113. Accuracy of the NHSN Central Line-Associated Bloodstream Infection (CLABSI) Definition

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Background. CLABSIs are serious infections that cause prolonged hospital length of stay, increased cost, and mortality. Acute care hospitals must report CLABSIs to NHSN to participate in CMS programs. NHSN definitions must be met to attribute a secondary BSI (SBSI), or bacteriaemia to default to CLABSI if a central line is present. The lack of CDC/NHSN definitions for certain secondary sites of infections or problems in the definitions may lead to over-labeling CLABSIs. We reviewed the accuracy of NHSN definitions in a large healthcare system.

Methods. We retrospectively reviewed medical records of 279 patients with positive blood cultures on or after hospital day 3 and a central line from 15 hospitals belonging to a large healthcare system from January 1 to November 27, 2017. A team of centralized infection preventions (IPs) adjudicated each case as a CLABSI or as SBSI through routine surveillance following NHSN methodology. A clinical review was performed by a PGY6 infectious diseases fellow. Descriptive statistics are presented.

Results. A total of 279 bacteriaemia cases were analyzed. Of those 279 patients, 237 (85%) were 18 years old, 162 (58%) were males, 92 (33%) were white, 62 (22.2%) were black, 5 (1.8%) were Asian, and 12 (4.3%) were “other.” Ninety-seven (34.8%) were from the reference hospital. IPs classified 171 CLABSIs and 108 as SBSI. Of the 44 patients classified as CLABSI and as SBSI, we were unable to classify 18/44 (40%) of cases.

Conclusions. Current NHSN definitions may underestimate CLABSIs by nearly 30%. Hospital data continues to work in CLABSI reduction, accurate and precise definitions/methodology will be key in focusing efforts and attention of the engaged parties and avoiding penalties.

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114. Birth Prevalence of Congenital Cytomegalovirus Infection and Language, Hearing, and Developmental Outcomes in a Cohort of HIV-Exposed, Uninfected Preschool Children

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Background. The prevalence of congenital cytomegalovirus infection (cCMV) at birth is 0.5%–1% in the United States. Most cCMV newborns are asymptomatic at birth with 10%–15% subsequently developing sequelae, such as hearing loss. Higher cCMV prevalence (2.5%–11.4%) is reported in infants born to HIV-infected women, associated with maternal immune suppression and lack of antiretroviral therapy (ART), with few studies addressing neurodevelopmental (ND) outcomes in their offspring. We report birth prevalence of cCMV in a cohort of HIV-exposed, uninfected infants (HEU) born to women on combination ART with well-controlled HIV and describe ND outcomes through age 5 years.

Methods. The Surveillance Monitoring for ART Toxicities (SMARTT) study is an ongoing NICHD-funded observational multi-centered cohort study (United States and Puerto Rico) of growth and development of HEU children that commenced in 2007. As of August 1, 2017, participants with stored blood pellets collected ≤3 weeks after birth and at least 1 ND assessment ≥1 year of age had pellets tested by DNA PCR to establish cCMV. Comparisons of ND outcomes (defined in figure) at ages 1, 2, and 5 by cCMV status were made using Wilcoxon and Fisher’s Exact tests.

Results. Of 895 children meeting study criteria (55% black; 32% white; 40% Latino), 8 had cCMV, yielding a birth prevalence of 0.89% (95% CI 0.39–1.75%). All were asymptomatic and similar to CMV-uninfected infants in gestational age and anthropometrics measurements at birth. The last HIV viral load prior to delivery was undetectable in 88% of women. The last available CD4% was <20% in 3/8 mothers of cCMV newborns compared with 112/873 in those without (38% vs. 13%, P < 0.07). The mean duration of follow-up (± standard deviation) of children with cCMV was 7.2 years (1.6) and those without 5.9 (2.3) years (P < 0.11). ND assessments for language development (CDI at 1, A&5 at 2, TOLD-P3 at 5), cognition (Bayleys-III at 1), intelligence (WPPSI-III at 5), and hearing (PTA at 5) did not differ by cCMV status (figure).

Conclusion. Birth prevalence of cCMV in HEU children born within the last decade approaches national US prevalence. Preschool HEU children with asymptomatic cCMV at birth did not show poorer language, hearing, and developmental outcomes compared with CMV-uninfected HEU children.

