1511. Influenza antiviral use in patients hospitalized with laboratory-confirmed influenza in the United States, FluSurv-NET, 2015 – 2019

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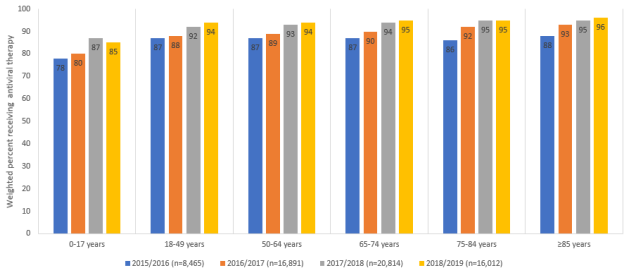
Session: P-68. Respiratory Infections - Viral

Background. Antiviral therapy is recommended for all patients hospitalized with influenza to reduce morbidity and mortality. We used data from the population-based Influenza Hospitalization Surveillance Network (FluSurv-NET) to evaluate trends in influenza antiviral use in patients hospitalized with influenza over 4 seasons in the United States.

Methods. We included cases residing within the FluSurv-NET catchment area and hospitalized with laboratory-confirmed influenza from October 1 – April 30 during 2015-16 through 2018-19 seasons. For 2015-16 and 2016-17, chart abstraction of demographic and clinical characteristics and antiviral use was performed on all cases; for 2017-18 and 2018-19, all patients < 50-years and an age-stratified random sample of older adults were sampled. Data were weighted to reflect the probability of selection. We assessed the frequency of treatment, by season and age group, and evaluated trends by season using the Cochran-Armitage test. Among those receiving antivirals, we used multivariable logistic regression to assess the association between the days from symptom onset to admission and receipt of early (0-2 days from symptom onset) versus late (> 2 days) treatment, adjusting for age, sex, race/ethnicity, and underlying medical conditions.

Results. Over 4 seasons, we sampled 62,182 patients; 54% female and 63% non-Hispanic white. Overall, 92% of patients received antivirals, increasing from 86% in 2015-16 to 94% in 2018-19; use increased by season in all age strata ($p < 0.001$) [Figure]. Most received oseltamivir (99%); in 2018-19, 2% received baloxavir. Of those who received antivirals, 38% received early treatment. The median days from symptom onset to admission was 1 day (interquartile range [IQR] 1-3) for those who received early treatment and 4 days (IQR 3-6) for those who received late treatment. Ninety-three percent who received antivirals started within 1 day of admission. For each additional day from symptom onset to admission, the adjusted odds of late treatment was 8.56 (95% confidence interval: 7.83-9.35).

Figure. Weighted percentage of hospitalized patients receiving influenza antivirals by influenza season and age strata, FluSurv-NET, 2015-16 through 2018-19.



Conclusion: In patients hospitalized with influenza, most received antiviral treatment within 1 day of admission. However, a majority had delays from symptoms onset to initiation, due to late presentation of illness.

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1512. Influenza vaccine effectiveness wanes over the influenza season: results from five military treatment facilities

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Session: P-68. Respiratory Infections - Viral

Background. Influenza vaccination can reduce influenza burden, but questions have arisen about the duration of vaccine protection. While the timing of vaccination varies, annual receipt of influenza vaccine is mandated for active duty military personnel. The goal of this analysis is to determine if influenza vaccine effectiveness decreases over time. A secondary goal of this analysis is to determine if repeated influenza vaccination is associated with risk for influenza.

Methods. Otherwise healthy individuals presenting for treatment of acute respiratory infections at 5 military treatment facilities from 2009 to 2018 were enrolled in the Acute Respiratory Infection Consortium (ARIC) study. Individuals with complete demographics, influenza vaccination in the two years prior to illness, and influenza laboratory results were included in this analysis (n=1,273). Multivariate logistic regression was used to calculate the odds of an influenza diagnosis according to time since influenza vaccination, categorized in 90-day periods. The model also included age, race, month of diagnosis, influenza season, and whether the participant received 4+ influenza vaccinations in the past 5 years.

