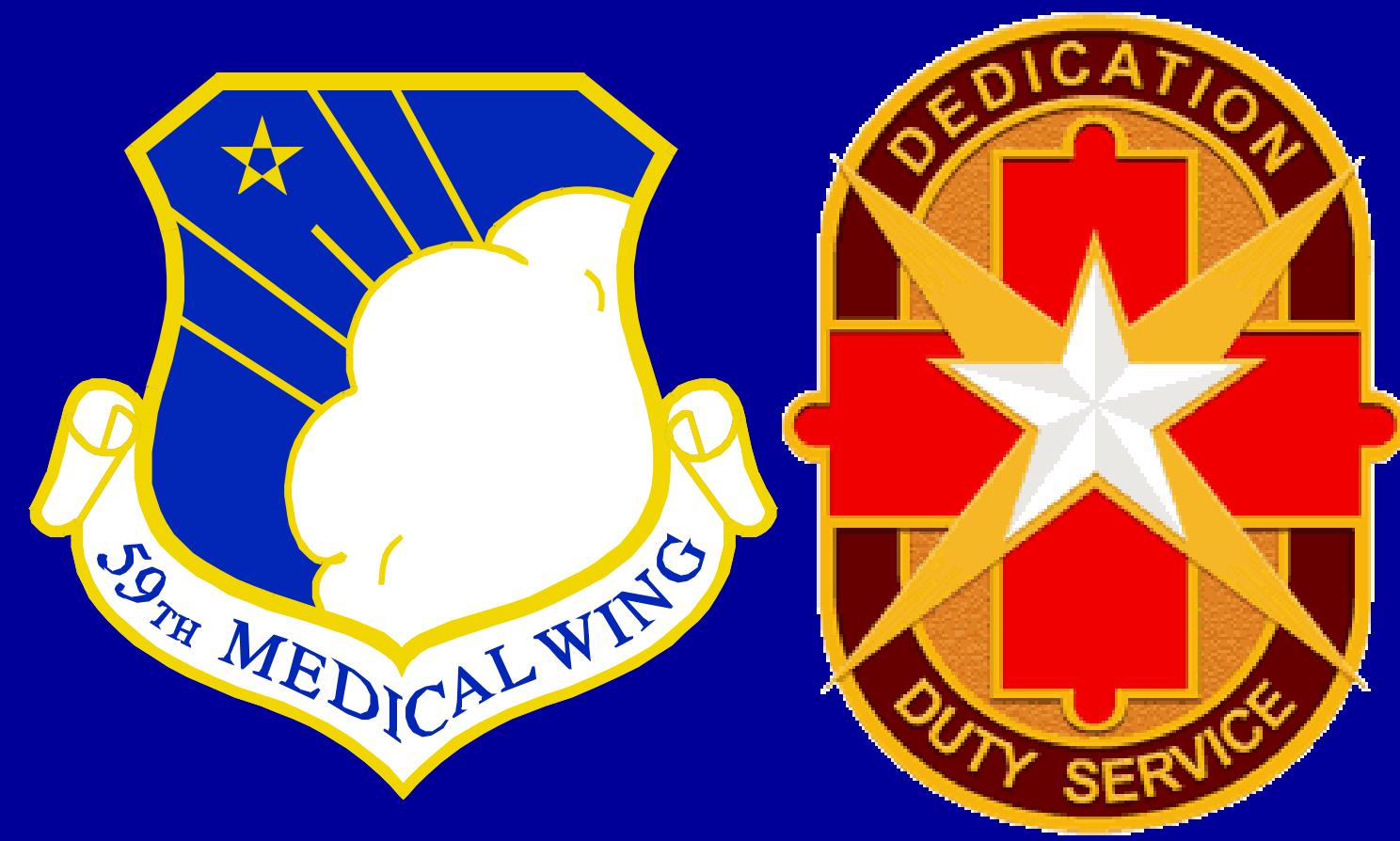# The Effect of Arrival Quarantine on Subsequent COVID-19 Testing in a Cohort of Military Basic Trainees

