

Summer 2014

The EpiNotes Newsletter

*North Carolina Department of
Health and Human Services*

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Cover: The virus is transmitted by *Aedes aegypti* and *Aedes albopictus* mosquitos. CDC.

What you need to know about Chikungunya.

By Carl Williams, DVM

Chikungunya fever is a mosquito-borne viral disease characterized by acute onset of fever and severe polyarthralgia. It often occurs in large outbreaks with high attack rates. Chikungunya virus was first identified in Tanzania in 1952 and the CDC has identified infected travelers returning to the US for many years. In December 2013, sustained transmission of Chikungunya virus was identified for the first time in the western hemisphere in the islands of the Caribbean. Since that time, over 470,000 cases have been reported to the World Health Organization from the western hemisphere. [1]

To date, all reported cases of chikungunya in NC have been imported cases, with acquisition of infection occurring in the Caribbean. However, due to the ongoing outbreak in the Caribbean, and due to the existence of a competent mosquito vector (*Aedes albopictus*, also call the *Asian tiger mosquito*) in North Carolina, it is possible that the virus could be introduced into the state's mosquito population and local transmission could occur. Recently the Florida Department of Health announced that local transmission of chikungunya virus had occurred among persons who had not left Florida. [2]

Preventing local transmission:

People who are infected with chikungunya virus are viremic (meaning the virus is circulating in their blood) for about 7 days beginning roughly two days prior to their onset of illness. During this time, if an Asian tiger mosquito bites the patient it could acquire the virus and transmit it to another person when it takes a subsequent blood meal. For this reason, local health

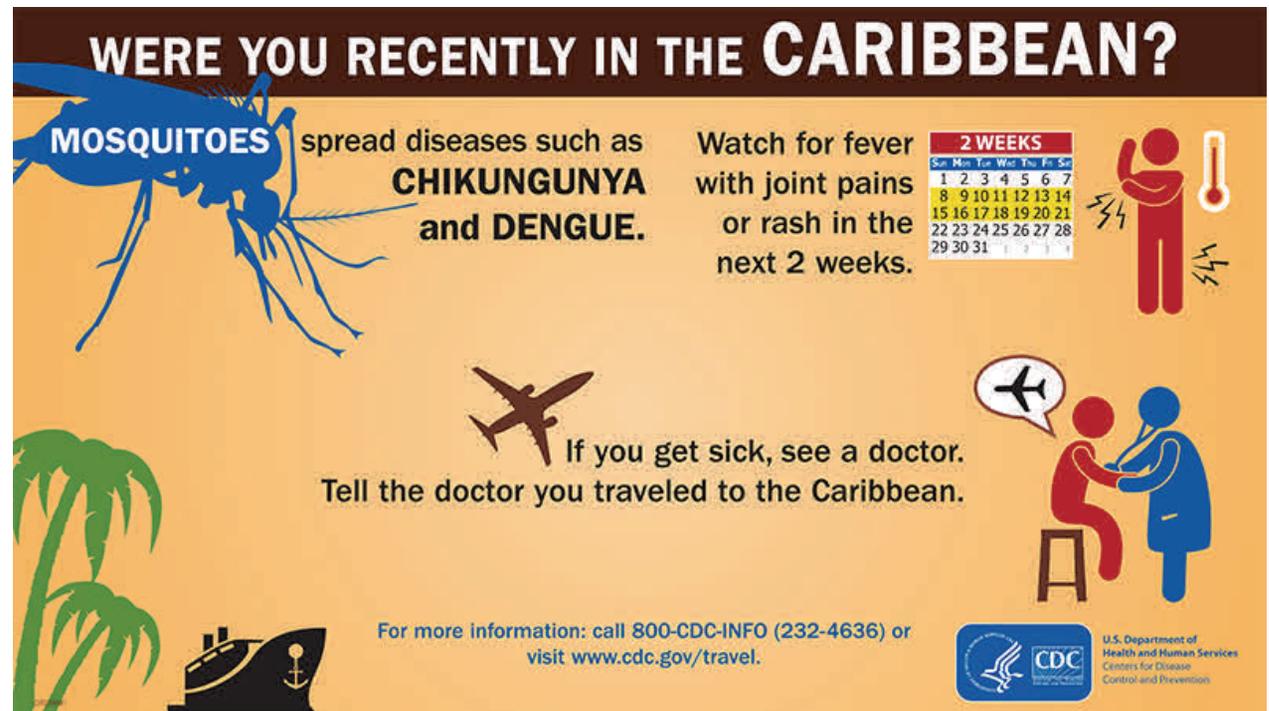


Figure 1. CDC chikungunya travel poster (CDC).

authorities and health care providers should instruct persons who may be infected with chikungunya to use methods to keep our local mosquitoes from becoming infected. This includes staying inside as much as possible, ensuring there are screens on the windows, reducing mosquito breeding sites, and using DEET and permethrin on exposed skin and clothing, respectively.

When should a person be tested for chikungunya virus infection (Figure 1)?

