patients presenting with varicella symptoms may result in misdiagnosis and/ mistreatment. This study investigated the diagnostic and treatment strategies used by HCPs for managing varicella infections in US children.

Methods. An online cross-sectional survey of licensed HCPs was conducted, after an Institution review board approval and HCP consent. 8 clinical vignettes with information on patients with varying varicella symptoms (representing uncomplicated and complicated cases) were presented. For each vignette, HCPs selected a diagnosis and appropriate intervention(s) from pre-determined lists. Descriptive analyses were performed.

Results. A total of 153 HCPs (50 nurses, 103 doctors) completed the survey. Mean age was 44 years, 62% were female, and 82% were licensed after 1995. Varicella infection was correctly diagnosed 79% of the time. HCPs were able to recognize uncomplicated cases of varicella 85% of the time and complicated cases 61% of the time. HCPs recommended the correct intervention 43% of the time for uncomplicated cases and 25% of the time for complicated cases. For example, HCPs recommended antibiotics 17% of the time and/or antivirals 18% of the time (Table 1), of which 25% and 69% (respectively) were not appropriate per the American Academy of Pediatrics guidelines respectively. Antibiotics were incorrectly recommended 6% of the time for uncomplicated cases of varicella.

Table 1. Additional Diagnosis & Treatment Results

Table 1. Additional Diagnosis & Treatment Results

	Total	Correct
Diagnosis	**Diagnoses**	**Diagnoses**
Correct diagnosis as varicella (8 vignettes)	1,224	970 (79%)
Correct diagnosis as varicella - uncomplicated cases (6 vignettes)	918	784 (85%)
Correct diagnosis as varicella - complicated cases (2 vignettes)	306	186 (61%)
Correct assignment as complicated versus uncomplicated varicella	1,224	841 (69%)
Treatment	**Antibiotics**	**Antivirals**
Total antibiotic or antiviral recommendations	204 (17%)	218 (18%)
Correct antibiotic or antiviral treatment recommendation	127 (62%)	61 (28%)
Incorrect antibiotic or antiviral treatment recommendation	77 (38%)	157 (72%)

Conclusion: Given the low incidence of varicella infections in the US, complicated cases of varicella may be under-recognized or inappropriately treated by some HCPs. Additional training may help HCPs better recognize/ treat cases of varicella. Further, ensuring high rates of varicella vaccination is important to avoid vaccine preventable conditions and to minimize unnecessary exposure to antimicrobial and antiviral therapies.

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1388. DTaP-containing combination vaccines use and adherence to the recommended infant-toddler vaccination series among privately insured children in the US

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Session: P-63. Pediatric Vaccines

Background. Despite universal recommendation of the 3 + 1 diphtheria, tetanus, and pertussis (DTaP) vaccine series in infants and toddlers, adherence (i.e. coverage and timeliness) remain suboptimal in the US. DTaP-containing combination vaccines are presumed to improve vaccine coverage rates and timeliness, but research on this topic is limited. The purpose of this study was to compare adherence to the recommended infant-toddler vaccination series between recipients of DTaP-containing combination vaccines (i.e. quadrivalent/pentavalent) and stand-alone vaccines (i.e. trivalent).

Methods. We used the Optum de-identified Clinformatics Data Mart database to create a cohort of children born between 2009 and 2016 with > 24 months of continuous enrollment from birth, and records of > 1 DTaP vaccine receipt. Patients were classified by DTaP-containing vaccine receipt: combination vaccines only, stand-alone vaccines only, or a mixture of both. The primary adherence outcome was completion of the 4-dose series within 20 months of life. We adjusted outcomes for gender, birth year, race, and socioeconomic status via a logistic regression model.

Results. The cohort contained 200,568 female (48.6%) and 211,882 male (51.4%) children. Of these children, 167,091 received combination vaccines only (40.5%), 61,342 received stand-alone vaccines only (14.9%), and 184,017 received a mixture of both (44.6%). Completion of the 4-dose series was highest among children who received combination vaccines only (75.5%), followed by those who received a mixture of vaccines (72.7%) and those who received stand-alone vaccines only (54.5%). Relative to those who received stand-alone vaccines only, adjusted odds of completion were approximately 2.9 times higher among combination vaccine recipients (odds ratio, OR = 2.93 [95% CI: 2.87, 2.98]) and 2.5 times higher among those who received a mixture of vaccines (OR = 2.54 [2.49, 2.59]).

Conclusion. DTaP-containing combination vaccine use was associated with significantly greater adherence. Although these results warrant further investigation to better understand the determinants of infant vaccination adherence, such evidence may further support preferential recommendations for combination vaccine use.

