

Impact of COVID-19 Pandemic on Influenza-like Illness (ILI) Experience among Healthcare Workers in Military Treatment Facilities

Ryan Liberg¹, Christina Schofield¹, Stephanie A Richard^{2,3}, Limone Collins⁴, Christina Spooner⁴, Srihari Seshadri⁴, Anuradha Ganesan^{2,3,5}, Wesley Campbell⁵, David Hrcir^{4,6,7}, Tahaniyat Lalani^{2,3,8}, Tyler Warkentien⁸, Katrin Mende^{2,3,9}, Ana E Markelz⁹, Catherine M. Berjohn^{2,10}, Daniel Libraty^{2,10}, Bruce McClenathan^{4,11}, Jitendrakumar R Modi¹², Alan Williams¹³, Timothy H Burgess², Rhonda E Colombo^{1,2,3,14}

¹Madigan Army Medical Center, Tacoma, WA, USA; ²Infectious Disease Clinical Research Program, Department of Preventive Medicine and Biostatistics, Uniformed Services University of the Health Sciences, Bethesda, MD, USA; ³The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., Bethesda, MD, USA; ⁴Immunization Healthcare Division, Defense Health Agency, Bethesda, MD, Falls Church, VA, Fort Bragg, NC, and San Diego, CA, USA; ⁵Walter Reed National Military Medical Center, Bethesda, MD, USA; ⁶Carl R. Darnall Army Medical Center, Fort Hood, TX, USA; ⁷Wilford Hall Ambulatory Surgical Center (WHASC), LAFB, San Antonio, TX, USA; ⁸Naval Medical Center Portsmouth, Portsmouth VA, USA; ⁹Brooke Army Medical Center, San Antonio, TX, USA; ¹⁰Naval Medical Center San Diego, San Diego, CA, USA; ¹¹Womack Army Medical Center, Fort Bragg, NC, USA; ¹²Naval Health Clinic, Annapolis, MD, USA; ¹³Department of Family Medicine, Uniformed Services University of the Health Sciences, Bethesda, MD, USA; ¹⁴Department of Medicine, Uniformed Services University of the Health Sciences, Bethesda, MD, USA

Background

Healthcare workers (HCWs) are at heightened risk of exposure to respiratory pathogens and occupy an important epidemiologic position in the COVID-19 pandemic.

PAIVED, a multicenter, multiservice study assessing influenza vaccine effectiveness in the Department of Defense over four consecutive influenza seasons (2018-22), provides an opportunity to describe influenza like illness (ILI) experience and assess the impact of SARS-CoV-2 in HCWs compared to non-HCWs.

Objective

Describe the impact of COVID-19 on influenza like illness (ILI) experience amongst healthcare workers (HCWs) and non-HCWs.

Methods

PAIVED: 2018-2022 Influenza Seasons

Study Locations

Bethesda, MD (WRNMMC); Portsmouth, VA (NMCP); San Antonio, TX (BAMC, WHASC); San Diego, CA (NMCS); Tacoma, WA (MAMC); Annapolis, MD (USNA); Fort Bragg, NC (WAMC), Fort Hood, TX (CRDAMC)

Subjects

- Adults eligible for medical care through DoD, seeking influenza vaccination, & able to provide informed consent

Exclusion criteria

- Already received/plan to receive live attenuated vaccine
- Unable to receive standard dose influenza vaccine
- Unable to return for follow up if ILI occurs

Study Procedures

All Subjects

- Randomized (1:1:1) to receive one of the following licensed, quadrivalent inactivated influenza vaccines: Egg-based (*Afluria*®, *Fluarix*®, *FluLava*®); Cell-culture based (*Flucelvax*®); Recombinant (*Flublok*®)
- Weekly surveillance for ILI symptoms (defined as cough or sore throat + feeling feverish/chills or having body aches/fatigue)

Those experiencing ILI were asked to complete a brief symptom severity questionnaire, submit a nasal swab for pathogen detection, and schedule two ILI visits with study staff.

Methods (cont.)

COVID-19 Protocol Adjustments

- Conduction of ILI visits via telephone was allowed
- Option for self-collected blood specimen (dried blood spot)
- Changes in taste/smell added to symptom questionnaire

Statistical Analysis

- Demographic and ILI experience difference tested for HCW vs. non-HCWs using chi-squared or Kruskal-Wallis tests

Results

13189 participants who enrolled in PAIVED from 2018 – 2022 were included in the analysis. Military recruits were excluded due to differences in ILI follow up procedures.

