New Mexico Emerging Infections Program (NM EIP) Update

May, 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: *Clostridium difficile* Surveillance - Focus on Pediatric *Clostridium difficile* Infection

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Introduction

Active, population-based surveillance for *Clostridium difficile* infection (CDI) among residents of Bernalillo County one year of age and older is now in its third year. To date, over 2,800 incident cases have been identified. While CDI has traditionally been associated with exposure to healthcare settings (i.e. hospitalization or residence in a long-term care facility) and the elderly, many cases occur in the community among children and young adults and in people who have not been hospitalized. Though the percentage of pediatric cases is relatively small, 93 cases in children ages 1-17 years have been identified since surveillance began in 2011. Furthermore, several studies have shown that the incidence of CDI in children is increasing, and that children with CDI have longer hospital stays and a greater risk of dying [1-3].

During January 2011-March 2013, pediatric cases in Bernalillo County were much more likely than adult cases to be Community-Associated; 60% were CA while only a fifth were Healthcare Facility Onset (HCFO) and another fifth were Community-Onset Healthcare Facility-Associated (CO-HCFA). Figure 1 compares the case classification by age group.

CDI cases are classified into one of three categories:

Healthcare Facility Onset (HCFO): Positive test greater than three calendar days after admission to a healthcare facility;

Community-Associated (CA): Positive specimen collected in an outpatient clinic or within three calendar days after admission to a healthcare facility with no documented overnight stay in a healthcare facility within the previous 12 weeks; and

Community-Onset Healthcare Facility-Associated (CO-HCFA): Community-onset cases that had an overnight stay in a healthcare facility within the previous 12 weeks.

Additional details regarding surveillance methodology can be found at http://www.cdc.gov/hai/eip/cdiff_techinfo.html.

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Partner Spotlight: TriCore Reference Laboratories

TriCore Reference Laboratories has been an integral part of all of the New Mexico Emerging Infections Program (NM EIP) surveillance initiatives, providing specimens or isolates for FoodNet, Active Bacterial Core surveillance (ABCs), FluSurv-NET, and *Clostridium difficile*. TriCore is also now a key partner in the new Multi-site Gram Negative Bacilli Surveillance Initiative (MuGSI), which focuses on carbapenem-resistant *Enterobacteriaceae* (CRE) and Acinetobacter. TriCore will identify, store, and ship CRE isolates to the Centers for Disease Control and Prevention (CDC) for further analysis and characterization of the resistance mechanisms in these emerging infections. TriCore also works closely with the NM EIP CDI Surveillance Program, providing a large number of *C. difficile* specimens that undergo further strain analysis at the CDC.

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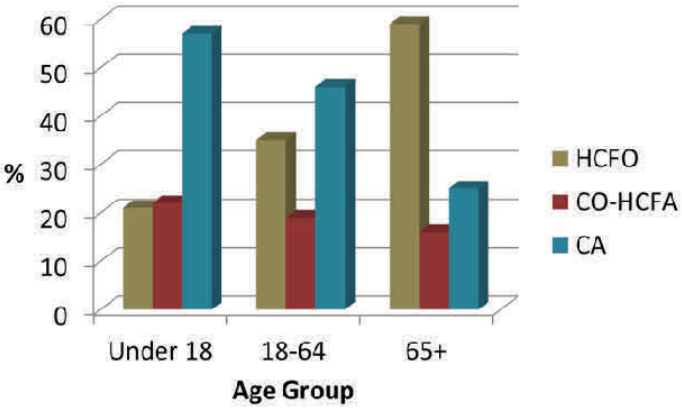
TriCore staffs left to right: Efrain Grijalva, Cliff Gaylor, Donna Schatt, Tricia Witte, Mario Maciariello, Souzy Abouttiba, Justin Baker, Patty Stan

Clostridium difficile Surveillance (Continued from page 1)

Figure 1: CDI Case Classification by Age Group



Most children (57%) were diagnosed in an outpatient setting; nearly a third (31%) in a hospital, and 10% in an emergency room. Males were overrepresented in the pediatric population, comprising 54% of the cases.