Disclosures. Matthew M. Loiacono, MSc, Sanofi Pasteur (Employee) Vitali Pool, MD, Sanofi Pasteur (Employee) Robertus Van Aalst, MSc, Sanofi Pasteur (Employee)

1389. Economic Evaluation of Universal Varicella Vaccination in Mexico

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Session: P-63. Pediatric Vaccines

Background. Universal varicella vaccination (UVV) has proven to be cost-effective in countries where implemented. However, this has not yet been evaluated for Mexico. We assessed the cost-effectiveness of UVV in the Mexican Immunization Program from both healthcare and societal perspectives.

Methods. The annual disease burden (varicella cases/deaths, outpatient visits, and hospitalizations) were derived from Mexican seroprevalence-published data adjusted to the 2020 country's population. The annual economic burden was calculated by combining disease with Mexican published unit cost data. Four different vaccination strategies were evaluated: 1. One dose of a single varicella vaccine at 1 year old; 2. Two doses of single varicella vaccine at 1 and 6 years; 3. One dose of a single varicella vaccine at 1 year, and quadrivalent measles-mumps-rubella-varicella vaccine (MMRV) at 6 years; 4. Two doses of MMRV at 1 and 6 years.

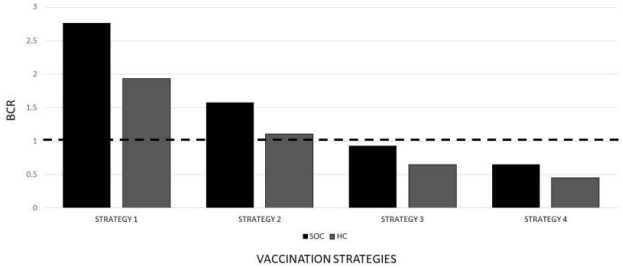
We developed an economic model for each vaccination strategy where 20 consecutive birth cohorts were simulated. The impact of vaccination (number of avoided cases/deaths) was evaluated for a 20 years follow-up period based on vaccine effectiveness (87% and 97.4%), and assuming a 95% coverage. Subsequently, we estimated net vaccination costs, benefit-cost ratio (BCR), annual costs saved, cost-effectiveness ratio.

Results. From annual disease burden estimation, avoided cases with one dose, and two doses were of 20,570,722 and 23,029,751, respectively. From the 20 years cohort, the yearly number of varicella cases was estimated at 2,041,296, and total costs at $115,565,315 (USD) (healthcare perspective) and $165,372,061 (healthcare and societal perspectives). Strategies 1 and 2 were found to be cost-saving (BCR >1) (Figure 1), and strategy 3 to be cost-effective (CE) ($1539 per Life Year Gained). Strategy 4 was not CE. Strategies 1 and 2 would allow saving annually $53.16 million and $34.41 million, respectively, to the Mexican society.

FIGURE 1

FIGURE 1

BENEFIT-COST RATIO (BCR) PER VACCINATION STRATEGY: SOCIETY (DIRECT AND INDIRECT COSTS) AND HEALTHCARE (ONLY DIRECT COSTS) PERSPECTIVES. (95% VACCINATION COVERAGE)



Conclusion: 1.The disease and economic burden of varicella in Mexico are high. 2.UVV with four different vaccination strategies results in a high reduction of cases. 3.From healthcare and societal perspectives, UVV was shown to be cost-effective (with strategy 3), and cost-saving (with strategies using one dose or two doses separately).

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1390. Effectiveness of M-M-R® II in outbreaks - a systematic literature review of real-world observational studies

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Session: P-63. Pediatric Vaccines

Background. M-M-R® II was approved in the US in 1978 and has been used globally for over 40 years. Widespread use of M-M-R® II has resulted in important declines in incidence, morbidity, and mortality of measles, mumps, and rubella in the US and other countries. While vaccine immunogenicity and efficacy were established in multiple placebo-controlled trials of each vaccine component, there are limited studies on vaccine effectiveness (VE) of M-M-R® II. This systematic literature review was conducted to summarize the VE of M-M-R® II from real-world observational studies.

Methods. The literature search was conducted in Medline and Embase (through May 2019), and grey literature sources (through July 2019). All publications and findings in English language were screened by two independent reviewers. The study characteristics and VE results were extracted for each study.

Results. Ten full-text publications related to VE of M-M-R® II were all identified from outbreak investigations and mainly in the US (n=8, sample size=318 - 20,496).

