1397. Long term impact of the 13-valent pneumococcal conjugate vaccine use in infant immunization program on all-cause pneumonia hospitalizations in British Columbia, Canada: a time series analysis

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Session: P-63. Pediatric Vaccines

Background. Pneumonia is a leading cause of hospitalization and in-patient mortality globally. We determined the impact of 13-valent pneumococcal conjugate vaccine (PCV13) use on all-cause pneumonia hospitalization rates eight years after the vaccine was introduced in British Columbia, Canada.

Methods. Routine administrative databases, such as, hospital discharge abstract databases, registry and demographics were used to build the cohort. Overall and age-specific all-cause pneumonia hospital admissions per month (Jan 2000 to Dec 2018) for those aged < 2 years, 2-5 years, 6-17 years, 18-64 years and ≥ 65 years were obtained using International Classification of Diseases 9 and 10 codes (480-486, J12-J18). Changes in the all-cause pneumonia hospitalization incidence rates before and after the PCV13 vaccine program introduction were evaluated using a negative binomial regression and time-series modelling while adjusting for seasonality, influenza-likeness illnesses, 7-valent pneumococcal conjugate vaccine (PCV7) program and pre-PCV13 vaccine secular trends.

Results. Long term use of the PCV13 vaccine in the infant immunization program was associated with significant declines in all-cause pneumonia hospitalization rates among all children, < 2 years (IRR: 0.63; 95% Confidence Interval (CI): 0.59-0.67), 2-5 years (IRR: 0.82; 95%CI: 0.77-0.87) and 6-17 years (IRR: 0.73; 95%CI: 0.69-0.78). All-cause pneumonia rates did not change significantly in those aged 18-64 years (IRR: 0.98; 95%CI: 0.96-1), whereas a modest increase was observed in those 65 years and over (IRR: 1.05; 95%CI: 1.02-1.07). Consequently, we did not observe significant change in the overall rate (IRR: 1.02; 95%CI: 1-1.02).

Conclusion. Significant reduction in all-cause pneumonia hospitalization rates in children demonstrates long term beneficial effect of PCV13 use. A modest increase in all-cause pneumonia hospitalization rates in adults aged 65 years and over indicates a need for further microbial investigation.

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1398. Maternal Knowledge and Perceptions about Routine Immunisation in a Slum Area of Pakistan

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Session: P-63. Pediatric Vaccines

Background. To know the baseline coverage and potential obstacles for children vaccination before starting a health awareness program.

Methods. A cross sectional study on immunization coverage in the slum area of Multan, Pakistan was conducted and a total of 312 mothers were interviewed face to face for Knowledge, Attitudes, and Perceptions (KAP).

Results. Among the children less than 3 years, 33 % fully, 46 % partially and 21 % were not at all immunized. High levels of BCG and OPV zero rates (79%) and low rates of OPV3/DPT3 (48%) and measles (41%) vaccines were found. Majority of the mothers were satisfied with the program. Most of the mothers were aware about the importance of vaccination but were ignorant for the need to complete the schedule. There were many misconceptions and beliefs among the mothers of partial and unimmunized children. The majority were of view that vaccines contain ingredients that will make the children infertile.

Conclusion. There is a need to enhance the maternal knowledge about the vaccine preventable diseases and importance of completing the immunization schedule. Also the misconception about the vaccines need be specifically addressed.

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1399. Parental Perceptions of the Childhood Vaccination Schedule and Combination Vaccines in the United States (US)

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Session: P-63. Pediatric Vaccines

Background. Ten different vaccine series are recommended by the US Advisory Committee on Immunization Practices from birth to 18 months. Combination vaccines can reduce the number of injections and visits required to complete the schedule in a timely manner. There is limited current information on parents' perception of the vaccine schedule and combination vaccines.

Methods. An online survey was completed by 100 parents who had at least one child under 2 years, were involved in vaccination decisions, and had accompanied their child to a vaccination appointment. Parents who reported not ever vaccinating their children were excluded. Parents' perception of, and adherence to, the recommended schedule, communication with providers, and knowledge of combination vaccines were collected. Descriptive analyses were performed.

Results. Ninety-six percent of parents (mean age=30.7 years; range 19.0-50.0; 91% white) reported their provider as a source of vaccination information, followed by internet searches (63%), family and friends (45%). Most (84%) followed all their provider's recommendations and trusted the information given to them (87%). State day care and pre-school requirements influenced vaccination decisions for nearly 80% of parents.

