North Carolina Institute of Medicine
Task Force on Prevention
March 27, 2009
Meeting Minutes
Infectious Disease and Food-borne Illness

Chairs: Jeff P. Engel, MD and Bob Seligson, MBA

Task Force Members/Steering Committee Members: Tom Bacon, Steve Cline, John Frank, Kathy Higgins, Polly Johnson, Peter Lehmuller, Meg Molloy, Peg O'Connell, Bob Parker, Mary Piepenbring, Kelly Ransdell, George Reed, Vandana Shah, Bill Smith, Danielle Breslin, Ruth Petersen, Marcus Plescia, Carol Runyan, Meka Sales

Interested Persons and Speakers: David Bergmire-Sweat, Benjamin Chapman, Megan Davies, DeeDee Downie, Patti Forest, Pam Highsmith, Pam Jenkins, Peter Leone, Gerri Matson, Larry Michael, Joe Reardon, Jessica Schorr Saxe, Jeff Spade, Walker Wilson, Elizabeth Zurick, and Bart Campbell

NCIOM Staff and Interns: Pam Silberman, Mark Holmes, Jennifer Hastings, Berkeley Yorkery, Thalia Shirley Fuller

Infectious Disease in North Carolina, Overview: *Steve Cline, DDS, MPH, Deputy State Health Director, North Carolina Department of Health and Human Services.*

Dr.Cline presented the history of infectious disease, principles of communicable disease, surveillance, investigation and control measures, trends in reportable diseases, and emerging infections.

A communicable disease is defined as an illness due to an infectious agent that is transmitted from an infected person, animal, or inanimate source though a plant or animal host or other vector to a susceptible host. The epidemiologic triad includes an agent, the environment, and a host. Transmission can be either direct (e.g. person to person via droplet transmission from a sneeze) or indirect (e.g. via an in-between carrier such as food, water, or kitchen equipment).

A vector is a living animal that has the ability to transmit infection from one host to another. Vector-borne diseases of concern in North Carolina include Lyme Disease, Rocky Mountain Spotted Fever, Ehrlichiosis, West Nile Virus, LaCrosse Encephalitis, and Eastern Equine Encephalitis. Prevention efforts can focus on the agent, environment, or host. Vaccines, for example, make the host less susceptible. Pesticides, restaurant inspections, and removal of standing water address are environmental approaches.

North Carolina has strong public health laws and rules regarding controlling and recognizing communicable diseases.
There are approximately 65 reportable conditions in North Carolina. Constant vigilance is important as changes in the population can affect prevalence of infectious diseases. Tuberculosis has not been eliminated due to comorbidity with HIV and decreased effectiveness of drugs. The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) is an innovation within the North Carolina Public Health Information Network that enables e-communication with every hospital and emergency department in the state to monitor infectious diseases in near real-time. A total of 22 data elements must be reported to the state every at least every 12 hours. Data collected from emergency departments allows public health messages to be modified to reflect information gathered.

Of infectious diseases (excluding STD/HIV), salmonella, followed by Hepatitis B, campylobacteria, Rocky Mountain Spotted Fever, and "other" food-borne illness, were the five most commonly reported diseases and conditions in North Carolina from 2004-2008. During the same time period, reportable diseases causing the highest mortality include strep A, influenza, salmonella, pneomococcal meningitis, and hepatitis B.

The following infectious diseases are of particular importance to the Prevention Task Force: HIV/STD, vaccine-preventable diseases (influenza, pertussis, hepatitis B, and meningococcal); vector-borne diseases (Lyme disease, Rocky Mountain Spotted Fever, and Arbovirus infections); and food-borne diseases (salmonella, campylobacteria, etc.).

Vaccine Preventable Diseases: *Gerri Matson, MD, FAAP, Medical Epidemiologist, Children and Youth Branch, North Carolina Division of Public Health*

Vaccine-preventable diseases must be reported, investigated, and controlled. Vaccine-preventable diseases (VPDs) causing significant morbidity in North Carolina are influenza (#1), rotovirus (#2), and pertussis (#5). Mortality from VPDs is led by pneumococcal meningitis (#1), influenza (#1, although it is not reportable), and meningococcal (#3).

Influenza
Influenza is underreported because it is a vague condition; there are many influenza-like illnesses (ILI). North Carolina has a sentinel surveillance network that monitors strains of flu through sample collection. Three percent of doctor visits are due to influenza-like illness (ILI). Physicians report ILI to the Centers for Disease Control and Prevention. The information is then used to control outbreaks, determine appropriate treatment, and vaccine efficacy. Influenza and pneumonia led to approximately 1,700 deaths in North Carolina in 2007, and leads to 6,000-10,000 hospitalizations per year. Young children are flu vectors.

Pertussis (Whooping Cough)
Pertussis is endemic in North Carolina. There were approximately 300 cases this year in North Carolina. Adults and children who do not know they have the disease are the vectors. There are many obstacles and misconceptions about outbreaks in North Carolina. For example, providers do not always notify the local health department when Pertussis is suspected and providers do not want to treat asymptomatic contacts. Pertussis vaccination should be given with every Tetanus shot and to everyone.

