Table 1. Estimated and Observed Influenza-Attributable Deaths in Los Angeles County (LAC) for the 2013-14 through 2017-18 Influenza Seasons

Season	Model estimate (95% CI)		Reported to LACDPH*	Underlying respiratory or circulatory COD	Population **
2013-14	1,045	(629-2,258)	112	25,828	10,019,362
2014-15	1,502	(929-2,514)	56	26,716	10,069,036
2015-16	1,478	(823-2,613)	81	28,080	10,192,376
2016-17	1,392	(823-2,613)	80	27,455	10,227,450
2017-18	1,905	(1,075-3,269)	288	28,732	10,272,648

* Excludes deaths in residents of the cities of Long Beach and Pasadena

** July 1 Population Estimates for 2013, 2014, 2015, 2016 and 2017, prepared by Hedderson Demographic Services for Los Angeles County Internal Services Department, 2014-2018.

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2318. Prevalence of Influenza-like Illness in Sheltered Homeless Populations: A Cross-Sectional Study in Seattle, WA

Julia H. Rogers, MA[1]; Elisabeth Brandstetter, MPH[1]; Caitlin Wolf, BS[1]; Jennifer Logue, BS[1]; Ashley E. Kim, BS[1]; Kira L. Newman, MD, PhD[1]; Nancy Sugg, MD, MPH[1]; April M. Gerard, RN, BSN[2]; Braia Weis, MSN, BSN, BA[1]; Noah Fay[3]; Jennifer Newman[4]; Jeffery Cathey[5]; Janet A. Englund, MD[6]; Michael Boeckh, MD, PhD[7]; Helen Y. Chu, MD, MPH[1]; [1]University of Washington, Seattle, Washington; [2]Downtown Emergency Service Center, Harborview Medical Center, Seattle, Washington; [3]Downtown Emergency Service Center, Seattle, Washington; [4]Catholic Community Services, Seattle, Washington; [5]St. Martin de Porres Shelter, Seattle, Washington; [6]Seattle Children's Hospital/University of Washington, Seattle, Washington; [7]Fred Hutchinson Cancer Research Center/University of Washington, Seattle, Washington

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Background. Individuals experiencing homelessness are at an increased risk of respiratory illness due to high prevalence of underlying chronic conditions, inadequate ventilation and crowding in shelters, and difficulty accessing health services. Few studies have investigated the prevalence and transmission of viral respiratory infections within shelters. We sought to determine the prevalence and risk factors for influenza-like illness (ILI) at two homeless shelters in Seattle, WA.

Methods. Between January and April 2019, we conducted a cross-sectional study of adults experiencing homelessness who identified their primary residence as one of the two shelters in Seattle. Participants voluntarily enrolled if they self-reported at least two symptoms of acute respiratory illness in the past week. Demographic, clinical, and behavioral data were ascertained via questionnaire, and a mid-nasal swab was collected. ILI was defined as fever with cough or sore throat. Chronic lung disease was defined as chronic obstructive pulmonary disease, asthma, and/or chronic bronchitis.

Results. Among the 480 participants enrolled in the study, 204 (42.5%) reported ILI symptoms. Of those enrolled, 144 (30.0%) had chronic lung disease. The prevalence of ILI was higher among individuals with chronic lung disease (53.5% vs. 42.5%, P = 0.001). A total of 422 (87.9%) had health insurance; the prevalence of ILI was lower among those with health insurance (42.4% vs. 57.8%, P = 0.66). 216 (45.0%) of participants received flu vaccine; the prevalence of ILI was similar among those who received the vaccine than those that did not (42.6% vs. 42.4%, P = 1.00). 129 (30.6%) of those with health insurance sought care for their reported symptoms; ILI was more prevalent in those that sought care than those that did not throughout the observation period (33.8% vs. 21.7%, P = 0.002). Of those with ILI that sought care, 46 (54.8%, P = 0.42) received antivirals or antibiotics. Laboratory results for the corresponding mid-nasal swabs are pending.

Conclusion. A large proportion of our study population self-reported ILI and chronic lung disease. Despite high insurance coverage, a low proportion of homeless enrolled sought care for their symptoms or received treatment.

Figure 1. Proportion of homeless participants self-reporting influenza-like illness symptoms in Seattle, WA compared to the proportion of flu-positive clinical tests reported to CDC in Washington State from January to April 2019.