Scenario 1: If a patient has a clinically compatible illness, but they report no travel to an endemic area in the two weeks prior to symptom

onset and they live in a county in which no imported cases of chikungunya have been reported, then the likelihood of the illness being due to chikungunya virus infection is low. If the clinician wants to proceed with testing, we recommend using a commercial laboratory such as Quest or Focus. [3,4] Both antibody and PCR testing should be ordered.

Scenario 2. If a patient has a clinically compatible illness, and they report travel to an endemic area (including the state of Florida) in the two weeks prior to symptom onset or they live in a county in which imported cases of chikungunya have been reported, then the likelihood of the illness being due to chikungunya

virus infection is higher, though not quantifiable. To proceed with testing, we recommend using a commercial laboratory (as above) or using the CDC via the State Laboratory of Public Health (SLPH). CDC Dash form and shipping instructions: <http://www.cdc.gov/chikungunya/hc/diagnostic.html>. Please also complete form 3445: <http://slph.ncpublichealth.com/virology-serology/special-serology.asp> to accompany the CDC DASH form. Have specimens shipped to SLPH, who will forward them to CDC.

Reporting chikungunya virus infections:

While chikungunya is an arbovirus, it does not generally cause a neuroinvasive illness and would not be regarded as reportable by clinicians per 10A NCAC 41A .0101. However the state health director has signed an emergency order specifically making chikungunya reportable. The CD branch is working to formally amend 10A NCAC 41A .0101 to include chikungunya and is also developing an NC EDSS form to accept chikungunya case data electronically. Laboratories have always been required to report “Arthropod-borne virus (any type).”

Presentation and acute disease:

Chikungunya fever affects all age groups and both genders. Following an incubation period of 3-7 days (range: 1-12 days) from the mosquito bite, the virus causes a febrile illness usually associated with arthralgia/ arthritis (87%), backache (67%) and headache (62%). The joint pain tends to be worse in the morning, relieved by mild exercise and exacerbated by aggressive movements. Ankles, wrists and small joints of the hand tended to be the worst affected.

Long term sequelae:

In a majority of the patients, symptoms resolve in 1 to 3 weeks. However, some patients might have relapse of rheumatologic symptoms (e.g., polyarthralgia, polyarthritis, tenosynovitis) in the months following acute illness. Variable proportions of patients report persistent joint pains for months to years. Neurological, emotional and dermatologic sequelae are also described. Older individuals and those with underlying rheumatic and traumatic joint disorders seem to be more vulnerable to develop the chronic joint symptoms. Mortality is rare and occurs mostly in older adults.

Differentiating chikungunya from dengue:

As stated by the CDC, it can be difficult to distinguish chikungunya and dengue based on clinical findings alone (Table 1). Chikungunya and dengue viruses are transmitted by the same mosquitoes and the viruses can circulate in the same area and cause occasional co-infections in the same patient. Chikungunya virus is more likely to cause high fever, severe polyarthralgia, arthritis, rash, and lymphopenia. Dengue virus is more likely to cause neutropenia, thrombocytopenia, hemorrhage, shock, and deaths. Patients with suspected chikungunya should be managed as dengue until dengue has been ruled out. Ideally patients should be tested for both infections at the same time.

Table 1 – Comparison Chikungunya and Dengue (*) [courtesy of CDC].

Clinical features	Chikungunya fever	Dengue fever
Fever	+++	++
Myalgias	+	++
Arthralgias	+++	+/-
Rash	++	+
Bleeding dyscrasias	+/-	++
Shock	-	+/-
Leukopenia	++	+++
Lymphopenia	+++	++
Neutropenia	+	+++
Trombocytopenia	+	+++

Adapted from PAHO/WHO Preparedness and response for Chikungunya virus in the Americas, 2010 (*) Mean frequency of symptoms from studies where the two diseases were directly compared among patient seeking care; +++ = 70-100% of patients; ++ = 40- 69%; + = 10-39%; +/- = <10%; - = 0%.

References:

- 1) World Health Organization. http://www.paho.org/hq/index.php?option=com_topics&view=article&id=343&Itemid=40931.
- 2) Florida Department of Health. <http://newsroom.doh.state.fl.us/wp-content/uploads/newsroom/2014/05/071714-Locally-Aquired-Chikungunya.pdf>.
- 3) Quest Diagnostics. Chikungunya Antibodies (IgG, IgM) with Reflex to Titer. <http://www.questdiagnostics.com/testcenter/TestDetail.action?ntc=70188>
- 4) Focus Diagnostics. Chikungunya Antibodies (IgG, IgM) with Reflex to Titer. http://www.focusdx.com/focus/1-reference_laboratory/search_frame.asp?f=3

Public Health Preparedness for the 2014 U.S. Open.

By Amanda Fuller-Moore, PharmD

The 2014 back to back play of the Men's and Women's Golf U.S. Open was the first time the United States Golf Association (USGA) had held the events in consecutive weeks on the same course. The event drew over fifty thousand visitors to the Village of Pinehurst daily during the Men's open (June 12-15, 2014) and over thirty thousand daily during the Women's Open (June 19-22, 2014).

