average 7.4 days of renal replacement. Three patients experienced encéphalopathy with seizures and were managed with levetiracetam and corticosteroids for Sx-induced cerebral edema. One patient received eculizumab, a terminal complement inhibitor approved for atypical HUS, with resolution of seizures and return to his neurocognitive baseline but with persistent electroencephalographic abnormalities. There were no deaths, and all recrudes had recovery of renal function.

Conclusion. This case series represents the largest STEC-HUS outbreak affecting a military population. Rates of HUS and mortality were lower than seen in prior outbreaks, in part due to a high level of baseline health and early detection and management of suspect cases. The rapid volume expansion and monitoring of cases may have reduced the risk for HUS progression and long-term sequelae.

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1099. Antibiotic Prescriptions for Acute Gastroenteritis during Office and Emergency Department Visits—United States, 2006–2015 Jennifer P. Collins, MD, MSc; Louise Francois Watkins, MD, MPH; Laura M. King, MPH; Monina Bartoces, PhD; Catherine Fleming-Dutra, MD and Cindy Friedman, MD; Division of Infectious Diseases, Wartere, and Emergency Departments, Centers for Disease Control and Prevention, Atlanta, Georgia; Centers for Disease Control and Prevention, Atlanta, Georgia; Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia; CDC, Atlanta, Georgia

Session: 133. Enteric Infections
Friday, October 5, 2018: 12:30 PM

Background. Acute gastroenteritis (AGE) is a major cause of office and emergency department (ED) visits in the United States. Most patients can be managed with supportive care alone, although some require antibiotic use. Antibiotic use can minimize side effects and the development of resistance. We used national data to assess antibiotic prescribing for AGE to target areas for stewardship efforts.

Methods. We used the 2006–2015 National Hospital Ambulatory Medical Care Survey (NHAMCS) and the National Ambulatory Medical Care Survey to describe antibiotic prescribing for AGE. An AGE visit was defined as one with a new problem (<3 months) as the main visit indication and an ICD-9 code for bacterial or viral gastrointestinal infection or AGE (nursa, vomiting, and/or diarrhea). We excluded visits with ICD-9 codes for Clostridium difficile or an infection usually requiring antibiotics (e.g., pneumonia). We calculated national annual percentage estimates based on weights of sampled visits and used an α level of 0.01, recommended for these data.

Results. Of the 12,191 sampled AGE visits, 13% (99% CI: 11–15%) resulted in antibiotic prescriptions, equating to an estimated 1.3 million AGE visits with antibiotic prescribing for AGE. An AGE visit was defined as one with a new problem (<3 months) as the main visit indication and an ICD-9 code for bacterial or viral gastrointestinal infection or AGE (nursa, vomiting, and/or diarrhea). We excluded visits with ICD-9 codes for Clostridium difficile or an infection usually requiring antibiotics (e.g., pneumonia). We calculated national annual percentage estimates based on weights of sampled visits and used an α level of 0.01, recommended for these data.

Results. Of the 12,191 sampled AGE visits, 13% (99% CI: 11–15%) resulted in antibiotic prescriptions, equating to an estimated 1.3 million AGE visits with antibiotic prescribing for AGE. Antibiotics were more likely to be prescribed in office AGE visits (16%, 99% CI: 12–20%) compared with ED AGE visits (11%, 99% CI: 9–12%; P < 0.05).

Conclusion. Patients treated for AGE in office settings were significantly more likely to present with diarrhea (75% vs. 57%; P < 0.001) and less likely to attend daycare (23% vs. 39%; P < 0.01). Children infected with GII.4 viruses were younger, less likely to visit for nausea or vomiting, and more likely to present with diarrhea (100% vs. 8%; P < 0.05) and/or be younger (15.5 vs. 21.3 months, P < 0.01). Giardia was the most common pathogen isolated from stool specimens (14% vs. 6%, P < 0.001).

