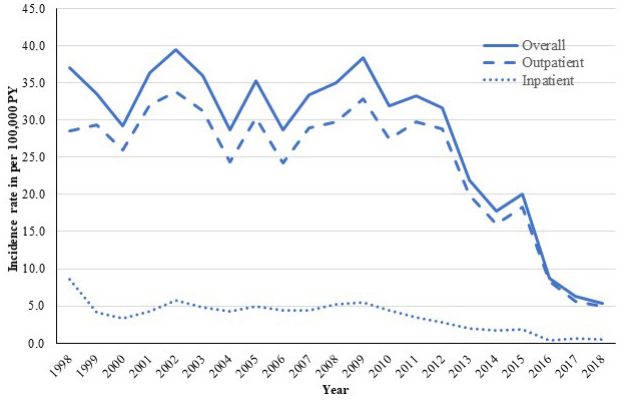
Figure 3. Non-invasive pneumococcal pneumonia incidence in children 5 - 17 years, episodes per 100,000 patient-years (1998 - 2018)



Conclusion: In children < 2 years, IRs of non-invasive PP decreased after introduction of PCV7 and PCV13. Following introduction of PCV 7 and PCV13, there remains a residual burden of non-invasive PP in children in the US. The impact of future PCVs on PP will depend on the proportion of PP caused by *S. pneumoniae* and vaccine-type serotypes.

Disclosures. Tianyan Hu, PhD, Merck (Employee, Shareholder) Yan Song, PhD, Merck (Consultant) Nicolae Done, PhD, Merck & Co., Inc. (Consultant) Qing liu, PhD, Merck (Consultant) James Signorovitch, PhD, Merck & Co., Inc. (Consultant) Tanaz Petigara, PhD, Merck & Co., Inc. (Employee, Shareholder)

1481. Incidence of Pertussis in Older Adults in England and the United Kingdom: A Large, Retrospective Database Analysis

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Session: P-67. Respiratory Infections - Bacterial

Background. Pertussis affects people of all ages and can lead to severe complications in adults, including hospitalization. Pertussis immunity, whether vaccine-induced or from natural infection, wanes over time. Therefore, despite extensive pediatric vaccination against pertussis, adults remain susceptible to the disease. Here we present the reported incidence of pertussis in people ≥ 50 years old (≥ 50yo) in England and the United Kingdom (UK).

Methods. We performed an observational, retrospective database analysis using the UK Clinical Practice Research Datalink GOLD and Aurum primary care databases, and Hospital Episode Statistics database when available for English subjects (HES-Eng), 2009-2018. Occurrence of pertussis was identified by diagnostic codes recorded in primary care only for the UK subset, and primary care and/or secondary care for HES-Eng.

Results. In the ≥ 50yo UK population, a total of 47.1 million (m) person-years of follow-up (PYFU) including 28.5m PYFU for HES-Eng, were included. In the UK, the pertussis Incidence Rate (IR) across all years was 5.44 per 100,000 PYFU. Yearly IRs ranged from 0.79 – 11.40 per 100,000 PYFU and reflected the cyclic epidemiology of pertussis. A peak of IR was observed in 2012, known to be an outbreak year, and observed IRs were higher in 2013-2018 (4.75 – 9.73 per 100,000 PYFU) than 2009-2011 (0.79 – 1.48 per 100,000 PYFU). In the HES-Eng population, overall IR was 5.76 per 100,000 PYFU. IRs were highest in the younger age groups (HES-Eng: 8.88 in 50-54 yo; 1.42 in ≥ 85 yo) (see table 1 and 2).