Results. One hundred and ninety-two individuals (15%) had laboratory confirmed influenza (Table 1). Participants were mostly active duty, male, and white. Over half of the participants received 4+ influenza vaccinations in the past 5 years. Participants who were vaccinated 90-179 and 180+ days ago had greater odds of being diagnosed with influenza than did individuals who were vaccinated < 90 days prior to illness onset (Table 2). Participants who were 18-24 years old had lower odds of influenza than individuals in other age groups. Vaccine experience (vaccinated against influenza for at least four of the past five years), race, and ethnicity were not statistically significantly associated with influenza diagnosis.

Table 1. Characteristics of individuals included in the analysis of waning influenza vaccine effectiveness in the ARIC study

Variable	Description	N	Influenza B # (%)	Influenza A # (%)	Influenza all # (%)
Participants (n)		1273	32	160	192
Age group*,^,+	<18	186	14 (44)	17 (11)	31 (16)
	18-24	471	5 (16)	29 (18)	34 (18)
	25-34	386	2 (6)	65 (41)	67 (35)
	35+	230	11 (34)	49 (31)	60 (31)
Sex	Men	767	21 (66)	93 (58)	114 (59)
	Women	506	11 (34)	67 (42)	78 (41)
Race	Black	188	3 (9)	33 (21)	36 (19)
	Hispanic	272	10 (31)	32 (20)	42 (22)
	Unknown/Other	140	4 (13)	16 (10)	20 (10)
	White	673	15 (47)	79 (49)	94 (49)
Military status	Active duty	966	10 (31)	111 (69)	121 (63)
	Dependent	277	16 (50)	41 (26)	57 (30)
	Retired	30	6 (19)	8 (5)	14 (7)
Season*,^,+	2009/10	26	0 (0)	1 (1)	1 (1)
	2010/11	338	13 (41)	30 (19)	43 (22)
	2011/12	201	3 (9)	16 (10)	19 (10)
	2012/13	121	8 (25)	41 (26)	49 (26)
	2013/14	150	4 (13)	32 (20)	36 (19)
	2014/15	38	1 (3)	7 (4)	8 (4)
	2016/17	199	1 (3)	13 (8)	14 (7)
	2017/18	200	2 (6)	20 (13)	22 (11)
Education^,+	High school	730	14 (44)	71 (44)	85 (44)
	Associate's degree	285	7 (22)	40 (25)	47 (24)
	Bachelor's degree+	258	11 (34)	49 (31)	60 (31)
BMI>30*,^,+	Not obese	912	14 (44)	97 (61)	111 (58)
	Obese	206	8 (25)	41 (26)	49 (26)
	Missing	155	10 (31)	22 (14)	32 (17)
Days since influenza vaccination^,+	<90	313	9 (2)	19 (6)	27 (9)
	90-179	614	12 (2)	96 (16)	108 (18)
	180+	346	12 (3)	45 (13)	57 (16)
# of last 5 years vaccinated^,+	1	312	7 (22)	23 (14)	30 (16)
	2	151	4 (13)	15 (9)	19 (10)
	3	129	5 (16)	13 (8)	18 (9)
	4	105	2 (6)	21 (13)	23 (12)
	5	576	14 (44)	88 (55)	102 (53)

*B, ^A, +Any influenza - characteristic statistically significantly different using chi-squared test

Table 2. Multivariate logistic regression results from model using influenza diagnosis as the outcome variable. Also included in the model are season and month of diagnosis.

