657. Changes in Incidence of Pediatric Hemolytic Uremic Syndrome and Associated Shiga Toxin-producing E. coli Infections, FoodNet, 2006–2014

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Background. Post-diarrheal, pediatric hemolytic uremic syndrome (D+HUS) is a sequela of Shiga toxin-producing Escherichia coli (STEC) infection and is a common cause of acute kidney failure among US children. The Foodborne Diseases Active Surveillance Network (FoodNet) conducts surveillance in ten sites for physician-diagnosed D+HUS through a network of nephrologists and hospital discharge data review to estimate illness and corroborate STEC surveillance trends. The incidence of pediatric STEC overall in FoodNet sites increased 18% from 2006 to 2014 while the incidence in STEC 0157 has decreased by 28%.

Methods. We summarized data on D+HUS cases, defined as HUS in children <18 years, reported to FoodNet during 2006–2014. We examined changes in incidence rates using US census data. Population density was defined by the United States Department of Agriculture Natural Resources and Environmental Services.

Results. During 2006–2014, 719 D+HUS patients were reported, resulting in 13 (1.8%) deaths. The average annual incidence was 0.72 cases/100,000 children which varied by site (range: 0.39–1.28). Incidence was 5-fold greater among patients aged 1–3 years (2.34) than in other age groups (0.44). Incidence rates/100,000 children (IR) were highest among females (0.81) and non-Hispanics (0.70). IRs were higher in rural counties (1.15) than in urban counties (0.64). Comparing 2006–2008 with 2012–2014, average incidence decreased by 19%, from 0.81 to 0.66, with the greatest decreases found in children aged 1–3 years (35%; P = 0.04). No laboratory testing was performed for 10 (1%) cases. The proportion of cases with laboratory evidence of STEC infection increased 15 percentage points, from 69% in 2006–2008 to 84% in 2012–2014. In total, 537 (75%) D+HUS patients had laboratory evidence of STEC infection, 452 (80%) were culture-confirmed; the most common serogroups were O157 (94%), O111 (1.9%), and O121 (1.3%).

Conclusion. During 2006–2014 cases of D+HUS decreased and showed marked demographic and geographic differences. The increase number of D+HUS cases with O157 (1.4%) and O121 (1.2%). The increased number of D+HUS cases with O157 (94%), O111 (1.9%), and O121 (1.3%).

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660. International Importations of Measles Virus into the United States during the Post-Elimination Era, 2001–2015

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Background. Measles is a highly contagious vaccine-preventable disease that lead to serious complications. Although measles was declared eliminated from the United States in 2000, measles cases and outbreaks continue to occur each year as a result of importations of the disease from countries in which it remains endemic. We describe the epidemiology of importations of measles virus into the US during the post-elimination era.

Methods. Measles is nationally notifiable in the USA and local and state health departments report confirmed measles cases to the Centers for Disease Control and Prevention (CDC). A case is considered internationally imported if at least some of the exposure period (7–21 days before rash onset) occurred outside of the USA, rash onset occurred within 21 days of entering the USA, and there was no known exposure to measles in the USA during that time. We describe the demographic characteristics, source regions, and vaccination status of measles importations during 2001–2015.

Results. From 2001 to 2015, 2,012 measles cases were reported to CDC; 535 (27%) were imported. A median of 28 importations occurred each year (range: 18–80). The median age of imported cases was 18 years (range: <1–75 years); 50% were male, 87% were unvaccinated or had unknown vaccination status, and 63% reported travel to countries in the Western Pacific and European Regions of the World Health Organization during their exposure periods. Half of all imported cases had rash onset between January and April. Overall, 62% (n = 332) of importations occurred in immigrants, varying from a low of 37% in 2001 to a high of 86% in 2014. One imported case occurred among a US resident too young to be vaccinated, and 15 (5%) occurred among US residents born before 1957 (presumed immune from natural disease), and thus were not vaccine preventable.

Conclusion. Importations of measles virus will continue to occur as long as measles remains endemic in many parts of the world. In the post-elimination era in the US, the majority of importations were among US residents, almost all of which were vaccine preventable. Our findings emphasize the importance of measles vaccination of individuals aged 26 months prior to international travel, per ACIP recommendations, and of supporting global measles control efforts.

