vaccine strain. Annual estimates of influenza vaccine effectiveness (VE) are important because of frequent changes in circulating and vaccine viruses.

Methods: We assessed VE among children 6 months–17 years old with acute respiratory illness and <10 days of symptoms enrolled during the 2019–20 influenza season at 7 pediatric hospitals (ED patients < 5 years at 3 sites) in the New Vaccine Surveillance Network. Combined mid-turbinate/throat swabs were tested for influenza virus using molecular assays. We estimated age-stratified VE from a test-negative design using logistic regression to compare odds of vaccination among children testing positive versus negative for influenza, adjusting for age in years, enrollment month, and site. For these preliminary analyses, vaccination status was by parental report.

Results: Among 2022 inpatients, 324 (16%) were influenza positive: 38% with influenza B/Victoria alone and 44% with influenza A(H1N1)pdm09 alone (Table). Among 2066 ED children, 653 (32%) were influenza positive: 45% with influenza B/Victoria alone and 43% with influenza A(H1N1)pdm09 alone. VE was 62% (95% confidence interval [CI], 51%–70%) against any influenza-related hospitalizations, 68% (95% CI, 55%–78%) for A(H1N1)pdm09 and 55% (95% CI, 35%–69%) for B/Victoria. VE by age group for any influenza-related hospitalizations was 57% (95% CI, 40%–69%) among children 6 months to < 5 years and 66% (95% CI, 49%–77%) among children 5–17 years. VE was 53% (95% CI, 42%–62%) against any influenza-related ED visits, 46% (95% CI, 28%–60%) for A(H1N1)pdm09 and 54% (95% CI, 39%–66%) for B/Victoria. VE by age group was 52% (95% CI, 37%–63%) among children 6 months to < 5 years and 42% (95% CI, 16%–60%) among children 5–17 years.

Table. Influenza viruses detected from children in VE analysis dataset for NVSN, 2019-2020

Virus Detected	Inpatient (N=319)	ED (N=652)
	n	n
B/Victoria alone	124	292
A(H1N1)pdm09 alone	141	278
A(H3N2) alone	2	3
A(H1N1)pdm09 and B/Victoria	1	3
A(H1N1)pdm09 and B, lineage unknown	2	0
A, not subtyped and B/Victoria	1	3
A, not subtyped and B, lineage unknown	1	0
A, not subtyped alone	17	17
B/Yamagata alone	3	2
B/Victoria and B/Yamagata	0	1
B, lineage unknown alone	32	54

Conclusion: Influenza vaccination in the 2019–20 season provided substantial protection against laboratory-confirmed influenza-associated hospitalizations and ED visits associated with the two predominantly circulating influenza viruses among children, including against the emerging B/Victoria virus V1A.3 subclade.

Disclosures: **Janet A. Englund, MD**, **AstraZeneca** (Scientific Research Study Investigator)**GSK group of companies** (Scientific Research Study Investigator)**Meissa vaccines** (Consultant)**Merck** (Scientific Research Study Investigator)**Sanofi Pasteur** (Consultant) **John V. Williams, MD**, **GlaxoSmithKline** (Advisor or Review Panel member)**IDConnect** (Advisor or Review Panel member)**Quidel** (Advisor or Review Panel member) **Natasha B. Halasa, MD, MPH**, **Genentech** (Other Financial or Material Support, I receive an honorarium for lectures - it's a education grant, supported by genetech)**Karius** (Consultant)**Moderna** (Consultant)**Quidel** (Grant/Research Support, Research Grant or Support)**Sanofi** (Grant/Research Support, Research Grant or Support) **Christopher J. Harrison, MD**, **GSK** (Grant/Research Support, Infant menigicicaal B conjugate vaccine trial)**Merck** (Research Grant or Support, Infant pneumococcal conjugate vaccine trial)

179. Individual and State-level Factors Associated with Receipt of Multiple Recommended Adolescent Vaccines in the United States

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Session: O-34. Pediatric Vaccines

Background: The Advisory Committee on Immunization Practices (ACIP) routinely recommends several adolescent vaccines, including human papillomavirus (HPV); quadrivalent meningococcal conjugate (MenACWY); and tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccines. Limited data are available on the percentage of adolescents receiving this complement of ACIP-recommended vaccines and factors that may increase likelihood of completion.