	Any influenza	Influenza A	Influenza B
Vaccinated <90 days ago	Ref	Ref	Ref
Vaccinated 90-179 days ago	2.2 (1.3, 3.7)	2.4 (1.4, 4.4)	1.1 (0.4, 3.4)
Vaccinated 180+ days ago	3.3 (1.9, 6.0)	4.1 (2.1, 8.2)	1.2 (0.4, 3.5)
Active duty	Ref	Ref	Ref
Dependent	1.6 (0.8, 2.8)	1.5 (0.8, 2.7)	1.3 (0.2, 5.7)
Retired	4.0 (1.6, 10.2)	1.5 (0.5, 4.0)	12.2 (2.8, 56.3)
Age <18	2.1 (0.9, 4.8)	1.3 (0.5, 3.3)	4.9 (0.9, 46.0)
Age 18-24	Ref	Ref	Ref
Age 25-34	1.9 (1.2, 3.2)	2.3 (1.4, 4.0)	0.3 (0.0, 1.6)
Age 35+	3.3 (1.9, 6.0)	3.5 (1.9, 6.5)	1.9 (0.5, 8.3)
Vaccinated 4+ times in last 5y	1.3 (0.8, 1.9)	1.3 (0.8, 2.0)	1.2 (0.5, 3.1)
Race: Black	Ref	Ref	Ref
Race: Hispanic	1.1 (0.7, 1.9)	1.3 (0.8, 2.1)	0.5 (0.1, 1.7)
Race: Unknown/other	1.0 (0.7, 1.6)	0.9 (0.6, 1.5)	1.6 (0.6, 4.0)
Race: White	1.0 (0.6, 1.8)	1.0 (0.5, 1.8)	1.3 (0.3, 4.0)

Conclusion. Influenza vaccination was most effective 14-89 days post-vaccination and effectiveness decreased thereafter. Repeat influenza vaccination, however, was not significantly associated with greater odds of influenza. The waning effectiveness of influenza vaccination indicates additional consideration be given to the timing of vaccination.

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1513. Medically Attended Respiratory Syncytial Virus Hospitalizations (RSVH) and All-Cause Bronchiolitis Hospitalizations (BH) Among Children Aged ≤ 24 Months at RSV Season Start With Higher-Risk Congenital Heart Disease (CHD) Before and After the 2014 American Academy of Pediatrics (AAP) Policy

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Session: P-68. Respiratory Infections - Viral

Background. In 2014, the AAP stopped recommending palivizumab for use in children with hemodynamically significant CHD (hs-CHD) aged 12 to 24 months at the RSV season start. This analysis investigates the impact of the 2014 AAP policy on the contemporary burden of RSVH and BH in children with CHD for whom palivizumab immunoprophylaxis is no longer recommended.

Methods. All children with CHD aged ≤ 24 months at the start of the RSV season and hospitalized for RSV or BH during the 2010-2017 RSV seasons (November-March) were studied. RSVH and BH were defined by International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) and ICD-10-CM codes. As there are no ICD codes for hs-CHD, we evaluated the effect of the guidance on higher-risk CHD as defined by ICD codes.[1] Frequency and characteristics of RSVH and BH and disease severity (including intensive care unit [ICU] admission and mechincal ventilation) for these children before and after the 2014 AAP guidance using the Children's Hospital Association's Pediatric Health Information System* (PHIS) data set were described. SAS version 9.4 was used for statistical analysis of this data, with z-tests method used to determine statistical significance.

Results. RSVH significantly increased after 2014 for all higher-risk CHD children aged ≤ 24 months (3.4% [1992 RSVH CHD/59,217 RSVH] before the 2014 guidance and 4.0% [1798 RSVH CHD/45,470 RSVH] after; $P< 0.0001$) and for the subgroup of children aged 12 to 24 months at the start of the RSV season (0.5% before the guidance and 0.8% after; $P< 0.0001$). Disease severity as measured by ICU admissions in the 12 to 24 months subgroup also significantly increased after the 2014 guidance (0.2% before the guidance and 0.3% after; $P< 0.0001$). Mechanical ventilation usage was not statistically significantly increased after the 2014 guidance ($P=0.188$). A similar pattern of results was found for BH.

Conclusion. RSVH, BH, and associated disease severity significantly increased among higher-risk CHD children aged 12 to 24 months, within the PHIS health system, after the 3 RSV seasons following the 2014 AAP RSV immunoprophylaxis recommendations.