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115. Results of a Targeted Neonatal Screening Program for Congenital Cytomegalovirus Infection in Montreal, Quebec

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Background. There remains considerable debate on the role of symptomatic, targeted vs. universal screening of newborns for congenital cytomegalovirus infection (cCMV). Here we report on a hospital-based targeted screening program for (1) infants who failed their newborn hearing screening and (2) infants of HIV-infected
women, and compare this to the prevalence among infants tested for CMV following clinical suspicion of a congenital infection.

Methods. In November 2013, the “Programme québécois de dépistage de la surdité chez les nouveau-nés” (PQDSN), a provincially mandated hearing screening program, was implemented at Centre Hospitalier Universitaire Sainte-Justine, a tertiary maternity and pediatric health center in Montreal, Quebec, along with CMV screening for all infants who failed their hearing test (excluding patients in the neonatal intensive care unit). Concurrently, beginning in April 2013, all infants of HIV-infected women were screened for cCMV infection within 48 hours of birth. The birth prevalence of cCMV infection in these targeted populations was compared with the prevalence among newborns tested for a clinical suspicion of cCMV.

Results. Out of 11,734 newborns screened for hearing through the PQDSN program between April 2014 and March 2018, 536 failed their initial hearing screen and 4 of these newborns tested positive for cCMV infection (0.75%). Out of a total of 130 HIV-exposed newborns born during this period, 116 were screened for CMV and 3 (2.6%) confirmed positive. An additional 455 newborns were identified by the attending pediatrician as having a risk factor for any congenital infection; of these, 22 (5.3%) tested positive for cCMV. Using these combined methods, a total of 0.24% of newborns enrolled in the PQDSN program tested positive for cCMV infection.

Conclusion. The overall birth prevalence of cCMV was 0.75% among infants who failed their hearing screen, 2.6% among HIV-exposed newborns, and 5.3% among infants with a clinical suspicion of a congenital infection. In the absence of hearing screening programs for newborns, these results reinforce the importance of maintaining a high index of clinical suspicion for cCMV infection.

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116. Role of Maternal Antibodies in Protection Against Postnatal Cytomegalovirus Acquisition
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Methods. We analyzed CMV-specific humoral responses in 29 CMV-seropositive Ugandan mother–infant pairs. Seventeen mothers were HIV co-infected. Infants were followed weekly for postnatal CMV acquisition using saliva PCR. Twelve infants acquired CMV and 17 infants did not acquire CMV in the first 6 months of life. We compared CMV-specific IgG responses at delivery of mothers whose infants acquired CMV to mothers whose infants did not acquire CMV by 6 months of life and in the infants at 6 weeks of life. We also compared CMV-specific responses in mothers at delivery and infants at 6 weeks of life based on maternal HIV status.

Results. We found similar CMV-specific total IgG and IgG3 binding, avidity index, neutralization, antibody-dependent cellular phagocytosis, and antibody-dependent cellular cytotoxicity responses in mothers whose infants did or did not acquire CMV by 6 months of life. Moreover, similar CMV-specific IgG binding and neutralization responses were also found between infants who did or did not acquire CMV by 6 months of life. Finally, CMV-specific IgG responses were similar in HIV-infected uninfected mothers at delivery and in infants at 6 weeks of life regardless of perinatal HIV exposure.

Conclusion. CMV-binding and functional IgG responses do not appear to impact infant susceptibility to postnatal CMV acquisition in the first 6 months of life, and therefore other viral or immunologic factors contribute to the inefficacy of this mode of CMV transmission. Thus, to provide sterilizing protection against mucosal CMV transmission, an antibody-based CMV vaccine would likely have to induce higher magnitude or qualitatively different responses than that of natural infection.

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117. Effect of Nasopharyngeal Pneumococcal Carriage on RSV and hMPV Illness Severity in Infants in Nepal
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Methods. We compared CMV-binding and functional IgG responses in mothers at delivery and infants at 6 weeks of life based on maternal HIV status.

Results. We found similar CMV-specific total IgG and IgG3 binding, avidity index, neutralization, antibody-dependent cellular phagocytosis, and antibody-dependent cellular cytotoxicity responses in mothers whose infants did or did not acquire CMV by 6 months of life. Moreover, similar CMV-specific IgG binding and neutralization responses were also found between infants who did or did not acquire CMV by 6 months of life. Finally, CMV-specific IgG responses were similar in HIV-infected uninfected mothers at delivery and in infants at 6 weeks of life regardless of perinatal HIV exposure.