Table 1. Self-reported demographics for PAIVED at enrollment, according to HCW status

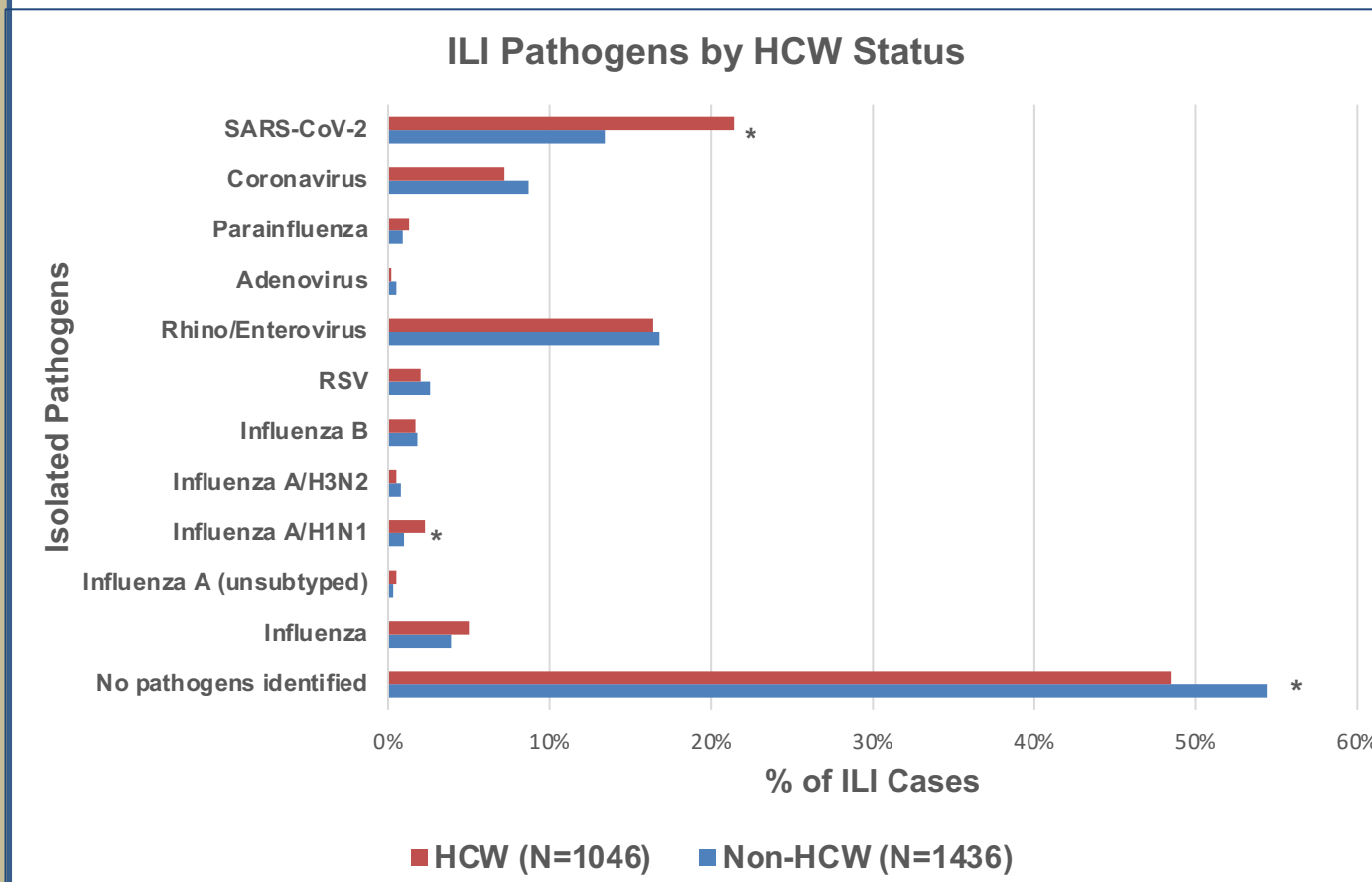
PAIVED Cohort Demographics	non-HCW (N=8366)	HCW (N=4823)	p value
Age group			< 0.01
18-24	2406 (28.8%)	822 (17.0%)	
25-34	2233 (26.7%)	1996 (41.4%)	
35-44	1448 (17.3%)	1127 (23.4%)	
45-54	909 (10.9%)	560 (11.6%)	
55-64	841 (10.1%)	265 (5.5%)	
65+	529 (6.3%)	53 (1.1%)	
Male	5760 (68.9%)	2748 (57.0%)	< 0.01
Race			< 0.01
Asian	502 (6.0%)	428 (8.9%)	
Black	1134 (13.6%)	491 (10.2%)	
Hispanic	1574 (18.8%)	707 (14.7%)	
Multiple races	335 (4.0%)	192 (4.0%)	
Unknown	140 (1.7%)	62 (1.3%)	
White	4681 (56.0%)	2943 (61.0%)	
Military status			< 0.01
Active duty	5767 (68.9%)	4154 (86.1%)	
Dependent	1207 (14.4%)	325 (6.7%)	
Retired military	1392 (16.6%)	344 (7.1%)	
> high school	4697 (56.1%)	3962 (82.1%)	< 0.01
BMI mean (SD)	27.2 (4.9)	26.1 (4.2)	< 0.01
Physically Active	7329 (87.6%)	4472 (92.7%)	< 0.01
Non-smoker	7726 (92.3%)	4689 (97.2%)	< 0.01
Non-vaper	6971 (83.3%)	4542 (94.2%)	< 0.01