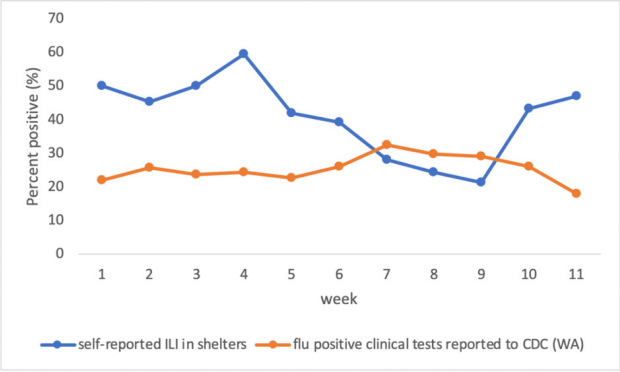
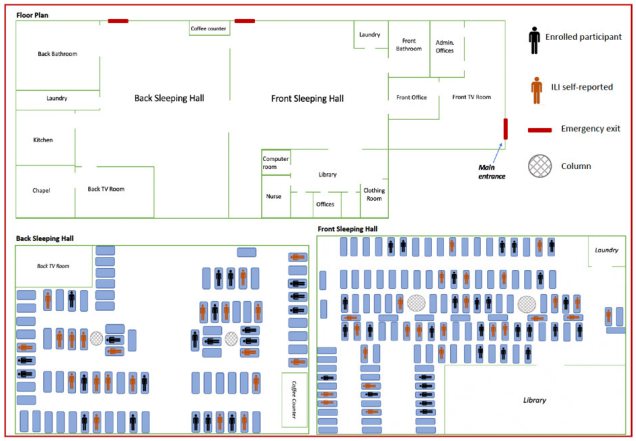
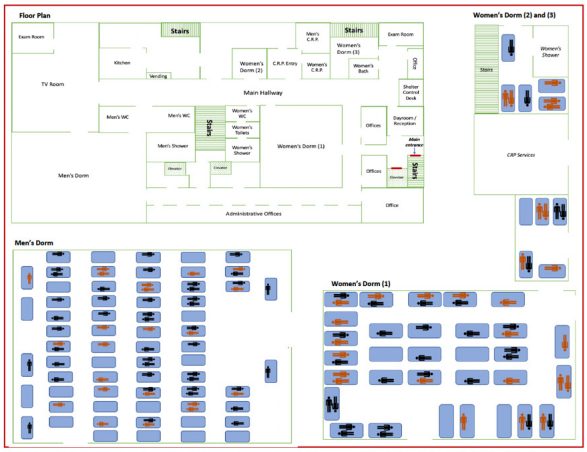


Figure 2. Floor plan and bed assignment location of enrolled participants based on ILI vs. non-ILI status reported at Shelter A.



*Due to multiple participants being assigned the same bed number over the course of the study period, only the first participant encounter recorded for each bed is indicated in the above maps.

Figure 3. Floor plan and bed assignment location of enrolled participants based on ILI vs. non-ILI status reported at Shelter B.



* Due to multiple participants being assigned the same bed number over the course of the study period, only the first participant encounter recorded for each bed is indicated in the above maps.
**All bed assignments at Shelter B are bunk beds; CRP = Crisis Response Program

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2319. Clinical Predictors of Influenza and Hospitalization of Children with Influenza in an Emergent Care Setting

Suchitra Rao, MBBS, MSCS[1]; Molly Lamb, PhD[2]; Angela Moss, MS[1]; Emad Yanni, MD[3]; Rafik Bekkat-Berkani, MD[3]; Anne Schuind, MD[3]; Bruce Innis, MD[4]; Edwin J. Asturias, MD[5]; [1]University of Colorado School of Medicine, Aurora, Colorado; [2]Colorado School of Public Health, Aurora, Colorado; [3]GSK, Rockville, Maryland; [4]PATH, Washington, DC; [5]University of Colorado Denver School of Medicine, Aurora, Colorado

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Background. Objective measures utilizing early vital sign data show promise in predicting more severe outcomes among adults with influenza, but data are sparse in children. The objectives of this study were to determine the value of vital signs in predicting influenza infection or hospitalization due to influenza infection among children evaluated in an emergency department (ED) or urgent care (UC) setting in Colorado.

