Table 1. Continued

	HD Cohort, No. (%)	SD Cohort, No. (%)	Risk Ratio (95% CI)	P Value	HD (≥65 yrs), No. (%)	SD (≥65 yrs), No. (%)	Risk Ratio (95% CI)	P Value
2015–16 Season	*n* = 176976	*n* = 1597803			*n* = 164111	*n* = 854707		
Lab-confirmed influenza	168 (0.095)	1801 (0.11)	0.84 (0.72–0.99)	0.03155	155 (0.094)	808 (0.095)	1.0 (0.84–1.19)	1.0
Influenza hospitalization	124 (0.07)	937 (0.059)	1.19 (0.99–1.44)	0.06114	114 (0.069)	568 (0.066)	1.05 (0.85–1.28)	0.68

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

1467. Effectiveness of a Web-Based Intervention to Increase Uptake of Maternal Vaccines

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Background. Tetanus-diphtheria-acellular pertussis (Tdap) and influenza (flu) vaccines are recommended for all pregnant women in each pregnancy. However, vaccination uptake is suboptimal. Our objective was to test of the efficacy of an online vaccine and social media resource in increasing uptake of Tdap and flu vaccines.

Methods. The RCT was conducted in an integrated health care system in Colorado from September 2013 to July 2016. Participants were pregnant women in the third trimester of pregnancy. Participants were randomly assigned to a website with vaccine information and interactive social media components (VSM), a website with vaccine information only (VI), or usual care (UC). To facilitate interaction on the VSM site, women were randomized 3:2:1 across the VSM:VI:UC arms. The interventions were designed and pilot tested using focus groups, individual interviews, surveys, and usability testing with vaccine-hesitant parents and pregnant women and included content on maternal and infant vaccination. Participants in the VSM and VI arms had access to the same base vaccine content. The VSM site also included a blog, discussion forum, chat room, and "Ask a Question" portal. After randomization, women in the VSM and VI arms were sent a website link. While they were encouraged to use the vaccine website, it was not required. Tdap and flu vaccination outcomes were analyzed separately. Women were included in each analysis if they had no record of vaccination for the relevant vaccine at enrollment and were >2 weeks from delivery.

Results. For Tdap (n = 172), there were no significant differences in uptake between study arms (VSM: 71%, VI: 69%, UC: 68%, P = .95). For flu (n = 284), women in both the VSM and VI arms had higher rates of uptake compared with UC, although the intervention arms were not significantly different from each other (VSM: 57%, VI: 55%, UC: 38%, P = .09). Women receiving any intervention (VSM or VI) had significantly higher uptake of flu vaccine compared with UC (VSM/VI: 56%, UC: 38%, P = .03).

Conclusion. Web-based vaccination information which is sent to pregnant women, with or without social media components, can positively influence maternal flu vaccine uptake. Because of the potential for scalability, the impact of robust vaccination information websites should be studied in other settings and with women in earlier stages of pregnancy.

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

1468. Provider Attitudes and Practices Regarding Maternal Vaccination Among Obstetrician-Gynecologists: A National Survey

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Background. Obstetrician-gynecologists (ob-gyns) play a crucial role as vaccinators of pregnant women, yet little is known about their attitudes and practices in this role. Our objectives were to describe, among a nationally representative sample of ob-gyns: 1) practices and attitudes regarding vaccination of pregnant women; and 2) barriers to the use of standing orders.

Methods. An e-mail and mail survey among ob-gyns conducted March-June 2016.

Results. The response rate was 69% (331/477). Overall, 90% reported administering ≥1 vaccines to pregnant women. Almost all (97% and 95%, respectively), strongly recommend influenza (flu) and tetanus-diphtheria-acellular pertussis (Tdap) vaccines; 60% use standing orders for flu vaccination and 56% for Tdap vaccination. More (68%) always recommend Tdap vaccines to household contacts of pregnant women than flu vaccines (53%). Physician attitudes are shown in the figure.

The most significant barriers to the use of standing orders included provider concern that patients prefer to speak to them first (12% major barrier, 25% somewhat), provider belief that they should be the one to recommend vaccines (11% major, 12% somewhat), and staff discomfort because of having to answer vaccine-related questions (7% major, 17% somewhat).

Conclusion. Ob-gyn attitudinal barriers to maternal vaccination are rare, whereas barriers to use of standing orders, a highly effective strategy for increasing vaccination uptake, are common, and less than 2/3 of providers currently use them.

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1469. Durability and Kinetics of Maternal Pertussis Antibodies in Infants of Mothers Immunized with Tdap During Pregnancy

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Background. Infant protection against severe pertussis requires sufficient maternal pertussis antibodies until infant immunization begins. The kinetics of maternally-derived Tdap-induced antibodies in infants is poorly understood.

Methods. 34 healthy mother-infant pairs were followed prospectively from maternal Tdap immunization to infant age 6 weeks. Blood was collected from women pre-Tdap, 4 weeks post Tdap and at delivery, and from infants at birth, and age 3 and 6 weeks. IgG to pertussis toxin (PT), filamentous hemagglutinin (FHA), fimbrial proteins (FIM) and pertactin (PRN) was quantified by luminex assay (IU/mL). Geometric mean concentrations (GMCs) with 95% confidence intervals (C.I.) for pertussis-specific IgG and half-life of IgG to PT were calculated.