Results (cont.)

HCWs more commonly reported ILI than their non-HCW peers (27.1% vs. 21.8%, p<0.01). The majority of those experiencing ILI had a negative respiratory pathogen evaluation, though this was less common in HCWs (48.5% vs. 54.4%, p<0.01).

When a pathogen was isolated, the most common culprit was rhinovirus/enterovirus, followed by SARS-CoV-2, which greatly overshadowed influenza. Notably this was identified in a significantly higher % of HCWs compared to non-HCWs (21.4% vs. 13.4%, p<0.01). HCWs were also more likely to contract Influenza A/H1N1 (2.3% vs. 1.0%, p<0.01) over the 4 years.

Figure 1. Distribution of pathogens isolated in participants meeting ILI criteria, categorized by HCW status. *Signifies p value <0.01



ILI Surveillance

- A higher percentage of HCWs had >85% response rate to surveillance (55.8% vs. 51.2%, p<0.01)
- HCWs were more likely to attend ILI visit 1 (95.8% vs. 93.0%, p<0.01) and ILI visit 2 (88.1% vs. 79.0%, p<0.01)

Symptom Severity and Duration

HCWs reported similar duration of illness to their non-HCW peers (11.3 vs. 11.9 days, p = 0.09).

Illness severity scores were similar between HCWs and non-HCWs.

- When the sense domain was excluded (taste/smell), HCWs reported lower severity scores than non-HCWs (p<0.01)
- HCW reported lower severity eye, gastrointestinal, and respiratory scores (p<0.01)

Conclusions

PAIVED provides great opportunity to describe the ILI experience in our DoD beneficiary population.

Overall, the HCW cohort was a younger, more physically active group, though were more likely to report ILI than non-HCWs.

SARS-CoV-2 emerged as a major pathogen in both groups, greatly overshadowing the incidence of influenza in recent years.

HCWs were more likely to be female and of child-bearing age which may have implications in increased risk of transmission.

Future Directions

Obtain SARS-CoV-2 vaccination histories and incorporate vaccination history into multivariable symptom severity model.

Compare ILI experience across seasons in subset of individuals who enrolled in multiple years of PAIVED.

Analyze difference in ILI for HCWs vs. non-HCWs by pathogen.

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Acknowledgments

This work (IDCRP-120) was conducted by the Infectious Disease Clinical Research Program (IDCRP), a Department of Defense (DoD) program executed by the Uniformed Services University of the Health Sciences (USU) through an award to The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. (HJF). This project has been supported with federal funds from the National Institute of Allergy and Infectious Diseases, National Institutes of Health (NIH), under Inter-Agency Agreement Y1-AI-5072 and from the Defense Health Program, U.S. Department of Defense, under award HU0001190002.

Disclaimer. The views expressed are those of the authors and do not necessarily reflect the official policy or position of the Uniformed Services University of the Health Sciences, Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., National Institutes of Health and Department of Health and Human Services, Department of the Navy, Army, Department of Defense, nor the U.S. Government. This research has been approved by USU IRB.

Correspondence

CPT Ryan Liberg, MD
ryan.b.liberg2.mil@health.mil