With a population of just over 15,000, Pinehurst, NC was inundated with attendees. The event strained traffic, hotels, restaurants, public safety, and health and medical staff of Moore County.

Even with Moore County's existing public health capacity to manage the regular disease burden affecting their own population (including occasional outbreaks), the influx of large numbers of people attracted to the event could have placed severe strains on these services, compromising the ability to detect a developing problem and carry out an effective response.

Staff from the Division of Public Health and Moore County Public Health worked together to manage many issues. Here are a few highlights :

Surveillance – Staff monitored for communicable disease outbreaks, trends in injuries and

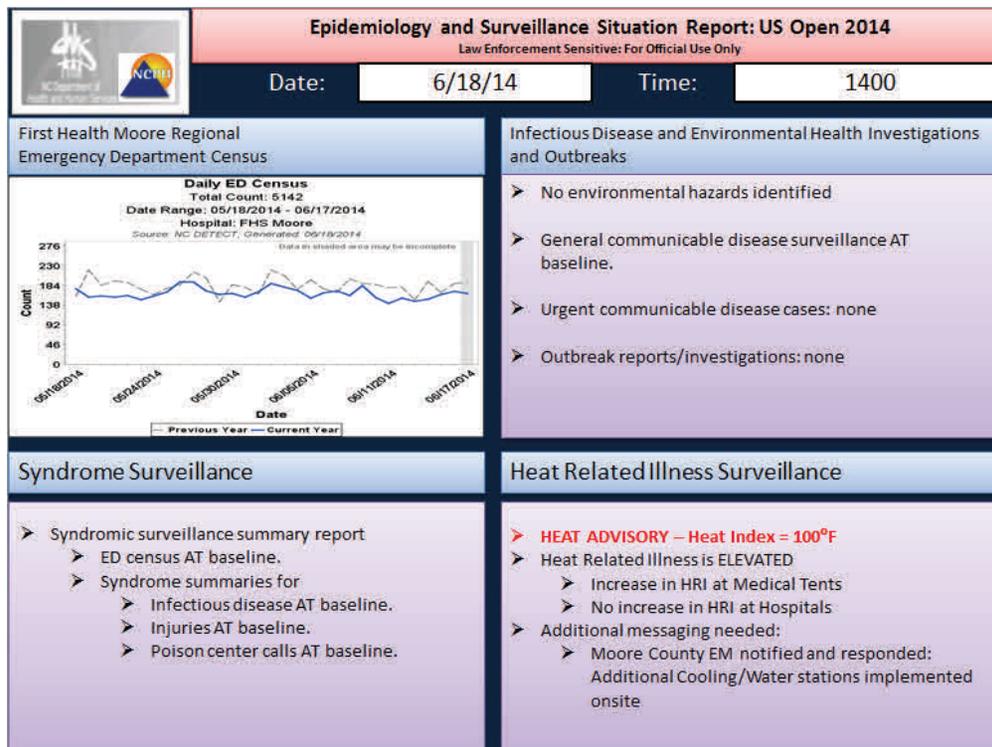


Figure 1. An example of the daily U.S. Open Surveillance Report.

environmental exposures that could impact the event. An NC DETECT dashboard was specifically created for this event to facilitate routine monitoring of syndromes and injuries in both emergency department and Carolina Poison Center data. NC DETECT data was supplemented by daily reports from on-site medical tents and EMS bike teams.

Surveillance revealed no disease outbreaks but did identify increases in heat related illnesses (Figure 1) leading public health to work with the USGA to increase public messaging about heat

and the importance of hydration. As a result, USGA and Emergency Management ensured greater access to water and water cooling stations for visitors throughout the event site.

Environmental Health Inspections – Staff inspected concessions, restaurants and hotels according to state rules and regulations to prevent injury and illness. Over 350 concession site inspections (finding over 250 instances of non-compliance with the food safety codes) were completed by the Environmental Health staff working under the authority of the Moore County Health Department.

Surge Capacity – The state supplied trained staff in excess of routine Moore County Health Department resources particularly for environmental health inspections, epidemiology and countermeasures. NC DPH signed Delegation of Authority agreements with Moore and neighboring counties to provide Moore County with surge capacity for environmental health activities.

The Men's and Women's US Open tournaments were excellent examples of state and local public health agencies working together hand-in-hand to ensure visitors from around the world could safely enjoy the tournaments.

Resolving Arsenic Contamination of Private Well Water in the Bullard Circle Community in Cumberland County.

By Ken Rudo, PhD, Sara J. Smith, CHES and Ricky Langley, MD, MPH

33 As Arsenic 74.92160	34 Se Selenium 78.96
51 Sb Antimony	52 Te Tellurium

Arsenic found in drinking water is a significant human health concern, especially in North Carolina. Since 1998,

the Occupational and Environmental Epidemiology Branch (OEEB) has identified over 7,000 private wells with arsenic levels that exceed 10 parts per billion (ppb) recommended by the Environmental Protection Agency's (EPA) Maximum Contaminant Level (MCL) (1). Arsenic is a known human carcinogen and is causally associated with human skin, bladder and liver cancer (2). Arsenic also has non-cancer health risks associated with long term exposure that include developmental effects, neurotoxicity, and cardiovascular disease.

