146. Influenza Vaccine Effectiveness among Elderly and Non-Elderly Adults Aged ≥45 Years in the United States, 2011–2012 to 2015–2016

Fiona P. Havens, MD, MPH1; Karina Vuolle, MD, MPH1; Jessie Chung, MPH1; Arnold S. Monto, MD, FIDSA2; Emily T. Martin, MPH, PhD3; Edward A. Belongia, MD, PhD4; Huang Q. McLean, PhD, MPH5; Manjusha Gagli, MBBS6; Kompapura Murthy, MBBS, MPH7; Richard K. Zimmerman, MD MPH, FIDSA8; Mary Patricia Nowalk, PhD9; Michael L. Jackson, PhD, MPH10; Lisa A. Jackson, MD, MPH, FIDSA10a and Brendan L. Flannery, PhD11. 1Infection Divison, Centers for Disease Control and Prevention, Atlanta, Georgia; 2Department of Epidemiology, University of Michigan School of Public Health, Ann Arbor, Michigan; 3Epidemiology, University of Washington School of Public Health, Seattle, Washington; 4Marshfield Clinic Research Institute, Marshfield, Wisconsin; 5Medische Kliniek Rotterdam; 6Kaiser Permanente Washington Health Research Institute, Seattle, Washington

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Friday, October 6, 2017: 12:30 PM

Background. While elderly adults have decreased immune responses to influenza vaccination compared with younger adults, few studies have compared influenza vaccine effectiveness among elderly and non-elderly adults.

Methods. We used data from the U.S. Influenza Vaccine Effectiveness (VE) Network over 5 influenza seasons from 2011–12 to 2015–16. We included data from adults aged ≥45 years seeking outpatient medical care for an acute respiratory illness within 7 days of illness onset. Combined nasal and oropharyngeal swabs were tested for influenza virus by RT-PCR. Current season vaccination was defined as receipt ≥14 days before illness onset. Vaccination history included both current season and previous high dose influenza vaccine along medical records, immunization registries and self-report. VE was estimated as (100% - (x / (1 - odds ratio))) from multivariable logistic regression comparing odds of vaccination among influenza RT-PCR-positive vs. negative participants, controlling for age, comorbid conditions, illness duration, calendar time, race/ethnicity, sex, and study site.

Results. 10,640 adults aged ≥45 years were enrolled; 2592 (24%) tested influenza positive, including high dose influenza vaccine among those ≥65 years of age in 65-74 and ≥75 years, respectively. VE against outpatient influenza among patients aged ≥45 years ranged from 28% in 2014–15 to 55% in 2011–12, with an average of 42% (95% CI: 36–51% across the 5 seasons). VE ranged from 5–36% against A/ H1N1pdm09, 41–69% against A/H1N1pdm09, and 57–75% against influenza B (Table).

Conclusion. Over 5 influenza seasons, influenza vaccine effectiveness against medically attended influenza did not significantly differ between elderly and non-elderly adults aged ≥45 years. Further investigation of the effect of medications and repeated vaccination are needed.

Table: Laboratory-confirmed Influenza and Influenza-coded Hospitalizations for Patients Receiving High-dose (HD) vs. Standard-Dose (SD) Influenza Vaccine

| Season | HD Cohort | SD Cohort | Ratio | P Value |
|--------|-----------|-----------|-------|---------|
| 2016–17 | 234923    | 1441940   | 1.04  | 0.35677 |
| 2017–18 | 256654    | 759862    | 1.02  | 0.75    |

1465. Efficacy and Effectiveness of High-Dose Influenza Vaccine for Older Adults: A Systematic Review and Meta-Analysis

Jason Lee, MBBS, MPH1; B. Seet, PhD2; Leslie Dan School of Pharmacy, University of Toronto, Toronto, Ontario, Canada; 3Influenza, Vaccine and Immunology, Health Sciences Center, Oklahoma City, Oklahoma, 4FluLab, Stanford University, Stanford, California

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Background. Seasonal influenza epidemics are responsible for significant disease burden each year, especially in adults over the age of 65. Only recently have there been vaccines that are formulated specifically for individuals 65 years of age or older, one of which, Fluzone High-Dose (IV3-HD), has received widespread use in the US. This study aims to review the evidence of efficacy and effectiveness of IV3-HD compared with standard dose influenza vaccines in individuals aged 65 years or older against clinical outcomes plausibly related to influenza.

