

March, 2013: This update is produced by the Infectious Disease Epidemiology Bureau, Epidemiology and Response Division, New Mexico Department of Health, and the Office for Community Health, University of New Mexico

### **Highlight: NM EIP Special Projects**

The national Emerging Infections Program (EIP) network was initiated in 1995 by the Centers for Disease Control and Prevention (CDC) and the first Emerging Infections Programs which have grown to include ten state health departments (CA, CO, CT, GA, MD, MN, NM, NY, OR, TN) and their collaborators at local, state, and national levels. The network includes a total population of approximately 44 million people, although the population totals included in the numerous EIP programs and projects are variable. The national EIP network chooses and implements core surveillance and associated research activities and projects that will inform public health practice and policy. Data is obtained from core EIP activities including Active Bacterial Core surveillance (ABCs), Foodborne Diseases Active Surveillance Network (FoodNet), influenza activities (FluSurv-NET), and Healthcare Associated Infections - Community Interface (HAIC) projects. Numerous special studies add to information to that obtained from core EIP activities, all of which is used for public health purposes, from prevention strategies for well-recognized diseases to understanding the burden of emerging pathogens.

New Mexico Emerging Infections Program (NM EIP) is participating in several special projects that will be highlighted in the current NM EIP Update. The projects focus on helping to answer the following questions:

- ⇒ How effective are influenza antiviral medicines for children?
- ⇒ What can we learn from population-based laboratory surveillance for carbapenem-nonsusceptibility among select gram-negative bacilli?
- ⇒ Does maternal vaccination with Tdap prevent pertussis in infants under 12 months of age? Does vaccinating household members help prevent pertussis in infants?
- ⇒ What are some of the risk factors associated with non-O157 Shiga toxin producing *E. coli* (STEC) infections?

### **Partner Spotlight**

#### **NM EIP Students: the Next Public Health Professionals!**

Over the years the New Mexico Emerging Infections Program (NM EIP) has been fortunate to work with a variety of talented students. From hiring student employees to providing data and mentorships for practicums and theses, NM EIP provides applied public health experience for interested undergraduate, master's degree, and medical students. Since 2004, when New Mexico first began contributing data to the national EIP network, NM EIP has hired eight Master's of Public Health (MPH) candidates and three undergraduates as student employees, provided practicum experience for three MPH candidates, and mentored an additional six MPH students and one medical student who analyzed NM EIP data for their master's theses. Universities represented by these students include University of New Mexico

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MPH students Nicole Wunderlin and Jeanette Mata

**Pediatric Antiviral Effectiveness (2012-2013)**  
**Emily B. Hancock, MS, NM EIP FluSurv-NET Principal Investigator**

During the 2012-2013 influenza season, NM EIP, along with 11 other FluSurv-NET sites, will collect information to assess whether antiviral treatment is associated with less severe outcomes among children who have been hospitalized with laboratory-confirmed influenza infection. The Centers for Disease Control and Prevention (CDC) will use the results of this project to better inform future recommendations regarding antiviral treatment.

As a part of routine FluSurv-NET surveillance, NM EIP Surveillance Officers (SOs) collect demographic and limited clinical information through medical record review. SOs will collect additional information from the medical record for identified cases under 18 years of age to better characterize underlying medical conditions and illness severity at the time of admission and to control for biases related to receipt of antiviral medication.

At the end of the data collection period, NM data will be combined with other FluSurv-NET sites' data to assess whether antiviral treatment is associated with reduced hospital or intensive care unit (ICU) length of stay and, secondarily, reduction in admission to the ICU >48 hours after hospital admission, need for mechanical ventilation, and death.

CDC recommends that all patients hospitalized with suspected or confirmed influenza receive treatment with antiviral medication, such as the neuraminidase inhibitors (oseltamivir and zanamivir). According to FluSurv-NET data from previous years, only half of children hospitalized with laboratory-confirmed influenza received antiviral treatment as recommended. If the results of this project indicate that treated children had better outcomes, the information will be used to improve compliance with antiviral treatment guidelines.

**Multi-Site Resistant Gram-Negative Bacilli Surveillance Initiative (MuGSI)**  
**Erin Phipps, DVM, MPH, CDI Principal Investigator**

Gram-negative bacilli are a common cause of infections in both healthcare and community settings; increasing antimicrobial resistance has brought these organisms into the public health spotlight. Of particular concern is the emergence of carbapenamases. Though thought to be relatively uncommon in the United States, certain genes conferring resistance to carbapenems are located on highly mobile regions of the genome and have the ability to spread rapidly among organisms. Currently, national surveillance for gram-negative bacilli of epidemiologic importance (e.g., carbapenem-nonsusceptible strains) is limited, particularly in the outpatient setting.

Beginning in 2013, NM EIP will join other EIP sites to initiate active, population-based surveillance for six carbapenem-resistant organisms identified from a normally sterile site or urine: *Escherichia coli*, *Enterobacter cloacae*, *Enterobacter aerogenes*, *Klebsiella pneumoniae*, *Klebsiella oxytoca*, and *Acinetobacter baumannii*. Cases will be identified through laboratories and will include only Bernalillo County residents; a subset of isolates will be collected and sent to CDC for strain typing and additional isolate characterization. Chart reviews focusing on risk factors, underlying medical con-

ditions, infection outcomes, and laboratory data will be done for all cases, including inpatients, outpatients, and extended care facility residents.