Figure 2 shows the U-shaped curve of the age distribution, with the highest number of cases among one-year olds, with the number of cases remaining low until gradually rising in adolescence. Asymptomatic colonization among up to 70% of infants and a third of children under two years old is well recognized [2]. Analyses are currently underway at the national level to determine the significance of positive CDI tests in the youngest age groups and to determine if these reflect colonization or true infections.

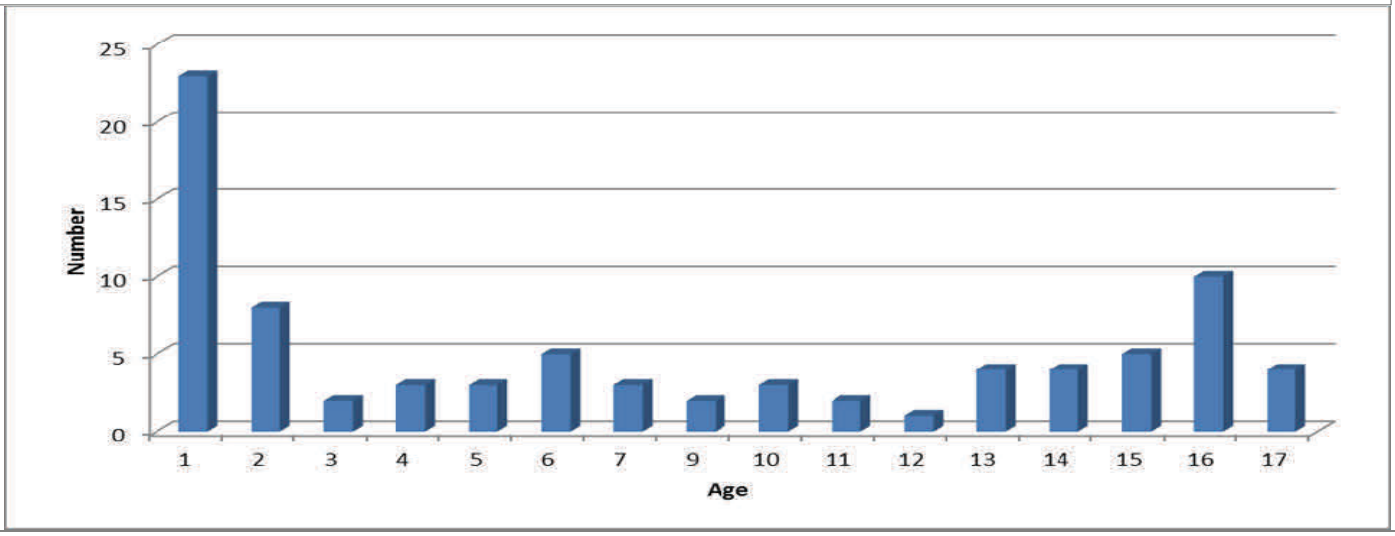
Co-infection

No clinically significant co-infections were identified in pediatric cases, though nearly a third (29%) did not have any other pathogens tested on the same date as the positive *C. difficile* stool. Based on the information in the medical record, it was not possible to determine if stool was tested for other pathogens in 13% of cases. Stool was tested for other pathogens in 59% of cases; no pathogenic organisms were isolated. One case had *Entamoeba hartmanni* and *Entamoeba coli* identified, both of which are considered non-pathogenic commensal protozoa.

Underlying Conditions

Nearly two thirds of the pediatric cases (64%) had no underlying conditions documented in the medical record. One quarter of the cases (25%) had one underlying condition and 3% had two conditions documented in the medical record. The most common underlying conditions were: chronic obstructive pulmonary disease (COPD)/asthma (8), neoplasia (6), immune deficiency (3), and chronic liver disease (2). One case of pre-existing inflammatory bowel disease was identified.

Figure 2: Age Distribution Among Pediatric CDI Cases



In the 12 weeks prior to their *C. difficile* diagnosis, a quarter (26%) had been hospitalized, 14% had visited an emergency room, and 9% had undergone a surgical procedure.

MEDICATIONS

A number of medications have been associated with increased risk of CDI. Antibiotics can disrupt the normal gastrointestinal flora and are a well-recognized risk factor. Additionally, immunosuppressive medications, gastric acid-reducing medications, and even antidepressants [4] may increase the risk of CDI.