During November 2013 until March 1, 2014, the OEEB evaluated private well water samples in the Bullard Circle community in Cumberland County for arsenic contamination. Twenty-seven (45%) out of approximately 60 private wells sampled in the community had arsenic levels exceeding the EPA's MCL. Three of these wells had levels between 30-33 ppb and two were greater than 100 ppb. The source of arsenic was most likely natural (i.e., geological) and not a result of man-made contamination. OEEB sent each affected resident a Health Risk Evaluation informing them of their levels and whether they exceeded the EPA MCL. For the residents with levels exceeding the arsenic MCL,



OEEB made recommendations for no well water consumption, including the utilization of well water for drinking, food preparation, making drinks such as coffee and tea, and making ice. No recommended restrictions were made for bathing, showering, washing clothes and dishes.

In a meeting held on March 11, 2014 with Cumberland County and City of Fayetteville officials, OEEB and the Cumberland County

Health Department presented their concerns for the Bullard Circle residents, as well as a desire for a permanent potable water solution for this community. On March 20, 2014, in a community meeting, Bullard Circle residents expressed a desire not to be annexed by the City of Fayetteville in order to get water lines. With the aid of the Cumberland County Health director, the Fayetteville Public Works Commission announced it had extended the water line to the Bullard Circle community, resulting in a permanent potable drinking water source for the Bullard Circle community. OEEB assisted the residents of this community in their communication with county and city officials toward an acceptable agreement for running water lines in this area of Cumberland County. This will result in the Bullard Circle community having a permanent, potable water source. The Bullard Circle community arsenic contamination investigation was an example of residents, state, county and city officials working together to protect the public health of North Carolina residents from a drinking water contamination event.

References:

1. Environmental Protection Agency. Arsenic in Drinking Water. Available at: <http://water.epa.gov/lawsregs/rulesregs/sdwa/arsenic/index.cfm>.
2. Agency for Toxic Substances and Disease Registry. Arsenic. Available at: <http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=3>.

Occupational Carbon Monoxide Exposures in North Carolina , 2014.

By Annie Hirsch, MPH

The Occupational and Environmental Epidemiology Branch (OEEB) conducts surveillance of acute toxic substance releases and their public health consequences through the National Toxic Substance Incidents Program (NTSIP). OEEB staff conduct public health investigations after significant incidents that result in injuries, evacuations or that effect vulnerable populations. Over the past year, OEEB has investigated an increasing number of occupational exposures to carbon monoxide (CO) that resulted in injuries and evacuations. OEEB staff learn of these exposures from a variety of sources, including the N.C. Emergency Operations Center, N.C. DETECT, fire departments and media reports.

To quantify and describe the injuries related to an occupational CO exposure, staff create a line list of injured persons and obtain information from the Carolinas Poison Center (if they received a call about the exposure) and the hospital where the victims were treated. Staff also follow-up with the fire department that responded to the incident to learn about the exposure source and the public health actions taken, including evacuation and environmental sampling. In addition, OEEB's medical consultant and industrial hygiene consultants are often asked to provide consultation on the medical care of the injured persons and the source of the exposure. OEEB staff notify the N.C. Occupational Safety & Health Administration (OSHA) if a CO exposure results in the death of an employee or the in-patient hospitalization of three or more employees.

Any business that operates combustion powered equipment or power tools indoors or in confined spaces is at risk for a CO exposure. OEEB has investigated five occupational CO exposures in the past year that resulted in employee injuries and evacuations. These exposures occurred at a produce packing facility, a restaurant, an ink manufacturing company, a printing company and a construction site inside a mall. Two of the exposures were caused by a generator, while



Indoor use of mobile equipment can create unsafe levels of carbon monoxide if the equipment is not properly serviced and maintained and a dilution flow of air is not established.

Photo courtesy of NIOSH

the other three were caused by a forklift, a welder, and a heating and cooling system.

The highest indoor airborne concentration of CO measured by firefighters during these incidents ranged from 150 parts per million (ppm) to 2214 ppm. According to the EPA's Acute Exposure Guideline Levels, exposure to an airborne concentration of CO above 150 ppm for 30 minutes has the potential to cause irreversible or serious, long-lasting adverse health effects, and exposure above this concentration for 4 hours has the potential to cause life-threatening health effects or death.

In total, 27 employees were taken to the emergency department for CO poisoning after the five occupational CO exposures. Symptoms experienced by these employees included headache, dizziness, loss of consciousness, chest pain, nausea, weakness and impaired memory. The majority of the injured employees were treated with oxygen therapy and released, but at least one employee was admitted for observation, one was transferred to a South Carolina hospital to receive hyperbaric treatment, and one died.