Surveillance objectives are:

- To evaluate the population-based incidence of carbapenem-nonsusceptibility among common strains of *Enterobacteriaceae* and *Acinetobacter baumannii*, and describe incidence changes over time;
- To better characterize carbapenem-nonsusceptible strains in order to inform prevention efforts; and
- To describe known resistance mechanisms among a subset of carbapenem-nonsusceptible *Enterobacteriaceae*

The data collected through this surveillance will increase understanding of illnesses that these bacteria cause while helping inform prevention and control strategies for these drug-resistant organisms. For additional information on this surveillance program, see <http://www.cdc.gov/hai/eip/mugsi.html> or contact Erin Phipps at (505) 272-6697 or [EPhipps@salud.unm.edu](mailto:EPhipps@salud.unm.edu).

## Evaluating the Effectiveness of Maternal Tdap Vaccination to Prevent Infant Pertussis Karen Scherzinger, MS, NM EIP Special Studies Coordinator

Pertussis (whooping cough) is a vaccine preventable disease that has experienced resurgence in the United States. Case counts for the last few years are higher than they have been since the 1950s, and appear to be increasing. Children in the youngest age groups are at highest risk for severe illness, hospitalization, and death from pertussis infection. The Advisory Committee on Immunization Practices (ACIP) has recommended several strategies to prevent pertussis in infants, including maternal prenatal Tdap immunization and immunization of household members (cocooning). New Mexico and 5 other EIP sites are participating in a case-control evaluation of these two strategies.

The families of NM children less than 12 months of age with confirmed or probable pertussis infection are

contacted and asked to complete a telephone interview and give consent for immunization history review. Three age group- and birth hospital-matched controls (who have not been diagnosed with pertussis) are interviewed as a comparison group. Mothers are interviewed to determine maternal vaccine history. For children less than 2 months of age, an interview is attempted with all adult “cocoon” members. Vaccine histories for case and control children and their mothers are verified for all evaluation subjects. For evaluation subjects under 2 months of age, vaccine histories are verified for the entire cocoon, including siblings and adult household members, as well as non-household caregivers (e.g., visiting grandparents, babysitters).

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## Risk factors for Non-O157 STEC Cynthia Nicholson, MS, NM EIP FoodNet Coordinator

Shiga toxin-producing *Escherichia coli* (STEC) infection causes bloody diarrhea and, in some cases, life-threatening kidney failure. STEC infections are categorized into two groups, O157 STEC and non-O157 STEC. Epidemiological studies in the United States and internationally have identified risk factors for O157 infection, including undercooked ground beef consumption, that led to enactment of targeted control measures associated with reduced O157 STEC infection incidence. However, little is known about the risk factors associated with non-O157 STEC infections. Non-O157 STEC infections have traditionally been under-diagnosed due to limitations in culture based laboratory diagnostic methods. In 1995, the first enzyme immunoassays (EIA) to detect Shiga toxin became available. These non-culture tests have facilitated diagnosis of non-O157 STEC infections.

Over the years, the CDC FoodNet Surveillance Program reported a steady increase in the number of non-O157 infections. During 2007-2011, NM non-O157 STEC incidence rates were two to three times higher than aggregate O157 incidence rates of the FoodNet network. Further study is needed to help guide non-O157 STEC infection prevention efforts.

During the next several years, CDC, NM EIP and nine other FoodNet sites will be conducting the first multi-

state non-outbreak-associated non-O157 STEC investigation in the United States. NM residents with laboratory-confirmed non-O157 STEC infections and three age- and location-matched controls, who have not been diagnosed with non-O157 STEC, will be asked to participate in a telephone interview to identify behavioral, environmental, dietary, and medical risk factors. As the most comprehensive and powerful evaluation of its kind, this assessment will make an important contribution towards better understanding of non-O157 STEC infection and provide evidence-based recommendations for prevention.

### Risk factors to be examined in the non-O157 STEC study:

- ⇒ Antibiotic & stomach acid-reducer use
- ⇒ Drinking water & recreational water
- ⇒ Sources & types of meats, dairy food, vegetables, & fruits
- ⇒ Exposure to pets, farm animals, & zoo animals
- ⇒ Domestic & international travel
- ⇒ Childcare exposures

### NM EIP Personnel

- ◆ Joan Baumbach, Principal Investigator
- ◆ Melissa Pfeiffer, Epidemiologist

#### Surveillance Officers

- ◆ Kathy Angeles
- ◆ Lisa Butler
- ◆ Gabriela Keener
- ◆ Sarah Khanlian
- ◆ Robert Mansmann

#### Active Bacterial Core surveillance (ABCs)

- ◆ Megin Nichols, Principal Investigator
- ◆ Joseph Bareta, Coordinator
- ◆ David Selvage, Pertussis Epidemiologist

