

RSV. A peak in RSV hospitalization was observed at age 2 months. Only 10% of all children < 24 months of age who were hospitalised with an RSV infection had a specific underlying medical condition (preterm infant, bronchopulmonary dysplasia, Down syndrome, chronic heart disease, immunodeficiency). The estimated rate of RSV-associated hospitalization was 35.4 per 1000 population per year among infants < 6 months of age.

Conclusion. In conclusion, 3 to 4 out of every 100 Japanese children aged < 6 months were hospitalized for RSV. Ninety percent of children < 24 months of age hospitalised with RSV infection did not have a recognised underlying medical condition. The peak of hospitalization for RSV infection occurred at 2 months of age. Thus, broad-based prevention strategies targeting young infants are needed.

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1498. Etiology of Community-acquired Pneumonia in Adults: A Systematic Review

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Session: P-68. Respiratory Infections - Viral

Background. **Background:** Recent guidelines recommend immediate empiric antibiotic treatment for patients (pts) with community-acquired pneumonia (CAP). Concerns about treatment recommendations and antibiotic stewardship motivated a systematic literature review of the etiology of CAP.

Methods. We reviewed English-language literature using PRISMA guidelines. Data were stratified into diagnostic categories according to the microbiologic studies that were done (Table 1).

Fig.1. Flowchart of systematic literature review and study selection

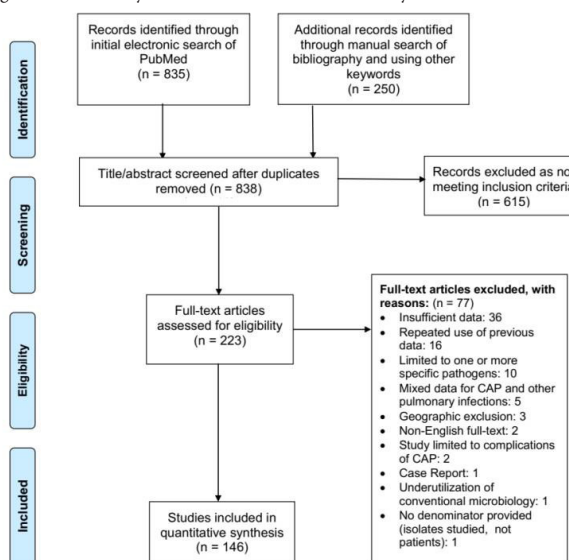


Fig.1. Flowchart of systematic literature review and study selection

Table 1. Characteristics of studies reporting the etiology of community-acquired pneumonia

Table1. Characteristics of studies reporting the etiology of community acquired pneumonia (CAP)

Nature of the microbiologic studies	Bacteriology only	Bacteria & 'atypicals'*	Bacteria, 'atypicals' & viruses	Modern Studies: Bacteria and:		
				PCR for 'atypicals'	PCR for viruses	PCR for 'atypicals' and viruses
Number of studies	25	37	46	16	10	12
Publication years	1945 – 2010	1984 – 2020	1967 – 2017	1999 - 2020	2006 - 2019	2005 - 2019
Study setting						
Inpatient only	6,653	14,281	23,555	6,790	6,260	4,399
Inpatient/outpatient	118	3,786	3,512	1,069	5,295	2,752
Outpatient only	610	1,368	226	0	0	0
Number of CAP patients	9,381	19,435	27,293	7,859	11,555	7,151
Antibiotic exposure prior to microbiologic testing	687 (7.3%)	3,104 (16%)	4,203 (15.4%)	1,074 (13.7%)	2,085 (18%)	966 (13.5%)
Number of patients with no etiology determined	6,293 (67.1%)	11,663 (60.0%)	13,704 (50.2%)	4,484 (57.1%)	5,823 (50.4%)	4,380 (61.3%)

*'Atypicals' is a term used loosely in publications to refer to *Mycoplasma*, *Chlamydia*, *Legionella* and/or *Coxiella*

Results. 146 articles with 82,674 CAP pts met criteria for inclusion; 63,938 (77.3%) were inpatients, 16,532 (20.0%) were in- or outpatients, and 2,204 (2.7%) were outpatients. Pneumococcus was the most common cause of CAP without regard to which microbiologic techniques were used (33-50% of all cases). The proportion due to this organism declined with time, much more strikingly in the US than in Europe. *Haemophilus influenzae* was the second most common cause (7-16% of cases), followed by *Staphylococcus aureus* and *Enterobacteriaceae* each in 4–10%. *Pseudomonas* (0.8-4.5%) and *Moraxella* (1.2-3.5%) were less common; all other bacteria were isolated far less frequently. *Mycoplasma* caused 4-11% of CAP, *Legionella* 3-8%, *Chlamydia* 2-7%, and *Coxiella* < 2%; some studies showed a much higher frequency of *Mycoplasma*. With routine use of viral PCR, a virus was identified in 30-40% of pts; bacterial/viral coinfection was found in 25-35% of these cases. In a separate study of CAP pts in whom viral PCR was positive, 40% had bacterial coinfection. Influenza viruses were identified in 6.2-13.7% of cases and rhinoviruses in 4.1-11.5%. RSV and human metapneumovirus were less common (0.4-4.7%), followed more distantly by other viruses. Even with the use of the most sophisticated diagnostic techniques, no etiologic agent for CAP was identified in > 50% of cases.