References:

To educate workers on the dangers of carbon monoxide exposure and how to prevent it, OEEB staff have developed a fact sheet in English and Spanish, a radio public service announcement, and an animated YouTube video, which are available on the Web at :

http://epi.publichealth.nc.gov/oe/a_z/co.html.

Ebola

By Zack Moore, MD, MPH and Aaron Fleischauer, PhD, MSPH

National and international health authorities are currently working to control the large, ongoing outbreak of Ebola involving areas in West Africa. While 2 American health care workers were treated in the U.S., no case has been diagnosed in the United States. As of September 1, 2014, the cumulative case count of Ebola virus disease (EVD) was 6,263 including 2,917 (47%) deaths in five countries: Guinea, Sierra Leone, Liberia, Nigeria and most recently Senegal. A smaller and apparently unrelated outbreak has recently been reported in the Democratic Republic of Congo.

EVD is a rare and deadly disease. The disease is native to several African countries and is caused by infection with one of the Ebola viruses (Ebola, Sudan, Bundibugyo, or Tai Forest virus). It is spread by direct contact with a sick person's blood or body fluids. It is also spread by contact with contaminated objects or infected animals. The incubation period for EVD is usually 8–10 days, but could potentially range from 2–21 days. The risk for person-to-person transmission of hemorrhagic fever viruses, to which Ebola belongs, is greatest during the latter stages of illness when viral loads are highest. Ebola is not transmissible during the incubation period (i.e., before onset of fever).

Symptoms of EVD include fever, headache, joint and muscle aches, sore throat, and weakness, followed by diarrhea, vomiting, and stomach pain. Skin rash, red eyes, and internal and external bleeding may be seen in some patients.

EVD should be suspected in febrile persons who, within 3 weeks before onset of fever, have either:

- Traveled in the specific local area of a country where EVD has recently occurred;
- Had direct unprotected contact with blood, other body fluids, secretions, or excretions of a person with EVD; or
- Had a possible exposure when working in a laboratory.

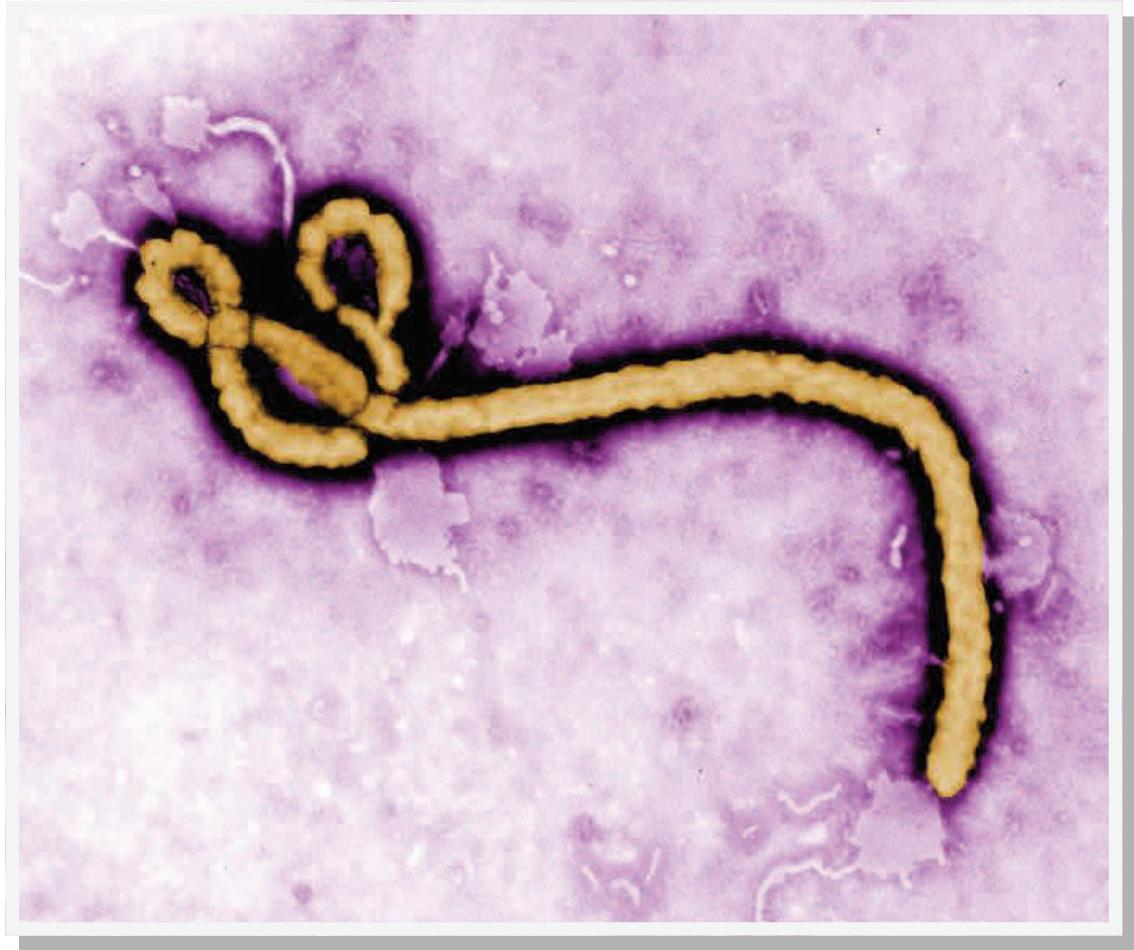


Figure. Colorized transmission electron micrograph on Ebola virus. (CDC).