Results. Mean maternal age was 31.1 years (range 22.7–39.7); 47% were white, 32% Hispanic and 21% Black. Tdap was administered at a mean gestation of 30.7 weeks (28–32.7). Infants had a mean gestation of 39.1 weeks (36–41.1) and birthweight of 3379g (2580–4584). GMCs (95%C.I.) for maternal pertussis-specific IgG increased significantly 4 weeks post-Tdap (4-fold higher in 59%, 41%, 29% and 44% for PT, FHA, FIM and PRN, respectively) and waned before delivery. Placental transfer was 135% for PT, 141% for FHA, 131% for FIM and 136% for PRN. Maternal antibodies in infants decayed quickly, but at age 6 weeks GMC of infant PT-specific IgG was 21.1IU/mL (14.7–30.2) and 91% had PT ≥ 10 IU/mL. Estimated half-life of PT-specific IgG in infants was 30.9 days.

Time	PT (IU/mL)	FHA (IU/mL)	FIM (IU/mL)	PRN (IU/mL)
Pre-Tdap	9.85 (6.71–14.45)	32.81 (21.79–49.42)	131.55 (81.98–211.15)	55.67 (35.75–86.68)
Post-Tdap	46.8 (34.4–63.68)	116.82 (88.9–153.5)	440.35 (327.57–591.97)	233.02 (179.14–303.04)
Maternal Delivery	40.78 (29.4–56.53)	104.81 (78.27–140.35)	384.5 (287.41–514.28)	204.41 (155.42–268.84)
Infant Cord	55.12 (38.65–78.6)	147.81 (113.47–192.49)	505.36 (366.44–696.95)	278.55 (216.57–358.26)
Infant 3w	30.73 (21.57–43.79)	82.49 (63.65–106.93)	292.87 (221.11–388.06)	167.72 (129.57–217.07)
Infant 6w	21.1 (14.72–30.23)	54.98 (41.97–72.03)	210.52 (153.74–288.27)	113.03 (86.94–146.99)

Conclusion. Although the half-life of maternal PT- specific antibodies induced by Tdap immunization during the third trimester of pregnancy is shorter than previously thought, this strategy results in levels likely sufficient to protect infants through the start of the immunization series.

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

1470. Tdap and Influenza Vaccination Among Women with a Live Birth, Internet Panel Survey, United States, 2015–2016

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Background. The Advisory Committee on Immunization Practices recommends that all pregnant women receive a tetanus diphtheria toxoids and acellular pertussis vaccine (Tdap) during each pregnancy and an influenza vaccination annually.

Methods. An opt-in Internet panel survey was conducted March 29-April 7, 2016 among women who reported being pregnant any time since August 1, 2015 to assess vaccination coverage with influenza and Tdap among pregnant women and explore reasons for non-vaccination. Analysis was restricted to women who delivered a live birth between August 1 and the time of survey. Respondents were asked about receipt of influenza vaccination since July 1 and Tdap during their most recent pregnancy, if a provider recommended or offered vaccination, and vaccination-related knowledge, attitudes, and beliefs. Estimates were weighted by age, race/ethnicity, and census region to the U.S. pregnant women population.

Results. Among 663 women, 28.8% reported receiving both influenza and Tdap vaccination, 14.9% received influenza vaccination only, and 20.0% received Tdap only. 70.3% of women received a provider recommendation for both vaccines, 16.8% were recommended influenza vaccine only, 6.5% were recommended Tdap only, and 6.4% received no vaccine recommendation. The corresponding estimates for receipt of a provider offer of vaccination were 52.9%, 21.1%, 10.7%, and 15.3%, respectively. The top reported reasons for non-vaccination with influenza vaccine, regardless whether or not Tdap was received, were not thinking the vaccine is effective and fear of getting sick/side effects from the vaccine. The top reported reasons for non-vaccination with Tdap, regardless whether or not influenza vaccination was received, were not knowing they were supposed to get Tdap and not getting a provider recommendation for Tdap.

Conclusion. Less than 30% of pregnant women reported being fully vaccinated with recommended maternal vaccines, leaving them and their infants at risk of vaccine-preventable disease. Reported reasons for non-vaccination differed by vaccine: primarily negative attitudes toward influenza vaccine and lack of awareness of the need for Tdap. Clinic-based education along with systems such as standing orders and provider reminders are strategies to increase maternal vaccination.

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1471. Pregnant Women's Acceptance of Hypothetical Zika Vaccine

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Background. Zika virus is associated with substantial infant morbidity and mortality. Promising Zika vaccines for pregnant women are currently in clinical trials. To prepare for public availability, the acceptability of a hypothetical Zika vaccine was assessed among pregnant women.

