used to evaluate the hypothesis that *Borrelia lonestari* is the causative agent of Southern Tick Associated  
*(continued on page 2)*

(*Vectorborne Disease Activities, continued from page 1*)

Rash Illness (STARI) in the United States. Using a Centers for Disease Control and Prevention study protocol, Dr. Philip Sloane of the UNC Department of Family Medicine will conduct a clinical study in eastern North Carolina during the 2008 tick season.

Dr. Sloane and his staff have surveyed clinical practices across the state and identified several sites in eastern and northeastern North Carolina that will serve as principal study areas. Clinical practices were selected because they reported seeing relatively more patients presenting with erythema migrans (EM) lesions than practices in other parts of the state. The clinical practices will enroll patients under the strict study protocol and provide incentives to the patients to participate in the study.

Southern Tick Associated Rash Illness appears to produce a simple, self limiting skin rash, and STARI patients are much less likely to be symptomatic than Lyme Disease (LD) patients.<sup>1</sup> However, the natural history of the illness is not completely understood and the possibility of long term sequelae cannot be excluded. The key clinical feature of STARI is an Erythema Migrans (EM)-like lesion that is also characteristic of early LD. However, the EM lesions of STARI are associated with the bite of the tick *Amblyomma americanum* (which is not a known vector for *B. burgdorferi*, the agent of LD) as opposed to *Ixodes scapularis* (which is a known vector of LD). Additionally, the agent of LD has never been cultured from a patient with an EM lesion, whose only exposure to ticks was in the southeast U.S.<sup>2</sup> Nonetheless, many people have been reported as having LD in the south because they have EM. Furthermore, several articles have revealed the presence of another agent, *B. lonestari*, that is carried by *A. americanum*, and it is speculated this agent may be the cause of STARI.<sup>3,4</sup>

Many of these patients may actually have had an EM lesion due to another cause and did not have LD. Counting STARI as LD affects both the accuracy and credibility of LD surveillance in the U.S., and it is therefore important to understand the etiology of this illness in the southern U.S. for both public health and clinical reasons. The etiology, natural history, incidence, public health importance and appropriate treatment of STARI are unknown; this study will attempt to answer some of these questions.

This study will obtain skin biopsy specimens, whole blood, and acute and convalescent serum samples from up to twenty patients with tick-bite associated, expanding, erythematous, rash lesions. Skin and serum samples will be tested for

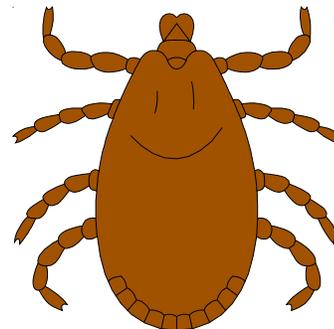
evidence of *B. lonestari* infection. Serum samples will be used to develop serologic tests for *B. lonestari* infection.

#### **AID TO COUNTIES:**

As a result of this study, counties that are home to the clinical practices involved in the study may see an increase in reporting of tick-borne diseases due to the extra attention the study itself will create. Limited state funds will be made available to provide health education materials related to tick-borne disease, or perhaps to be used to collect convalescent serum samples as appropriate for routine surveillance activities. Based upon the location of the clinical practice sites, Bertie, Craven and Hertford counties are eligible for additional funding.

For more information, contact Dr. Carl Williams, State Public Health Veterinarian and lead investigator for Vectorborne Disease Surveillance at 919-733-3419, or [carl.williams@ncmail.net](mailto:carl.williams@ncmail.net). ♦

1. **Wormser, et. al.** 2005. Prospective Clinical Evaluation of Patients from Missouri and New York with Erythema Migrans Like Skin Lesions. *Clinical Infectious Diseases*. **41**:958-965.
2. **Kirkland, et. al.** 1997. Erythema Migrans like Rash Illness at a Camp in North Carolina: A New Tickborne Disease? *Archives of Internal Medicine*. **157(22)**:2635-2641
3. **James, et. al.** 2001. *Borrelia lonestari* Infection after a Bite by an *Amblyomma americanum* Tick. *The Journal of Infectious Diseases*. **183**:1810-1814.
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## Gasoline and Chlorinated Solvent Contamination of Private Drinking Water Wells in Person County

*Prepared by Kenneth Rudo, Toxicologist, Occupational and Environmental Epidemiology Branch*