Trends of identification of *S. pneumoniae* and *H. influenzae* as the etiology of CAP (above); and the proportion of *S. pneumoniae* as the causes of CAP in different geographic regions (below).

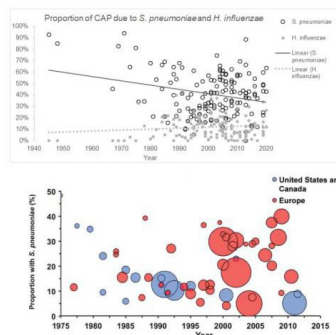


Figure 2. Trends of identification of *S. pneumoniae* and *H. influenzae* as the etiology of CAP (above); and the proportion of *S. pneumoniae* as the causes of CAP in different geographic regions (below).

Conclusion: Our results justify current guidelines for initial empiric antibiotic treatment of all pts with CAP. With pneumococcus and *Haemophilus* continuing to predominate, efforts at antibiotic stewardship might be enhanced by greater attention to routine use of sputum Gram stain and culture. Because viral/bacterial coinfection is relatively common, the identification of a virus by PCR does not, by itself, permit the non-use of an antibiotic.

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1499. Incidence of Community Acquired Pneumonia by Age and Comorbid Conditions in the Veterans Health Administration (VHA)

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Session: P-68. Respiratory Infections - Viral

Background. Community acquired pneumonia (CAP) remains a major cause of morbidity and mortality. Risk factors for CAP are often grouped as moderate- (e.g., diabetes mellitus, chronic liver, lung, or heart disease) and high-risk (e.g., immunosuppressive) conditions, which in turn influences preventative strategies, notably pneumococcal vaccination. Here, we use the national VHA databases to assess the risk of CAP among adults, expanding on previous work by using administrative data to assess the incidence of CAP among people with > 1 moderate risk condition

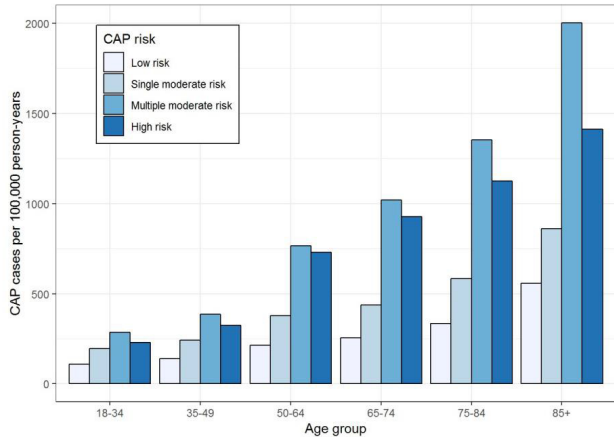
Methods. We used the national VHA databases merged with claims summaries from the Centers for Medicare and Medicaid Services (CMS) to identify patients receiving clinical care in the VHA without clinical Medicare claims in 2016-2017. Within this population, we identified CAP cases defined by the presence of a diagnostic code for pneumonia, chest X-ray, and antibiotics as well as the absence of healthcare exposure or antibiotics in prior 90 days. We determined the total patient years at risk and calculated incidence rates by age group and by moderate- and high-risk conditions.

Results. We identified 37,348 CAP cases in 7.9 million person-years at risk and observed similar annual rates in 2016 and 2017 (468.9 and 472.2 cases/100,000 person-years, respectively). The prevalence of high-risk conditions and incidence of CAP increased with age whereas the prevalence of >1 moderate-risk condition peaked for ages 50-64 and 65-74 years (Table). The incidence of CAP among those with > 1 moderate-risk condition exceeded that of patients with high-risk conditions across all age strata (Figure).