Table 1

	UK population			HES-Eng population		
	Follow-Up (100,000 PYFU)	Pertussis events	Pertussis IR per 100,000 PYFU (95%CI)	Follow-Up (100,000 PYFU)	Pertussis events	Pertussis IR per 100,000 PYFU (95%CI)
Overall incidence (whole study period 2009-2018)						
	471.48	**2565**	**5.44 (5.23 – 5.66)**	**284.5**	**1638**	**5.76 (5.48 – 6.04)**
By year						
2009	46.49	45	0.97 (0.71 – 1.30)	28.52	28	0.98 (0.65 – 1.42)
2010	46.87	37	0.79 (0.56 – 1.09)	28.73	22	0.77 (0.48 – 1.16)
2011	47.15	70	1.48 (1.16 – 1.88)	28.81	41	1.42 (1.02 – 1.93)
2012	47.62	543	11.40 (10.46 –12.40)	28.97	359	12.39 (11.14 – 13.74)
2013	47,11	296	6.28 (5.59 – 7.04)	28.72	197	6.86 (5.94 – 7.89)
2014	46.99	223	4.75 (4.14 – 5.41)	28.63	148	5.17 (4.37 – 6.07)
2015	47.14	295	6.26 (5.56 – 7.01)	28.62	163	5.70 (4.85 – 6.64)
2016	46.96	457	9.73 (8.86 – 10.67)	28.45	281	9.88 (8.76 – 11.10)
2017	47.28	364	7.70 (6.93 – 8.53)	28.62	247	8.63 (7.59 – 9.78)
2018	47.86	235	4.91 (4.30 – 5.58)	26.43	152	5.75 (4.87 – 6.74)

UK, United Kingdom subject with primary health care data available, HES-Eng, English subject with primary and secondary health care data available, 95%CI, 95% confidence interval; IR, incidence rate; PYFU, person-year of follow-up.

Table 2

	HES-Eng population		
	Follow-Up (100,000 PYFU)	Pertussis events	Pertussis IR per 100,000 PYFU (95%CI)
Incidence by age-group			
50-54 y	55.43	492	8.88 (8.11 – 9.7)
55-59 y	47.96	363	7.57 (6.81 – 8.39)
60-64 y	44.36	267	6.02 (5.32 – 6.79)
65-69 y	40.29	216	5.36 (4.67 – 6.13)
70-74 y	32.47	148	4.56 (3.85 – 5.36)
75-79 y	25.63	83	3.24 (2.58 – 4.01)
80-84 y	19.32	42	2.17 (1.57 – 2.94)
≥ 85 y	19.04	27	1.42 (0.93 – 2.06)

HES-Eng, English subject with primary and secondary health care data available, 95%CI, 95% confidence interval; IR, incidence rate; PYFU, person-year of follow-up; y, year-old.

Conclusion. The observed reported IR of pertussis was similar in the UK and HES-Eng populations, noting the inclusion of secondary care diagnoses in the latter. The dynamics of IRs across years are consistent with estimated IRs from Public Health England data. Considering the burden of pertussis established elsewhere in older adults, and their non-negligible contribution to the whole population incidence, strategies for the prevention of pertussis should include this age group.

Disclosures. Emmanuel Aris, PhD, the GSK group of companies (Employee, Shareholder) Esse Ifebi Akpo, n/a, the GSK group of companies (Employee, Shareholder) Amit Bhavsar, MBBS, MHA, the GSK group of companies (Employee) Lauriane Harrington, n/a, the GSK group of companies (Employee) Evie Merinopoulou, MSc, Evidera Ltd (Employee)the GSK group of companies (Consultant) Nicola Sawalhi-Leckenby, MSc, Evidera Ltd (Employee)the GSK group of companies (Consultant) Elisa Turriani, PhD, the GSK group of companies (Employee) Kinga Meszaros, MBA, the GSK group of companies (Employee, Shareholder) Dimitra Lambrelli, PhD, MPharm, Evidera Ltd (Employee)the GSK group of companies (Consultant) Piyali Mukherjee, MBBS, MPH, the GSK group of companies (Employee, Shareholder)

1482. Local validation of the drug resistance in pneumonia clinical prediction score at a large academic medical center and a community hospital

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Session: P-67. Respiratory Infections - Bacterial

Background. Community-acquired pneumonia (CAP) is responsible for ~1 million emergency department (ED) visits yearly and the leading cause of infection-related deaths. Given that increasing antibiotic resistance rates complicate appropriate empiric antibiotic selection, clinicians may benefit from tools to help identify patients at risk for drug-resistant pathogens (DRPs). Limitations of traditional tools, such as healthcare-associated pneumonia criteria (HCAP), have led to development of novel scoring tools such as the drug resistance in pneumonia (DRIP) score. Webb *et al.* showed the DRIP score was more predictive of CAP caused by DRPs than HCAP criteria. The objective of this study was to validate the DRIP score in a local population of hospitalized patients at an academic and a community medical center.