Testing for Ebola is currently available through the CDC. Prior consultation and approval from public health officials is required.

Guidance for providers, health departments, laboratories and other groups in North Carolina is available at <http://epi.publichealth.nc.gov/cd/diseases/hemorrhagic.html> or by contacting NC DPH on-call epidemiologist at **919-733-3419**. Updated information and guidance are also available from the CDC at <http://www.cdc.gov/vhf/ebola>.

The Communicable Disease Branch Welcomes Drs. Anne Hakenewerth and Erika Samoff



On May 15, 2014, Dr. Anne Hakenewerth joined the Communicable Disease Branch as the Surveillance Systems Unit (SSU) Manager and will oversee NC EDSS, NC DETECT and meaningful use activities.

Dr. Hakenewerth comes to the Branch with an impressive

background in public health and health informatics. From 2012 to 2014, she was the Senior Epidemiologist and Manager of the Epidemiology Group at the Texas Cancer Registry where she led a staff of seven epidemiologists and directed cancer-related epidemiologic studies. In 2011, she joined the Carolina Center for Health Informatics as the Director of Research. She also served as the Director of Health Informatics from 1997 to 2006 at the University of North Carolina at Charlotte in the College of Health and Human Services.

Dr. Hakenewerth received her undergraduate degree in biology from Saint Louis University. She received her master's degree in Biology from UNC-Charlotte and her doctorate in Epidemiology from UNC-Chapel Hill Gillings School of Global Public Health.



On September 3, the Communicable Disease Branch welcomes Dr. Erika Samoff as the Manager of the HIV/STD Surveillance

Unit. Erika will oversee HIV/STD epidemiology and surveillance programs as well as HIV special projects including the Medical Monitoring Project.

Dr. Samoff comes to the Branch with many years of epidemiologic experience at the local, state and national levels, particularly in the areas of STD epidemiology and surveillance system evaluation. Prior to joining NC DHHS, Erika worked for the Institute for Public Health and state and local government agencies. Her most recent work, in Durham County, used health data to support conversations among county staff, community organizations, and residents to develop county health policy.

Her past work focused on the use of data and informatics to support public health practice, including a focus on STI program evaluation at the State of California Department of Public Health. She was an Epidemiologic Intelligence Service Officer at the Centers for Disease Control and Prevention Sexually Transmitted Diseases Prevention Branch, where she completed projects focused on HPV, syphilis, and HIV. She completed an MPH in Hospital and Molecular

Epidemiology at the University of Michigan in Ann Arbor and a PhD in Microbiology and Epidemiology at Yale University. Her research has appeared in peer-reviewed publications such as the American Journal of Public Health and the American Journal of Epidemiology and Public Health Reports. Dr. Samoff's goal is to use expert and community input to develop effective prevention and treatment programs.

Save the Date!

6th Annual
Communicable
Disease Conference

April 29—May 1,
2015
Raleigh, NC

NC EDSS Upgraded to Maven version 5.0

By the Surveillance Systems Unit

The Surveillance Systems Unit (SSU) in the Communicable Disease Branch facilitates expansion and innovation of electronic disease surveillance in North Carolina. The SSU is actively engaged in a variety of projects including onboarding electronic laboratory reporting into NC EDSS and integrating records from multiple disparate HIV surveillance and patient care sources into a single data warehouse. The SSU also provides routine and specialized NC EDSS training and Help desk support.

The SSU is proud to announce the recent upgrade of the Maven software that supports NC EDSS. On August 23rd, SSU staff worked with dedicated DPH IT staff to successfully upgrade Maven to version 5.0.

The most noticeable change to NC EDSS is the “splash page” that will now serve as the user’s NC EDSS homepage. The splash page continues to use some of the same icons for navigating NC EDSS such as “create an event”, but also includes many new features. For example, the left side of the page includes a workflow listing, tasks and recent cases. The recent cases section allows for bookmarking events for future use. The right side of the page provides links to important resources such as the CD Manual or emailing the Help Desk.