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661. Burden of Influenza-like Illness Among Military Personnel Receiving Advanced Training at Ft. Sam Houston, TX

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Background. Influenza-like illness (ILI) places a significant burden on operational readiness in the U.S. military, particularly in trainees who live and work
in congregated settings. ILI incidence rates for the trainees are based on passive surveillance of those presenting to medical clinics. Such clinic-based surveillance may under-estimate the true ILI burden because trainees with ILI may not seek health care due to mild symptoms or fear of missing training. We aimed to estimate the hidden ILI burden among trainees and behaviors related to healthcare seeking for ILI.

Methods. A 1-page voluntary, anonymous ILI survey was administered during the end of program sessions for military medical trainees at Fort Sam Houston (JBSA-FSH), TX. The survey was started in January 2017 and is ongoing.

Results. Between January and April 2017, 724 surveys were returned: respondents aged 17–42 years (median 20 yo), 299 (41%) were female, and 442 (62%), white. The trainees maintained a healthy and active life style: 94% exercised at least 3 times a week; 79% never smoked and only 3% were obese. Overall, 68% trainees reported ILI symptoms during training; the proportion decreased from 75% in January to 46% in April (P-for-trend <0.01). History of travel and self-reported contact to people with ILI were associated with reporting having ILI. Of those reporting ILI, only 36% sought health care, and the proportion did not change over the four month period. Females were more likely to seek health care if they developed ILI: 43% of females vs. 31% of males (P = 0.02). While the majority of trainees washed their hands or used hand sanitizer at least 4 times a day, only 60% of trainees washed their hands after covering their mouth/nose for a sneeze, which may facilitate ILI close contacts.

Conclusion. Among young and healthy medical trainees at JBSA-FSH, ILI was reported frequently during winter and decreased in spring. Trainees often did not seek health care for mild symptoms. The high prevalence of self-reported ILI among trainees despite their healthy lifestyle and good compliance with hygiene was unexpected. A better understanding of the impact of self-reported ILI on performance and of factors associated with health-seeking are needed.

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662. First Mumps Outbreak in a Decade: Measuring Impact of Mumps Among Naïve Population—Tokunoshima Island, Japan

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Background. Currently, mumps vaccine is not included in the routine vaccina-
tion program in Japan and consequently, nationwide mumps outbreak is observed approximately every 4 years. Tokunoshima Island, located in the southern part of Japan with population of 25,000, experienced island-wide mumps outbreak since July 2015. This outbreak was unique because unlike the rest of the country, the Island was not hit by mumps virus for last 10 years. Island being in an inconvenient location, and with less than 2% mumps vaccine coverage rate among one year old children even last year, it was considered that the population, especially less than 10 years old, is basically naive to mumps virus. We conducted a comprehensive outbreak investigation to analyze the disease burden of mumps among naive Island population.

Methods. We collected information of epidemiological characteristics for all mumps cases which visited medical facility in the Island from July 1, 2015 to June 30, 2016. In addition, to capture those who developed mumps but not sought medical care, we conducted questionnaire survey targeting all students and their family members. We conducted a descriptive analysis to evaluate public health impact of mumps among mumps naïve population.

Results. From chart review, we found 1,191 mumps cases. Median age was 6 years old (range: 0–77). Among them, six cases were tested positive by RT-PCR and its geno-
type was type G. Genome sequence of the all collected viruses matched 100%. This result indicated that 5.1% of the population developed mumps by a single strain. If we focus on under 10 years old population, the incidence rate is 37,824 cases per 100,000 person-years. We also found 24 (2%) cases of aseptic meningitis and 2 (0.2%) cases of deafness. This disease burden is under-estimated as we captured 35 additional cases with symptoms but did not visited medical facility with 61% questionnaire collection rate.

Conclusion. We investigated large mumps outbreak which took place in an island with high mumps susceptible population. This disease burden clearly indicates that mumps vaccine should be included in routine vaccination and maintain high coverage rate to prevent periodic outbreaks.

