

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



CAPT Timothy H Burgess, MD, MPH<sup>1</sup>, Stephanie A Richard, PhD, MHS<sup>1,2</sup>, Limone Collins, MD<sup>3</sup>, Rhonda E Colombo, MD, MHS<sup>2,4</sup>, Anuradha Ganesan, MD<sup>5</sup>, Casey Geaney, MD<sup>5</sup>, David Hrcncir, MD<sup>3,6,7</sup>, Tahaniyat Lalani, MBBS, MHS<sup>1,2,8</sup>, LTC Ana E Markelz, MD<sup>9</sup>, CAPT Ryan Maves, MD<sup>1,10</sup>, Bruce McClenathan, MD<sup>3,11</sup>, Katrin Mende, PhD<sup>1,2,9</sup>, Jitendrakumar R Modi, MD<sup>12</sup>, Jay R. Montgomery, MD<sup>3,5</sup>, Christina Schofield, MD<sup>4</sup>, Srihari Seshadri, MBBS, PhD, MPH<sup>3</sup>, Catherine Skerrett<sup>7</sup>, Christina Spooner, MS<sup>3</sup>, CAPT Gregory Utz, MD<sup>1,2,10</sup>, CDR Tyler Warkentien, MD, MPH<sup>8</sup>, Christian L Coles, PhD<sup>1,2</sup>

<sup>1</sup>Infectious Disease Clinical Research Program, Department of Preventive Medicine and Biostatistics, Uniformed Services University of the Health Sciences, Bethesda, MD, USA, <sup>2</sup>The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., Bethesda, MD, USA, <sup>3</sup>Immunization Healthcare Division, Defense Health Agency, Bethesda, MD, Falls Church, VA, Fort Bragg, NC, San Antonio, TX (BAMC, WHASC), and San Diego, CA, <sup>4</sup>Madigan Army Medical Center, Tacoma, WA, <sup>5</sup>Walter Reed National Military Medical Center, Bethesda, MD, <sup>6</sup>Carl R. Darnall Army Medical Center, Fort Hood, TX (CRDAMC), <sup>7</sup>Lackland Air Force Base, San Antonio, TX, <sup>8</sup>Naval Medical Center Portsmouth, Portsmouth VA, <sup>9</sup>Brooke Army Medical Center, San Antonio, TX, <sup>10</sup>Naval Medical Center San Diego, San Diego, CA, <sup>11</sup>Womack Army Medical Center, Fort Bragg, NC, <sup>12</sup>United States Naval Academy, Annapolis, MD

## 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

**Primary objective:** Compare the relative effectiveness of 3 types of licensed influenza vaccines over 3 influenza seasons (2018/19, 2019/20, 2020/21)

- Vaccine effectiveness: prevention of laboratory-confirmed influenza

**Participants:** DoD healthcare beneficiaries aged 18+

- Active duty (AD), dependents, retirees were randomized to receive 1 of 3 licensed influenza vaccine formulations (egg-based, recombinant, or cell-culture derived)

**Locations:** San Diego, CA (NMCS/MCRD), Annapolis, MD (USNA), Bethesda, MD (WRNMMC), Fort Bragg, NC (WAMC), Fort Hood, TX (DAMC), San Antonio, TX (BAMC, LAFB), Portsmouth, VA (NMCP), and Tacoma, WA (MAMC).

**Surveillance:** Participants completed weekly surveys throughout the influenza season (excluding recruits, who reported directly to clinic when ill). When an ILI was identified, participants completed two clinic visits: Visit 1 (acute visit, symptom information, blood sample, and nasal swab collected) and Visit 2 (convalescent visit, follow up of illness course and blood sample collected)