Methods. A systematic review of four electronic databases and other sources was conducted for randomized and observational studies assessing IV3-HD efficacy and effectiveness (VE) of IV3-HD against clinical outcomes such as influenza-like illness, hospital admissions and death in adults 65 years of age or older. A meta-analysis was conducted by separately extracting individual VE's reported in the studies and estimating random-effects pooled efficacy against each of the clinical outcomes.

Results. Seven eligible studies (4 randomized trials and 3 observational studies) were identified following the screening of 1,816 studies. All of these studies reported relative VE (rVE) of IV3-HD vs. IV3, and not absolute efficacy/effectiveness of IV3-HD. Of those, 5 studies reported rVE for IV3-HD vs. IV3 against influenza-like illness, 6 studies reported rVE against hospital admissions, and 3 studies reported rVE against death. IV3-HD demonstrated improved protection against influenza-like illness (rVE=18.3%, 95% CI: 7.0 to 28.3%), and was also more effective at preventing hospital admissions due to influenza (rVE=19.4%, 95% CI: 6.7 to 30.4%), pneumonia (rVE=22.4%, 95% CI: 5.0 to 36.5%), and cardiorespiratory events (rVE=12.0%, 95% CI: 4.9 to 18.6%), and death following a hospital admission for influenza (rVE=22.2%, 95% CI: 18.2 to 24.8%). IV3 also had a modest but not statistically significant impact on all-cause hospital admissions (rVE=7.3%, 95% CI: 1.5 to 15.4%) and all-cause death (rVE=8.8%, 95% CI: 4.2 to 5.5%)

Conclusion. There is significant evidence demonstrating IV3-HD is more effective than standard dose influenza vaccine at reducing the clinical outcomes typically associated with influenza infection in older adults.

This study was funded by sanofi pasteur

Disclosures. 1. Lee, sanofi pasteur: Employee; Salary; 2. G. Lam, sanofi pasteur: Employee; Salary; 3. T. Shin, sanofi pasteur: Employee; Salary; 4. J. Kim, sanofi pasteur: Co-op Student, Educational support; 5. A. Krishnan, sanofi pasteur: Co-op Student, Undergraduate support; 6. B. Seet, sanofi pasteur: Employee and Shareholder; 7. D. Neame, sanofi pasteur: Employee and Shareholder; 8. A. Chit, sanofi pasteur: Employee, Salary.
Table 1. Continued

| HD Cohort | SD Cohort |
|-----------|-----------|
| Risk Ratio | P Value |
| No. (%) | No. (%) |
| (95% C.I) Value | (95% C.I) Value |

2015–16

| Season | n | n | n | n | n | n |
|--------|---|---|---|---|---|---|
| 2015-16 | 168 | 1801 | 0.94 | 0.03155 | 808 | 10.0 |
| confirmed | 0.096 | 0.11 | 0.72 | 0.094 | 0.095 | 0.84 |
| influenza | 0.99 | 1.19 | 0.06114 | 568 | 1.05 | 0.68 |

Disclosures. All authors: No reported disclosures.

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

Sean O’Leary, MD, MPH; Nicole Wagner, MPH; Komal Narwaney, PhD; Courtney Kraus, MPH; Jo Ann Shoup, PhD; Stanley Xu, PhD; Saad Omer, MMBS, MPH, PhD, FIDSA; Kathy Gleason, PhD; Matthew F. Daley, MD, and Jason Glanz, PhD.

Pediatric Infectious Diseases, University of Colorado School of Medicine and Children’s Hospital Colorado, Aurora, Colorado, Institute for Health Research, Kaiser Permanente Colorado, Denver, Colorado, Emory Vaccine Center, Atlanta, Georgia

Session: 162. Maternal/Infant Immunization

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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 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 basic 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 VSM, 73% of women who 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 protein (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.