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Abstract

Background
The COVID-19 pandemic has been associated with significant spread in congregate settings and various forms of non-pharmaceutical interventions (NPI) have been implemented to prevent spread. Basic Military Training at Joint Base-San Antonio is the entrance to the US Air Force and has been associated with respiratory outbreaks in the past. A two-week arrival quarantine was implemented in March 2020. Effects on subsequent testing for COVID-19 after an arrival quarantine is unknown.
Methods
The first four weekly cohorts of trainees who underwent an arrival quarantine between March 16-April 13 were monitored during their 7 week training for COVID-19 symptoms. Symptoms, medical testing, and days removed from training with possible COVID-19 symptoms including cough, shortness of breath, or fever. Testing during the two-week arrival quarantine were compared to the subsequent five weeks of training. Nominal variables were compared by chi squared or Fisher's exact test as appropriate. Continuous variables were compared by Mann-Whitney U Test.
Results
A total of 2,573 started training during study period, 89 (3.4%) had symptoms concerning for COVID-19 and were tested. 5 (6%) patients tested positive, all of whom in the arrival quarantine. Compared to patients who completed quarantine (n=29), patients in the arrival quarantine who tested negative for COVID-19 (n=54) were tested more often (26 trainees a week vs. 5.8 later in training, p=< 0.01), and received more rapid flu tests (74% vs. 38%, p=<0.01) and multiplex respiratory PCR (15% vs. 0%, p=0.05). Trainees in quarantine were isolated longer for symptoms than patients who completed quarantine (median 3 vs. 2, p=0.01). There was no difference in presenting symptoms for trainees in quarantine or after quarantine.
Conclusion
Arrival quarantine appears to be an effective NPI, which in conjunction with other interventions prevented any COVID-19 transmission after quarantine completion. For those who went through arrival quarantine, there was more intense initial testing and initial longer symptomatic patient isolation, this was balanced by fewer symptomatic patients, less testing, and shorter isolations later in training.
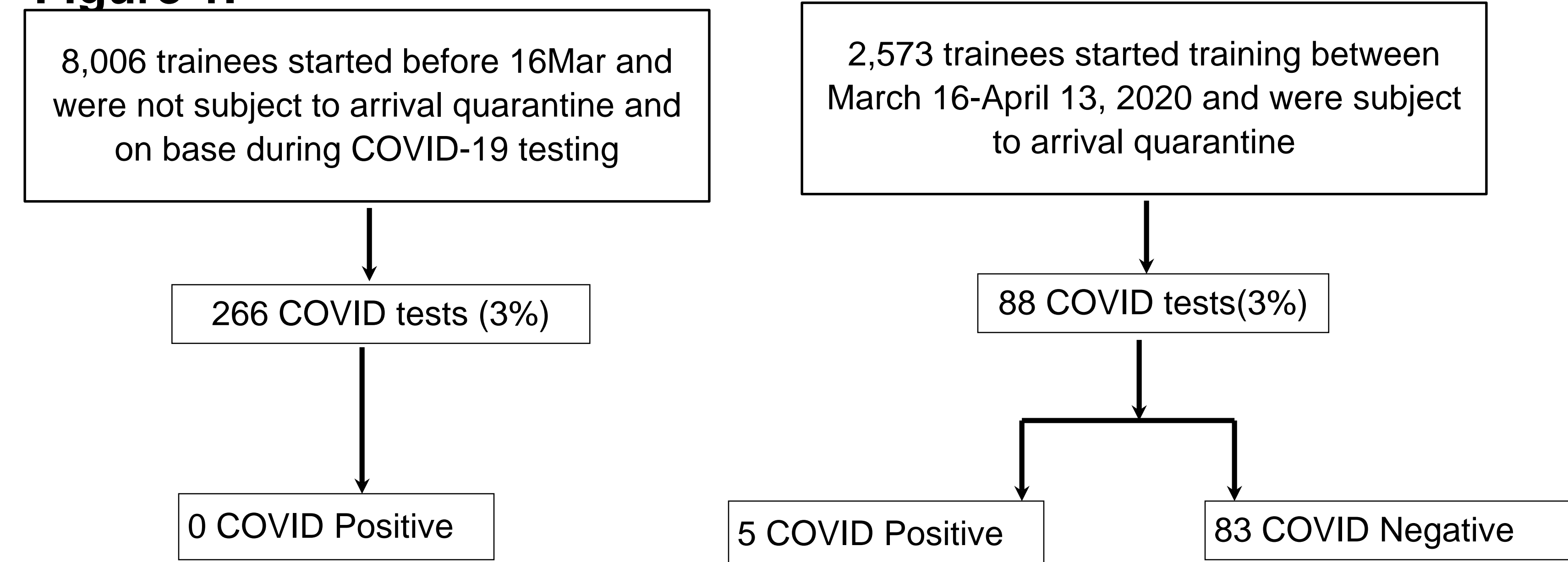
Introduction

- COVID-19 has been associated with outbreaks in congregant settings during pandemic.
- Basic Military Training provides a model for COVID-19 response with insight that can guide response for other institutions drawing young, healthy people from around US with risk factors for outbreak.
- In COVID-19, utility of arrival quarantine is unknown in preventing outbreaks and decreasing subsequent testing.
- We hypothesized that quarantine would be associated with increased COVID-19 testing, and would result in overall reduced testing compared to cohorts who did not undergo quarantine.