Over 80% of parents thought it is important to protect against diseases covered by the vaccination schedule. One-third had at some time asked to delay or not administer vaccines; depending on the vaccine, up to 50% ultimately had their child vaccinated as recommended. Top reasons for delaying vaccination were to avoid crying and pain from multiple injections (82%), and the concern that too many vaccines would overwhelm the immune system (64%). Top reasons for refusal were religious views (57%) and the belief that the vaccine was not needed (52%).

On average, parents would accept their child receiving 3 injections in one visit. Most parents were aware of combination vaccines (84%); however, one-third reported that their child had not received, or they were unaware of their child receiving, a combination vaccine.

Conclusion. Providers are in a strong position to influence vaccination decisions by parents. Whereas parents are motivated to avoid the pain of multiple injections, many are unaware that their children are receiving combination vaccines.

Disclosures. Tanaz Petigara, PhD, Merck & Co., Inc. (Employee, Shareholder) Xinyi Ng, PhD, Merck & Co., Inc. (Consultant) Ya-Ting Chen, PhD, Merck & Co., Inc. (Employee, Shareholder) Jyoti Aggarwal, MHS, Merck & Co., Inc. (Consultant) Jenna Bhaloo, MPH, Merck & Co., Inc. (Consultant) Michelle Goveia, MD, Merck & Co., Inc (Employee, Shareholder) David Johnson, MD, MPH, Sanofi Pasteur (Employee, Shareholder) Gary S. Marshall, MD, GlaxoSmithKline (Consultant, Scientific Research Study Investigator)Merck (Consultant, Scientific Research Study Investigator)Pfizer (Consultant, Scientific Research Study Investigator)Sanofi Pasteur (Consultant, Grant/Research Support, Scientific Research Study Investigator, Honorarium for conference lecture)Seqirus (Consultant, Scientific Research Study Investigator)

1400. Physician Attitudes towards Combination Vaccine Use in Infants up to 24 months of age in the United States (US)

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Session: P-63. Pediatric Vaccines

Background. Combination vaccines reduce the number of injections and improve the timeliness of vaccination coverage. US Advisory Committee on Immunization Practices (ACIP) recommendations state that combination vaccines are generally preferred over equivalent individual component vaccines. Healthcare providers strongly influence parental decisions about vaccination. We sought a contemporary understanding of physician's attitudes towards combination vaccine use in infants.

Methods. We conducted an online survey of US physicians (70 pediatricians and 30 family practitioners) who administer vaccines to infants aged 0-24 months and spend at least 2 days a week providing patient care. Information was collected on attitudes towards combination vaccines and factors that influence the choice of combination vaccine used in clinical practice. Descriptive analyses were performed.

Results. Physicians (mean age=50.2 years, range 30.0-70.0; 66% white; 37% women) reported a median of 4 injections (range 2-9) as the maximum that parents would accept at a single visit, and 71% routinely explained what combination vaccines are to parents. When deciding which pentavalent vaccine to use, physicians considered how the brand fits into the current vaccine schedule (71%); upfront purchase costs (64%); and availability as a prefilled syringe (61%). The main reasons for using combination vaccines were to reduce the number of injections (96%); ensure the infant is up-to-date with vaccinations (86%); and reduce the pain that the infant experiences with multiple injections (68%). More than half reported that their institution or practice has a program to incentivize infant vaccination according to schedule. If a hexavalent vaccine-based schedule was available, 76% of physicians said they would choose it over their current schedule comprising pentavalent or equivalent component vaccines.

Conclusion. Choice of pentavalent combination vaccine among pediatricians and family practitioners was largely dependent on convenience and cost-related factors. Over three-quarters would be inclined to use a hexavalent vaccine schedule if available.