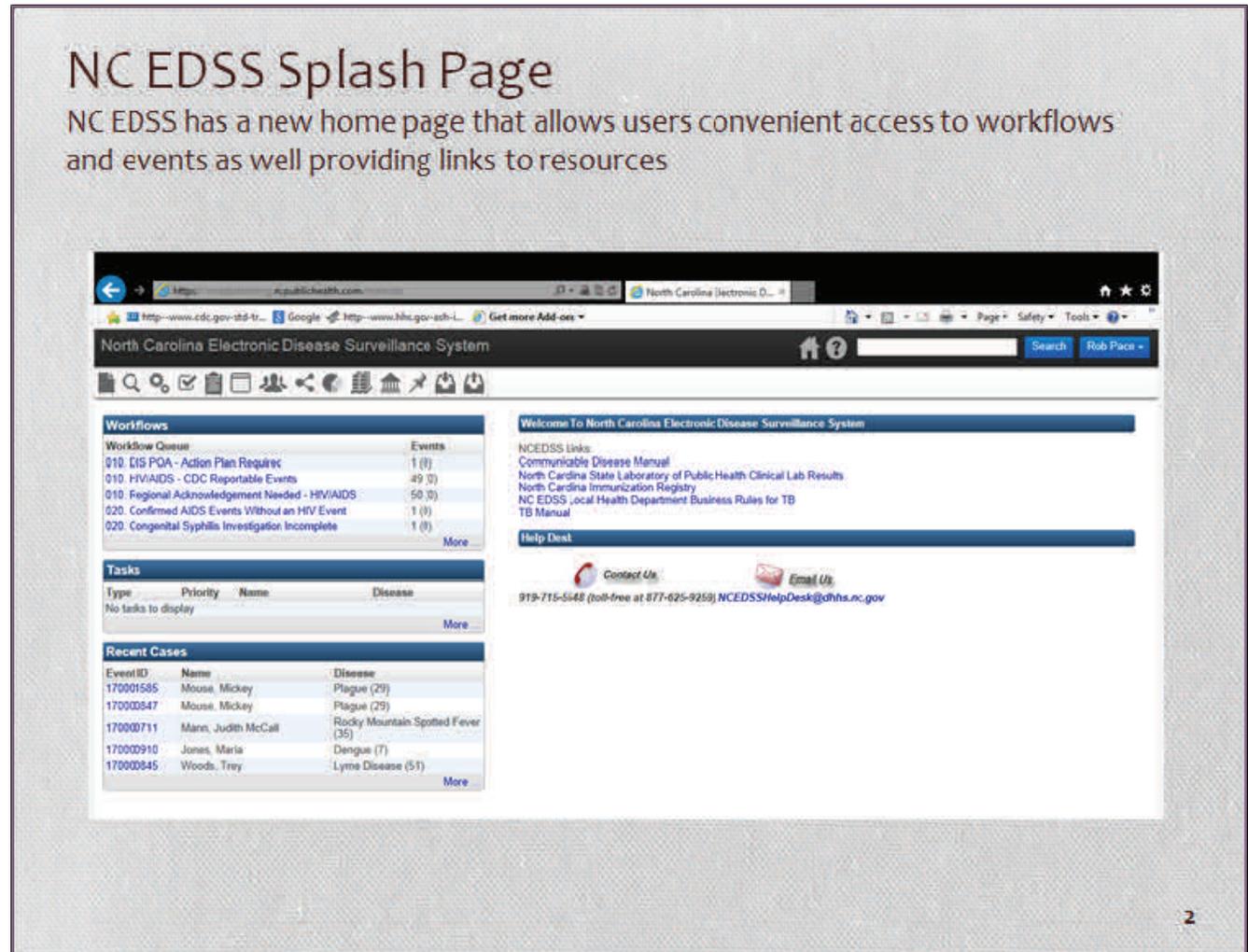
Another useful upgrade is the display of laboratory information. A new lab display shows all tests that have been entered and new functionality allows these tests to be sorted.

Workflows also have added functionality. They can be filtered by date, disease type, jurisdiction or any number of parameters.

Most of the changes in the upgrade are straight-

forward and transparent to users and improve the storage and retrieval of data. This NC EDSS upgrade will eventually provide a more interactive capability for creating customized data reports for local health departments.

If you have any questions about NC EDSS capabilities, please contact the NC EDSS Helpdesk at (919) 715-5548.





Pictured from L-R: John Peebles, Dr. Megan Davies, Recipient John Furnari, Jacquelyn Clymore and Evelyn Foust

Employee of the Quarter: **John Furnari**

Mr. John Furnari is being recognized for his leadership and service excellence to the 50 million dollar North Carolina AIDS Drug Assistance Program (ADAP). ADAP is housed within the HIV/STD Unit of the Communicable Disease Branch. John's accomplishments are many. For example, he successfully implemented the State's Pharmaceutical Assistance Program (SPAP), which generates significant savings and revenue each quarter that is then applied to supporting the rest of ADAP's clients. John oversaw the end of the ADAP waiting list and the restoration of both the medication formulary and the eligibility levels of the program. He reorganized the methods for tracking and accounting for

budget and enrollment to assure that the state can provide near real-time information about the budget for medication and the number of clients who can be served each year. He has reorganized all aspects of data management and analysis within ADAP and reorganized staff assignments,

assuring more efficient processes. These program efficiencies include monthly tracking of medication dispenses, costs and number of clients served.