Methods

- Retrospective analysis of 10,579 basic trainees at JBSA-Lackland
- Tests at provider's discretion for symptomatic patients only
- Data collected: Arrival date, testing performed, symptoms at presentation, days removed from training
- Comparisons:
  - For those who underwent arrival quarantine: Testing during 14 day arrival quarantine vs. after completion of arrival quarantine (day 15 or after)
  - Testing after day 14 during last four weeks before implementation of arrival quarantine vs. first four weeks after implementation of arrival quarantine
- Statistical analysis performed with Pearson's Chi Squared and Fisher's Exact Test.

Results

Figure 1.

8,006 trainees started before 16Mar and were not subject to arrival quarantine and on base during COVID-19 testing

2,573 trainees started training between March 16-April 13, 2020 and were subject to arrival quarantine

266 COVID tests (3%)

88 COVID tests(3%)

0 COVID Positive

5 COVID Positive

83 COVID Negative

Workflow showing trainees meeting inclusion criteria for trainees who arrived on or before week of April 13, 2020.

Figure 2.
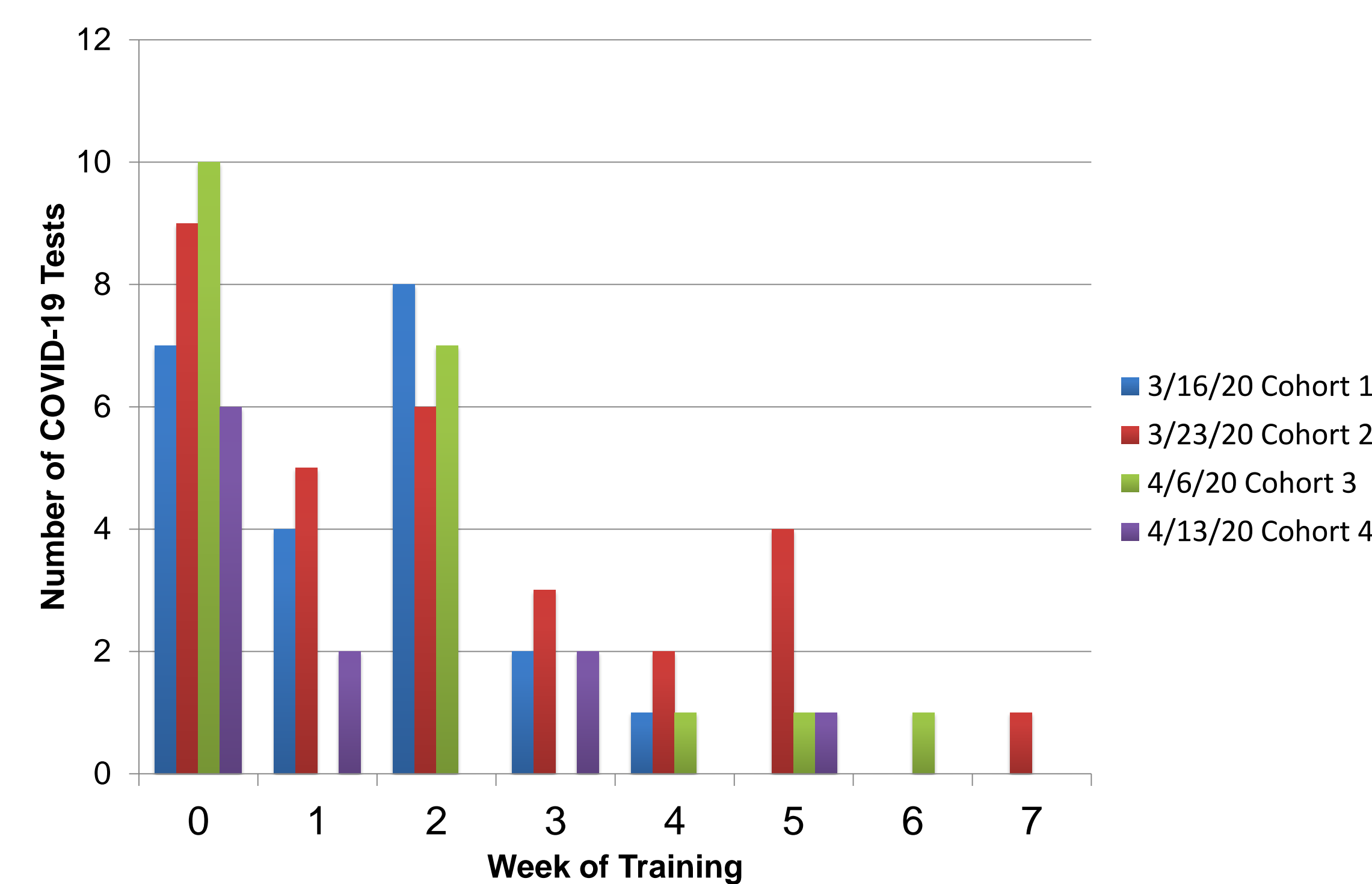
Bar graph showing testing symptomatic COVID-19 testing by week for first four cohorts that underwent 14 day quarantine showing more testing earlier in training. Weeks 0,1, and portions of week 2 represent time in quarantine.