Haemophilus Influenza, Type B
Haemophilus influenza, also called H-flu, can cause meningitis and pneumonia. It does not cause the flu (influenza). In 2007, the state had a vaccine shortage (there were five cases in 2008). From 2004-2008, there were 17 cases. Increased asymptomatic carriage is being seen due to deferral of the booster vaccine.

Measles, Mumps, and Meningococcus
There were 6 cases of measles, 98 cases of mumps, and 138 cases of meningococcal disease in North Carolina from 2004-2008. No deaths were caused by measles or mumps; however, there were 13 meningococcal deaths.

Vaccines
North Carolina has a universal vaccine distribution program to increase access to required vaccines. Current state funding for this program is $20 million. At this time, the state is not able to provide all those vaccines recommended by the CDC. Issues vaccines face include access, supply, distribution, administration, safety, public distrust, and financing/funding. Nationally, 18% of parents delay or refuse some vaccines. In North Carolina, refusal is allowed by law for two reasons: religious reasons and medical contraindications. The CDC controls 20% of the flu vaccines; the private sector controls the rest.

Dr. Mattson provided the following recommendations to the Task Force:

1) Increase influenza vaccination rates
    a. -Expand coverage with state supplied flu vaccine for all children 6 months to 18 years of age. This would cost $9 million to expand to 18 year-olds. A two-year incremental approach is suggested.
    b. -Develop and fund ongoing school influenza vaccination programs. (Current uptake in schools is an estimated 50%.) This would cost approximately $6.50 per child. The Immunization Branch, North Carolina Division of Public Health would work with local health departments to develop/promote this program.

2) Implement an outreach program to increase Tdap (Tetanus plus Pertussis vaccine) immunization rates targeting emergency rooms and newborn contacts. The vaccination has been out since 2005. The Immunization Branch, North Carolina Division of Public Health promotes Tdap and also promotes that people around newborns should be vaccinated.
3) Restore universal coverage for all CDC recommended vaccines for children. This would cost $35 million annually in addition to existing state funding for coverage.

Vector-borne Disease
Megan Davies, MD, Medical Epidemiologist, Communicable Disease Branch, North Carolina Division of Public Health

Vector-borne diseases (VBD) are transmitted to humans or other animals by insects or other arthropods. The most common vectors in North Carolina are ticks and mosquitoes. Diseases that mosquitoes carry are referred to as arboviruses. Mosquitoes acquire virus from reservoir hosts, which are typically small mammals or birds. Those VBDs of concern include Lyme disease (a bacterial disease), Rocky Mountain Spotted Fever and Erlichiosis (Ricketssial diseases), West Nile Encephalitis, LaCrosse Encephalitis, Eastern Equine Encephalitis (viral diseases), and STARI (Southern Tick Associated Rash Illness, unknown disease-type).

Lyme Disease
Lyme Disease, which affects the heart, nervous system, and joints, is the most common tick-borne illness in the US. Transmission, diagnosis, and treatment are controversial. From 1992-2006, there were 141 cases in North Carolina.
Lyme Disease is often confounded by STARI. Prevalence among females in North Carolina is higher than the national prevalence. Illness onset is highest May through July.

Rocky Mountain Spotted Fever
Rocky Mountain Spotted Fever's (RMSF) vector is the dog-tick and it is the most common vector-borne disease in the state. It is a potentially fatal disease with a 3-5% mortality rate with treatment. North Carolina's incidence rate is 4-10 times that of the country; however, mortality in North Carolina is less than 1% due to high awareness among clinicians or infection with less pathogenic Rickettsiae. Of racial and ethnic groups, whites and non-Hispanics are most likely to contract RMSF. Illness onset peaks in summer months.

Human Monocytic Ehrlichiosis
Ehrlichiosis has case numbers similar to Lyme Disease. Illness onset peaks from May to July.

In North Carolina, various steps are being taken to reduce morbidity and mortality caused by VBD. The state's Vector Borne Disease Task Force meets quarterly to coordinate prevention, control, research, outreach, and education. In addition, outreach is being conducted to clinicians and to the general public.

Dr. Davies provided the following recommendations to the Task Force:
1) Expand outreach campaign to the public about prevention of VBD in general and tick-borne diseases in general.
2) Expand outreach to health care providers emphasizing appropriate and timely treatment in accordance with guidelines (from the Infectious Disease Society of America, Morbidity and Mortality Weekly Report, and American Academy of Neurology) and appropriate diagnostics for surveillance
3) Differentiate STARI from Lyme Disease by expanding UNC/CDC study in progress to learn more about STARI and develop a better understanding of Spotted Fever Group Rickettsiae.

Food Safety and Defense: What It Means for North Carolina
Pam Jenkins, EdD, CNS, MSN, RN, UNC Chapel Hill School of Nursing

Food safety involves accidental contamination (e.g. cutting board contamination), while food defense refers to deliberate contamination (e.g. agroterrorism). The food process chain in North Carolina is fragmented and

regulated in parts. The food process chain involves various agencies including the North Carolina Department of Agriculture, North Carolina Department of Transportation, North Carolina Department of Agriculture (NCDA), North Carolina Department of Environment and Natural Resources (DENR), US Department of Agriculture, and US Food and Drug Administration.

