1062. Pertussis-Associated Persistent Cough in Previously Vaccinated Children
Nicola Principi, MD; David Litt, MD, PhD; Leonardo Terranova, BSc;1
Marina Picca, MD;1 Concetta Malvaso, MD;2 Cettina Vitale, MD;3 Norman Fry, PhD;4 Susanna Esposito, MD6 and Italian Pertussis Group for Persistent Cough in Children; Pediatric Highly Intensive Care Unit, University of Milan, Fondazione IRCCS Ca’ Granda Ospedale Maggiore Policlinico, Milan, Italy;2 Research of Preventable Bacteria Reference Unit, Public Health England, London, United Kingdom;3 Primary care pediatrician, Milan, Italy;4 Primary care pediatrician, Latina, Italy;5 Primary care pediatrician, Palermo, Italy;6 University of the Studi di Perugia, Perugia, Italy
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Background. Persistent cough is a very distressing condition. It may be due to infections such as sinusitis, rhinitis or B. pertussis. In this case, associated symptoms are frequently different from typical pertussis (PT) cases and diagnosis is difficult and delayed. In this study, the role of B. pertussis infection as cause of persistent cough in school-children and adolescents and the protective role of previously administered PT vaccine doses was evaluated.

Methods. Healthy 7- to 17-year-old children with cough lasting from 2 to 8 weeks were enrolled. Excluded were the patients who had received the preschool booster (PSB) PT vaccine less than one year before the cough onset. At enrollment, a nasopharyngeal swab and an oral fluid sample were obtained to seek pertussis infection by detection of B. pertussis DNA in the nasopharynx using PCR and/or an elevated titer of anti-pertussis toxin IgG in oral fluid using an IgG antibody-capture enzyme-linked immunosorbent assay. Saliva determination of anti-PT toxin IgG was used because it acts as a surrogate for anti-PT toxin IgG serology.

Results. Among 96 patients, pertussis was diagnosed in 18 (18.7%; 95% CI 11.5–28.0%). In 2 children with cough lasting 2 weeks, confirmation was based on the detection of B. pertussis in 13 cases, with cough lasting 4–7 weeks, PT was diagnosed because of a positive test for anti PT IgG in blood; in 3 cases with cough lasting 3 weeks, PT was diagnosed due to positivity for both tests. In 15 children, the disease occurred despite PSB administration. In 2 cases, PT diagnosis was made only 16 and 19 months after booster injection, whereas in other 13 cases infection emerged after a longer period. However, in eight cases disease occurred less than 5 years after vaccine administration.

Conclusion. This study demonstrates that about 20% of persistent cough in children is due to PT. In case of persistent cough, this has to be considered to prescribe an effective antibiotic treatment, that protection evoked by PT vaccine rapidly wanes and that schoolchildren may return to be PT susceptible after few years of the officially recommended PSB dose. If confirmed, these findings might lead to anticipate presently recommended PT vaccine dose for adolescents.

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1063. Mapping Pediatric Tetanus Cases in Central Pennsylvania and Analyzing Hospital Costs Associated with Treatment
Bilal Ahmed, MPH; Michael Beck, MD, MPH and Parvathi Kumar, MD; Penn State University College of Medicine, Hershey, Pennsylvania
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Background. Pennsylvania is home to Amish and Mennonite communities with an estimated combined population of over 90,000 people. Under-immunization is common with vaccine preventable diseases, including tetanus, periodically presenting among children from these communities. Nearly 20% of nationally reported pediatric tetanus cases in the past 10 years were treated at our institution, the tertiary care center which serves these unique populations. We characterize demographics and costs of tetanus cases in the past 10 years were treated at our institution, the tertiary care center

Methods. Healthcare outcomes for 833 children aged 0–17 years treated for clinically diagnosed tetanus infection between January 2006 and December 2015. Cost data were extracted from Horizon Business Insight Institute of Medical Education & Research, Chandigarh, India;4 Oslo & Gyn, Post Graduate Institute of Medical Education & Research, Chandigarh, India

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Background. The resurgence of vaccine preventable diseases in young infants is a matter of concern worldwide. The aim of our study was to determine the seroprevalence of protective antibodies against diphtheria, pertussis, measles, mumps and rubella antigens in cord blood among term Indian newborns, at birth.

Methods. A total of 833 term newborns delivered in the tertiary care hospital in Northern India, over two year period (Apr 15-March 17) were enrolled after taking informed consent from their parents; and their cord blood sample was collected. Ethical clearance was obtained from Institute Ethics committee, before enrolling subjects. Cord blood samples were tested for antibodies using commercial ELISA kits (IMMUNOBLAB IgG).

Results. A total of 160 newborns (M:F = 86:74) were enrolled. In our study, antibodies (IgG) against diphtheria toxin (DT) were > 0.1 U/mL in 44.4% (71/160), 0.01 to 0.1 U/mL in 53.1% (85/160) and < 0.01 U/mL in 2.5% (4/160). None of them received Td vaccine in past. The median AS for tetanus serology among the entire sample of 833 children was 0.02 (0.01-0.05). In case of persistent cough, this has to be considered to prescribe an effective antibiotic treatment, that protection evoked by PT vaccine rapidly wanes and that schoolchildren may return to be PT susceptible after few years of the officially recommended PSB dose. If confirmed, these findings might lead to anticipate presently recommended PT vaccine dose for adolescents.

