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1066. Trends in the Burden and Seasonality of Rotavirus in the United States, 2000–2016

Negar Aliabadi, MD MS[1]; Amber Haynes, MPH[2]; Jacqueline Tate, PhD[3]; Umesh D. Parashar, MBBS[1] and Aaron T. Curns, MPH[4]; [1]National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia, [2]IHRC Inc., contracting agency to Division of Viral Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia, [3]Division of Viral Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia, [4]Centers for Disease Control and Prevention, Atlanta, Georgia

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Background. Before implementation of rotavirus vaccination in 2006, rotavirus caused 55,000-70,000 hospitalizations and 410,000 clinic visits annually in US children. This report examines the long-term impact of vaccine introduction on rotavirus detection and seasonality through comparison of pre (2000–2006) and post (2007–2016) vaccine seasons through the National Respiratory and Enteric Virus Surveillance System (NREVSS).

Methods. NREVSS is a passive laboratory system collecting results of weekly total and rotavirus-positive stool specimens. Seasons are defined as July through June. To characterize changes in rotavirus detection, total and positive specimens for each post vaccine season from 11 continuously reporting (≥26 weeks per season) laboratories were compared with median values for 2000–2006. Data from 20 participating laboratories were used to determine changes in season characteristics. ArcGIS software was used to document the annual geographic trend across the United States between 2000 and 2015. For season 2015–2016, data are available through April and are not included in the ArcGIS analysis.

Results. Nationally, there was a 53–93% reduction in rotavirus positivity in the post vaccine period as compared with the median in 2000–2006. Trends in rotavirus positivity declined steeply after vaccine introduction in 2006, and have remained low compared with the pre-vaccine period, with alternating years of lower and greater activity (figure). All regions had similar reductions in positive tests. ArcGIS data indicate that peak seasonal activity was largely restricted to January-April for each pre-vaccine year. In the 2006–2007 season, peak activity occurred during January-April, for 2007–2008, this shifted to March-April, for 2008–2009, the peak activity nationwide occurred at all months of the year from the reporting laboratories. This diffuse activity occurred for all subsequent years, save 2009–2010 and 2012–2013, where peak seasonal activity was again confined to January-April.

Conclusion. Rotavirus vaccine substantially and sustainably reduced the burden and changed the epidemiology of rotavirus in US children. The biennial pattern observed may be explained by accumulating unvaccinated children over two successive seasons resulting in stronger rotavirus seasons every alternate year.

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1067. Differential Gene Expression Elicited by Children in Response to the 2015–2016 Live Attenuated vs. Inactivated Influenza Vaccine

Richard Zimmerman, MD, MPH, FIDSA[1]; Kelly Cole, PhD[2]; Judith Martin, MD[3]; William Horne II, MS[4]; Chyongchiou J Lin, PhD[1] and Mary Patricia Nowalk, PhD RD[1]; [1]Family Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania, [2]University of Pittsburgh, Pittsburgh, Pennsylvania, [3]Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania, [4]Pediatrics, Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania

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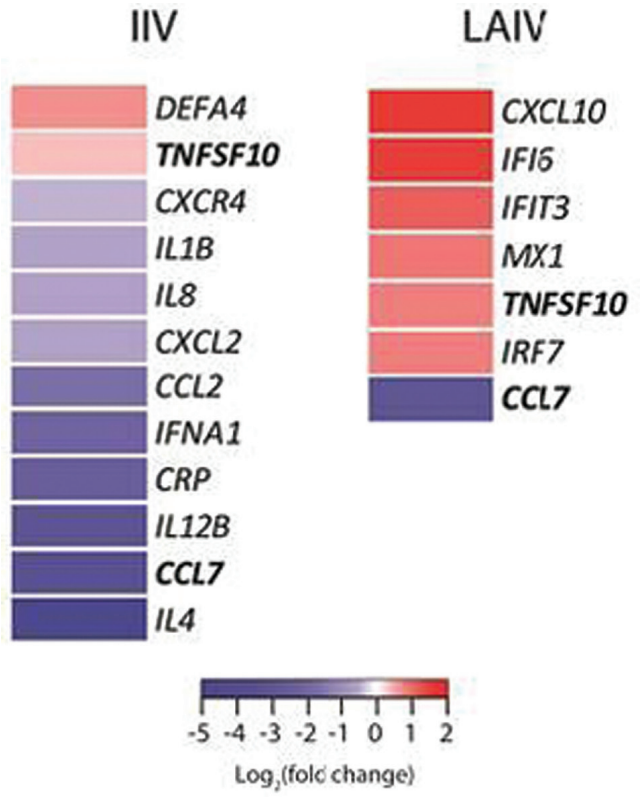
Background. In recent influenza seasons, the live attenuated influenza vaccine (LAIV) has not demonstrated the same level of vaccine effectiveness as that observed among children who received the inactivated influenza vaccine (IIV). To better understand this difference, this study compared the mRNA sequencing transcription profile (RNA seq) in children who received either IIV or LAIV.