For measles outbreaks (n=4), VE ranged from 71% to 96% in different age groups. Among high school students, VE of ≥1-dose of M-M-R® II was 94-96%. Among young adolescents, the incremental VE of ≥2-dose vs. 1-dose was 94.1%. When M-M-R® II was used as post-exposure prophylaxis within 72 hours of exposure during an outbreak, the VE was 83.4% among children 6 months to 19 years old. In another study among infants 6-14 months old, VE was 71% against laboratory-confirmed measles.

Among mumps outbreaks, the VE of 1-dose, 2-dose, and ≥1-dose M-M-R® II compared to unvaccinated was 83-84%, 80-89%, 83-86% respectively. Three studies evaluating the effectiveness of a third dose of M-M-R® II showed an incremental mumps VE of 60-88% for 3-dose vs. ≤ 2-dose. One study found that individuals who had received a 2nd dose of M-M-R® II ≥13 years (vs. < 13 years) before the outbreak had higher risk for contracting mumps.

No study reported VE of M-M-R® II in a rubella outbreak.

Conclusion. M-M-R® II was found to be effective against measles and mumps during outbreaks. More effectiveness studies are warranted to further address questions on the relationship of VE and time since vaccination as well as the effectiveness of a third dose of M-M-R® II for measles or mumps outbreak control.

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1391. Enhanced Education and Administration of Influenza Vaccine in a Pediatric Subspecialty Practice

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Session: P-63. Pediatric Vaccines

Background. Strategies to increase influenza (flu) immunization rates are desirable. Some children who are at increased risk for severe disease may only be seen in a subspecialty office during the months when flu vaccine is offered. Subspecialists may also provide education for families that are uncertain about benefits of vaccines.

Methods. During the 2019- 2020 season, our multispecialty pediatric practice, which includes divisions of Endocrinology, Gastroenterology, Infectious Disease, Nephrology, Pulmonary, and Surgery, initiated a quality project to increase delivery of flu vaccine during visits. Beginning 10/1/19, providers were encouraged to use tools in the electronic medical record (EMR) to ask about flu vaccine status and administer if indicated and accepted. Flu immunizations given for all divisions, as well as individual divisions, were compared with the previous 2018–2019 season.

Results. From 9/1/19 -3/31/20, 615 doses of flu vaccine were administered for 5667 patients for a rate of 10.9 %. This was an increase from 9/1/18- 3/31/19 when 256 doses were given for 5760 patients (4.4%, p< .0001). All divisions had a significant increase in flu vaccine rates except for infectious disease. Review of certain high risk disorders showed significant increased rates for diabetes and asthma but not for inflammatory bowel disease, HIV infection, chronic renal disease, or cystic fibrosis. During this project an EMR flu tool was not used for 1788 patients (32%). Of the remaining 3879 patients, 1982 (51%) reported prior receipt of flu vaccine and 579 (15%) were not eligible for state supplied vaccine. For 1318 eligible patients, flu vaccine was accepted by 631 (48%) and given to 615 patients. Flu vaccine was declined by 687 (52%) patients.

Conclusion. There is opportunity to provide education and flu vaccine during pediatric subspecialty visits. All specialties increased the number of flu vaccine given except for infectious disease. This is likely because this division has routinely offered flu vaccine and visits for travel declined in 2020. Although the practice overall gave more flu vaccine from the prior year, there appear to be missed opportunities. Further quality improvement work will strengthen the EMR flu screening tools to increase participation and learn more about why flu vaccine is declined.

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

1392. Evaluation of the Impact of a Single-dose Hepatitis A Vaccination in Brazil: a time-series analysis

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Session: P-63. Pediatric Vaccines

Background. Brazil has transitioned from an intermediate to low hepatitis A virus endemic country, increasing the risk of severe Hepatitis A (HepA) disease. To control transmission, the HepA vaccine, MSD, was introduced in the National Childhood Immunization Program (NIP) in 2014 for children aged 12-24 months and extended to children under 5 years old in 2017. We evaluated the impact of the vaccination on the HepA incidence, associated healthcare resource utilization (HCRU), and costs.

Methods. We conducted an observational, retrospective study using Brazilian National Public Health Data (DATASUS). An interrupted time-series analysis was conducted for incidence rates (IR) of laboratory- or clinically-confirmed Hep A cases. Using a negative binomial regression model, we assessed changes in annual HepA IR between pre- (2010-2013) and post- (2015-2018) HepA vaccination periods and compared to predicted counterfactual rates without HepA vaccination. We compared HCRU and cost of Hep A-associated hospitalizations and outpatient procedures between pre- and post- HepA vaccination periods.