In November 2007, the Occupational and Environmental Epidemiology Branch (OEEB) received several private well-water test results that indicated elevated levels of gasoline and chlorinated solvents in two private drinking water wells in the Virgilina Road/Halifax Road Community north of Roxboro in Person County, North

Carolina. With the help of the Environmental Health Section of the Person County Health Department, over 35 additional private wells were sampled. The results indicated widespread contamination of these wells with chlorinated solvents and gasoline products, with only seven out of approximately 40 wells free of contaminants. Levels of contaminants were elevated to a degree in seven wells such that OEEB recommended no further water use for these homes and point-of-entry filter systems were installed. Eight other homes had well water contamination to a degree that OEEB recommended no further water consumption, along with limits on bathing and shower times. These homes were provided with bottled water. The remaining 18 homes that were contaminated are on a resampling program to monitor any changes in contaminant levels over time. A public meeting was held with the community in December 2007 to answer questions regarding the contamination of these wells. The local health department is continuing to resample wells in this area, and the investigation and cleanup is ongoing under the supervision of the North Carolina Superfund Section, the North Carolina Underground Storage Tank Section, and the U.S. Environmental Protection Agency (EPA).♦

## State Laboratory Begins Testing for HPV

*Prepared by Myra Brinson, MT(ASCP), Virology/Serology Manager and Marjorie Lavender, Cancer Cytology Manager, NC State Laboratory of Public Health*

Human papillomavirus (HPV), the causative agent of genital warts, is the most common sexually transmitted infection, affecting both men and women. According to the American Social Health Association, approximately 5.5 million new cases of sexually transmitted HPV are reported every year. In fact, at least 80% of women, by the age of 50, will have been infected with genital HPV at some time in their lives.

Persistent HPV infection has been closely linked to cervical cancer in women, particularly infection with certain “high-risk” HPV genotypes including types 16 and 18. Traditional

Pap smears and liquid-based cytology (ThinPrep®) look only for abnormal cervical cell changes. The State Laboratory of Public Health (SLPH) Cancer Cytology Unit received approximately 95,000 ThinPrep® samples in 2007; 5.7% were reported as having atypical squamous cells of undetermined origin (ASCUS), 10.1% were diagnosed as low-grade squamous intraepithelial lesions (LSIL), 1.5 % had cells consistent with high-grade squamous intraepithelial lesions (HSIL), and 0.001% were reported as cervical cancer. ASCUS and LSIL cases have traditionally been followed by colposcopy (cervical biopsy), an invasive, time-consuming, and costly procedure. For patients with ASCUS Pap results, the HPV test is useful to identify those patients with an increased risk that the atypical cells will progress to cervical cancer. A negative HPV test result indicates a low likelihood of disease progression, while patients with a positive HPV result should continue to be followed up with colposcopy.

Since January 2008, SLPH has been performing HPV reflex testing on samples from women over the age of 20 with ASCUS Pap results, using the Hybrid Capture® 2 High-Risk HPV DNA Test® by Digene Corp. The assay, which detects 13 high-risk HPV types, is not useful for testing in younger women since HPV infection in this age group is common and will usually clear on its own. Results so far show that approximately 60% of ASCUS patients test negative for high-risk HPV types, thereby reducing by over half the number of patients who would have previously been referred to colposcopy.♦

## New Tigris Instrumentation Improves For Chlamydia and Gonorrhea at N.C. State Laboratory of Public Health

*Prepared by Myra Brinson, MT(ASCP), Virology/Serology Manager and Mary Noel Dodd, MT(ASCP), Bacterial STD Laboratory Supervisor, NC State Laboratory of Public Health*

Improvements have recently been made to chlamydia and gonorrhea testing at the State Laboratory, with the addition of two state-of-the-art instruments. New instruments will greatly enhance the laboratory’s capacity for optimum throughput and test turn-around time for the detection of these two infections.

Chlamydia and gonorrhea are two of the most common sexually transmitted infections in the world, predominantly affecting young adults between the ages of 15 and 24. Despite a nationwide expansion of screening test programs since the 1990s, chlamydia continues to be the most common bacterially transmitted disease in the United States. Both chlamydia and gonorrhea are easily treatable with antibiotics, but undetected and untreated infections can lead to serious complications

*(continued on page 4)*

*(New Tigris Instrumentation, continued from page 3)*

such as ectopic pregnancy, pelvic inflammatory disease, and infertility. In addition, patients who are infected with one sexually transmitted infectious agent are more likely to acquire others, such as HIV or herpes. The majority of men and women with chlamydia have no symptoms, and untreated gonorrheal infections may also be asymptomatic. Therefore, prevention education and regular testing are vital to reducing the incidence of disease and subsequent adverse outcomes.