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Research Support, Scientific Research Study Investigator, Honorarium for conference lecture)Seqirus (Consultant, Scientific Research Study Investigator)

1401. Real-World Effectiveness of Inactivated and Live Attenuated Influenza Vaccines in Children During Three Recent Seasons: 2016–2019

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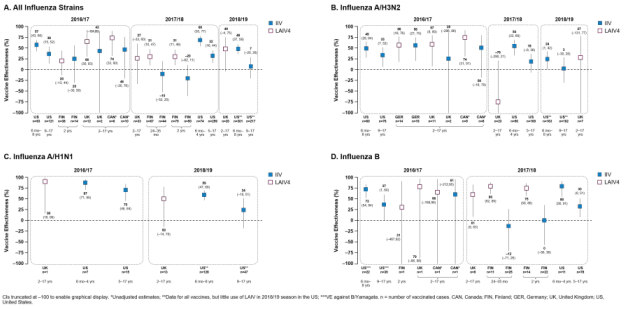
Session: P-63. Pediatric Vaccines

Background. Given the substantial burden of influenza in the pediatric population, influenza vaccination with live attenuated influenza vaccines (LAIVs) and/or inactivated influenza vaccines (IIVs) is now recommended for children in an increasing number of countries. In recent seasons, the real-world effectiveness of influenza vaccines has varied substantially. In the 2013/14 and 2015/16 influenza seasons, LAIV demonstrated reduced vaccine effectiveness (VE) against A/H1N1 strains. LAIV and IIVs have also demonstrated variable effectiveness against A/H3N2 strains in recent seasons. This study evaluated LAIV and IIV effectiveness in children between the 2016/17 and 2018/19 seasons.

Methods. Quadrivalent LAIV (LAIV4) and IIV effectiveness studies conducted in the pediatric population from 2016/17 through 2018/19 were identified from published literature, congress presentations, public health websites and personal communication with national investigators. Studies were excluded if they were from countries where Ann Arbor-backbone LAIV was not available for at least one season during the study period, were from randomized, interventional studies, or contained duplicate data from other publications.

Results. For the three seasons, point estimates of all-strain VE for children ranged from 20% to 74% for LAIV4 and from –20% to 68% for IIV (Fig 1A). During the same period, VE against A/H3N2 for children ranged from –76% to 74% for LAIV4 and from 3% to 56% for IIV (Fig 1B). Point estimates of VE against A/H1N1 for children were 50% and 90% for LAIV4 and ranged from 24% to 87% for IIV (Fig 1C). For influenza B, VE for children ranged from 31% to 80% for LAIV4 and from –12% to 80% for IIV (Fig 1D). Statistical comparison of LAIV4 and IIV VE across each season was not feasible due to the multivariate nature of each study cohort.

Figure 1. 2016–2019 Effectiveness of Inactivated and Live Attenuated Influenza Vaccines by Influenza Strain in Children



CIs truncated at –100 to enable graphical display. *Unadjusted estimates. **Data for all vaccines, but little use of LAIV in 2018/19 season in the US. ***VE against B/Yamagata. n = number of vaccinated cases. CAN, Canada; FIN, Finland; GER, Germany; UK, United Kingdom; US, United States.

Conclusion. During three recent seasons, LAIV4 and IIV showed similar moderate effectiveness against all influenza strains, A/H1N1 strains, and B strains. VE against A/H3N2 for LAIV4 and IIV was good in 2016/17, but decreased in the 2017/18 and 2018/19 seasons. VE estimates for LAIV4 and IIV overlapped for all strains and each subtype, demonstrating the general comparability of LAIV4 and IIV VE in the seasons between 2016 and 2019.

Disclosures. Allyn Bandell, PharmD, AstraZeneca (Employee, Shareholder) Raburn Mallory, MD, AstraZeneca (Employee, Shareholder) Christopher S. Ambrose, MD, MBA, AstraZeneca (Employee, Shareholder)

1402. Smart Technology and Education for Smart Protection against the Flu: Impact of a Multifaceted Quality Improvement (QI) Intervention on Influenza Vaccination Rates in Children

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Session: P-63. Pediatric Vaccines

Background. Low pediatric influenza vaccination rates are a public health challenge. It is imperative that innovative measures to promote influenza immunization are studied.

Methods. Aim: To study impact of a multifaceted QI intervention on influenza vaccination rates in children evaluated at outpatient clinics, urgent care (UC) and emergency departments (ED) at UnityPoint Health tertiary care centers (UPH) across Northwestern (NW) and Northcentral (NC) Iowa (IA). Patients aged 6 months-18 years evaluated at UPH in NW and NC IA (encompassing 5 outpatient clinics, 2 UC, 2 ED) were included. A multifaceted QI intervention was implemented on 9/1/2018 consisting of all of the following concomitantly: 1. Patient/family education: Posters about flu vaccination displayed at entrance, in waiting rooms and patient rooms throughout the clinics, UC, ED as well as patient/family handouts emphasizing importance of influenza immunization. 2. Information Technology: "Health maintenance" reminder in outpatient electronic medical record (EMR- EPIC) that appears as soon as a patient's chart is accessed to remind nurses/providers that influenza vaccine is due. 3. Provider Education flyers at study sites about debunking flu myths. We compared pre-intervention period (P1, 09/01/2017– 05/31/2018) with intervention period (P2, 09/01/2018 – 05/31/2019) for influenza vaccination rates.