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1064. Reported History of Measles and Long-term Impact on Antibody to Tetanus in Children 6–59 Months of Age Receiving DTP in the Democratic Republic of Congo
Hayley Ashbaugh, DVM, MPH1; James D. Cherry, MD, MSC, FIDSA2; Sue Gerber, MPH;3 Stephen G. Higgins, MS4; Adva Gadoth, MPH5; Vivian H. Alfonso, PhD, MPH6; Patrick Mukadi, MD;4 Nicole Holf, MPH, PhD;2 Reena Doshi, PhD, MPH;2 and Anne W. Rimoin, PhD, MPH;7 Epidemiology, University of California, Los Angeles, Fielding School of Public Health, Los Angeles, California;6 Pediatric Infectious Diseases, University of California, Los Angeles, David Geffen School of Medicine, Los Angeles, California; Bill and Melinda Gates Foundation, Seattle, Washington;8 OpGen Incorporated, Gaithersburg, Maryland; University of California, Los Angeles, UCLA DRC Research Program, Kinshasa, Congo (The Democratic Republic of the),9 University of California, Los Angeles, UCLA DRC Research Program, Los Angeles, California

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Background. Recent studies suggest a measles-induced immune amnesia that could have long-term immunosuppressive effects via preferential depletion of memory B cells T CD150+ lymphocytes.

Methods. We examined the association between past measles and tetanus antibody levels among children participating in the 2013–2014 Democratic Republic of Congo (DRC) Demographic and Health Survey (DHS). Our sample consisted of 833 children aged 6–59 months whose mothers were selected for interview. Mothers reported (via recall) history of measles within the lifetime of the child. Classification of children who previously had measles was completed using maternal recall and measles immunoglobulin G (IgG) serostatus obtained via dried blood spot (DBS) analysis. A multiplex chemiluminescent immunoassay platform was used to obtain serologic results and Assay Score (AS) was calculated as a ratio to a positive control included in each run. Tetanus serostatus was categorized as being above or below the sample median serology AS value. Tetanus vaccination status was obtained via dated vaccination card and limited to children receiving the complete 3-dose vaccine

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Results. The median AS for tetanus serology among the entire sample of 833 children was 0.085, while children with history of measles had a median AS of 0.053 (N = 41) and children with no history of measles had a median AS of 0.088 (N = 792), that is, a 15% (95% CI: 1.4–24.5) relative risk (RR) of being below the median for measles serology. Continuous AS values were examined to ascertain the association between previous measles disease and odds of having below median levels of tetanus antibody. Controlling for potential confounding variables, the odds of a child with past history of measles having less than the median level of tetanus antibody was 3.86 (95% CI: 1.70, 8.78) among children fully vaccinated for tetanus.

Conclusion. The results suggest that, among children 6–59 months in DRC, measles may have a long-term impact on levels of pre-existing, vaccine-induced immunity to tetanus. These findings suggest the need for laboratory studies examining measles’ impact on pre-existing, vaccine-induced immunity and underscore the need for continued evaluation and improvement of DRC’s measles vaccine program.

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1065. Cord Blood Antibody Seroprevalence Against Diphtheria, Pertussis, Measles, Mumps and Rubella among Term Healthy Indian Newborns
Deepak James, MD1; Jula Lavanya, MD2; Sanjay Verma, MD Pediatrics3; Amit Rawat, MD3; Venkateshash S, MD2 and Neelam Aggarwal, MS5; Pediatrics, Post Graduate Institute of Medical Education & Research, Chandigarh, India;2 6Os & Gyn, Post Graduate Institute of Medical Education & Research, Chandigarh, India

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Background. The resurgence of vaccine preventable diseases in young infants is a matter of concern worldwide. The aim of our study was to determine the seroprevalence of protective antibodies against diphtheria, pertussis, measles, mumps and rubella antigens in cord blood among term Indian newborns, at birth.

Methods. A total of 160 newborns, delivered in the tertiary care hospital in Northern India, over two year period (Apr 15-March 17) were enrolled after taking informed consent from their parents; and their cord blood sample was collected. Ethical clearance was obtained from Institute Ethics committee, before enrolling subjects. Cord blood samples were tested for antibodies using commercial ELISA kits (IMMUNOBLAB IgG).

Results. A total of 160 newborns (M:F = 86:74) were enrolled. In our study, antibodies (IgG) against diphtheria toxin (DT) were > 0.1 U/mL in 44.4% (71/160), 0.01 to 0.1 U/mL in 53.1% (85/160) and < 0.01 U/mL in 2.5% (4/160). None of them received Td vaccine in past. The median AS for tetanus serology among the entire sample of 833 children was 0.02 (0.01-0.05). In case of persistent cough, this has to be considered to prescribe an effective antibiotic treatment, that protection evoked by PT vaccine rapidly wanes and that schoolchildren may return to be PT susceptible after few years of the officially recommended PSB dose. If confirmed, these findings might lead to anticipate presently recommended PT vaccine dose for adolescents.

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1066. Trends in the Burden and Seasonality of Rotavirus in the United States, 2000–2016
Nagar Aliabadi, MD MS1; Amber Haynes, MPH1; Jacqueline Tate, PhD1; Umesh D. Parashar, MBBS1 and Aaron T. Curns, MPH1; 1National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia; 2HRC Inc., contracting agency to Division of Viral Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia; 3Division of Viral Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia; 4Centers 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, FIDSA1; Kelly Cole, Ph.D1; Judith Martin, MD1; William Horne II, MD1; Hyongsik J Lin, PhD1; and Mary Patricia Nowalk, PhD RD1; 1Family Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania; 2University of Pittsburgh, Pittsburgh, Pennsylvania; 3Children’s Hospital of Pittsburgh, Pittsburgh, Pennsylvania; 4Pediatrics, Children’s Hospital of Pittsburgh, Pittsburgh, Pennsylvania

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Background. Children 3–17 years of age receiving quadrivalent 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 RNA Seq target enrichment method. Fold differences in normalized RNA seq counts on Day 7 (range 6–10 days) following vaccination were calculated, log 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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