Methods. Children 3–17 years of age receiving quadrivalent influenza vaccine were enrolled. Blood samples were collected on Day 0 prior to vaccination and again on Day 7 (range 6–10 days) following vaccination. Total RNA was isolated from PAXgene tubes and sequenced for a custom panel of 89 transcripts using the TruSeq Targeted RNA Expression method. Fold differences in normalized RNA seq counts from Day 0 to Day 7 were calculated, $\log_2$ transformed and compared between the two vaccine groups.

Results. Of 73 children, 47 received IIV and 26 received LAIV. Following IIV vaccination, 12 genes demonstrated significant differential expression at Day 7. In contrast, following LAIV vaccination, seven genes demonstrated significant differential expression at Day 7, five of which were not differentially expressed by IIV. Two genes demonstrated similar patterns of regulation in both IIV and LAIV recipients.

Conclusion. Differential regulation of genes was observed between 2015 and 2016 LAIV and IIV recipients. These results help to elucidate the immune response to influenza vaccines and might help explain the difference in vaccine effectiveness observed in recent years between LAIV and IIV.



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1068. Varicella Vaccination Coverage among Adolescents Ages 13–17 Years, United States, National Immunization Survey, 2007–2014

Jessica Leung, MPH[1]; Sarah Reagan-Steiner, MD[1]; Adriana S Lopez, MHS[1]; Jenny Jeyarajah, PhD[2] and Mona Marin, MD[1]; [1]Centers for Disease Control and Prevention, Atlanta, Georgia, [2]Carter Consulting, Inc., Atlanta, Georgia

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Background. Varicella is typically a self-limiting disease but it can be more severe in adolescents and adults. In 2007, 2-doses of varicella vaccine were routinely recommended for children, with a catch-up second dose for persons who received 1 prior dose.

Methods. We used 2007–2014 NIS-Teen data to examine trends in ≥2 dose varicella vaccination coverage and proportions of adolescents with/without evidence of immunity to varicella. Evidence of immunity included receipt of ≥2 doses of varicella vaccine or varicella disease history. Additionally, using 2014 data, we assessed characteristics of ≥2 dose varicella vaccination coverage: 1) factors associated with ≥2 dose vaccination, 2) timing of receipt of second dose and 3) missed opportunities for second dose vaccination among adolescents who had received 1 prior dose of varicella vaccine.

Results. During 2007–2014, the proportion of adolescents with ≥2 doses of varicella vaccine increased from 8.3% to 66.9% in 13–15 year olds, and from 3.6% to 56.7% in 16–17 year olds. The proportion of adolescents with evidence of varicella immunity also increased for both age groups, from 68.0% to 84.1% in 13–15 year olds and from 78.6% to 83.4% in 16–17 year olds. Among adolescents who received ≥2 doses of varicella vaccine by 2014, a higher proportion of 13–15 year olds received their second dose at 4–6 years compared with 16–17 year olds (13.4% vs. 3.2%). Factors significantly associated with lower ≥2 dose coverage included non-Hispanic White race/ethnicity; rural residence; living at >133% of the income-to-poverty ratio; no 11- to 12-year well-child visit; not receiving an adolescent vaccine; and residence in a state with no 2-dose immunization school entry requirement. Among the 2,478 adolescents who received only 1-dose of varicella vaccine, 77.1% (1,922) had at least 1 missed opportunity to receive their second dose; potentially 2-dose coverage could have increased from 79.5% to 94.8%.

Conclusion. The ≥2-dose varicella vaccination coverage and the proportion of adolescents with evidence of immunity to varicella increased during 2007 to 2014, though 16% lacked evidence of immunity in 2014. Though catch-up campaigns