Conclusion. CMV-binding and functional IgG responses do not appear to impact infant susceptibility to postnatal CMV acquisition in the first 6 months of life, and therefore other viral or immunologic factors contribute to the inefficacy of this mode of CMV transmission. Thus, to provide sterilizing protection against mucosal CMV transmission, an antibody-based CMV vaccine would likely have to induce higher magnitude or qualitatively different responses than that of natural infection.

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118. Nasopharyngeal (NP) Bacterial Detection in Infants With Respiratory Syncytial Virus (RSV) Infection: Impact on Clinical Outcomes
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Methods. Infants were enrolled at the time of birth in a maternal influenza immunization trial conducted in rural Nepal from 2011 to 2014. Weekly household-based active surveillance was performed from birth to 6 months to assess for infant respiratory illness, defined as fever, cough, difficulty breathing, wheeze, or otitis media. Mid-nasal swabs were collected and tested by PCR for RSV, hMPV, and streptococcus pneumoniae with inclusion of first illness episode in the surveillance period. Disease severity was defined using the World Health Organization Integrated Management of Childhood Illness criteria.

Results. Altogether, 247 (73.5%) of 336 infants with RSV and 154 (83.7%) of 184 infants with hMPV had S. pneumoniae detected. Mean age at RSV illness with concurrent pneumococcal carriage was 97.0 days (91.3–102.6) versus 72.8 days (63.3–82.4) for infants without carriage (P = 0.001). Mean age at hMPV illness with concurrent pneumococcal carriage was 101.3 days (93.9–108.7) versus 77.2 days (56.3–98.0) for infants without carriage (P = 0.01). Frequency of reported lower respiratory tract infection did not differ with or without carriage (RSV: 64.4% vs. 65.2% respectively; P = 0.89, hMPV: 52.6% vs. 50.0% P = 0.79). S. pneumoniae PCR cycle threshold value did not differ by duration or severity of RSV or hMPV illness episode.

Conclusion. High rates of pneumococcal carriage were observed with RSV and hMPV illness episodes in a birth cohort of infants in rural Nepal. The majority of infants with RSV or hMPV illness had pneumococcus detected at the time of first observed illness. However, no increase in RSV or hMPV illness severity or duration was seen with pneumococcal carriage.

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Background. Pneumococcal pneumonia after a preceding respiratory viral illness is associated with morbidity and mortality in infants. Our study sought to determine how pneumococcal carriage impacted illness severity due to respiratory syncytial virus (RSV) or human metapneumovirus (hMPV) in infants 0–6 months in a low-resource setting in South Asia without pneumococcal vaccination. Previous studies in this population found an overall 79.4% prevalence of pneumococcal carriage in ages 1–36 months with higher rates of carriage among healthy controls when compared with those with respiratory illness.

Methods. Infants were enrolled at the time of birth in a maternal influenza immunization trial conducted in rural Nepal from 2011 to 2014. Weekly household-based active surveillance was performed from birth to 6 months to assess for infant respiratory illness, defined as fever, cough, difficulty breathing, wheeze, or otitis media. Mid-nasal swabs were collected and tested by PCR for RSV, hMPV, and streptococcus pneumoniae with inclusion of first illness episode in the surveillance period. Disease severity was defined using the World Health Organization Integrated Management of Childhood Illness criteria.

Results. Altogether, 247 (73.5%) of 336 infants with RSV and 154 (83.7%) of 184 infants with hMPV had S. pneumoniae detected. Mean age at RSV illness with concurrent pneumococcal carriage was 97.0 days (91.3–102.6) versus 72.8 days (63.3–82.4) for infants without carriage (P = 0.001). Mean age at hMPV illness with concurrent pneumococcal carriage was 101.3 days (93.9–108.7) versus 77.2 days (56.3–98.0) for infants without carriage (P = 0.01). Frequency of reported lower respiratory tract infection did not differ with or without carriage (RSV: 64.4% vs. 65.2% respectively; P = 0.89, hMPV: 52.6% vs. 50.0% P = 0.79). S. pneumoniae PCR cycle threshold value did not differ by duration or severity of RSV or hMPV illness episode.

Conclusion. High rates of pneumococcal carriage were observed with RSV and hMPV illness episodes in a birth cohort of infants in rural Nepal. The majority of infants with RSV or hMPV illness had pneumococcus detected at the time of first observed illness. However, no increase in RSV or hMPV illness severity or duration was seen with pneumococcal carriage.

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