Methods. Patients who presented to the ED between May 2017 and May 2019 were included in this retrospective review. Patients were included if they were ≥ 18 years diagnosed with CAP by radiographic evidence with respiratory culture positivity and susceptibility results. Exclusion criteria were: presence of non-bacterial non-respiratory pathogens, patients with cystic fibrosis, lung transplant or systemic co-infections. The primary outcome was validation of the DRIP score by comparing the sensitivity, specificity, negative and positive predictive values (NPV/PPV) to the derivation and validation study by Webb et al. Secondary outcomes were the percentage of CAP cases with DRPs and the predictability of DRP using the DRIP score versus HCAP criteria.

Results. A total of 164 patients were included; 60.4% were male with a median age of 70 years. The primary outcome shown in Table 1 demonstrated similar sensitivity,

specificity, NPV, and PPV of the DRIP score to those in the study by Webb *et al.* *Staphylococcus aureus* (32.9%) and *Streptococcus pneumoniae* (27.4%) were the most commonly isolated pathogens and CAP due to DRPs occurred in 30.5% of patients. The DRIP score also demonstrated improved performance in predicting DRPs in CAP compared to the HCAP Criteria as shown in Table 2.

Table 1. DRIP Score Validation

Table 1. DRIP Score Validation				
Validation Study*	**Sensitivity** (95% CI)	**Specificity** (95% CI)	**PPV** (95% CI)	**NPV** (95% CI)
MGH + NWH	0.74 (0.59-0.85)	0.85 (0.77-0.91)	0.68 (0.54-0.80)	0.88 (0.80-0.93)
Webb, *et al.*	0.82 (0.67-0.88)	0.81 (0.73-0.87)	0.68 (0.56-0.78)	0.90 (0.81-0.93)

* MGH: Massachusetts General Hospital (academic); NWH: Newton-Wellesley Hospital (community)

Table 2. Predictability of the DRIP score vs. HCAP criteria

Table 2. Predictability of the DRIP Score vs. HCAP Criteria				
Scoring Tool	**Sensitivity** (95% CI)	**Specificity** (95% CI)	**PPV** (95% CI)	**NPV** (95% CI)
MGH + NWH (DRIP Score)	0.74 (0.59-0.85)	0.85 (0.77-0.91)	0.68 (0.54-0.80)	0.88 (0.80-0.93)
MGH + NWH (HCAP Criteria)	0.82 (0.68-0.90)	0.45 (0.36-0.54)	0.39 (0.29-0.44)	0.85 (0.73-0.92)
Webb, *et al.* (HCAP Criteria)	0.79 (0.67-0.88)	0.65 (0.56-0.73)	0.53 (0.42-0.63)	0.86 (0.77-0.92)

Conclusion: Our results further validate the DRIP score derived by Webb *et al.* in predicting DRPs in CAP. These results encourage a local prospective evaluation of the DRIP score as an antimicrobial stewardship tool.

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

1483. Maternal Tdap Vaccination During Pregnancy and Immune Response: A Comparison Between Infants Born to Mothers Primed with Acellular or Whole Cell Pertussis Vaccines

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Session: P-67. Respiratory Infections - Bacterial

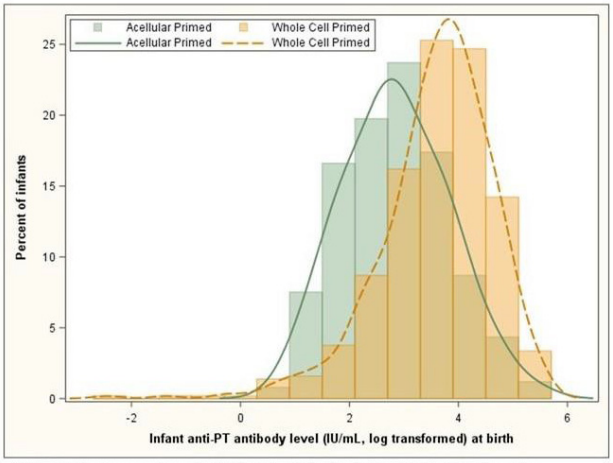
Background. Acellular pertussis (aP) vaccines replaced whole cell pertussis (wP) vaccines for the recommended childhood primary series in the United States in 1997. As women primed with aP vaccines in childhood enter reproductive age, it is unknown how maternal aP-priming will impact pertussis protection conferred to infants through Tdap (tetanus toxoid, reduced diphtheria toxoid and acellular pertussis) vaccination during pregnancy.

