Conclusion. Our results indicate variation in practice among providers at ECU ID Clinic regarding the screening, the need for a follow-up, and the type of follow-up provided. Additionally, research shows that anal cancer is one of the non-defining AIDS cancers whose incidence increases as the patient ages. However, based on the data, anal cancer screening decreases as the patient ages at the ECU ID clinic. Therefore, a standardized clinic protocol is needed, which may help improve the screening and follow-up rates. Also, a higher percentage of patients with an ASCUS result do not receive follow-up when compared with patients with an LGSIL and HGSIL result. Future research to determine the significance of follow-up for patients with an ASCUS result should be explored.

Disclosures. **All authors:** No reported disclosures.

2275. Parental Risk Factors for Fever in their Children 7–10 Days After the First Dose of Measles-Containing Vaccines

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Background. Fever 7–10 days after the first dose of a measles-containing vaccines (MCV) clusters among siblings in families suggesting a genetic basis. To further investigate this association, we evaluated whether clinical conditions in parents are associated with fever after a first dose of MCV in the child.

Methods. We conducted a cohort study including children born in Kaiser Permanente Northern California between 2009 and 2016 who received an MCV between ages 1 and 2 years. Each child was linked with his/her mother and father (where possible). We defined MCV- associated fever as a clinic or emergency department visit with fever code 7-10 days after the first dose of an MCV and identified parental clinical conditions present before or after child birth in electronic health record data. We evaluated parental clinical conditions associated with MCV-associated fever in the child using chi square or T test and multivariable logistic regression analyses

Results. The study included 244,128 children, 192,253 mothers (100 % of children) and 118,046 fathers (59% of children). There were 3750 children (1.54%) with MCV-associated fever. We identified more than 1000 separate clinical conditions in the parents, of which 29 maternal and 11 paternal conditions were significantly associated with MCV-associated fever in the child. After adjustment for maternal and infant covariates, including healthcare seeking behavior, maternal fever (odds ratios [OR] 1.18, 95% confidence interval [CI] 1.06–1.32), respiratory infection with fever (OR 1.20, 95% CI 1.09–1.31), maternal fever after a MCV (OR 5.90, 95% CI 1.35–25.78), migraines (OR 1.14, 95% CI 1.05–1.24), syncope (OR 1.14, 95% CI 1.01–1.27), arrhythmia (OR 1.21, 95% CI 1.00–1.45), essential thrombocythemia (OR 1.93, 95% CI 1.15–3.25) and Addison's disease (OR 2.90, 95% CI 0.90–9.33) were significantly associated with infant fever after a MCV. Paternal fever (OR 1.44, 95% CI 1.20–1.72) and (OR 1.60, 95% CI 1.03–2.48) were associated with MCV-associated fever in the child

Conclusion. Specific parental immune factors were associated with fever in their child 7–10 days after an MCV. These results imply that risk for fever after MCV may be related generally to genetics and particularly to familial immune responses

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2276. Immunogenicity of Takeda's Bivalent Virus-Like Particle (VLP) Norovirus Vaccine (NoV) Candidate in Children From 6 Months up to 4 Years of Age

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Background. With the introduction of routine childhood rotavirus vaccination, norovirus is now becoming the major cause of medically-attended gastroenteritis in children. Takeda is developing a norovirus vaccine (NoV) that contains genotypes GI.1 and GII.4 consensus (GII.4c) sequence VLPs. We report the immunogenicity data of NoV administered to children from 6 months up to 4 years of age.

Methods. Two age cohorts (1 to < 4 years, and 6 to < 12 months, n = 120 per cohort) were enrolled in this ongoing double-blind, randomized, phase 2 dose-finding study conducted in Colombia and Panama. Children received one or two intramuscular doses of NoV formulations containing 15/15, 15/50, 50/50 or 50/150 µg of GI.1/GII.4c VLPs adjuvanted with 0.5 mg $Al(OH)_3$. Vaccinations were on Days 1 and 29, with saline placebo as dose two to maintain blinding in one dose groups. Antibody responses to each VLP were measured on days 1, 29 and 57 as functional histo-blood group binding antigen blocking antibodies (HBGA), expressed as seroresponse rates (SRR), the proportions displaying ≥ 4-fold increases over baseline, and geometric mean titres (GMT).