Results. A total of 10050 and 9889 patients were evaluated during P1 and P2 respectively. Influenza vaccination rate increased significantly from 56.1% (5642) in P1 to 73.3% (7252) in P2 (p< 0.0001). Patients were 1.43 times more likely to get vaccinated during P2 than P1 (95% CI= 1.32-1.46). Regionally during P2, influenza vaccination rate was higher than the national (62.6%; p< 0.0001) and Iowa state averages (65.8%; p< 0.0001) respectively. Proportion of children aged < 9 years receiving second dose of influenza vaccine increased from 43% to 69% (p< 0.001). Influenza vaccination rates among children aged 6-36 months increased significantly [40% (1078/2671) in P1 to 47.2% (1287/2723) in P2; p< 0.01].

Conclusion. With the combined educational and technologic intervention, pediatric influenza vaccination rates increased significantly across NW and NC IA, including proportion of patients receiving second dose of the vaccine.

Disclosures. Richard Malley, MD, Merck (Consultant)

1403. The Pediatric Emergency Room as a Promising Setting for Receiving the Flu Shot

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Session: P-63. Pediatric Vaccines

Background. Children are the most likely population to get influenza, and are two times more likely compared to adults aged 65 and greater (attack rate by age group: 0-17 yo 9.3%, 18-74 yo 8.8%, 65 + 3.9%). Additionally, children are at high risk of suffering complications from influenza. According to the CDC, the overall effectiveness of the 2018-2019 flu vaccine for both strains A and B was 48% in children aged 6m-8 years and 7% in children aged 9- 17 years. Currently our Pediatric Emergency Department (PED) does not routinely offer influenza vaccine to unvaccinated patients. Our project goals are to identify barriers to the administration of influenza vaccine in the PED and to offer and administer influenza vaccine to eligible patients.

Methods. After performing root cause analysis with key stakeholders, the first countermeasure implemented in a Plan-Do-Study Act (PDSA) cycle was the development of a screening form including eligibility criteria, history of influenza vaccine, consent for vaccine or reason for declining vaccine. The screening form was administered by resident physicians in our PED from October to November who then went on to order the vaccine for eligible patients who consented. Primary outcome measures included number of patients screened per month, percent of patients who desired the vaccine, and the percent of patients who received the vaccine in the ED during their visit. Secondary outcome measures included length of PED stay.

Results. Preliminary results show that 75% (42/56,CI: 62%-86%) of children screened in the PED between October and November were eligible for the influenza vaccine. Of those eligible, 59% (29/42, CI: 43%-74%) received the vaccine. The average length of stay was comparable between those that received influenza vaccine and those that did not (p value 0.4756).

Conclusion. A subset of eligible patients are now being offered and receiving the flu shot in our PED. Over half of eligible patients received the influenza vaccine, demonstrating that a resident administered screening form has been a successful countermeasure for increasing vaccine rates. Future PDSA cycles will focus on further increasing the number of patients screened and capturing patients who consented but did not receive vaccine.

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1404. Twenty-year impact of Pneumococcal Conjugate Vaccines (PCV) on the burden of invasive pneumococcal disease in US children less than 5 years of age

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Session: P-63. Pediatric Vaccines

Background. Clinical trials of PCV7 demonstrate significant reductions in vaccine-type (VT) invasive pneumococcal disease (IPD), clinically diagnosed pneumonia in children less than 5 years of age and VT acute otitis media in children < 2 years of age. Observational, population-based studies demonstrate a reduction in overall IPD in US children following the introduction of PCV7 and PCV13. The cumulative impact of PCV on IPD syndromes over the 20 years following introduction into the US national immunization program has not been detailed.

Methods. Published and unpublished data from the Active Bacterial Core (ABC) surveillance network were used to calculate annual incidence rates of IPD and the proportional distribution by syndrome in children < 5 years of age. Cases averted were calculated from published incidence for each IPD syndrome