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663. Epidemiological Characteristics of Congenital Rubella Syndrome Cases during Rubella Epidemic in Japan, 2012–2014

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Background. Rubella infection during the first 20 weeks of pregnancy can cause congenital rubella syndrome (CRS). The main defects of CRS are known as classic triads: hearing impairment, congenital heart disease, and cataract. In Japan from 2011 to 2013, rubella outbreak occurred mainly among adults in their 20s to 40s, and consequently notification of CRS cases increased.

Methods. We collected information of epidemiological characteristics regarding all reported CRS cases and their mothers retrospectively by questionnaire to the physicians and interview to the several members of patients’ association of CRS. We conducted descriptive analysis to evaluate public health impact on CRS in Japan.

Results. A total of 45 CRS cases were reported from October 2012 to October 2014. Majority of cases (96%: 43/45) were diagnosed at less than three months old, except for two cases whose diagnosis at 9 months old and 13 months old due to late onset of cataract and hearing impairment. Males accounted for 56% (25/45). The median gestational week at birth was 38 weeks (range: 31 to 41 weeks) and mean birth weight was 2,171 g (standard deviation: ± 626 g). Frequencies of clinical manifesta-
tions at the time of diagnosis revealed that 67% (30/45) of cases had hearing impair-
ment, 58% (26/45) had congenital heart disease, and 16% (7/45) had cataract. The most frequent heart diseases was patent ductus arteriosus (77%: 20/26), followed by pulmonary stenosis (15%: 4/26), and atrial septal defect (15%: 4/26). Only 7% (3/45) had classic triads. Thrombocytopenia (which accounted for 73% (33/45) was the most frequent manifestation developed other than classic triads. Eleven cases died at the time of investigation, indicating 24% of case fatality proportion of reported CRS cases in this outbreak. Among ten cases died before 6 months old, nine were complicated by congenital heart disease. None of the mothers of reported CRS cases had two doses of Rubella Containing Vaccine (RCV) before pregnancy; meanwhile 24% (11/45) of mothers had one dose of RCV.

Conclusion. High case fatality proportion of CRS pointed out obvious high public health impact in Japan. Vaccination of two doses of RCV before pregnancy is necessary to preventing CRS.

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664. Establishing Outbreak Thresholds for Army Active Duty Soldiers, 2013–2016

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Background. Gastrointestinal illness (GII) in military personnel can have a serious impact on missions both in and out of combat zones. In late 2016, a Salmonella outbreak at a major Army installation, coupled with multiple reports of Salmonella at other Army installations, led to heightened concern surrounding GII among US Army Medical Command leadership. Cases of GII are reported to the Army Public Health Center daily and monthly reported, but no threshold exists to detect outbreaks. The objective of this analysis was to determine the burden of gastrointestinal illness among US Army soldiers over the past 4 years and to develop an epidemic threshold to warrant a formal outbreak investiga-
tion and response efforts.

Methods. GII case counts among Active Duty Army soldiers were obtained from the Disease Reporting System Internet (DRSI), the Army’s disease surveil-
ance system, for the period of January 2013 to December 2016. Incidence rates among Army soldiers were compared with national rates published by the Centers for Disease Control and Prevention. The probability of seeing a specific number of cases was calculated by dividing the number of times that each case count was observed by the number of times in the time the series. For each of the three most common GI pathogens, null Poisson and negative binomial regression mod-
els were fit and compared in order to establish alarm thresholds indicating sta-
tistically abnormal high weekly case count levels that could be suggestive of an outbreak event.

Results. There were a total of 655 cases of GII among Army soldiers reported in DRSI during the study period. The majority of the cases were Campylobacter (42.4%), closely followed by Salmonella (39.5%). The weekly case count that fall within the top 10% percentile for Campylobacter, Salmonella, and Shigella are 3 cases, 3 cases, and 2 cases, respectively. The weekly case count that would fall within the top 5% percentile response for Campylobacter, Salmonella, and Shigella are 4 cases, 4 cases, and 2 cases, respectively.

Conclusion. Public health practitioners can use these thresholds, in collaboration with clinicians at Military Treatment Facilities, to improve GII surveillance and out-
break response protocols.

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