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# Influenza vaccination and respiratory virus interference among Department of Defense personnel during the 2017–2018 influenza season

Greg G. Wolff

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## Highlights

- We examined virus interference in a Department of Defense dependent population.
- Vaccinated personnel did not have significant odds of respiratory illnesses.
- Vaccinated personnel were protected against influenza.
- Odds of virus interference by vaccination varied for individual respiratory viruses.

## Abstract

### Purpose

Receiving influenza vaccination may increase the risk of other respiratory viruses, a phenomenon known as virus interference. Test-negative study designs are often utilized to calculate influenza vaccine effectiveness. The virus interference phenomenon goes against the basic assumption of the test-negative vaccine effectiveness study that vaccination does not change the risk of infection with other respiratory illness, thus potentially biasing vaccine effectiveness results in the positive direction. This study aimed to investigate virus interference by comparing respiratory virus status among Department of Defense personnel based on their influenza vaccination status. Furthermore, individual respiratory viruses and their association with influenza vaccination were examined.

### Results

We compared vaccination status of 2880 people with non-influenza respiratory viruses to 3240 people with pan-negative results. Comparing vaccinated to non-vaccinated patients, the adjusted odds ratio for non-flu viruses was 0.97 (95% confidence interval (CI): 0.86, 1.09;  $p=0.60$ ). Additionally, the vaccination status of 3349 cases of influenza were compared to three different control groups: all controls ( $N=6120$ ), non-influenza positive controls ( $N=2880$ ), and pan-negative controls ( $N=3240$ ). The adjusted ORs for the comparisons among the three control groups did not vary much (range: 0.46–0.51).

## Conclusions

Receipt of influenza vaccination was not associated with virus interference among our population. Examining virus interference by specific respiratory viruses showed mixed results. Vaccine derived virus interference was significantly associated with coronavirus and human metapneumovirus; however, significant protection with vaccination was associated not only with most influenza viruses, but also parainfluenza, RSV, and non-influenza virus coinfections.

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## Keywords

Influenza vaccine; Virus interference; Department of Defense; Respiratory illness

## Abbreviations

DoD, Department of Defense; DoDGRS, The Department of Defense Global Respiratory Pathogen Surveillance Program; GEIS, Global Emerging Infections Surveillance and Response System; DHA/AFHSB, AF, The Defense Health Agency/Armed Forces Health Surveillance Branch, Air Force Satellite Cell; USAFSAM, United States Air Force School of Aerospace Medicine; LRMC, Landstuhl Regional Medical Center; RSV, Respiratory Syncytial Virus; AFCITA, Air Force Complete Immunization Tracking Application; OR, Odds Ratio; 95% CI, 95% Confidence Interval

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