Since 1996, North Carolina and seven other southeastern states in Region IV have received federal funding to screen a select population of women for chlamydia. The ongoing Chlamydia Infertility Prevention Project (IPP) is coordinated between the HIV/STD Prevention and Care Branch, the Women's Health Branch, and the North Carolina State Laboratory of Public Health. Historically, chlamydia testing at the State Laboratory had been limited to either prenatal women or women who were symptomatic. The IPP funding enabled the expansion of chlamydia testing to include any asymptomatic woman under the age of 25 who undergoes a pelvic examination at a local health department clinic.

Prior to 2004, chlamydia testing at the State Laboratory utilized an enzyme immunoassay (EIA) procedure that detected the chlamydia antigen from an endocervical swab specimen, with confirmation of grey-zone results by either PCR or a direct fluorescent antibody test. All testing for gonorrhea was performed at the local health departments by traditional culture methods. The State Laboratory also offered chlamydia cell culture for specimens obtained from infants and on non-urogenital specimens from adults, such as conjunctival specimens.

Although traditional chlamydia cell culture and bacterial culture for gonorrhea were once considered to be the gold standards for testing, newer methodologies that offer high specimen throughput and greater sensitivity have largely replaced older methods of detection and have consequently become the new gold standard. The State Laboratory recognized the need to improve detection of chlamydia and gonorrhea infections and thus changed to a nucleic acid amplification test (NAAT) in May 2004.

Amplification tests are more sensitive than any of the previously used methods, while still retaining a high degree of specificity. The semi-automated instrumentation used to perform the assay was ideally suited to the large test volumes of a public health laboratory. In addition, the new instruments offer the advantage of a single dual assay for the simultaneous detection of both chlamydia and gonorrhea in the same tube.

Since changing to the new assay, chlamydia positivity rates have increased from approximately 5.4% by EIA detection to an average of 7.4% by NAAT detection. Gonorrhea positivity rates currently average 2.2% by NAAT detection. (Because gonorrhea testing was previously performed at the local health departments where these data were not tracked, gonorrhea positivity rates by traditional culture were not available for comparison to NAAT.) The increased positivity rates clearly demonstrate that the new technology greatly improves the quality of chlamydia and gonorrhea testing by detecting cases that would have been missed with the older technology.

While NAAT testing offers the very best in specificity and sensitivity, performance of the assay is technically demanding and requires strict adherence to procedure and protocols by trained and highly skilled technologists. Failure to follow these procedures closely may result in cross-contamination and specimen carryover, leading to low-level, false-positive results. The recent release of a fully automated testing platform eliminated all of the manual pipetting steps of the semi-automated platform. The State Laboratory successfully procured and installed two fully automated platforms this past spring, and four staff medical technologists traveled to vendor headquarters in San Diego, California to receive intensive training in instrument operation and maintenance.

On June 11, the changeover of chlamydia/gonorrhea testing to the fully automated platforms was completed. By automating all phases of testing, from sample preparation through the reporting of results, any error due to technique or unavoidable operator variability has been virtually eliminated. Improved consistency of test results has decreased the number of equivocal results, thereby reducing the subsequent need for patients to return to the health department to have a repeat specimen collected. The risk of repetitive-motion injuries that can be common among staff performing high-volume testing has also been greatly reduced. Walk-away automation capability has also allowed the laboratory to add testing in other areas with existing staff such as HPV reflex testing, which is scheduled to begin in 2008.

Conversion to the instrumentation was not completely without problems, however. The instruments require that a strict range of room temperature and humidity be maintained throughout operation. The record-breaking high temperatures in July and August, along with the heat generated by the instruments themselves in an aging laboratory facility, resulted in several consecutive days when the instruments failed to be operational due to excessive heat. Dedicated laboratory staff worked very early shifts on

*(continued on page 5)*

(*New Tigris Instrumentation, continued from page 4*)

weekends, as well as weekdays, in order to beat the heat of the afternoon high temperatures. Fans and a portable air conditioning unit were brought into the instrument room in an effort to keep the instruments operational. A longer term solution came with installation of a package air conditioning unit in the overhead attic space above the instrument room.