Nearly half (47%) of the pediatric cases had documented antibiotic exposure in the 12 weeks prior to their infection. The most common antibiotic exposures are shown in Figure 3. Among those who had been on antibiotics, nearly a third (29%) had been on one antibiotic, 10% on two, 3% on four, and 3% had documented exposure to five different antibiotics in the prior 12 weeks. Fifteen percent of cases had been on acid-reducing medication (i.e. proton pump inhibitors or H2 blockers), and 20% had been on immunosuppressive therapy.

OUTCOMES

Compared to adults, fewer pediatric cases (32%) were hospitalized at the time of, or within 7 days after, their *C. difficile* diagnosis. However, among those who were admitted to a hospital, pediatric cases were more likely (32%) to be admitted due to CDI. Severe complications due to CDI were rare among children: there were no documented cases with ICU admission, toxic megacolon, pseudomembranous colitis, or colectomy. One case had documented ileus, and one case died during the follow-up period.

Multiple episodes of *C. difficile* were not uncommon. Seventeen percent had at least one new episode of CDI at least 8 weeks after the initial infection, and 16% had a CDI recurrence 2-8 weeks after their initial infection.

CONCLUSION

Though uncommon, CDI occurs in children and occurs primarily in an outpatient setting. Many, but not all, children had documented risk factors such as prior antibiotic exposure or hospitalizations; approximately one-quarter of children had no documented risk factors. Analyses are underway to further characterize these infections and clarify their clinical significance. In addition to ongoing surveillance, a national EIP case-control study will begin in 2014 to elucidate the risk factors for community-associated CDI in both adults and children.

REFERENCES

1. Sammons JS, Localio R, Xiao R, Coffin SE, Zaoutis T. *Clostridium difficile* Infection Is Associated With Increased Risk of Death and Prolonged Hospitalization in Children. *Clin Infect Dis*. 2013 [published online ahead of print March 26 2013]. http://cid.oxfordjournals.org/content/early/2013/04/04/cid.cit155.full.pdf+html Accessed April 25, 2013.
2. Sammons JS, Tolzis P, Zaoutis TE. *Clostridium difficile* Infection in Children. *JAMA Pediatr*. 2013 [published online ahead of print March 4 2013]. http://archpedi.jamanetwork.com/article.aspx?articleid=1659616#SEVERECDIINCHILDREN Accessed April 25, 2013.
3. Committee on Infectious Diseases, American Academy of Pediatrics. *Clostridium difficile* infection in infants and children. Pediatrics 2013;131:196-200.
4. Rogers MA, Greene MT, Young VB, et al. Depression, antidepressant medications, and risk of *Clostridium difficile* infection. BMC Medicine 2013, 11:121. [published online ahead of print May 7, 2013]. http://www.biomedcentral.com/content/pdf/1741-7015-11-121.pdf . Accessed May 9, 2013.

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TriCore serves as the largest Microbiology facility in the state and is integral in providing data and isolates for characterization of bacterial and viral isolates in New Mexico. The collaboration between TriCore and NM EIP contributes to the efficient detection of outbreaks and emerging diseases that are affecting the lives of New Mexicans.

New Mexico-based TriCore is a full-service medical reference laboratory serving patients and healthcare providers across New Mexico and in nearby states. TriCore Reference Laboratories also provides pathology consultation services to clients across the nation.

SAVE THE DATE!
The 2013 EIP Conference will be held on **September 11, 2013** at Northern Navajo Medical Center in Shiprock, NM. Details to follow.

Other Updates:
The New Mexico Phase 1 Central Line-associated Bloodstream Infection Data Validation Project was published in the American Journal of Infection Control: Thompson DL, Makvandi M, Baumbach J. Validation of central line associated bloodstream infection data in a voluntary reporting state: New Mexico. AJIC 41 (2013) 122-5.

The New Mexico Phase 2 Central Line-associated Bloodstream Infection Data Validation Project was presented as a poster at Preventive Medicine 2013 in Phoenix, Arizona, February 21-22, 2013.

Figure 3: Exposure by Antibiotic Class Among Children Who Had Been on Antibiotics in the Previous 12 Weeks