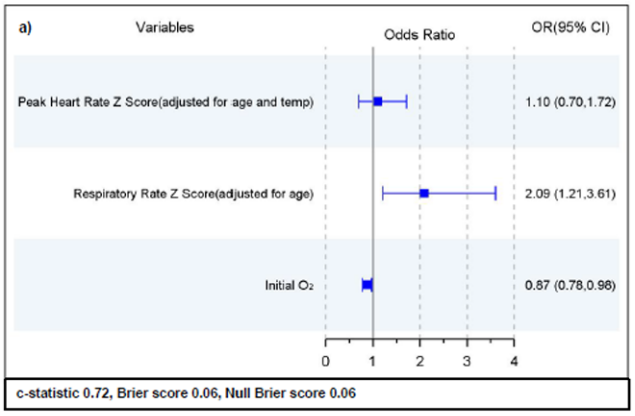
Methods. We evaluated vital signs obtained from a prospective cohort study of children aged 6 months to 8 years of age with influenza like illness evaluated at an ED/UC site in Aurora, CO from 2016–2018, and who underwent influenza testing by PCR. We collected the first set of vital signs, peak heart rate and temperature, and converted heart rate (HR) and respiratory rate (RR) to z-scores by age. HR z scores were further adjusted for temperature. Bivariable analyses for each vital sign as a predictor of influenza-related hospitalization and influenza infection as main outcomes were conducted. Predictors with $P < 0.2$ were entered into a multivariable logistic regression model to determine odds ratios (OR) and 95% CI; model performance was assessed using the Brier score and discriminative ability with the C statistic.

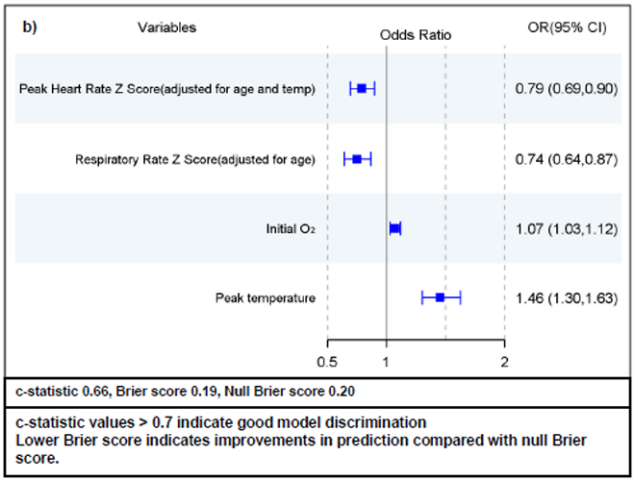
Results. Among 1478 children, 411 were positive for influenza, of which 28 were hospitalized. In multivariable analyses, among children with influenza infection, lower initial oxygen saturation (OR 0.87, 95% CI 0.78–0.98, P = 0.026) and higher adjusted respiratory rate (OR 2.09, 95% CI 1.21–3.61, P = 0.0085) were significant predictors of hospitalization (Figure 1). Among children with ILI, higher peak temperature (OR

1.46, 95% CI 1.30–1.63, $P < 0.0001$), lower adjusted peak heart rate (OR 0.79, 95% CI 0.69–0.90, $P = 0.0005$), higher initial oxygen saturation (OR 1.07, 95% CI 1.03–1.12 $P = 0.002$) and lower adjusted respiratory rate (OR 0.74, 95% CI 0.64–0.87, $P = 0.0002$) were significant predictors for having PCR-confirmed influenza. However, this model had poor calibration and discriminatory ability.

Conclusion. Higher respiratory rate adjusted for age and lower initial oxygen saturation were significant predictors of hospitalization among young children with PCR-confirmed influenza, but were not reliable discriminators of having influenza infection.

Figure 1 - Predictive value of vital sign data and a) having PCR-confirmed influenza infection and b) hospitalization with PCR-confirmed influenza infection





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2320. The Role of Ultraviolet Light, Atmospheric Ozone, and Humidity in Influenza Activity

Edison J. Cano Cevallos, MD; Aaron J. Tande, MD; John C. O'Horo, Sr, MD, MPH; Mayo Clinic, Rochester, Minnesota

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Background. The interaction between influenza activity and environemental factor such as ultraviolet light index (UVI), atmospheric ozone (AO), and other related meteorological variables remains poorly understood. In the midst of climate change and increasingly poor performance of influenza vaccination, more information on influenza activity and its interaction with meteorological variables is critically needed.