The conversion to a totally automated NAAT platform for chlamydia and gonorrhea testing will increase capacity for the expansion of STD test volumes and facilitate the addition of new testing programs. Continued improvements in the expeditious detection of chlamydia and gonorrhea, along with subsequent treatment, should certainly aid in the control of these infections. ♦

## Reducing Asthma Episodes in Schools

*Prepared by David Lipton, Industrial Hygiene Consultant,  
Occupational and Environmental Epidemiology Branch*



Asthma is a chronic illness affecting many children in North Carolina. According to the 2006-2007 North Carolina Annual School Health Services

Report for Public Schools, 83,440 students were reported to have asthma and 3,199 students were reported to use peak flow monitoring during school. Asthma is also a significant cause of school absenteeism. The Burden of Asthma in North Carolina 2006 Report indicated that of children (age  $\leq 17$  years) with current asthma, almost half (47.5%) missed at least one day of school due to their asthma in the last year. Of that group, 37% of children with asthma missed between one and nine days of school in the past 12 months due to their asthma, and 10% of children with asthma missed 10 or more days.

Asthma episodes can be triggered by biological agents, chemical compounds and/or physical conditions. Biological triggers include viable and non-viable microorganisms, their products, and allergens such as fragments and dander from insects and fur bearing animals. Chemical triggers include outdoor air pollutants such as oxides of nitrogen, ozone, fine particles, industrial pollutants, motor vehicle exhausts, and volatile organic compounds (VOC's). Indoor sources of VOCs include building materials, furnishings, equipment, cleaning products, pesticides, paints and sealants, personal care products and air-fresheners. Ozone generating air cleaners can be potential asthma triggers. Physical conditions such as extremes or rapid changes in temperature

and humidity can also be asthma triggers. Controlling moisture is important to reduce molds, dust mites, and insect pests.

Teachers, students, custodians and maintenance staff should be educated and informed about the following recommended methods to reduce asthma triggers.

**Reduce biological triggers:** Reduce reservoirs by eliminating clutter and limiting upholstered furniture, carpets, stuffed animals and pets. Use Integrated Pest Management (IPM) to control insects and pests. IPM strategies and techniques exclude or make environmental conditions unfavorable for pest infestations, reducing the use of pesticides.

**Reduce Chemical Triggers:** Stop using air-fresheners, deodorizers, and ozone-generating air cleaners. When "Air Quality Action Days" are forecast, inform staff and teachers to keep windows closed and limit outdoor activities. Perform renovations such as painting when the school is unoccupied, using increased ventilation during and for several days after the work is completed. Use only school-approved chemicals.

**Reduce physical triggers:** Maintain, clean, calibrate, and adjust heating ventilation and air conditioning (HVAC) systems equipment to operate at design specifications. Operate HVAC systems to keep relative humidity below 60%.

**Enhance cleaning and maintenance practices:** Clean furnishings such as window blinds, bookcases, light fixtures, desks, chairs, bookshelves, chalkboards, white boards and cabinet tops using high efficiency particulate air (HEPA) vacuuming or damp-wiping to extract and remove soiling. Carpeting should be dry within 24 hours after steam (extraction) cleaning. Use medium-efficiency pleated filters in HVAC systems.

Reducing asthma triggers improves the school environment and benefits all students and staff. Healthy school environments promote student and teacher health and performance, and increase school attendance.

Information on controlling environmental asthma triggers can be found in the EPA document, *Managing Asthma in Schools* ([www.epa.gov/iaq/schools/asthma.html](http://www.epa.gov/iaq/schools/asthma.html)). ♦

**Reported Communicable Diseases, North Carolina, January-March 2008 (by date of report)\***

Disease	Year-to-Date (First Quarter)			1 <sup>st</sup> Quarter 2008	Comments / Notes
	2008	2007	Mean (2003-2007)		
Campylobacter	93	123	155	93	
Chlamydia, laboratory reports	2352	7656	7848	2352	
Cryptosporidiosis	9	8	15	9	
E. coli Shiga Toxin-producing	12	16	11	12	
Ehrlichiosis, Monocytic	5	3	6	5	
Foodborne, C. Perfringens	2	0	1	2	
Foodborne, Other	1	44	29	1	
Gonorrhea	1270	3811	4118	1270	
Haemophilus Influenzae	24	13	14	24	
Hepatitis A	9	6	20	9	
Hepatitis B	24	48	44	24	
Hepatitis B Carrier	162	84	175	162	
Hepatitis C, Acute	5	6	4	5	
HIV/AIDS	351	487	524	351	Note 1
Legionellosis	5	9	8	5	
Listeriosis	4	3	6	4	
Lyme Disease	2	5	14	2	
Malaria	2	4	6	2	
Meninccocal Invasive	3	4	7	3	
Meningitis, Pneumococcal	5	18	12	5	
Mumps	1	0	2	1	
Rabies	107	102	124	107	
RMSF	11	32	86	11	
Salmonellosis	177	337	286	177	
Shigellosis	25	14	86	25	
Strep A	43	39	33	43	
Syphilis, Total	125	159	130	125	Note 2
Toxic Shock Synd., Strep	1	3	2	1	
Tuberculosis	47	61	47	46	
Typhoid, Acute	3	1	1	3	
Vibrio, Other	2	1	2	2	
VISA/VRSA (Staph aureus)	1	0	0	1	
Whooping Cough	39	59	41	39	

