SARS-CoV-2 Rapid Antigen Testing For Departing Passengers at Vancouver International Airport

Mawath Ali Qahtani[1], MASc.; Cheng Wei Tony Yang[2], PhD; Lynda Lazosky[1,2] MSc.; Xuan Li[2], MSc.; Jonathan D'Cruz[5], BSc; Marc G. Romney[1.3*], MD; Don D. Sin[1,2,4,*], MD, MPH

[1]Providence Health Care, St. Paul's Hospital, Vancouver, BC, Canada

[2] Centre for Heart Lung Innovation, St. Paul's Hospital, Vancouver, BC, Canada

[3]Department of Pathology and Laboratory Medicine, University of British Columbia, Vancouver, BC, Canada

[4]Department of Medicine, Division of Respiratory Medicine, University of British Columbia, Vancouver BC, Canada

[5]Vancouver Airport Authority, Vancouver, BC, Canada

*co-senior authors

Corresponding Author:

Don D. Sin,
St. Paul's Hospital,
1081 Burrard Street, Vancouver, BC.
1-604-806-8395 (voice); 1-604-806-9274 (FAX)
Email: don.sin@hli.ubc.ca
Twitter: @donsin4

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Teaser: Here, we show that point-of-care rapid antigen testing for COVID-19 is feasible to implement in the departure areas of a major airports for same-day travelers and effective in ruling out possible carriers of SARS-CoV-2 in asymptomatic air travelers. This strategy may help to reduce the spread of COVID-19 via air travel.

Air travel is thought to be a major route of spread of severe acute respiratory coronavirus-2 (SARS-CoV-2)[1], the virus responsible for COVID-19 (coronavirus disease-2019), across the world[2]. Accordingly, airports have instituted strict screening measures to reduce the risk of transmission on flights. Here, we describe the experience of using a point-of-care lateral flow device for COVID-19 screening in airports.

We invited passengers between the ages of 18 and 80 years, who were boarding on a same-day domestic flight on WestJet at the Vancouver International Airport (YVR) between Nov 23rd, 2020 and Feb 28th, 2021 to participate (**Figure S1**). In February, we added 4 international flights, traveling from YVR to Amsterdam, the Netherlands (operated by KLM Royal Dutch Airlines). All international passengers had received polymerase chain reaction (PCR) testing for COVID-19 within 3 days prior to departure; in contrast, none of the domestic passengers had been previously tested for COVID-19. The study was approved by the University of British Columbia/Providence Research Ethics Board (#H20-03225) and registered at ClinicalTrials.gov (NCT04665193).

We collected nasopharyngeal (NP) swabs from study participants in the departure area of YVR and performed rapid antigen testing using the Panbio COVID-19 Ag Rapid Test Device (Abbott®)[3] according to the manufacturer's instructions. We also performed PCR on all remnant NP swab samples according to standard protocols. Continuous variables are reported as mean ±SD and categorical variables are reported as % of total.

627 travellers (405 WestJet and 187 KLM) were approached; 592 (94.4%) met the eligibility criteria and consented. All of the refusals (n=35) occurred on WestJet flights. The most common reason for refusal was the possibility of being denied boarding with a positive test (n=10; 28.6%), which was followed by the possibility of receiving a false positive result (n=6; 17.1%), fear of NP swabs (n=6; 17.1%) and a preference for PCR testing (n=5; 14.3%); 8 travelers (22.9%) did not meet the study's eligibility criteria. The demographic characteristics are summarized in **Table 1**. The swab-to-test-result time was less than 20 minutes. All NP swabs tested negative on Panbio with no invalid results and were confirmed to be negative on PCR (at a cycle threshold >40). Based on a Bayesian hierarchical model with 10,000 simulations in WinBUGS software and assuming a Beta prior with an exponential hyperprior and hyperparameter 1, the median prevalence of COVID-19 in our setting was 1.2 cases per 1,000 tested individuals with a 95% credible interval of 4×10^{-5} to 6×10^{-3} (**Figure S2**), which is consistent with a previous finding[4].

Here, we demonstrated that COVID-19 screening using a lateral flow device is feasible in passengers departing on same day flights. All passengers tested negative both on Panbio and PCR indicating no false negatives. There were limitations to the study. Participants were volunteers and as such selection bias was possible, which may have led to an underestimation of the COVID-19 prevalence among passengers. We did not recruit children or adolescents. In conclusion, a rapid point-of-care testing strategy for COVID-19 is feasible and can be implemented on same-day flights. Although in a low prevalence setting such as same-day air-travel, antigen testing has the potential for reduced sensitivity, it may also be highly effective in ruling out passengers with COVID-19, who may be infectious[3]. Since antigen tests can also detect variants, this strategy may also be attractive in

detecting variants-of-concern at airports and reducing the risk of virus exportation to other jurisdictions.

Table 1. Demographic and Clinical Characteristics of Participants (N=592)

Age, years	40.32 ± 15.62
Sex, Females	47.8%
Ethnicity/Race	
White	67.9%
Asian	13.5%
Hispanic	1.7%
First Nations	2.6%
Others	14.4%
Body Mass Index, kg/m^2	25.45 ± 5.33
Vaccination Status	
Influenza (Flu shot)	43.9%
Pneumococcal	10.6%
COVID-19	0.3%
Nicotine Smoking Status	
Current	10.1%
Former	17.8%
Never	72.1%
Cannabis Smoking Status	
Current	8.4%
Former	12.0%
Never	79.6%
Vaper (Nicotine/Cannabis)	5.6%
Symptoms	
Cough	0.18%
Sore throat	0.93%
Runny nose	2.6%
Muscle aches	0.55%
Phlegm	1.1%
Night sweats	0.74%
Co-morbidities	
Lung Disease	5.2%
Heart Disease	4.5%
Diabetes	4.7%

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