Results. Each formulation induced dosage-dependent HBGA responses after a single dose, with a further increase after a second dose. In 1- to <4 year-olds HBGA SRR against GI.1 and GII.4c after one dose were 55–62% and 67–82%, respectively. SRR increased to 93–100% and 83–100% after a second dose. In 6 to < 12 month-olds responses were lower after the first dose: SRRs were 10–61% and 17–65% for GI.1 and GII.4c, respectively, increasing to 83–100% and 80–92% after a second dose. GMTs reflected this pattern of responses with higher GMTs for GI.1 and GII.4c achieved with the 50/150 µg formulation than the other dosages after both vaccinations in both age cohorts.

Conclusion. In 6–12 month-old infants and children up to 4 years of age, robust immune responses to the bivalent norovirus VLP vaccine candidates were observed; the highest HBGA responses in both age cohorts were observed after two doses of the 50/150 µg formulation. Further clinical evaluation of these formulations is underway in infants < 6 months of age.

Clinical Trial Registration ***(NCT: 02153112, EudraCT: 2014-000778-20)***

Disclosures. **T. Masuda**, Takeda Pharmaceuticals International AG: Employee, Salary. **I. Lefevre**, Takeda Pharmaceuticals International AG: Employee, Salary. **P. Mendelman**, Takeda Pharmaceuticals International AG: Employee, Salary. **J. Sherwood**, Takeda Pharmaceuticals International AG: Employee, Salary. **S. Bizjajeva**, Takeda Pharmaceuticals International AG: Employee, Salary. **A. Borkowski**, Takeda Pharmaceuticals International AG: Employee, Salary.

2277. Whooping Cough: Epidemiological Changes After Tdap Maternal Immunization Strategy in a Pediatric Hospital

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Background. Whooping cough is a major cause of morbidity and mortality in infants younger than 1 year old. In 2012 Argentina introduced Tdap in pregnancy to prevent infant mortality. The aim was to describe the clinical and epidemiological profile of *Bordetella pertussis* (Bp) comparing pre and post Tdap maternal immunization periods.

Methods. All laboratory PCR confirmed Bp cases between December 2003 and December 2017 were included in "R. Gutierrez" Children's Hospital. Statistical analysis was performed comparing clinical epidemiological features, Bp hospitalization rates (per 10,000 discharges) and lethality rates (%), between pre-vaccination (PreV) 2003–2011 and post-vaccination maternal immunization strategy (PostV) 2013–2017 periods, excluding intervention year (2012).

Results. From 1075 suspected cases, 350(32.6%) were Bp confirmed cases; median age 3 months (IQ = 2–7 months), 38% <3 months, 68% <6 months, 83% <12 months; 55% females; 18% had comorbidities; prematurity 10%, malnourishment 1%, and immunosuppression 1%; 81% required hospitalization, median length of stay was 6 days (IQ = 4–10 days), 17% in UCI. Confirmed cases showed a seasonal pattern predominantly from September through February (spring–summer). In comparison with PreV, PostVcases were older (3 vs. 9 months; $P < 0.001$), required less hospitalization (87% vs. 68%; $P < 0.001$), HR (22.3 vs. 10.9; $P < 0.001$) and LR (6.8% vs. 0%; $P = 0.03$) decreased and had a higher proportion of complete primary vaccination schedule (44% vs. 11%, $P < 0.001$). No difference found in gender (females 62% vs. 54%; $P = 0.23$), length of stay days ($P = 0.51$) or intensive care requirement (18% vs. 17%; $P = 0.91$). All fatal cases occurred in PreV.

Conclusion. After maternal immunization strategy Bp confirmed cases were older, required less hospitalization and had a higher proportion of complete primary vaccination schedule. Hospitalization and lethality rates showed a significant decrease. There were no fatal cases in our center after this intervention.

Disclosures. **All authors:** No reported disclosures.

2278. Maternal Immunization Rates With Tetanus–Diphtheria–Acellular Pertussis and Influenza Vaccines in the United States: A Retrospective Claims Database Analysis

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Background. The Advisory Committee on Immunization Practices (ACIP) recommends maternal immunization (MI) with tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccine during every pregnancy, preferably between 27–36 weeks of gestation, as well as influenza vaccination for all women who are pregnant or who might be pregnant in the influenza season.