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1100. Characterization of Enteropathogenic Escherichia coli (EPEC) in Cancer Patients With Diarrhea Pablo Okhuysen, MD, MDSA; Adilene Carlin, BA; Jennifer P., MD, FIDSA; Adilene Carlin, MD; and Danielle Ollivier, BS, MLS (ASC)CM and Lily Carlin, BS, Infectious Diseases, The University of Texas MD Anderson Cancer Center, Houston, Texas

Session: 133. Enteric Infections
Friday, October 5, 2018: 12:30 PM

Background. Food insecurity is defined as a lack of consistent access to food in adequate quantity or quality. Both cholerat and food insecurity tend to occur in impoverished communities where poor access to food, inadequate sanitation, and an unsafe water supply often coexist. The relationship between the two, however, has not been previously studied.

Methods. We performed a secondary analysis of household-level data from the 2012 Demographic and Health Survey in Haiti, a nationally and subnationally representative cross-sectional household survey conducted every 5 years. We used multivariable logistic regression to evaluate the relationship between household food insecurity (as measured by the Hollinger Hunger Scale) and (1) reported history of cholera since 2010 by any person in the household and (2) reported death by any person in the household from cholera. We used survey commands to apply sampling probability weights and account for clustering and stratification in sample design. We performed a complete case analysis because no missing data on household food insecurity or cholera and <1% for the other covariates of interest.

Results. There were 13,181 households in the survey, 2,104 of which reported at least one household member with history of cholera. Both moderate hunger in the household (adjusted odds ratio (AOR) 1.47, 95% confidence interval (CI) 1.27–1.71;


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1104. Deployment-Associated Infectious Gastroenteritis and Associations With Irritable Bowel Syndrome, Post-Traumatic Stress Disorder, and Combat Stress: A Retrospective Cohort Study Among Deployed United States Military Personnel

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Session: 133. Enteric Infections
Friday, October 5, 2018: 12:30 PM

Background. Previous studies have shown an association between post-traumatic stress disorder (PTSD) and the development of irritable bowel syndrome (IBS) in deployed service members. Deployment places soldiers at risk for chemical, physical, psychological, and infectious stressors. Acute stress can alter the gastrointestinal barrier leading to gut barrier dysfunction, which is an independent risk factor for infectious gastroenteritis (IGE). We sought to assess if there was an association between IBS and PTSD in military deployed in support of recent and ongoing military operations.

Methods. We conducted a retrospective cohort study of United States military service members who participated in a combat deployment to the Middle East from 2001 to 2013 with no prior Axis I disorders or PTSD diagnoses based on data from the Defense Medical Surveillance System. Univariate and multivariate logistic regression models were used to assess the differential risk of PTSD following a combat deployment among those with and without a prediagnosis of IBS. These models were controlled for confounders/covariates of interest (IGE, age, duration of deployment, sex, race, marital status, education level, military rank, branch of service, number of deployments).

Results. Among 3825 service members, those who developed IGE had a 34% (95% CI 25–43; P < 0.001) increased risk of PTSD compared with those with no IGE during deployment. Additionally, those with IBS prediagnosis had a 40% (P = 0.001) increased risk of PTSD upon return from deployment compared with those without IBS prediagnosis. Duration of deployment was significantly (P < 0.0001) associated with PTSD with an increasing risk with increasing duration of deployment.

Conclusion. IGE and IBS were significantly associated with PTSD further supporting previous studies describing their association. Baseline chronic dysbiosis and acute stress-related microbiota perturbations may lead to short- and long-term resilience and performance deficits in our soldiers that may compromise mission capabilities and decrease the quality of life in returning soldiers. Further understanding the potential interactions between the gut–brain–microbiome may have immediate and long-term impacts on improving warfighter health and performance.