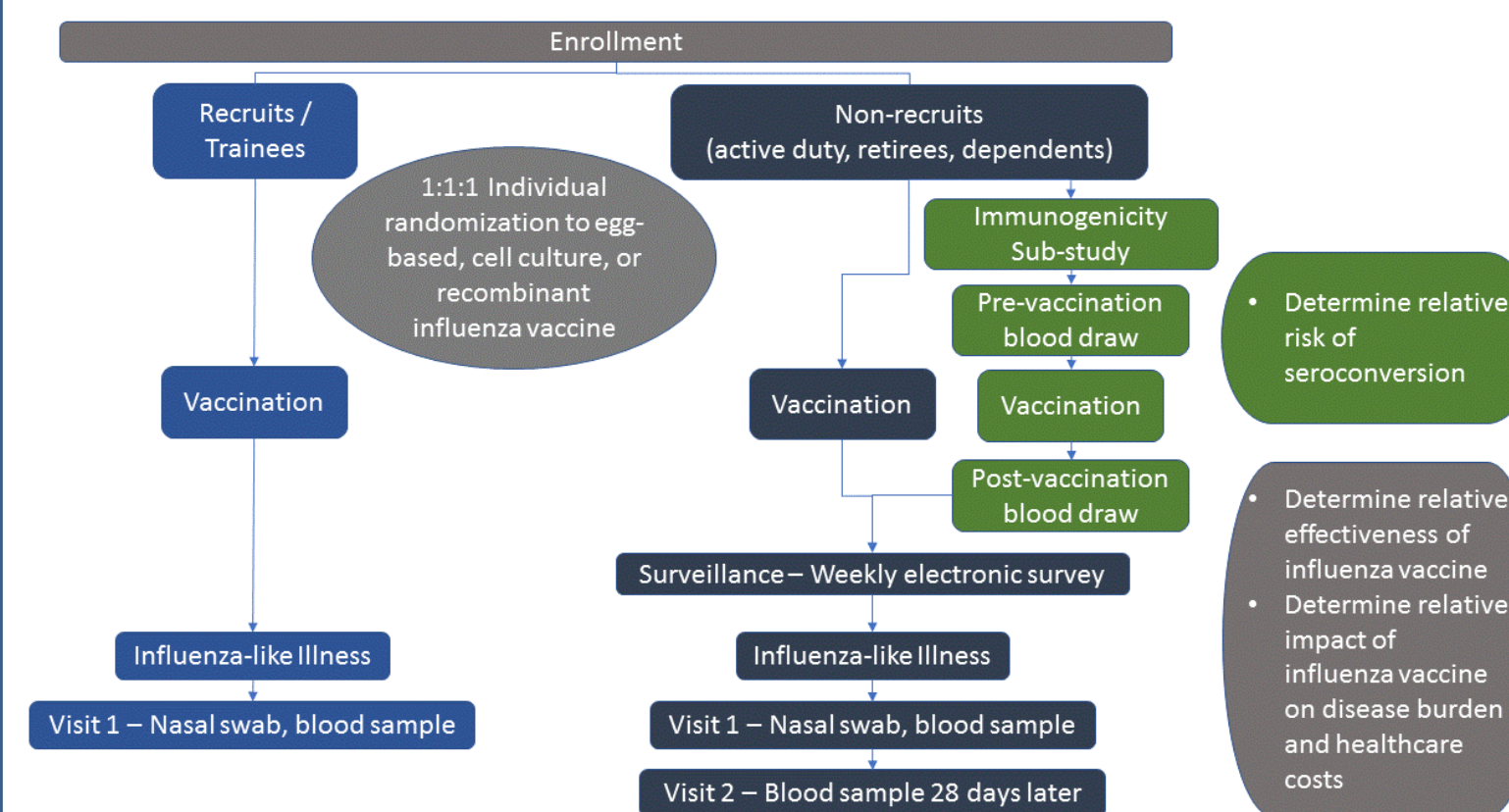
**Influenza-like illness (ILI) definition:** Cough or sore throat, **and** feverish or having chills, **or** body aches or fatigue (updated, previously required all 3 symptoms)

**Outcomes:** In participants reporting ILI:

- Nasal swab for viral PCR to determine if influenza is the cause of illness, and
- ILI symptom/severity