Methods: This study used 2015–18 pooled National Immunization Survey-Teen (NIS-Teen) data to estimate national and state-level completion rates by age 17 of a two-dose MenACWY series, two- or three- dose HPV series (depending on age at first vaccination), and a Tdap vaccine, using multivariable logistic regression modeling to adjust for individual characteristics. NIS-Teen data were then combined with public state-level data to construct a multilevel model evaluating effects of both individual- and state-level factors on completion.

Results: After adjusting for individual-level factors, the national completion rate for these ACIP-recommended vaccines by age 17 was 30.6% (95% confidence interval [CI]: 30.1–31.0%). However, rates for individual states varied substantially, from 11.3% in Idaho (CI: 6.9–18.0%) to 56.4% in Rhode Island (CI: 49.8–62.8%) (Figure 1).

In the multilevel model, individual characteristics associated with increased likelihood of receiving the recommended vaccines by age 17 included female gender, black or Hispanic race, Medicaid coverage (vs. private/other), last provider visit at age 16 or 17, generally having ≥1 provider visit in last year, and receiving a provider recommendation for HPV vaccination. Residing in a state with a MenACWY vaccination mandate for elementary and secondary schools was the only state-level variable that significantly increased the likelihood of completion (odds ratio: 1.6; CI: 1.2–2.3) (Figure 2).

Figure 1: Model-Adjusted Completion Rates of ACIP-Recommended HPV, MenACWY, and Tdap Vaccines by Age 17 Years in the United States, 2015–18. ACIP, Advisory Committee on Immunization Practices; HPV, human papillomavirus; MenACWY, quadrivalent meningococcal conjugate; Tdap, tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis. Note: Vaccination completion is based on completion of the HPV series (i.e., receipt of 2 doses for individuals aged 9–14 years at first vaccination or receipt of 3 doses for individuals aged 15 years or older at first vaccination), completion of the MenACWY series (i.e., receipt of 2 doses), and receipt of a Tdap vaccine. Note: Model-adjusted composite vaccination completion is adjusted for sex, race/ethnicity, mother's educational attainment, health insurance status, continuity of health insurance coverage since age 11, whether the individual was 16 or 17 years old at their last checkup, number of physician or other healthcare professional visits in past 12 months, whether a doctor or other healthcare professional ever recommended that the individual receive HPV vaccination, and state. The model-adjusted estimate is generated by taking the average of the predicted probability of vaccination for each individual as if they were all from the same state (while retaining all other characteristics).

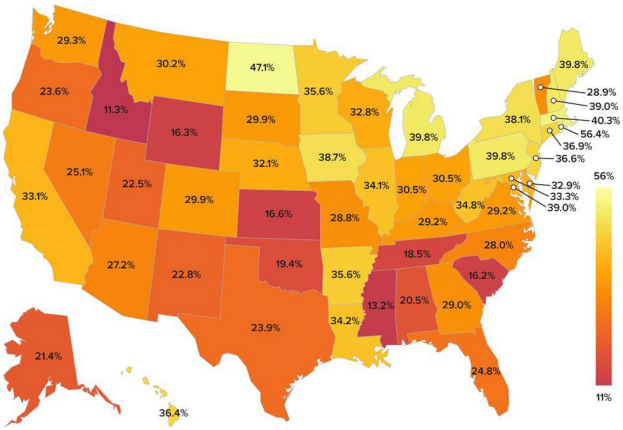
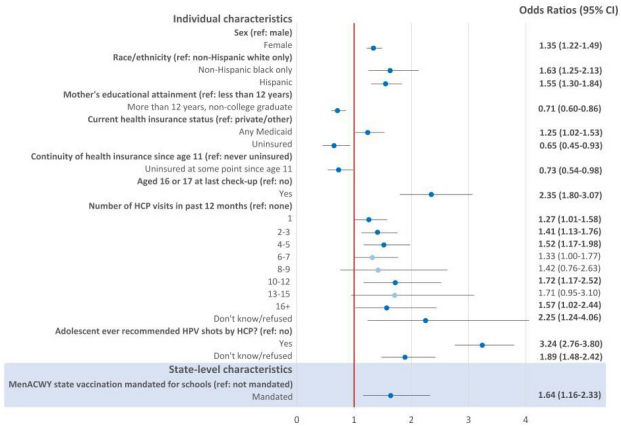


Figure 2: Individual-Level and State-Level Characteristics Associated with an Individual's Completion of ACIP-Recommended HPV, MenACWY, and Tdap Vaccines by Age 17 Years in the United States, 2015–18. ACIP, Advisory Committee on Immunization Practices; CI, confidence interval; HCP, healthcare professional; HPV, human papillomavirus; MenACWY, quadrivalent meningococcal conjugate; ref, referent category; Tdap, tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis. Note: Bold characters and darker circles indicate significant results. Note: Vaccination completion is based on completion of the HPV series (i.e., receipt of 2 doses for individuals aged 9–14 years at first vaccination or receipt of 3 doses for individuals aged 15 years or older at first vaccination), completion of the MenACWY series (i.e., receipt of 2 doses), and receipt of a Tdap vaccine.