Methods. Infants born at term to women who had been vaccinated with Tdap at 27-36 weeks' gestation and ≥ 14 days prior to delivery were included. Geometric mean concentrations (GMC) of pertussis-specific antibodies (measured in IU/mL) in umbilical cord blood of infants born to women born after 1997 (aP vaccine primed) were compared with those born to women born before 1992 (wP vaccine primed).

Results. 253 and 506 neonates born to aP- and wP-primed women, respectively, were included. Compared with wP-primed women, aP-primed women were younger (19.3 v. 24.5 years), more likely to be Hispanic or non-Hispanic black and to have infants with lower birthweight (3264 v. 3392 grams, p< 0.01 for all). Gestation at Tdap receipt, gestational age at delivery, and interval between Tdap administration and delivery were not statistically different.

Antibodies against pertussis toxin (PT) and filamentous hemagglutinin (FHA) were significantly lower among neonates born to aP-primed versus wP-primed mothers (PT: 17.3 v. 36.4, GMC ratio 0.475 (0.408 – 0.552) **(Figure)**; FHA: 104.6 v. 121.4, GMC ratio 0.861 (0.776 – 0.958)). No significant differences were observed between the aP and wP-primed groups for anti- fimbriae (FIM) or anti-pertactin (PRN) antibodies ((FIM: 469.6 v. 577.2, GMC ratio 0.81 (CI 0.65 – 1.01); PRN 338.8 v. 292.6, GMC ratio 1.16 (CI 0.99 – 1.35)).

Figure. Distribution of anti-PT antibody levels in cord blood in infants born to women who were primed with whole cell pertussis compared with acellular pertussis vaccines in childhood.*



*Antibody titers were not normally distributed and the distribution of antibody levels was log transformed.

Conclusion. The type of pertussis vaccine a woman received during childhood significantly impacted her response to Tdap vaccination during pregnancy; the largest reduction was in anti-PT antibodies thought to be most important in preventing severe infection in infants. These findings suggest that infants born to aP-primed women who received Tdap during pregnancy may have less passive protection against pertussis during the first months of life than those born to wP-primed women.

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

1484. Microbial Etiology of Community-acquired Pneumonia in Immunocompromised Patients

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Session: P-67. Respiratory Infections - Bacterial

Background. Community-acquired pneumonia (CAP) is a leading cause of infection related mortality. Few studies have specifically evaluated the microbial etiology of CAP in immunocompromised patients. Using a large national inpatient database, we compared the microbial etiology of CAP in immunocompromised patients compared to immunocompetent patients.

Methods. We included adult patients admitted with pneumonia from 2010-2015 to 176 US hospitals participating in Premier. Patients were identified as having CAP if they had a chest X-ray and were on antimicrobials on the first day. Immunocompromised was defined by the receipt of immunosuppressive medications or ICD-9 codes for neutropenia/ hematological malignancy/ organ transplantation or comorbidities with AIDS. For microbial etiology, patients were included if they had a positive culture or test collected by hospital day 0 through 3. Patients with identical bacteria in blood and urine were excluded.

Results. A total of 168,159 patients had a diagnosis of CAP with a culture/test performed on first 3 days. A pathogen was detected in 18.8% of patients. Among pathogen positive patients, 4,851 patients were identified as immunocompromised and 26,752 as immunocompetent. Almost all patients (99%) had at least one culture, blood (96%) and respiratory (51%). Among patients who were immunocompromised, the most common bacterial pathogens (compared to immunocompetent patients) were, *S. pneumoniae* (17.7% vs 19.0%), MRSA (13.1% vs 14.4%), MSSA (12.0% vs 11.8%), *P. aeruginosa* (12.0% vs 9.9%), *E. coli* (7.4% vs 6.4%), *K. pneumoniae* (5.8% vs 4.9%), *H. influenzae* (5.5% vs 5.5%), *M. pneumoniae* (3.0% vs 3.0%) and *L. pneumophila* (0.93% vs 1.2%). Among viral pathogens, while the most common were influenza virus (12.9% vs 14.1%) followed by rhinovirus (1.5% vs 0.89%), immunocompromised patients has a higher prevalence of noninfluennza viruses (3.42% vs 2.43%).