in W-EU and 58.7% in the US. MRSA rates in the US improved from 44.8% in 2016 to 40.2% in 2019 (p< 0.05). Overall MRSA rates were 21.4% in W-EU, and 28.7% in E-EU. CRE rates decreased continuously in the US from 3.0% in 2016 to 1.7% in 2019 (p < 0.05; 2.4% overall) and were higher E=EU (16.6%) than W-EU (2.2%). Among *K. pneumoniae*, susceptibility to ceftriaxone and MEM were 80.7% and 94.9% in the US, 70.1% and 90.7% in W-EU, and 34.5% and 70.4% in E-EU, respectively. Among *E. coli*, susceptibility to ceftriaxone and levofloxacin were 71.4% and 55.0% in the US, 79.2% and 71.2% in W-EU, and 62.6% and 55.9% in E-EU, respectively.

Table 1

Rank	Frequency of top 8 organisms stratified by region		
	United States (n=17,770)	Western Europe (n=7,966)	Eastern Europe (n=3,182)
1	*S. aureus* (27.3%)	*P. aeruginosa* (20.6%)	*P. aeruginosa* (27.2%)
2	*P. aeruginosa* (24.3%)	*S. aureus* (20.1%)	*K. pneumoniae* (19.3%)
3	*K. pneumoniae* (8.1%)	*E. coli* (12.7%)	*A. baumannii* (19.0%)
4	*E. coli* (6.4%)	*K. pneumoniae* (9.2%)	*S. aureus* (9.1%)
5	*S. maltophilia* (4.7%)	*E. cloacae* (5.5%)	*E. coli* (6.1%)
6	*S. marcescens* (4.3%)	*S. marcescens* (4.3%)	*S. maltophilia* (3.9%)
7	*E. cloacae* (3.9%)	*K. oxytoca* (3.5%)	*E. cloacae* (2.9%)
8	*H. influenzae* (3.0%)	*S. maltophilia* (3.2%)	*S. marcescens* (2.3%)

Conclusion: Rank order and antimicrobial susceptibility of bacteria isolated from patients with pneumonia varied widely by geographic region. Multidrug-resistant NF-GNB represented an important cause of pneumonia in US and Europe.

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1473. Guideline Adherence in Pediatric Ambulatory Visits for Acute Otitis Media

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Session: P-67. Respiratory Infections - Bacterial

Background. Acute otitis media (AOM) is the most common pediatric outpatient condition treated with antibiotics in the United States. Over 30% of children receive inappropriate antibiotics for AOM, contributing to increasing antimicrobial resistance and unnecessary adverse events. Strict adherence to diagnostic and treatment guidelines has been proposed by the American Academy of Pediatrics (AAP) Committee on Infectious Diseases as one strategy to combat inappropriate antibiotic use. Our objective was to describe adherence to the 2013 AAP guidelines on AOM.

Methods. We performed a cross-sectional study on a random sample of visit notes for patients 3 to 59 months old diagnosed with otitis media based on ICD-10-CM codes (H65, H66, H67) and treated with antibiotics between 9/1/2017 and 8/31/2018 in an association of pediatric practices across Massachusetts. Children with tympanostomy tubes or a chronic medical condition increasing their risk for AOM were excluded. Based on the 2013 AAP diagnostic criteria, tympanic membrane exam descriptions were reviewed and classified as describing AOM or not. Antibiotic choices were classified as appropriate or inappropriate. Notes were then labeled as "fully adherent" (exam consistent with AOM and appropriate antibiotic choice), "partially adherent" (exam inconsistent with AOM **or** inappropriate antibiotic choice), and "non-adherent" (exam inconsistent with AOM **and** inappropriate antibiotic choice).

Results. Three hundred and ninety-four visit notes from 39 different practices were analyzed. One hundred and sixty-six notes (42%) were "fully adherent" to the AAP guidelines, 183 (46%) were "partially adherent" and 45 (11%) were "non-adherent" (Figure 1). In the "partially adherent" and "non-adherent" groups combined, exams were inappropriate in 179 notes (45.4%) and antibiotic choice was inappropriate in 94 notes (23.9%). Cefdinir was the most frequent inappropriate antibiotic (44/94, 46.8%) (Table 1). "Watchful waiting" occurred in only 7% (16/229) of eligible cases.