John is regularly called on by Section, Division and Department leadership to provide information, talking points and data about ADAP operations, as well as future forecasting about program needs, which he does with considerable skill and precision. In addition, John created an expedited process that assures that clients with an emergency need for medication can be served. He has spoken before the Legislative Oversight Committee for ADAP, written RFPs and overseen all aspects of new contracts put in place for pharmacy benefits management. Importantly, John has assured in every way possible that ADAP operates efficiently with optimal use of resources and in a manner that is most beneficial to clients. Mr. Furnari has revolutionized how North Carolina runs ADAP!

Epidemiology Section Offices

Communicable Disease Branch
(24/7 on-call)

919-733-3419

HIV/STD Program

919-733-7301

TB Program

919-733-7286

Occupational & Environmental
Epidemiology Branch

919-707-5900

Public Health Preparedness
and Response

919-715-0919

PHPR Emergency 24/7

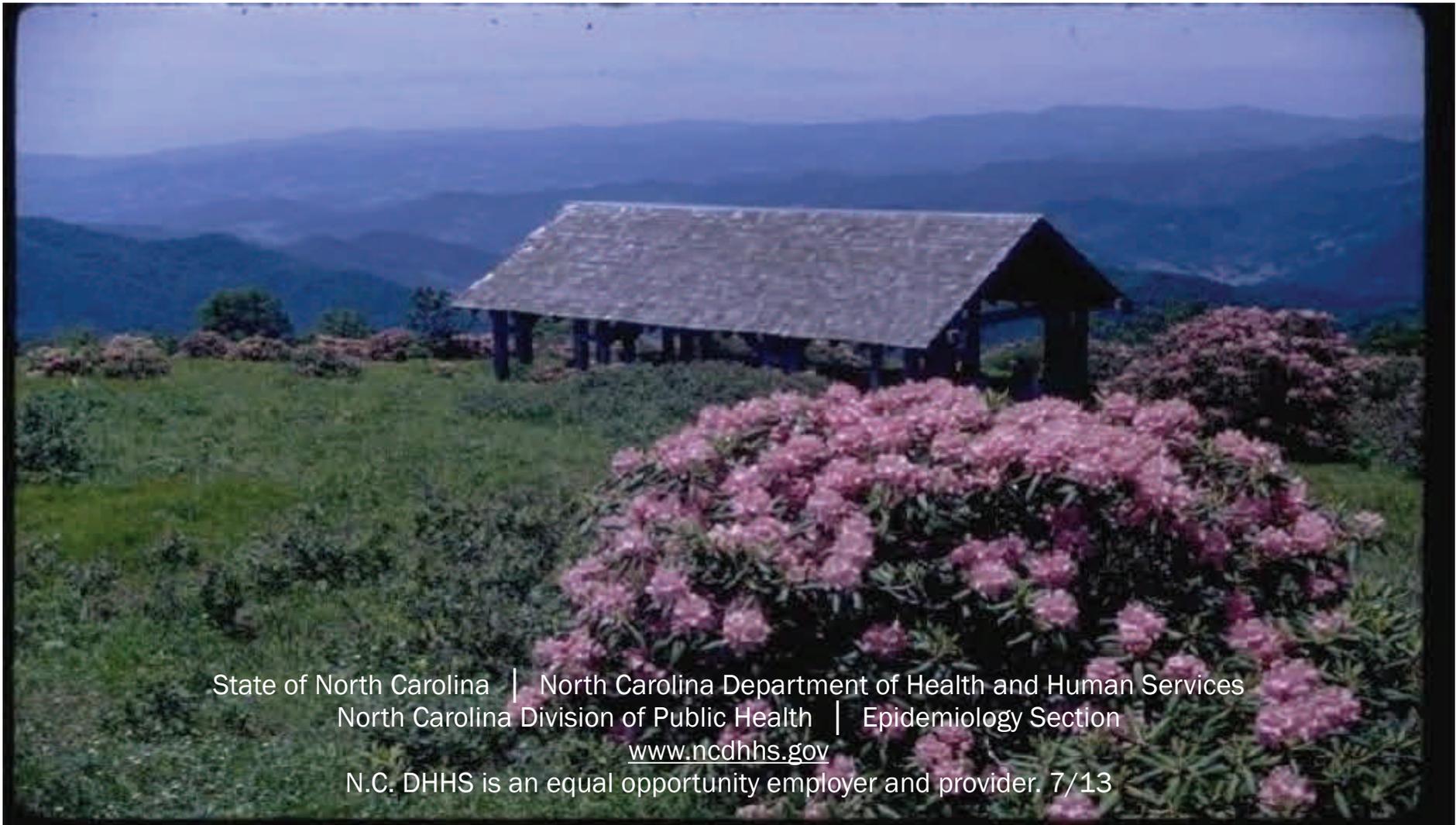
919-820-0520

Rabies Emergency
(Nights, Weekends, Holidays)

919-733-3419

State Laboratory of Public Health

919-733-7834



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“Craggy Gardens”. Photo courtesy of NC.gov

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