Methods. This retrospective cohort analysis characterizes the rate of Tdap and influenza vaccination among large national samples of pregnant women in the United States using administrative claims data. The MarketScan® Commercial Claims and Encounters ("Commercial") and the Multi-State Medicaid Databases ("Medicaid") were used to identify pregnancies between January 1, 2010 and April 30, 2017. Diagnosis and procedure codes that describe gestational age at pregnancy end were used to estimate the date of last menstrual period (LMP) or the index date (Figure 1). Eligible pregnancies had ≥6 months of continuous enrollment prior to index date

("baseline") through 60 days after pregnancy end ("follow-up"). Maternal Tdap and influenza immunization rates are described by calendar year of pregnancy end. Analyses are reported separately for Commercial and Medicaid cohorts.

Results. A total of 1,862,705 and 628,079 eligible pregnancies in the Commercial and Medicaid databases, respectively, were identified. After the 2013 ACIP recommendation to administer Tdap vaccination during each pregnancy, the proportion of pregnancies vaccinated against Tdap was 39% in 2014 and increased to 54% in 2016 for the Commercial cohort (Figure 2). A similar trend for Tdap MI was observed for the Medicaid cohort (Figure 3). In 2016, 41% and 25% of all pregnancies received influenza vaccination in the Commercial and Medicaid cohorts, respectively. Tdap and influenza MI rates also varied by several factors, including maternal age group, geographic region, urban/rural location, and race/ethnicity.

Conclusion. In this analysis of large claims databases, for pregnancies ending in 2016 in the Commercial cohort, over 50% received Tdap vaccination and over 40% received influenza vaccination, whereas, in the Medicaid cohort, 30% of all pregnancies were vaccinated against Tdap and 25% received influenza vaccination.

Figure 1: Study Time Periods

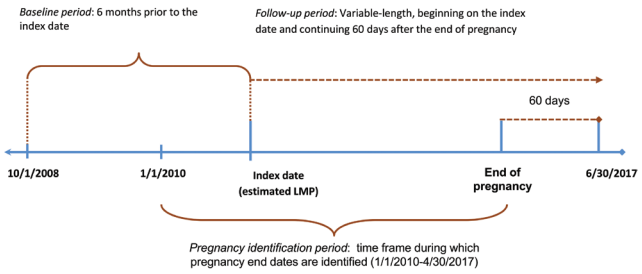


Figure 2: Maternal Immunization Rates with Tdap/Influenza Vaccines in the Commercial cohort

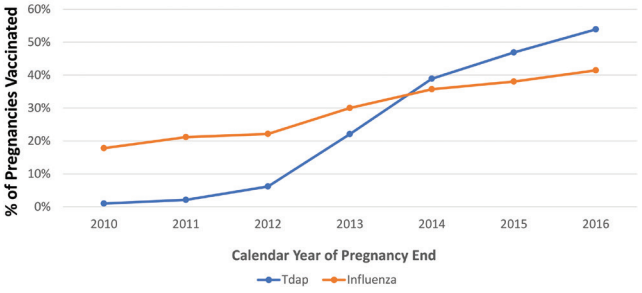
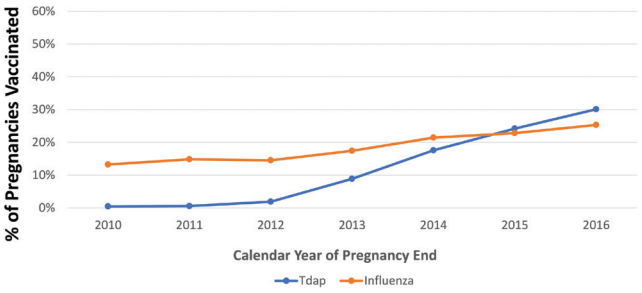


Figure 3: Maternal Immunization Rates with Tdap/Influenza Vaccines in the Medicaid cohort



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2279. A Randomized Open-Label Trial of 2-Dose or 3-Dose Primary Rabies Immunization Among Thai Children

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Background. The World Health Organization (WHO) recently recommended 2-dose primary rabies immunization instead of the 3-dose standard regimen. Given limited data of 2-dose regimens in pediatric population, this study was conducted. The objective was to compare the immunogenicity between 2-dose and 3-dose primary rabies immunization.