Conclusion. Mean maternal age was 31 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). Infants had a mean gestation of 39.1 weeks (36.1–41.8) and birthweight of 3379g (2580–4584). GMCS (95%CI) for maternal pertussis-specific IgG increased significantly 4 weeks post-Tdap (4-fold higher in 59%, 41% and 24% for PT, FHA, FIM and PRN, respectively) and waned before delivery. Placental transfer was 133% 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.

Disclosures. All authors: No reported disclosures.

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

Sean O’Leary, MD, MPH; Laura Riley, MD, Megan C. Lindley, MPH; Mandy Allison, MD, MSHP; Lori Crane, PhD, MPH; Laura Hurley, MD, MPH; Brenda Beatty, MPH; Michaela Burtikova, PhD, MPH; Alison Albert, MPH ChE; Alison Fisher, MPH; Angela Jiles, MPH and Allison Kempe, MD, MPH.

Pediatric Infectious Diseases, University of Colorado School of Medicine and Children’s Hospital Colorado, Aurora, Colorado, The American Congress of Obstetricians and Gynecologists, Washington, DC, Centers for Disease Control and Prevention, Atlanta, Georgia, Pediatrics, University of Colorado, Aurora, Colorado, Colorado School of Public Health, Aurora, Colorado, Denver Health, Denver, Colorado, University of Colorado Anschutz Medical Campus, Aurora, Colorado, University of Colorado Anschutz Medical Campus and Children’s Hospital Colorado, Aurora, Colorado, CDC, Atlanta, Georgia, Department of Pediatrics, University of Colorado Anschutz Medical Campus, Aurora, Colorado

Session: 162. Maternal/Infant Immunization

Friday, October 6, 2017: 12:30 PM

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 21 vaccines to pregnant women. Almost all (97% and 93%, respectively) strongly recommended influenza (flu) and tetanus-diphtheria-acellular pertussis (Tdap) vaccines; 80% 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 barrier 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.

Disclosures. All authors: No reported disclosures.

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

C. Mary Healy, MD, FIDSA; Marcia Rench, BSN; Laurie Swain, MD; Audra Timmins, MD; Anuja Vyas, MD; Nancy Ng, BSN; Simon Paulus, PhD; So Hee Park, MS; Amilia Jeyachandran, MS; Gorisankar Raman, PhD; Jarad Schneller, MS and Carol J. Baker, MD, FIDSA, FSHEA, FPIDDS; Pediatrics, Infectious Diseases, Baylor College of Medicine, Houston, Texas, Center for Vaccine Awareness and Research, Texas Children’s Hospital, Houston, Texas, Obstetrics and Gynecology, Baylor College of Medicine, Houston, Texas, Microbial Pathogenesis and Immune Response Laboratory, Centers for Disease Control and Prevention, Atlanta, Georgia

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Friday, October 6, 2017: 12:30 PM

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 protein (FIM) and pertactin (PRN) was quantified by luminex assay (IU/mL).

Results. Mean maternal age was 31 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). Infants had a mean gestation of 39.1 weeks (36.1–41.8) and birthweight of 3379g (2580–4584). GMCs (95%CI) for maternal pertussis-specific IgG increased significantly 4 weeks post-Tdap (4-fold higher in 59%, 41% and 24% for PT, FHA, FIM and PRN, respectively) and waned before delivery. Placental transfer was 133% 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.

Disclosures. All authors: No reported disclosures.

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

Carla Black, PhD; Helen Ding, MD, MSPH; Katherine Kahn, MPH; Sarah Ball, MPH, SDS; Rebecca Fink, MPH; Rebecca Devlin, MA; Amy Parker Fiebelkorn, MSN; Denise D’Angelo, MPH; and Stacie Greby, DVM, MPH, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia, CFID Research Corporation, Huntsville, Alabama, 6Leidos, Inc., Atlanta, Georgia, Abt Associates, Cambridge, Massachusetts, Abt

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