Methods. Influenza A and B tests results by PCR from respiratory sources were collected from two large hospitals in Phoenix, AZ and Jacksonville, FL from January 1, 2014 to December 31, 2017. Publicly available meteorological data for each location was obtained from the National Oceanic and Atmospheric Administration. We excluded cases residing beyond 0.5° of longitude and latitude radius of the given meteorological data. A weekly index activity and maximum weekly values of meteorological variables were matched, and performed a correlation and regression analysis.

Results. A total of 5,238 influenza tests were performed during the study period. The influenza index showed an statistically significant weakly positive correlation with maximum CSUVI ($r = 0.14$; $P = 0.0227$) and mean zenith ($r = 0.17$; $P = 0.0047$). An statistically significant, positive correlation was observed between influenza index and atmospheric ozone ($r = 0.23$; $P = 0.0001$). Significant negative correlations were also observed with DBT, DPT, RH and HI ($r = -0.27$, $r = -0.39$, $r = -0.13$, $r = -0.33$, respectively; $P < 0.04$). The influenza index showed significant interactions in a univariate linear regression (Table 1). A relationship between influenza index and dew point temperature was observed in a multivariate model (OR = 0.66; CI95% 0.44–0.97).

Conclusion. To the best of our knowledge, this is the first report showing a significant interactions between influenza index, UVI and atmospheric ozone in two geographically distant locations. Further studies are needed to define the role of complex climatological patterns and influenza.

Table 1. Univariate linear regression of weekly influenza index and maximum weekly meteorological variables.

Variables	OR	CI95%			p-value
Mean Zenith	1.18	1.05	to	1.32	0.0047
Clear sky UVI	2.12	1.11	to	4.03	0.0227
Cloudy sky UVI	0.78	0.40	to	1.52	0.4636
Cloud transmission	0.30	0.06	to	1.61	0.1605
Aerosol transmission	1.07	0.31	to	3.70	0.9112
Atmospheric ozone	1.11	1.05	to	1.17	0.0001
Hourly dry bulb temperature	0.72	0.62	to	0.82	<0.0001
Dew point temperature	0.64	0.56	to	0.73	<0.0001
Relative humidity	0.91	0.84	to	0.99	0.0362
Heat Index	0.67	0.58	to	0.77	<0.0001

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

2321. FluMex: A New Clinical Severity Index in Mexican Hospitalized Patients with Influenza

Gloria Mayela Aguirre-García, MD[1];
Carmen Magdalena Gamboa-Alonso, MD[1]; Emma Purón-González, MD[1];
Adrian Camacho-Ortiz, PhD[2]; [1]Hospital Christus Muguerza Alta Especialidad, Monterrey, Nuevo Leon, Mexico; [2]Universidad Autónoma de Nuevo León, Monterrey, Nuevo Leon, Mexico

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Background. Influenza virus infection is frequently characterized by a complex clinical behavior and outcomes can be fatal. There are many published scoring methods aimed for pulmonary infections and sepsis severity nevertheless they lack adequate sensitivity and specificity in patients with Influenza.

Methods. From 2013 to 2018, hospitalized patients from five hospitals from the Christus Muguerza health group from Monterrey, Mexico who had a positive rapid influenza-test and/or positive PCR for Influenza virus were enrolled. Risk factors for severity and mortality were evaluated calculating odds ratio with a binary logistic regression model and were adjusted for other factors. The new index was then compared with pneumonia severity scores by assessing area under the curve(AUC), sensitivity and specificity.

Results. We analyzed data from 125 patients hospitalized with confirmed Influenza infection. Less than 1% had received the corresponding seasonal influenza vaccine. Type 2 diabetes (T2D) and hypertension (HT) were the most prevalent comorbidities. Odds ratios were significant for age > 65 years, body mass index (BMI) > 30, T2D, HT, pulsoximetry < 90%, respiratory rate > 22 per minute, altered mental status, blood urea nitrogen (BUN) > 19 mg/dL, elevated lactate dehydrogenase (LDH), and an abnormal chest X-ray. The FluMex score was applied to a control group of 125 admitted patients with confirmed Influenza infection. AUC was 0.63 (CI 95%, 0.52–0.74; $P < 0.05$) for severity and 0.90 (IC 95%, 0.83–0.97; $P < 0.05$) for mortality, showing better predictive performance than other pneumonia and sepsis scores such as CURB-65, PSI, CROMI, SIRS, SOFA, qSOFA and ILI (Table 1).

Conclusion. The FluMex scoring system can be a useful tool for patients with suspected Influenza infection in predicting severity and mortality, helping to improve care and resource management.