Figure 1. Breakdown of encounters by adherence type

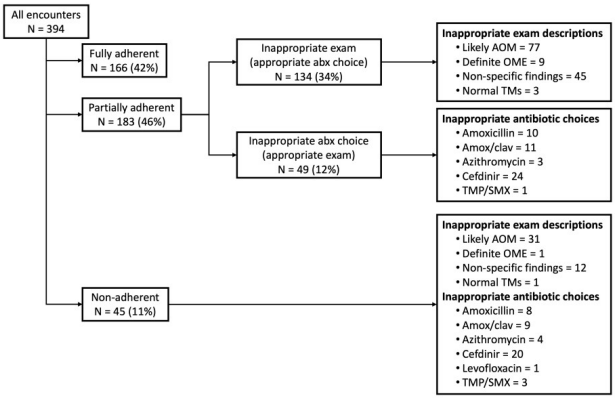

Table 1. Cross-table of indicated and prescribed antibiotics

Antibiotic Prescribed	Indicated Antibiotic: Amoxicillin	Amox-clav	Cefdinir*	Ceftriaxone
Amoxicillin	232	18		
Amox-clav	20	41		
Cefdinir*	18	25	27	1
Ceftriaxone				
Azithromycin	1	1	5	
Levofloxacin			1	
TMP-SMX	1		2	1

Conclusion. Our analysis of independent pediatric practices showed moderate adherence to the AAP guidelines for AOM. Substantial room exists for improvement in diagnosing and treating AOM in young children, especially regarding the potential for watchful waiting.

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1474. Impact of 13-valent Pneumococcal Conjugate Vaccine (PCV13) on Non-bacteremic Pneumococcal Pneumonia (NBPP) among Adults in the United States, 2013-2017

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Session: P-67. Respiratory Infections - Bacterial

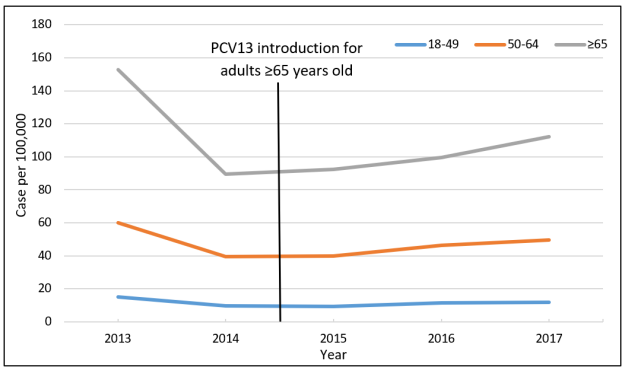
Background. PCV13 was recommended for U.S. children in 2010 and for adults ≥ 65 years in 2014. Vaccine coverage among adults ≥ 65 years was 43% in 2017. We evaluated PCV13 impact on NBPP among adults.

Methods. NBPP cases (clinically or radiographically confirmed pneumonia and a positive pneumococcal urine antigen test (PUAT) in a hospitalized adult aged ≥ 18 years) were identified at select hospitals in 10 sites within CDC's Active Bacterial Core surveillance during 2013-2017. NBPP rates (per 100,000) were estimated using U.S. Census Bureau population denominators and adjusted for the proportion of pneumonia patients tested by PUAT and the number of pneumonia admissions in the catchment area.

Results. Between 2013 and 2017, 4,430 NBPP cases were identified. Adults aged ≥ 65 years accounted for 49% of cases. Case fatality rate was 6%. From 2013 to 2014, rates of NBPP declined from 153 to 90 (41% reduction, 95%CI 28%, 51%) in ≥ 65 year-olds;

60 to 40 (34% reduction, 95%CI 22%, 45%) in 50-64 year-olds; and 15 to 10 (36% reduction, 95%CI 25%, 47%) in 18-49 year-olds. From 2014 to 2017, rates of NBPP increased in all ages, but remained below 2013 rates (Figure).

Figure. Estimated Annual Non-Bacteremic Pneumococcal Pneumonia Incidence by Age Group, 2013–2017



Conclusion. Reductions in NBPP among adults were primarily due to indirect effects of PCV13 use in children, with no additional declines following PCV13 introduction for adults aged ≥ 65 years.

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1475. Impact of a Routine Infant PCV Program on the Serotype Distribution of Episodes of Invasive Pneumococcal Disease (IPD) and Non-bacteremic Pneumococcal Pneumonia in Adults

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Toronto Invasive Bacterial Diseases Network (TIBDN)

Session: P-67. Respiratory Infections - Bacterial

Background. Herd immunity from pediatric pneumococcal conjugate vaccine (PCV) programs has resulted in substantial reductions in IPD due to PCV serotypes (ST). We assessed whether similar changes in ST distribution occur in non-bacteremic pneumococcal pneumonia (NBPP).

Methods. The Toronto Invasive Bacterial Diseases Network performs population-based surveillance for IPD and hospitalized, culture-confirmed NBPP in Toronto/Peel Region, Canada (Pop 4.5M). Patient data are collected by interview/chart review; illness associated with respiratory isolates is categorized using Musher criteria.