Conclusion: Recommended adolescent vaccine completion rates are suboptimal and highly variable across states. Provider recommendations, visits at 16–17 years of age, and state mandates for MenACWY are implementable strategies associated with completion of recommended adolescent vaccines.

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Disclosures: **Elizabeth M. La, PhD**, **RTI Health Solutions** (Employee) **Diana Garbinsky, MS**, **GSK** (Other Financial or Material Support, The study was conducted by RTI Health Solutions, which received consultancy fees from GSK. I am a salaried employee at RTI Health Solutions and received no direct compensation from GSK for

the conduct of this study..) **Shannon Hunter, MS**, **GSK** (Other Financial or Material Support, Ms. Hunter is an employee of RTI Health Solutions, who received consultancy fees from GSK for conduct of the study. Ms. Hunter received no direct compensation from the Sponsor.) **Sara Poston, PharmD**, **The GlaxoSmithKline group of companies** (Employee, Shareholder) **Patricia Novy, PhD**, **GSK** (Employee, Shareholder) **Parinaz Ghaswalla, PhD, ORCID: 0000-0002-2883-5590**, **GlaxoSmithKline** (Employee, Shareholder)

180. Impact of Pneumococcal Conjugative Vaccine on Antibiotic Resistant Invasive Pneumococcal Disease in the United States

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Session: O-34. Pediatric Vaccines

Background: Antibiotic-nonsusceptible invasive pneumococcal disease (NS-IPD) in the United States declined dramatically following the introduction of pneumococcal conjugative vaccines (7-valent, PCV7 in 2000, replaced by the 13-valent, PCV13 in 2010). We evaluated the long-term impact of PCV13 on NS-IPD.

Methods: IPD cases were identified through CDC's Active Bacterial Core surveillance during 2005–2018. We applied 2012 Clinical and Laboratory Standards Institute breakpoints to minimum inhibitory concentrations determined by broth microdilution (2005–2014) or whole genome sequencing (2015–2018) and classified non-susceptible isolates as those intermediate or resistant to ≥1 antibiotic class. Isolates were serotyped and classified as PCV13 or non-vaccine type (NVT). Incidence rates (cases per 100,000) were calculated using United States Census Bureau population denominators.

Results: From 2005 to 2018, NS IPD incidence decreased from 8.5 to 3.2 among children < 5 years old and from 13.0 to 9.4 among adults ≥ 65 years old. Incidence of vaccine-type NS-IPD decreased in all age groups (Figure 1), while incidence of NVT NS-IPD increased in all age groups (Figure 2). The greatest absolute increase in NVT NS-IPD occurred among adults ≥ 65 years from 4.7 in 2005 to 7.2 in 2018. PCV13 serotypes contributed to 62% of NS-IPD (36% of NS-IPD caused by serotype 19A alone) in 2005–2009, and 27% of NS-IPD in 2014–18 (8% of NS-IPD caused by 19A). During 2014–18, NVTs 35B (11%), 33F (9%), 22F (9%), and 15A (9%) were the most common NS-IPD serotypes.

Figure 1. Incidence of vaccine type antibiotic non-susceptible invasive pneumococcal disease by age group, 2005–2018.