## Results

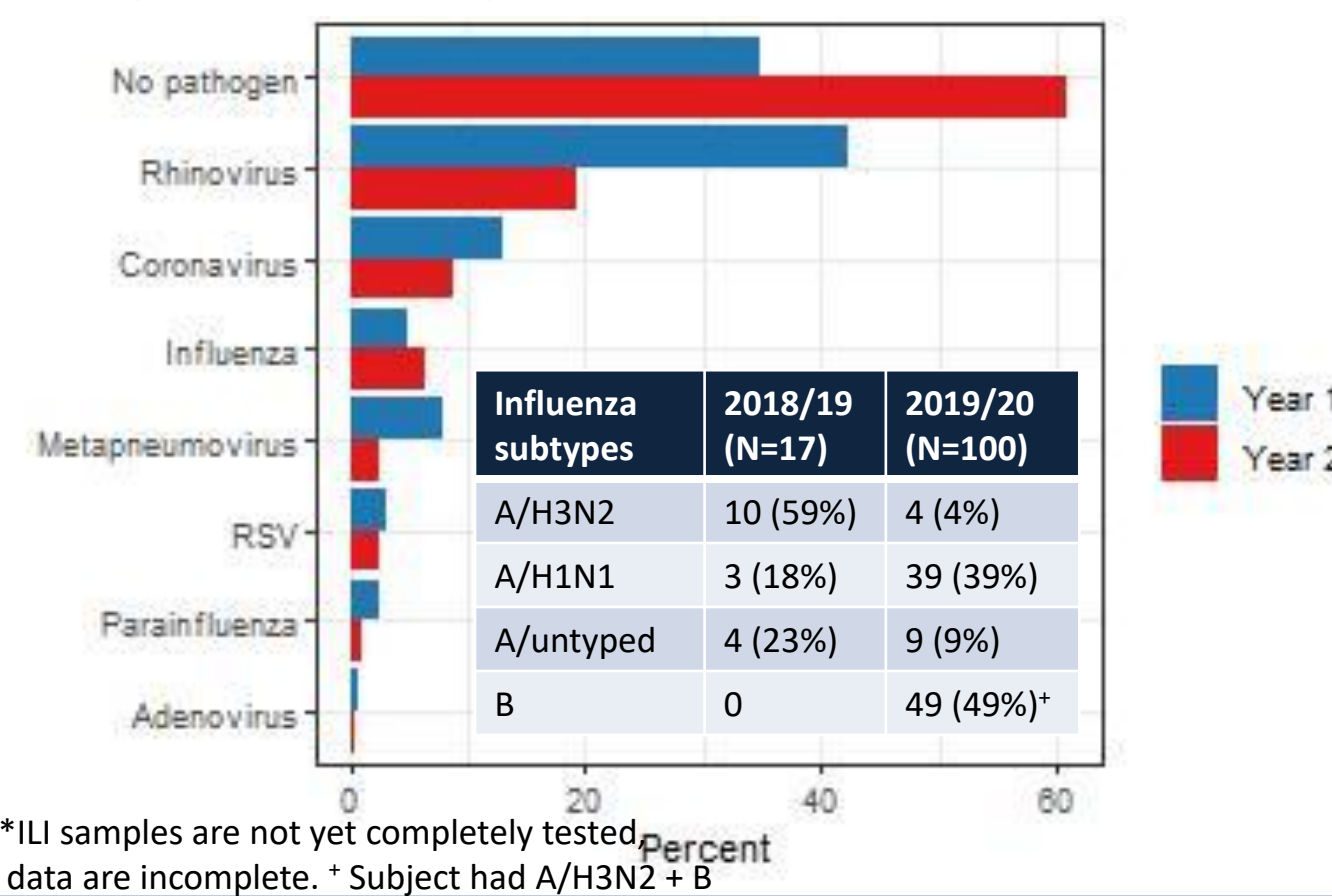
**Figure 1. PAIVED summary flow chart**



**Table 1. PAIVED summary**

	2018/19	2019/20	Total
# military bases	5	9	9
# participants	1,623	5,879	7,502
# in sub-study	200	379	579
# with at least 1 ILI	322	1,452	1,773
Total ILIs	343	1,776	2,119
Mean duration	11.4	12.2	12.1
Mean days of limited activity	2.5	2.9	2.9
Mean days of missed work	0.6	0.7	0.7

