

# Exploring the Gaps: Symptoms by Influenza Type and Enhanced Sampling

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## OBJECTIVE

This study describes clinical symptoms reported in conjunction with influenza, non-influenza respiratory viruses, and negative viral cultures from the Department of Defense (DoD) Global Influenza Surveillance Program; influenza-like illness (ILI) case questionnaires were linked to corresponding laboratory specimen results for the 2005-06 influenza season for analysis.

## BACKGROUND

The ability to accurately predict influenza infection by symptoms and local epidemiology prior to lab confirmation warrants further study and is particular concern as the threat of pandemic flu heightens. Antiviral drugs are effective when given within 48 hours of symptom onset, but this usually precludes culture confirmation. Further, rapid tests can be clinically helpful but lack the sensitivity of viral culture. Hence, ILI symptoms are a potentially important covariate in the early diagnosis of flu. However, gaps remain in several areas of flu symptom research, including knowledge of potential differences between symptoms of Influenza A and of Influenza B [1]. Therefore, an examination of symptoms generally associated with Influenza infection was begun, as well as an examination of symptoms specifically associated with Flu A and Flu B. An additional focus in this study was to evaluate the performance of the current ILI case definition used by the DoD flu program. This definition is useful to identify individuals who are likely to be infected with influenza, as the ability to capture and characterize novel strains of influenza is an important component to this program. Better yields of influenza mean less time and money spent processing negative specimens.

## METHODS

The AFIOH Epidemiology Laboratory performs viral culture and subtyping on all respiratory specimens submitted to the DoD flu program for patients meeting the ILI case definition (fever  $\geq 100.5$  F° AND cough or sore throat). Lab results were matched to questionnaires administered by base clinic personnel. The presence of immunization status, cough, sore throat, and fever were compared for those with and without positive influenza lab results. Two-symptom combinations were also compared for each group. Patients positive for Influenza A and B were compared to determine if there were differences in the presence of vaccination, cough, fever, and age. Odds

ratios and chi squared values were generated for each. The probability of log odds was calculated to illustrate how cough contributed to the likelihood of flu positivity in the presence of fever.

## RESULTS

In 2005-2006, 1,100 specimens matched to an influenza surveillance questionnaire and were included in the analyses. Two-hundred eleven specimens were positive for Flu A, while 73 were positive for Flu B. The ILI case definition was 86% sensitive and 33% specific for flu, with (+) predictive value of 30% and (-) predictive value of 87%. Influenza B was more likely to occur in children under 12 years of age, and it was observed that females were less likely to have Flu A. Presence of cough, fever (either at home or clinic), and flu vaccination status did not differ between Flu A and B cases. Only cough and fever, independently and when combined, were significantly associated with influenza among symptoms recorded. Presence of sore throat did not increase the odds of having influenza.

## CONCLUSIONS

When the ILI case definition was met, flu was present 30% of the time. When the ILI case definition was not met, flu was absent 87% of the time. Removal of sore throat from the ILI case definition for this program may be warranted. Prior studies have also indicated that having a sore throat does not increase and perhaps even negatively predicts flu [1,2].

Cough and fever appear to more strongly predict flu in the current study than in a prior systematic review [1]. Including these findings in the review may be warranted, in order to expand the included age range and perhaps impact the review's robustness. Though it does not appear that major differences exist between Influenza A and B among the variables captured by the influenza surveillance questionnaire, re-examining all flu positives once molecular characterization is performed on flu vaccination breakthroughs may provide further insight into potential difference in symptoms among influenza types.

## REFERENCES

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