Table

Age	CAP Cases	Patient Years	CAP cases / 100,000 person years (95% CI)	Prevalence (%), one moderate-risk condition	Prevalence (%), >1 moderate-risk condition	Prevalence (%), high-risk condition
18-34	1,303	914,155	143 (135- 150)	20.1	6.2	3.5
35-49	2,962	1,432,931	207 (199- 214)	25.5	10.4	8.0
50-64	11,267	2,486,250	453 (445- 462)	26.3	20.1	16.5
65-74	13,328	2,126,508	627 (616- 637)	26.2	19.1	26.7
75-84	5,292	669,266	791 (770-812)	22.8	11.5	36.0
85+	3,196	301,995	1058 (1022-1096)	18.6	6.3	41.8

Figure



Conclusion: Age-adjusted analysis revealed that the greatest burden of CAP occurs in patients with > 1 moderate-risk condition, even compared to those with a high-risk condition. Our analysis of CAP based on national VHA data suggest that additional preventative health measures directed at individuals older than 50 years with > 1 moderate-risk condition may help to reduce the burden of CAP and limit its morbidity and mortality.

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1500. Population-based incidence, health care resource utilization and cost among children < 5 years of age hospitalized with RSV, Utah

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Session: P-68. Respiratory Infections - Viral

Background. Respiratory Syncytial Virus (RSV) is one of the most common causes of childhood lower respiratory tract infection (LRTI) worldwide. Accurate data are critical to inform the rationale for RSV vaccine and immunoprophylaxis development. We evaluated the burden of laboratory-confirmed RSV from hospitalized children.

Methods. During the 2019-2020 RSV season, we prospectively identified children < 5 years of age hospitalized with laboratory-confirmed RSV LRTI at Primary Children's and Riverton hospitals in Salt Lake City, Utah. Outcomes included Salt Lake county RSV hospitalization rates, adjusted for market share, health care resource utilization including intensive care unit (ICU) stays, mechanical ventilation, length of stay (LOS), and total hospital costs.

Results. A total of 284 children had laboratory-confirmed RSV LRTI hospitalizations during the 2019-2020 RSV season: 106 (37%) < 6 months of age; 67 (24%) had high-risk medical conditions (HMC); 70 (25%) children had an ICU stay; 18 (6%) required mechanical ventilation; 132 (46%) received antibiotics and median hospital

LOS of 2.3 days (IQR 1.6- 3.6). Population-based incidence rates of RSV hospitalization were 4.6/1000 (range 0.7/1000 to 17/1000). The highest rates were in children < 6 months, and rates decreased with increasing age. The mean hospital cost was \$12,974.6 (standard deviation: \$19869.7), with a total for the cohort was \$3.7 million; 42% was accounted for by children < 6 months. Median age of children with HMC's were significantly older (18.7 mon vs. 12.7 mon; p=0.001) than healthy, but comparable mean hospital cost (\$14208.5 vs. 12593.2) and median hospital LOS (2.4 vs. 2.3).

Conclusion. Hospitalized RSV LRTI among children < 5 years remains significant, and is associated with substantial HCRU, antibiotic use and morbidity. Nationwide, the mean hospital costs may total \$1.1 billion. Our data support the need for RSV vaccines and immunoprophylaxis to prevent RSV hospitalization.

Disclosures. Krow Ampofo, MBChB, Merck (Grant/Research Support) Yoonyoung Choi, PhD, MS, RPh, Merck (Employee) Lyn Finelli, DrPH, MS, Merck & Co Inc, (Employee)

1501. Pragmatic Assessment of Influenza Vaccine Effectiveness in the DoD (PAIVED): Updates from Year 2 of multi-site trial

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Session: P-68. Respiratory Infections - Viral

Background. Despite nearly universal influenza vaccination for active duty military personnel, breakthrough influenza infections occur. We are reporting on the second year of the Pragmatic Assessment of Influenza Vaccine Effectiveness in the DoD (PAIVED), comparing three FDA-licensed influenza vaccine types (egg-based, cell -based, and recombinant) to assess differences in immunogenicity and effectiveness.

Methods. Participants in the second year of PAIVED were enrolled from Oct 2019 through Jan 2020 at 9 military facilities. Participants received weekly inquiries about influenza-like-illnesses (ILI) experienced in the past week, and if the participant reported having a cough or sore throat and a) muscle/body aches or fatigue and/or b) being feverish or having chills, they were scheduled for a clinic visit. During this visit, a blood sample and a nasal swab were collected, as well as information about symptom duration and severity. A second (convalescent) visit was conducted approximately 4 weeks later, which involved collecting additional information about the duration of symptoms and illness burden, as well as a second blood draw. Due to the COVID-19 pandemic, acute and convalescent visits were disrupted at most sites in March and April due to COVID-19 precautions.

Results. PAIVED year 2 enrolled 5,892 participants who completed demographic forms (Table 1). Among those who reported any ILIs, most reported one ILI (1,345), while 264 reported two ILIs, and 42 reported three ILIs. Nasal swabs were processed