Methods. This study was an open-label clinical trial. Inclusion criteria were children aged 2–12 years with rabies virus neutralizing antibody (RVNA) titers < 0.5 IU/ml at baseline. The participants were divided into 2-dose vaccination (2D) on days 0 and 28 and 3-dose vaccination (3D) on days 0, 7, and 28 with a 2:1 ratio. A dose of 0.5 ml purified vero cell rabies vaccine (PVRV) was administered intramuscularly. RVNA titers were measured at 14-day post primary immunization. RVNA titers ≥ 0.5 IU/ml were considered seroprotective against rabies. Geometric mean titers (GMT) were calculated. T cell specific response to rabies vaccine antigen were measured from peripheral blood mononuclear cells (PBMCs) using the interferon-gamma enzyme-linked immunospot (IFN-gamma ELISpot) assay.

Results. From September to October 2017, 105 participants (52% male), 76 in 2D group and 29 in 3D group were enrolled. Median age and body weight was 70 months (IQR 53–88) and 19.2 kilograms (IQR 15.9–24.3), respectively. All participants had seroprotection at 14-day post primary immunization with GMT of 18.6 (95% CI 15.8-21.9) and 16.3 (95% CI 13.1–20.0) in 2D and 3D groups, respectively ($P = 0.35$). Median IFN-gamma level at 14-day post primary immunization was 60 spot forming cells (SFC) per 10^6PBMCs and 132 SFC per 10^6PBMCs in the 2D and 3D groups, respectively ($P = 0.15$).

Conclusion. The immunogenicity of 2-dose primary rabies immunization at 14-day post primary vaccination is comparable to the 3-dose regimen. Participants are currently being followed for 1-year results.

Disclosures. **All authors:** No reported disclosures.

2280. Antibiotic Exposure Does Not Impact Serological Responses to Rotavirus Vaccination

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Background. Antibiotic exposure around the time of rotavirus (RV) immunization has been suggested to diminish immune responses, but data are sparse.

Methods. We retrospectively analyzed data from a randomized RV vaccine study (NCT01266850) outlined in the Table. Concomitant antibiotic use, defined as receipt of an antibiotic 14 days before or 7 days after RV immunization, was recorded. The primary outcome was RV-specific IgA seroresponse (IgA ≥20 U/mL) by ELISA obtained 1 month after the last dose of RV vaccine and geometric mean titer (GMT) to strain WC3 (RV5 backbone) or strain 89–12 (RV1 backbone). Only subjects who received all scheduled vaccine doses and phlebotomy were included. Data were assessed for homogeneity across vaccine schedule groups, stratified by antibiotic exposure. We examined differences in seroresponse adjusting for treatment group, gender, race, ethnicity, and study site using logistic regression models.

Results. Of the 1384 immunized children, 1174 (85%) met inclusion criteria.

Table: Treatment Allocation and Effect of Antibiotic Exposure on Seroresponses

Groups	1	2	3	4	5
Immunization Schedule	Rotateq® (RV5) 3 doses $N = 206$	RV5, RV1, RV1 $N = 207$	RV5, RV5, RV1 $N = 194$	Rotarix® (RV1) 2 doses $N = 287$	RV1, RV5, RV5 $N = 280$
Seroresponse: Antibiotic Exposed	21/25 (84%)	20/20 (100%)	18/22 (82%)	13/15 (87%)	32/32 (100%)
Seroresponse: Antibiotic Not-Exposed	167/181 (92%)	168/187 (90%)	158/172 (92%)	209/272 (77%)	238/248 (96%)

Nearly 10% ($n = 114$) of participants were antibiotic exposed; group 4 had the ***least*** antibiotic exposure ($P = 0.05$). No differences in GMT or seroresponses were observed to either WC3 or 89–12 (figure) by antibiotic exposure. In the multivariable logistic regression model, there were no significant differences for gender, race, ethnicity, site, or antibiotic exposure (P-value ≥0.5 for IgA seroresponse). The only observed difference in seroresponses was by RV vaccine group ($P < 0.0001$).

Conclusion. Antibiotic administration around the time of RV vaccine did not diminish RV-specific IgA seroresponses observed 1 month after the last RV vaccine dose.