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1514. Mortality and Readmission in Adults during the First Year Following Hospitalization for Community-Acquired Pneumonia in the US

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Session: P-68. Respiratory Infections - Viral

Background. Increasing evidence suggests that the impact of community-acquired pneumonia (CAP) extends beyond discharge from the hospital and the acute phase of illness. We sought to characterize mortality and hospital readmission across the adult age span and spectrum of comorbidities.

Methods. A retrospective cohort design and data from Optum's de-identified Integrated Claims-Clinical dataset (2009-2018) were employed. Study population comprised all adults who, between 1.1.2013 and 12.31.2017, had ≥ 1 acute-care hospitalization for CAP; each qualifying CAP hospitalization separated by ≥ 365 days was included as a unique observation in analyses. Study outcomes included acute-care hospital readmission for any reason and death for any reason. Hospital readmission was ascertained during the 360-day period following discharge from the CAP hospitalization; death was ascertained during the CAP hospitalization as well as during the same 360-day period. Cumulative rates of mortality and readmission were summarized for all patients as well as subgroups defined on age and comorbidity profile (i.e., healthy, at-risk, high-risk).

Results. Study population totaled 37,006 patients who contributed 38,809 CAP hospitalizations; mean age was 71 years, 51% were female, and 88% had an at-risk (33%) or high-risk (55%) condition. Hospital readmission was 12.5% during the 30-day post-discharge period, and 42.3% during the 360-day post-discharge period. Mortality was 3.5% in hospital, 8.2% from admission to 30 days post-discharge, and 17.7% from admission to 360 days post-discharge. Mortality rates increased with age and severity of comorbidity profile; readmission rates were highest for persons aged 65-74 years and high-risk persons.

Rates of readmission and mortality among adults hospitalized for CAP

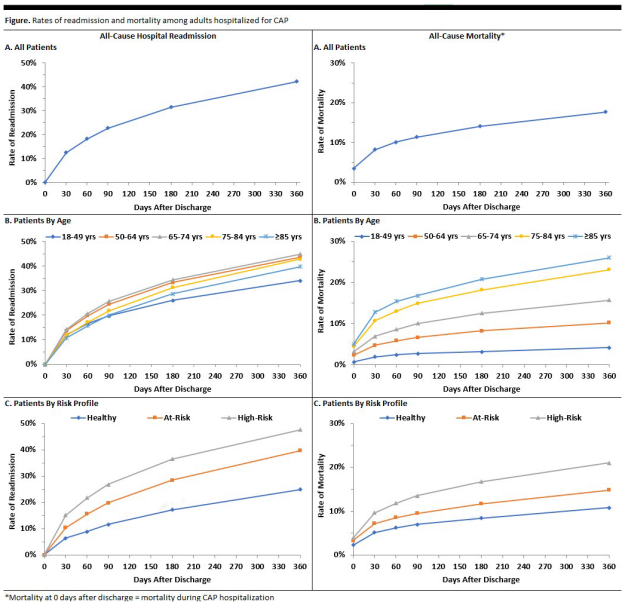

Figure. Rates of readmission and mortality among adults hospitalized for CAP

*Mortality at 0 days after discharge = mortality during CAP hospitalization

Conclusion. All-cause mortality up to 1 year following hospital admission for CAP was substantial, and was associated with increasing age and worsening comorbidity profile. Both readmission and mortality were greater at all ages in high-risk and at-risk groups compared with their healthy counterparts. Strategies that prevent pneumonia and/or the pathophysiologic changes that follow CAP, especially among individuals with comorbid conditions, have the potential to reduce morbidity and mortality following CAP as well as healthcare costs associated with readmission.

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1515. Nationwide trends of invasive pneumococcal disease in Spain for the period 2009-2019

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Session: P-68. Respiratory Infections - Viral

Background. Introduction of pneumococcal conjugate vaccines (PCV) is an effective measure to control the invasive pneumococcal disease (IPD) although the emergence of non-vaccine serotypes is of great concern worldwide.

Methods. This study includes national data from IPD cases affecting pediatric and adult population for the period (2009-2019). Data contain 25341 laboratory-confirmed clinical isolates of *Streptococcus pneumoniae* causing IPD in Spain.