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1105. Vibrios Titer Variation and Likelihood of Protection in Children Compared With Adults in a Cholera Endemic Area

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Session: 133. Enteric Infections
Friday, October 5, 2018: 12:30 PM

Background. Vibrio cholerae, the causative agent of cholera, is responsible for significant morbidity and mortality worldwide. Children less than 5 years old have the highest disease burden of cholera in endemic areas. While children develop serum vibriocidal antibody responses to cholera vaccines, they derive less protection from vaccine compared with adults. The aim of our study was to determine whether the vibriocidal immune responses to V. cholerae infection are equally accurate as markers of protection in all age groups.

Methods. Cholera patients and their household contacts, who are known to be at high risk of V. cholerae infection, were enrolled between 2001 and 2017 in Dhaka, Bangladesh. Baseline vibriocidal titers were measured at the time of enrollment of household contacts, and participants were followed prospectively for development of V. cholerae infection.

Results. We studied 50 contacts < 5 years old (“young children”), 228 contacts 5–16 years old (“older children”), and 548 contacts > 16 years old (“adults”). The baseline serum vibriocidal titer was higher in contacts who remained uninfected from all age groups than in contacts who developed cholera during the follow-up period (young children: P = 0.0092; older children: P = 0.0003; adults: P = 0.0012).

Conclusion. We found that higher vibriocidal antibody titers were associated with protection against V. cholerae infection across all three age categories. These findings may help increase our understanding of the protective immune response against V. cholerae infection and have importance for future vaccine development strategies.

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1106. Infectious Etiologies of Acute Gastroenteritis in Children under the First 100 Days Post-Allogeneic Hematopoietic Cell Transplant

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Session: 133. Enteric Infections
Friday, October 5, 2018: 12:30 PM

Background. Acute gastroenteritis (AGE) is a frequent sequela in children undergoing hematopoietic cell transplant (HCT). Although rotavirus and norovirus have been implicated as important causes of AGE, the frequency of other pathogens is unknown. Little data exist on longitudinal prevalence of infectious AGE in HCT.

Methods. From February 2015 to May 2016, subjects <18 years undergoing allogeneic HCT were enrolled at four CDC-NVSN sites: Oakland, Kansas City, Seattle, and Nashville. Stool samples were collected at enrollment, weekly until discharge or day 100 (whichever occurred earliest), during re-admissions within the first 100 days, and day 100. AGE was defined as unexplained ≥3 episodes diarrhea and/or ≥3 episode vomiting/24 hours. Specimens were tested using Luminex xTAG Gastrointestinal Pathogen Panel (Austin, TX) and real-time PCR for adenovirus, astrovirus, norovirus, and sapovirus.

Results. Thirty-one patients were enrolled at four sites (Seattle: 13, Kansas City: 8, Oakland: 6; Nashville: 4) with median age 5 (IQR 3–10) years. Two hundred sixteen samples were obtained with median 7 samples/subject. During the first 100 days, 29 (94%) subjects met the AGE definition. Thirty-six single pathogen detections occurred in 16 (52%) subjects. Clostridium difficile was the most frequent pathogen (Figure 1), with 14 detections in nine patients, all ≥23 years; 50% of detections were asymptomatic. Seven (50%) detections occurred at HCT onset and none received targeted C. difficile therapy. Sapovirus was detected nine times in four patients, with seven (78%) detections associated with AGE symptoms. Rotavirus was detected nine times, during five symptomatic episodes, in three patients. Adenovirus was detected four times in three patients and all were asymptomatic.

Conclusion. We longitudinally characterized the etiology of infectious AGE in children undergoing HCT. Despite the majority of patients meeting the definition for AGE, only half had a pathogen detected, suggesting that differentiating infectious vs. noninfectious AGE (e.g., medication induced) in this population is difficult. Although all subjects with adenovirus and most with sapovirus were symptomatic, asymptomatic C. difficile detection was common. Interestingly, norovirus was not detected. Further investigation of AGE is warranted in this population.

Figure 1. Pathogens detected during the first 100 days post-HCT.