\* Preliminary data, as of 3/31/2008. Quarters defined as 13-week periods. Diseases reported in 2008 define those listed in this table. Notes: 1. Earliest report with HIV infection or AIDS diagnosis; 2. Includes primary, secondary and early latent syphilis.

## **Maureen O'Rourke Named New Tuberculosis Program Manager**

We are excited to announce that Maureen O'Rourke was promoted to the position of Tuberculosis Program Manager in the Communicable Disease Branch, Epidemiology Section of the N.C. Department of Health and Human Services, effective April 8. Maureen is an assignee from the Centers for Disease Control and Prevention's Division of Tuberculosis Elimination and has been in Raleigh since March 2006. Here, Maureen has served as the assistant to the N.C. TB Medical Director, Dr. Carol Dukes Hamilton, providing technical and administrative leadership in the management of North Carolina's statewide tuberculosis control program. Maureen came to us from the Pennsylvania TB Program in Harrisburg, where she independently wrote the Human Resources Training Plan and assisted with the development of a TB program evaluation plan for Pennsylvania. Maureen began her career with CDC in Columbia, South Carolina in 1993 as a public health advisor in the sexually transmitted diseases (STD) program. Before that, she was a state disease intervention specialist (DIS) for a year and a half in Florida's Hillsborough and Manatee counties. Maureen also served three years on active duty in the United States Army and six additional years as a commissioned officer in the Medical Service Corps, Army National Guard. Please join Dr. Hamilton and the N.C. TB Program in congratulating Maureen on her new leadership position! ♦

## **Employee Recognition: Dr. Carl Williams Employee of the Quarter**

*Prepared by Patsy West, Administrative Assistant,  
Epidemiology Section*



Dr. Carl Williams began employment with the Occupational and Environmental Epidemiology Branch as a Public Health Veterinarian on January 12, 2004. For the past two years, he has been the manager of the Veterinary Public Health Program. Dr. Williams' efforts have focused on preventing exposure to rabies, avian influenza and other zoonotic diseases in North Carolina. He works closely with local health departments, animal control offices, physicians and veterinarians across North Carolina in helping to stop the spread of rabies and other zoonotic diseases. Under his leadership, almost one million rabies tags per year have been redistributed to local health departments and other facilities. As a member of the Veterinarian Infection Control Committee of the National Association of State Public Health Veterinarians, Dr. Williams helped develop a national compendium to control and prevent occupational exposures to zoonotic agents in veterinary practices. One of Dr. Williams' major accomplishments was his leadership role in the Centers for Disease Control and Prevention's World Rabies Day in September 2007. This CDC event increased awareness about rabies in North Carolina, the United States and the world. Dr. Williams is a champion of unwanted pets through the management of the spay/neuter program and is a guardian of humane treatment of animals.

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

State of North Carolina • Michael F. Easley, Governor  
Department of Health and Human Services • Division of Public Health  
Epidemiology Section • [www.epi.state.nc.us/epi/](http://www.epi.state.nc.us/epi/)

Dr. Jeffrey Engel, Chief  
Managing Editor, Jeffrey Engel  
Layout and Typesetting, Angela Green

Epidemiology Section Office (919) 733-3421  
General Communicable Disease Control Branch (919) 733-3419  
HIV/STD Prevention and Care Branch (919) 733-7301  
Occupational and Environmental Epidemiology Branch (919) 707-5900  
State Laboratory of Public Health (919) 733-7834  
Office of the State Medical Examiner (919) 966-2253  
Office of Public Health Preparedness and Response (919) 715-0919  
**Rabies Emergency Number - Nights, Weekends, Holidays (919) 733-3419**  
**EMERGENCY NUMBER - Nights, Weekends, Holidays (919) 733-3419**

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