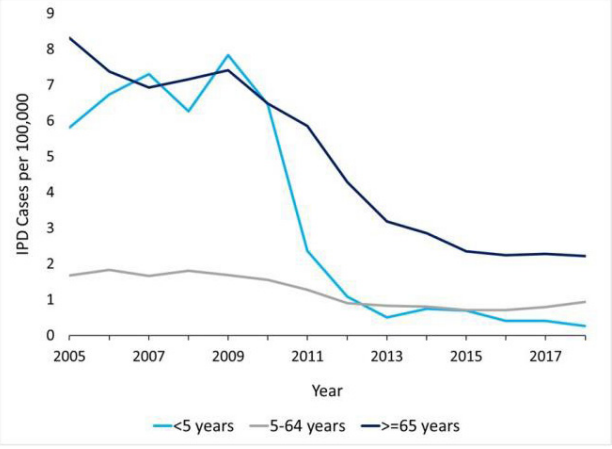
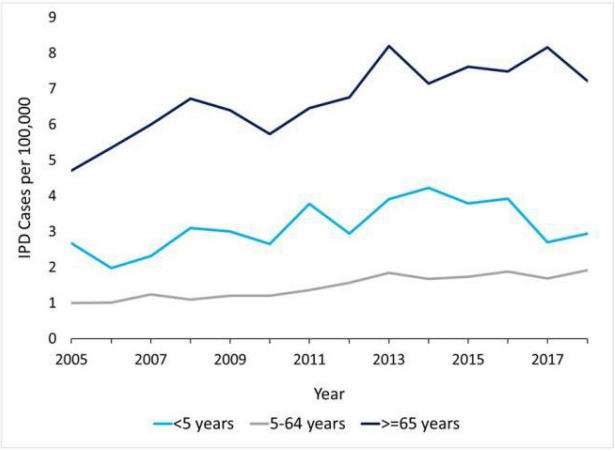


Figure 2. Incidence of non-vaccine type antibiotic non-susceptible invasive pneumococcal disease by age group, 2005–2018.



Conclusion: NS-IPD incidence decreased following PCV13 use in the United States, driven by reductions in PCV13 serotypes. Recent increases in NVT NS-IPD, most pronounced among older adults, have started to erode PCV impact on NS-IPD. PCVs in development that contain serotypes 22F and 33F could help to further reduce NS-IPD.

Disclosures: **Lee Harrison, MD**, **GSK** (Consultant)**Merck** (Consultant)**Pfizer** (Consultant)**Sanofi Pasteur** (Consultant)

181. Antimicrobial Use in the Time of COVID-19 – Data from 84 VA Facilities

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Session: O-35. SHEA Featured Oral and Program Choice

Background: The VA initiated an antimicrobial stewardship program in 2011, which includes participation in the Center for Disease Control (CDC) Antimicrobial Use Option, educational webinars, training programs for antimicrobial stewards, required staffing & reporting, and quality improvement initiatives, that has led to ongoing decreases in antimicrobial therapy nationwide. With the onset of the COVID-19 pandemic, however, there are several factors that may contribute increases in antimicrobial use (increased presentations of lower respiratory tract infection, concern for bacterial co-infection with SARS-CoV-2, etc.). We sought to compare patterns of antibacterial use in the VA from January – May 2020 with corresponding time periods in prior years.

Methods: Data on antibacterial use from 2015 – 2020 were extracted from the VA Corporate Data Warehouse for acute inpatient care units in 84 VA facilities (facilities which provide limited acute inpatient services were excluded). To control for seasonal effects, only data from January to May for each year were included in the analysis. Days of therapy (DOT) per 1000 days-present (DP) were calculated and stratified by CDC-defined antibiotic classes.

Results: From 2015 – 2019, total antibiotic use from January to May decreased by a mean of 9.1 DOT/1000 DP per year. In contrast, from 2019 to 2020, antibiotic use over the same months increased by 26.4 DOT/1000 DP (Table). Increases were observed in all drug classes except for a decrease in narrow spectrum ß-lactam antibiotics. Total antibiotic DOT in 2020 increased by 27.9 and 7.3 DOT/1000 DP in facilities in the highest and lowest terciles of use in 2019 (Figure).

Table – Trends in Yearly Antibiotic Use by CDC Drug Class, 2015 to 2019 versus 2019 to 2020

Year	Narrow Βlactams	Broad GNR Community	Broad GNR Hospital	Anti-MDRO GNR	Anti-MRSA	All other	Total
	Days of Therapy/1000 Days Present						
2015	82	141	156	2.0	123	138	642
2016	84	137	153	1.5	118	137	631
2017	88	131	152	1.7	113	135	620
2018	92	128	147	1.8	107	137	612
2019	94	121	146	1.7	102	142	606
Mean change/year	**2.8**	**-5.2**	**-2.4**	**-0.1**	**-5.2**	**0.9**	**-9.1**
2020	89	130	154	1.8	103	154	632
2020 vs 2019	**-4.4**	**9.1**	**7.6**	**0.1**	**1.5**	**12.7**	**26.4**

Figure – Facility Specific Total Antibiotic Use in 2019 and Change in Use from 2019 to 2020