Results. Between 2010 and 2018, 32,295 Hep A cases occurred across all ages. Among the NIP target children aged 1-4 years, HepA vaccination was associated with an immediate HepA IR decrease (-52,5% of level change) and with a decrease in slope (-7.7% vs -67.6% per year for pre- and post-periods, respectively, Figure 1). We observed a similar trend in non- HepA vaccination target children aged 5-14 years with -57.1% of level change and slope change from -3.4% (pre- HepA vaccination) to -53.7% (post- HepA vaccination) per year (Table 1). Across all age groups, 14,468 Hep A cases were averted when compared to predicted counterfactual rates (Table 2). Overall, HepA-related hospitalization rate dropped 64% after NIP introduction of vaccination resulting in a cost reduction of 55%. The total number of outpatient procedures claimed among HepA-diagnosed patients reduced 18% with 42% cost reduction.

Figure 1: time-series analyses of Hepatitis A incidence rate (IR) for NIP target population. Monthly number of hepatitis A cases observed over the study period (black line). Predicted trend based on the pre- HepA vaccination (red line) and post-HepA vaccination (blue line) monthly cases

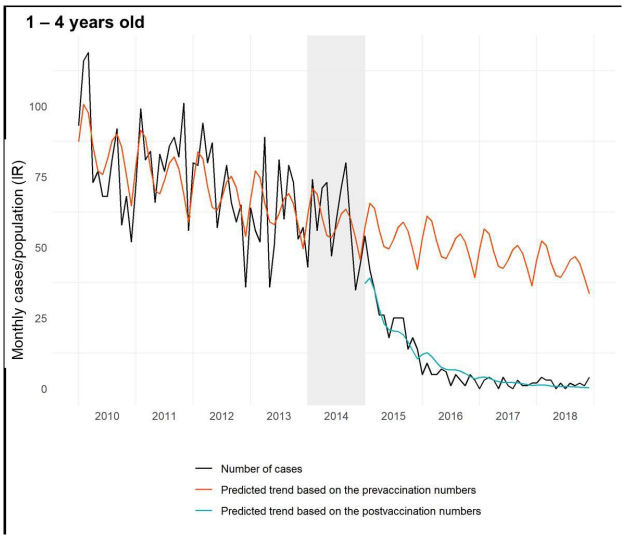

Table 1: Time-series analysis of the impact of the hepatitis A vaccination on the incidence rate level of change, according to age group

Age groups	Variation (%)	2.5%	97.5%	p-value
<12 months				
Immediate effect[a]	-54.0	-69.8	-30.0	<0.001
Trend without vaccination effect[b]	-0.4	-0.8	9.0	0.9465
Trend with vaccination effect[c]	-34.5	-46.2	25.3	<0.001
Comparison of pre-post HepA vaccination trends	-	-	-	<0.001
1-4 years old				
Immediate effect[a]	-52.5	-61.3	-41.7	<0.001
Trend without vaccination effect[b]	-7.7	-11.8	-3.4	<0.001
Trend with vaccination effect[c]	-67.6	-71.7	-62.8	<0.001
Comparison of pre-post HepA vaccination trends	-	-	-	<0.001
5-14 years old				
Immediate effect[a]	-57.1	-66.9	-44.3	<0.001
Trend without vaccination effect[b]	-3.4	-10.5	4.2	0.3651
Trend with vaccination effect[c]	-53.7	-58.0	-49.1	<0.001
Comparison of pre-post HepA vaccination trends	-	-	-	<0.001
15-39 years old				
Immediate effect[a]	-62.7	-75.1	-44.1	<0.001
Trend without vaccination effect[b]	-0.7	-12.2	12.2	0.914
Trend with vaccination effect[c]	17.4	3.7	32.9	0.0114
Comparison of pre-post HepA vaccination trends	-	-	-	0.057
≥40 years old				
Immediate effect[a]	-43.3	-56.1	-26.8	<0.001
Trend without vaccination effect[b]	-1.9	-9.2	5.8	0.6154
Trend with vaccination effect[c]	9.5	1.2	18.6	0.024
Comparison of pre-post HepA vaccination trends	-	-	-	0.045

[a] Level of change on hepatitis A incidence rate immediately after the vaccine introduction (2014)
[b] Predicted annual change (slope) on hepatitis A incidence rate during pre- HepA vaccination period (2010-2013)
[c] Predicted annual change (slope) on hepatitis A incidence rate during post- HepA vaccination period (2015-2018)