Table 1.

	During Arrival Quarantine (n=54 tests)	After Completion of Arrival Quarantine (n=29 tests)	p-value
COVID tests per 1000 trainee-weeks	10.5	2.25	<0.0001
Respiratory Viral Panel	8 (15%)	0	0.05
Flu	40 (74%)	11 (38%)	0.001
Days Removed From Training if COVID-19 Negative	3 (2-5)	2 (2-3)	0.01

Table comparing testing rates and isolation days for trainees in first 14 days of training (arrival quarantine) compared to that same group of trainees after arrival quarantine. This data show quarantine associated with increased rates of testing and more days removed from training, even in COVID-19 negative patients.

Table 2

	Started training before arrival quarantine (n=215 tests)	Completed arrival quarantine (n=29 tests)	p-value
COVID tests per 1000 trainee weeks	14.3	2.25	<0.0001
Symptoms			
Chest Pain	22 (10%)	3 (10%)	0.99
Dyspnea	29 (13%)	3 (10%)	0.64
Cough	179 (83%)	16 (55%)	0.003
Headache	76 (35%)	9 (31%)	0.65
Fever	41 (19%)	4 (14%)	0.47
Chills	36 (17%)	4 (14%)	0.73
Nausea	25 (12%)	6 (20%)	0.17
Vomiting	14 (7%)	2 (7%)	0.48
Diarrhea	9 (4%)	4 (14%)	0.03
Myalgia	33 (15%)	3 (10%)	0.50
Sore Throat	111 (52%)	11 (38%)	0.17
Amnosia	10 (5%)	3 (10%)	0.20
Runny Nose	95 (44%)	4 (14%)	0.002
Signs			
T>100.4	9 (4%)	1 (3%)	0.89
SpO2<94	0	0	--
Tests Ordered			
Respiratory Viral Panel	14 (7%)	0	0.38
Flu	160 (74%)	11 (38%)	0.0001

Table comparing symptomatic testing for COVID-19 after day 14 of training amongst last four weekly cohorts of trainees who arrived before March 16th and did not complete an arrival quarantine and first four weekly cohorts who arrived after March 16th and did complete an arrival quarantine. Arrival quarantine was associated with less testing for flu and COVID after day 14 of training.

Conclusions

- Amongst trainees those who underwent arrival quarantine, most of their symptomatic testing occurred during quarantine with significantly reduced testing afterwards.
- Arrival quarantine led to less symptomatic testing later in training compared to group that did not undergo arrival quarantine.
- Quarantine appears to be an effective strategy to decrease symptomatic testing and possibly decrease in overall symptoms.
- Limitations: 1) Only tested symptomatic patients 2) Well-resourced setting with ability to rapidly isolate may limit generalizability, 3) Seasonality limits interpretation of other tests, such as flu 4) Unable to determine effect in preventing outbreak with low prevalence of COVID in cohort 5) Data from early in pandemic with evolving non-pharmaceutical interventions during data collection