**Figure 2. Pathogens identified in ILI samples\***



**Table 2. PAIVED demographics**

	2018/19 (N=1623)	2019/20 (N=5877)	Total (N=7500)
Age			
Mean (SD)	35.7 (19.2)	33.6 (14.6)	34.1 (15.7)
Range	18.0 - 87.9	17.9 - 91.6	17.9 - 91.6
Male	1211 (74.6%)	4058 (69.0%)	5269 (70.2%)
Military status			
Active duty	211 (13.0%)	3894 (66.2%)	4105 (54.7%)
Dependent	331 (20.4%)	699 (11.9%)	1030 (13.7%)
Recruit	771 (47.5%)	571 (9.7%)	1342 (17.9%)
Retired military	310 (19.1%)	715 (12.2%)	1025 (13.7%)
Education level			
High school	942 (58.0%)	2768 (47.1%)	3710 (49.5%)
Associate's	214 (13.2%)	862 (14.7%)	1076 (14.3%)
Bachelor's	211 (13.0%)	1007 (17.1%)	1218 (16.2%)
Higher degree	255 (15.7%)	1221 (20.8%)	1476 (19.7%)
Missing	1 (0.1%)	21 (0.4%)	22 (0.3%)
Race			
White	876 (54.0%)	3463 (58.9%)	4339 (57.8%)
Hispanic	455 (28.0%)	1114 (18.9%)	1569 (20.9%)
Black	139 (8.6%)	667 (11.3%)	806 (10.7%)
Asian	77 (4.7%)	362 (6.2%)	439 (5.9%)
Multiple races	61 (3.8%)	214 (3.6%)	275 (3.7%)
Other	15 (0.9%)	59 (1.0%)	74 (1.0%)
Smoking status			
Non-smoker	1338 (82.4%)	4873 (82.9%)	6211 (82.8%)
Former smoker	227 (14.0%)	653 (11.1%)	880 (11.7%)
Current smoker	56 (3.5%)	352 (6.0%)	408 (5.4%)
Missing	2 (0.1%)	1 (0.0%)	3 (0.0%)
DoD affiliation			
Air Force	151 (9.3%)	903 (15.4%)	1054 (14.0%)
Army	447 (27.5%)	2525 (42.9%)	2972 (39.6%)
Coast Guard	16 (1.0%)	22 (0.4%)	38 (0.5%)
Marines	804 (49.5%)	631 (10.7%)	1435 (19.1%)
Navy	178 (11.0%)	1764 (30.0%)	1942 (25.9%)
Missing	0 (0.0%)	1 (0.0%)	1 (0.0%)
Other	27 (1.7%)	33 (0.6%)	60 (0.8%)

## Conclusions

Among the 7,502 participants enrolled in PAIVED over two influenza seasons, 24% reported an ILI (256 had 2 ILIs, 45 had 3 ILIs), and 7.3% of the ILIs (117/1,605) with tested nasal swabs have been positive for influenza. While all the samples have not yet been processed, we have identified some breakthrough cases of influenza among vaccinated enrollees. Planned analyses include comparative vaccine effectiveness in order to inform future vaccine purchasing decisions, and samples from the 2019/20 season will also be tested for SARS-CoV-2. PAIVED will be continuing for a third year and will incorporate SARS-CoV-2 surveillance.

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The investigators have adhered to the policies for protection of human subjects as prescribed in 45CFR46.

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## Correspondence

CAPT Timothy H. Burgess, MD, MPH  
timothy.burgess@usuhs.edu