#### FluSurv-NET

- ◆ Emily Hancock, Principal Investigator

#### Foodborne Diseases Active

#### Surveillance Network (FoodNet)

- ◆ Sarah Lathrop, Principal Investigator
- ◆ Cynthia Nicholson, Coordinator

#### Healthcare-associated Infections/Community Interface (HAIC)

#### HAIC Special Projects

- ◆ Deborah Thompson, Principal Investigator

#### Clostridium difficile Infection (CDI)

- ◆ Erin Phipps, Principal Investigator
- ◆ Nathan Blacker, Surveillance Officer
- ◆ Lori Morrow, Data Entry

#### NM EIP Special Projects

- ◆ Karen Scherzinger, Coordinator

#### Administrators

- ◆ Bonita Ferus, UNM
- ◆ Victoria Armijo, NM Dept. of Health

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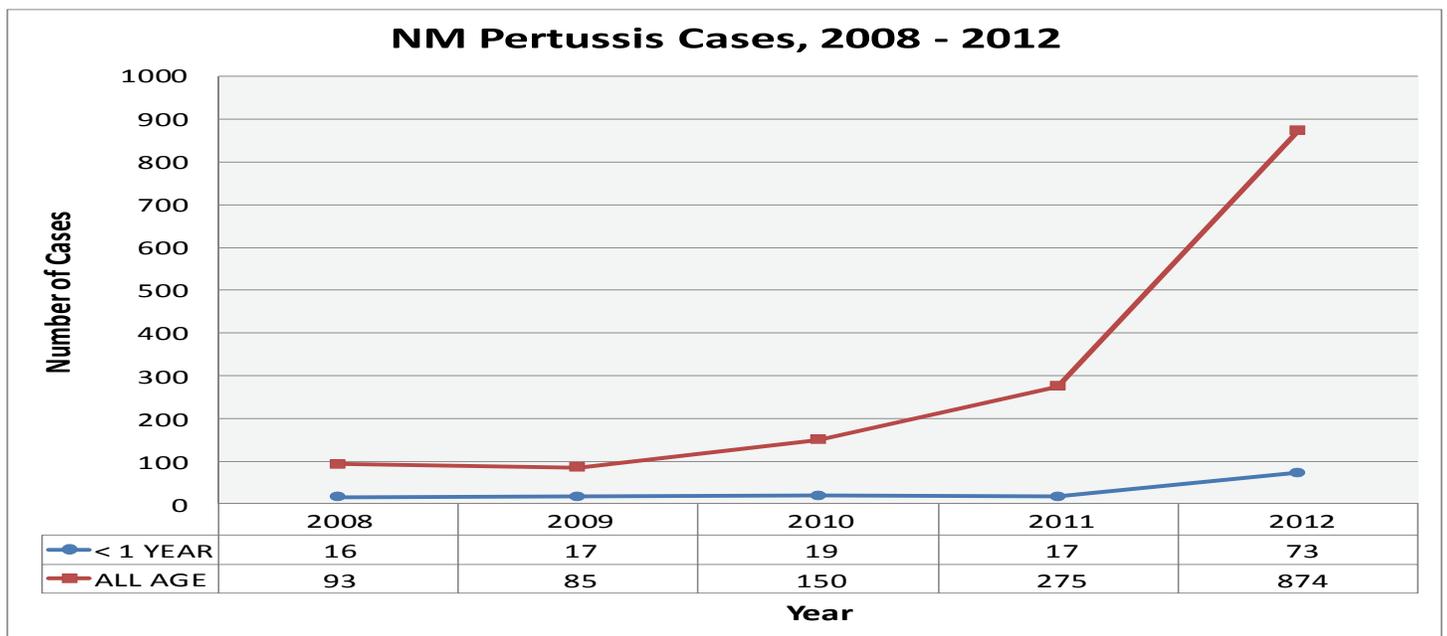
(UNM), Emory University, and Swarthmore University. Students can use NM EIP data to explore topics of interest to them, and have performed detailed analyses of such topics as laboratory testing for Shiga toxin-producing *E. coli* (STEC), the epidemiology of invasive pneumococcal disease in New Mexico, trends in *Neisseria meningitidis*, the association of *Salmonella* infections with livestock distribution, and the epidemiology of Group B *Streptococcus* infections in the state.

Currently, four UNM MPH students are working on various projects with NM EIP. Nicole Wunderlin works on an evaluation of the effectiveness of the pneumococcal conjugate vaccine in children less than five years of age. Jeanette Mata and Sarah Shrum work on an evaluation of vaccination strategies to prevent pertussis in infants. Rose Galbraith is working on a Council of State and Territorial Epidemiologists (CSTE) study of social determinants of health using pneumonia hospitalization data.

NM EIP is indebted to the participating students for the hard work, enthusiasm, and insightful questions they bring. NM EIP also appreciates the opportunity to assist in their growth as public health professionals.

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Once data collection is completed, NM data will be combined with other sites' data and analyzed. Case data will be compared with control data to identify infection risk factors and determine the effectiveness of maternal immunization and cocooning in preventing pertussis in infants. This study requires a large sample size and will likely be conducted through the next several years.



Source: New Mexico Electronic Disease Surveillance System, New Mexico Department of Health