Results. Since 2002, 6627 episodes of IPD, and 7323 non-bacteremic episodes with a respiratory isolate of *S. pneumoniae* (2180 meeting modified Musher criteria for NBPP) have occurred in adults. Distributions of vaccine-type serotypes in IPD and NBPP pre-PCV7 (2002-2004), post-PCV7 (2006-2009) and late post-PCV13 (2014-2019) are shown in the Figure. There were no significant changes in distribution of vaccine serotype groups from 2014-2019 in IPD or NBPP. From 2014-2019, serotypes included in PCV13 and PCV20 were associated with 33% and 59% of IPD cases, and 29% and 49% of NBPP cases in adults..

Figure. distribution of serotype groups included in different pneumococcal vaccines in cases of IPD and non-bacteremic pneumonia

Conclusion. Eight years post routine infant PCV13 implementation, PCV13 type IPD and NBPP persists in adults. The distribution of vaccine-type strains is similar in IPD and NBPP; although non-vaccine-type strains are more common in NBPP.

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1476. Impact of an Educational Campaign on Rates of Sputum Culture Acquisition as an Opportunity for Antibiotic De-escalation

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Session: P-67. Respiratory Infections - Bacterial

Background. The 2019 community-acquired pneumonia (CAP) guidelines recommend obtaining a sputum culture in patients who are empirically treated for methicillin-resistant *Staphylococcus aureus* (MRSA) or *Pseudomonas aeruginosa* to assist clinicians in optimizing antimicrobial therapy. A previous study at our institution found respiratory cultures were rarely obtained in patients with CAP. As a result of these findings, an educational campaign was implemented to promote the use of an induced sputum protocol.

Methods. This was a multicenter, retrospective cohort study that included patients who were ≥18 years of age, had a diagnosis of CAP, and received ≥48 hours of anti-pseudomonal antibiotics. Patients were excluded if mechanically ventilated within 48 hours of admission or diagnosed with hospital-acquired or ventilator-associated pneumonia. Patients were grouped into pre- and post-intervention time periods. The intervention involved education on obtaining respiratory cultures including technique on induced sputums and updates to CAP order sets. The primary outcome was the rate of sputum culture acquisition. Secondary outcomes included duration of anti-pseudomonal and anti-MRSA therapy, in-hospital mortality, and length of stay.

Results. A total of 143 patients met inclusion criteria, 72 in the pre-implementation group and 71 in the post-implementation group. Baseline characteristics were similar between the two groups. More patients in the post-implementation group had a sputum culture obtained but the difference was not statistically significant (38.9% vs 53.5%; p=0.08). Anti-pseudomonal therapy was continued for an average of 5.6 days pre-implementation and 5.2 days post-implementation (p=0.499). There was also not a significant difference in anti-MRSA duration between the two groups (3.4 days vs 3.2 days; p=0.606). In-hospital mortality and length of stay were similar between the two groups.

Conclusion. An educational campaign focusing on the acquisition of induced sputums led to an increase in rates of sputum cultures collected. However, this did not correlate with a decrease in duration of anti-MRSA or anti-pseudomonal therapy. Further interventions should be made to optimize de-escalation of broad spectrum antibiotics based on sputum culture results.

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

1477. Impact Of Resistance Thresholds On Mortality In Hospital-Acquired And Ventilator-Associated Pneumonia

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Session: P-67. Respiratory Infections - Bacterial

Background. Hospital-acquired (HAP) and ventilator-associated pneumonia (VAP) represent a significant source of morbidity and mortality in hospitalized patients. Numerous studies demonstrate mortality benefit with appropriate empiric therapy. Choosing the right empiric coverage is paramount; however, this decision becomes more challenging as rates of antibiotic resistance rise. Most recent HAP/VAP guidelines use an arbitrary population resistance rate of 20% to recommended methicillin-resistant *Staphylococcus aureus* (MRSA) coverage and double-coverage of resistant gram negative bacilli (GNB). Using this threshold has led to overuse of broad spectrum antimicrobials. The goal of this study is to mathematically explore the impact of this threshold on patient outcomes and link population resistance rates to individual mortality risk.

Methods. We used the concept of excess morality risk (EMR) to develop a theoretical simulation model based for HAP/VAP caused by GNB and MRSA empirically treated with piperacillin-tazobactam and vancomycin. EMR is the product of the proportion of HAP/VAP caused by GNB/MRSA, the rate of antibiotic (piperacillin-tazobactam/ methicillin) resistance in GNB and Staphylococcus aureus isolates and the difference in mortality between discordant and appropriate antibiotic therapy. Model parameters were obtained from large surveillance networks and published clinical trials.

Results. At the HAP/VAP guideline threshold of 20% methicillin resistance in SA isolates, the EMR was 0.3%; when the model included only culture positive patients, EMR was 0.6%. At a threshold of 20% resistance to piperacillin-tazobactam in GNB isolates, EMR was 1.9% and 3.1% when culture-negative patients were excluded. EMR increased as baseline risk of failure with discordant therapy increased (e.g. critically ill patients, ventilated HAP).