Most of the time, what specifically causes food-borne illness (FBI) is not known. However, numbers are increasing because states have capacity to test. Nationally, Salmonella is probably 40x underreported. The indirect and direct cost per case of FBI is approximately $3,000. Common contributory factors to FBI include contamination, proliferation (bacteria or virus growth due to foods remaining at room or warm temperatures for several hours), survivability factors (survival of bacteria or virus due to insufficient cooking or heating time), and bacterial outbreaks (raw product or ingredient contamination by pathogens).

The North Carolina Department of Agriculture reported that in 2008 there were:

- 52 violations of state and/or federal meat inspection laws
- 3,000 pounds of illegally produced meat and/or poultry products identified and detained
- 100 recalls of food products

North Carolina Initiatives to Address FBI

North Carolina is among the top five states in food safety. Interestingly, North Carolina Food Code is based on 1976 Federal Food Code and has been piecemealed over the last 30 years. Currently, recalls and consumer complaints are handled at the local level.

- IN 2007, DENR developed BETS (Best Environmental Technology System) software to collect compliance data on establishments throughout the state. Data will be analyzed for trends and program effectiveness.
- DENR's Food Protection Branch enrolled in the voluntary FDA National Retail Registry Program Standards in 2007.
- North Carolina is one of six states selected to be part of national pilot for the Manufactured Food Regulatory Standards program.

Our food supply is a global food supply as it crosses local, state, and national boundaries. Twenty federal agencies regulate the 200 major food commodities owned and operated by industry. These agencies are making efforts to connect and share information regularly.

North Carolina food safety and defense agencies include the North Department of Agriculture (Meat and Poultry and Food and Drug), North Carolina Department of Environment and Natural Resources, public health, regional resources, and local health departments. Strengths in North Carolina's system include public health and agriculture laboratory capacities, experienced personnel in all agencies, North Carolina Food Safety and Defense Task Force, and strong state and local inspection programs. Current weaknesses are that each agency has a separate mission, organization, culture, and goals; the food chain is not viewed as a system; electronic surveillance systems do not connect with each other; there is competition for funding; actions are reactive rather than preventive; there is a lack of commitment, vision, and direction at highest levels of government and industry,.

Panel: Case Study of the Castleberry Recall for Clostridium Botulinum

(Panelists include Larry Michael, RS, MPH, Head, Food Protection Branch, Division of Environmental Health, North Carolina Department of Environment and Natural Resources; Joe Reardon, Director, Food and Drug Protection Division, North Carolina Department of Agriculture; David Bergmire-Sweat, MPH, Epidemiologist, Epidemiology Section, North Carolina Division of Public Health, North Carolina Department of Health and Human Services; and Donald Delozier, State Director, Meat and Poultry Inspection Division, North Carolina Department of Agriculture.)

In 2007, there was a voluntary recall of Castleberry chili due to four confirmed cases of Botulinum contamination. More than 90 products, 27 brands, and 1 million cans were recalled. This is known as one of the largest and most dangerous recalls as botulism is the worst of FBI. In total, 16,000 locations in North Carolina

were visited and 35,000 products were removed from shelves in North Carolina. The recall effort in North Carolina was incredibly successful in large part due to the coordination and innovation from individuals in leadership positions at the time, and not due to the existing food safety system. Local health departments (LHDs) were critical to the removal of the product from shelves throughout the state. Local health departments focused on places they typically inspect such as childcare centers, nursing homes, and summer camps. Due to the LHDs, the person-power of the recall effort grew from 70 to 800 people. The NCDA began a public information campaign, but the concern with recalls is that people often do not pay attention or overact. NC DETECT allowed surveillance and communication. No cases were detected in North Carolina (a detection would have meant a failure to prevent infection).

The major lessons learned from the Castleberry recall are as follows:

- Strengthening ties to industry is important. NCDA has started to emphasize this more.
- Web-based information is an important way to reach consumers.
- It's necessary to work across division and agency lines. The food safety and defense program in North Carolina has to be strong; a strong system is never going to the come from the federal level.
- The state needs contingency plans for emergency food recall especially in this budget year.
- Leveraging human resources is key to a statewide response. Losing personnel n health departments would compromise response abilities.
- North Carolina needs to adopt the federal food code.

Dr. Jenkins provided the following recommendations to the Task Force:

1) North Carolina needs to blur agency lines to function with a single-agency approach to prevent, detect, and respond to FBI, while moving toward a single food safety and defense policy.
2) Connect and strengthen food safety and defense automated and human surveillance systems for early detection and mitigation.
3) Strengthen public health infrastructure by adopting the current Federal Food Code in North Carolina.
4) Encourage all industry to have and make HACCP (Hazard Analysis Critical Control Point) plans available to government agencies, or use risk-based inspections by government, focusing on prevention rather than inspection. (HACCP is required at all points from production to distribution.)
5) Strengthen and increase ties to industry to make them a valued stakeholder.