Methods. A 16-question, 10-point Likert-scale survey was administered to a convenience sample of 100 pregnant women receiving routine prenatal care at the University of Kansas Medical Center from 07/07/2016 to 9/29/2016. The primary outcome, hypothetical vaccine acceptability, was evaluated by calculating the proportion of respondents who strongly agreed (responded 10/10) with the statement "If a vaccine for Zika virus was available, I would get this vaccine while pregnant." Multivariable analyses were conducted to examine characteristics associated with Zika vaccine acceptability.

Results. Nearly half of the 100 patients surveyed (48%) expressed strong agreement to getting a hypothetical Zika vaccine while pregnant. Among these women, 98% $n = 47$ strongly agreed that a recommendation from their prenatal provider would be very important to them. Among the other 52% who did not demonstrate strong agreement to getting a Zika vaccine while pregnant, only 63% $n = 33$ of them strongly agreed that a recommendation from their prenatal provider would be very important to them. Women indicating strong acceptance of a hypothetical Zika vaccine were also more likely to feel strongly about the importance of children being up to date on all their vaccinations (97% vs. 83%, $P = 0.01$) and the importance of getting recommended vaccinations during her pregnancy (97% v. 79%, $P = 0.003$).

Conclusion. A Zika vaccine may be acceptable to pregnant women but would benefit from strong provider support and education about the risks and consequences of Zika infection and the benefits of vaccination.

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1472. Clinical Presentation, Risk Factors, and Cross-Protection from Repeated Respiratory Viral Infections in Infants in Nepal

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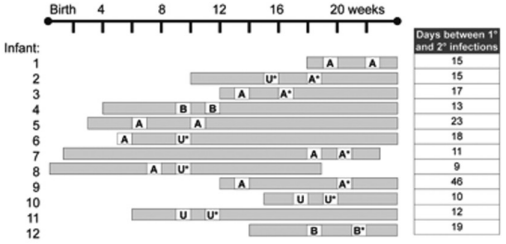
Background. Globally, pneumonia is the leading cause of childhood mortality, and RSV is a leading cause of viral pneumonia among children. Many respiratory viruses, including RSV, parainfluenza virus types 1–4 (HPIV), and rhinovirus (HRV) have the ability to cause repeated infections throughout a person's lifetime. However, the incidence, clinical characteristics, and risk factors associated with recurrent RSV are not well described, particularly in low and middle income countries.

Methods. Data were collected from a randomized trial of maternal influenza vaccination conducted in rural southern Nepal from April 2011 to May 2014. Infants were followed weekly for respiratory illness until 180 days after birth. If symptomatic, a nasal swab was collected for analysis by RT-PCR for RSV and other respiratory viruses.

Results. HRV was the leading cause of respiratory infections with an incidence of 1071 per 1000 person-years (p-y). Incidence of RSV and HPIV were 222 and 223/1000 p-y, respectively, followed by CoV, BoV, HMPV, Flu, and AdV. Male gender, maternal smoking, and having other children at home were associated with a higher risk for any respiratory viral infection. Of the 336 infants infected with RSV, 12 (3.6%) had a second RSV infection in the first six months of life. The incidence for a secondary RSV infection was lower than the incidence for a primary infection (167 vs. 222/1000 p-y, respectively). No significant differences in severity or duration of illness were noted between the first and second RSV infections. Repeated infections with HRV, HPIV, and Flu were observed in 466 (34.8%) of 1,341 infants, 12 (3.4%) of 350 infants, and 7 (4.0%) of 177 infants, respectively. Birth between June and September conferred a protective effect against repeat respiratory viral infections.

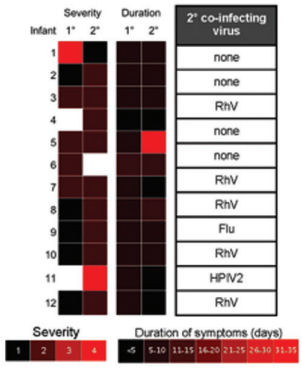
Conclusion. Repeated infections were observed with all the respiratory viruses tested. However, the incidence of secondary RSV infection was lower than primary infection in infants less than 6 months of age, suggesting a potential protective immune response in infants after natural infection. These data are supportive of using vaccination to protect this vulnerable population against disease.

Figure 1.



Timing of RSV episodes in 12 infants who were re-infected with RSV. The black bars represent individual RSV episodes. The letters A or B correspond to the RSV subtype (U denotes that the virus was not-typable or un-typed. The gray bars represent the RSV season (October – February). The symbol * means another virus was detected at the same time (either rhinovirus, influenza, or PIV2). The duration between the first and second RSV episodes for each infant are shown at the right.

Figure 2.



Heat-map of severity and duration of disease during the first and second episodes of RSV in infants re-infected with RSV. For severity: 1 = disease limited to the upper respiratory tract; 2 = mild lower respiratory tract disease or lower respiratory tract disease without sufficient clinical data to fully determine severity; 3 = severe lower respiratory tract disease; and 4 = very severe lower respiratory tract disease. White denotes that there was insufficient clinical data to determine whether the infant had lower respiratory tract disease.

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