



Impact of Polymerase Chain Reaction Versus Antigen-Based COVID-19 Testing on Subsequent Infections In Military Trainees

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Background

- The Infectious Disease Society of America (IDSA) recommends using a single standard nucleic-acid amplification test (NAAT) over a single rapid antigen test for evaluation of asymptomatic individuals with risk for exposure to SARS-CoV-2 due to higher sensitivity.
- Debate exists whether to use a NAAT (i.e. PCR) or an antigen-based test for screening purposes such as those entering into congregate living settings.
- To help fill this gap we performed a retrospective review of secondary COVID-19 cases among persons undergoing United States Air Force (USAF) Basic Military Training when initial arrival screening was done via PCR versus antigen-based.

Study Population

- All Individuals who attended USAF Basic Military Training with arrival dates of 1 January 2021 - 31 August 2021.

Methods

- Persons with arrival January 1 – May 21, 2021 underwent SARS-CoV-2 screening with PCR and those with arrival May 24 – August 31, 2021 were screened with rapid antigen test.
- Upon arrival, all individuals were placed into training groups (flights).
- Public health measures including arrival quarantine, masking, social distancing, and rapid isolation of COVID-19 cases was standard throughout the study period.
- Arrival screening results and secondary cases were compared based on method of the arrival screening.
- Individual and training group comparisons were performed.
- A secondary case was defined as a new, symptomatic COVID-19 infection in an individual within the first full two weeks of training who had a negative arrival screening test.
- A cluster was defined as a training group with 5 or more symptomatic COVID-19 cases.

Results

Table 1. Arrival SARS-CoV-2 Screening Results by Initial Screening Test.

	PCR (n=14,251)	Antigen (n=10,350)	RR (95% CI)	p-Value
Positive Cases	358 (2.5%)	48 (0.4%)	5.4 (4.0-7.3)	<0.0001
Symptomatic Positives	116 (32%)	18 (37%)	0.86 (0.58-1.28)	0.46

Table 2. Secondary Cases Within Two Full Weeks of Training by Initial Screening Test.

	PCR Screening (n=13,893)	Antigen Screening (n=10,302)	RR (95% CI)	p-Value
Positive Cases	187 (1.3%)	231 (2.2%)	0.60 (0.5-0.73)	<0.0001
Cases Within Clusters	123 (66%)	179 (77%)	0.85 (0.75-0.96)	0.01

Table 3. Training Group Analysis by Modality of Initial Screening Test.

	PCR Screening (n=344)	Antigen Screening (n=240)	RR (95% CI)	p-Value
Flights with an Initial Screening Positive	198 (57%)	26 (11%)	5.3 (3.7-7.7)	<0.0001
Flights with a Secondary Case	70 (20%)	54 (22%)	0.90 (0.66-1.24)	0.53
Flights with Clusters	14 (4%)	16 (6.7%)	0.61 (0.3-1.2)	0.16

Key Findings

- Individuals who underwent entry screening via PCR were more likely to have a positive SARS-CoV-2 test than those screened with an antigen-based test.
- Symptomatic COVID-19 cases upon arrival did not differ based on entry screening method.
- Individuals who at entry screened negative via antigen versus PCR test were more likely to develop a symptomatic secondary case of COVID-19 within the first two weeks of training.
- There was no difference in the number of training groups having a secondary case based on initial SARS-CoV-2 screening test.
- There was no difference in the number of training groups that developed a case cluster based on method of initial entry screening test.

Conclusions

- In a setting at high risk for COVID-19 transmission, initial arrival screening with either a PCR or rapid antigen test did not result in a difference in number of training groups with a secondary case or case-cluster.
- This study supports the consideration of antigen-based arrival screening in congregate settings.

Disclaimer

- The views expressed are those of the authors and do not reflect the official views or policy of the Department of Defense or its Components.

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