



Study to Address Threats of Acute Respiratory Infections among Congregate Military Populations (ATARI)



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Abstract

Background: Respiratory infections are among the most commonly diagnosed medical conditions in US military recruits and trainees. Despite high coverage with the influenza and adenovirus vaccines, influenza-like illnesses (ILI) remain a frequent cause of missed duty and hospitalizations. More research is needed on the epidemiology and etiology of ILI to reduce the burden of respiratory infections in congregated military settings.

Methods: We conducted a prospective cohort study to assess ILI patterns among US Army recruits in a 9-week basic combat training course at Ft. Benning, GA. Demographic data, vaccination history, and information on recent illness were collected at enrollment in January 2017. Participants were divided into two platoons with staggered biweekly visit schedules. Visits occurred from reception through training, with nasal swabs and symptom surveys (all visits) and blood draws (weeks 8 and 9). Nasal specimens were used to detect clinical and colonizing pathogens using the Diatherix TEM-PCR Respiratory Panel.

Results: A total of 90 recruits were enrolled in the study. Twelve recruits were lost due to training attrition in the first week of the study. The participants were male and the median age was 21 yo (IQR 19-24). There were 10 (13%) cases of ILI reported among the 78 remaining participants, 6 in week 1, 3 in week 2 and 1 in week 9. The most frequently detected pathogens in the 10 symptomatic cases were coronavirus (5, 50%), rhinovirus (4, 40%), other enterovirus (3, 30%), and influenza A (2, 20%). Pathogen co-detections were common, 8 out of 10 cases were associated with 2 pathogens, representing 7 unique combinations. While rhinovirus and coronavirus were most common among asymptomatic trainees, 10% had detectable influenza A. Detection of multiple pathogens was common in the first two weeks of training (50% among those who had viral detection). The study is still in progress.

Conclusion: Symptomatic ILI was associated with coronavirus, rhinovirus, and enterovirus, in addition to influenza in the early weeks of training. Coronavirus and rhinovirus also circulated widely among healthy recruits, along with influenza. Pilot study findings will inform design of ILI study in larger trainee cohort.

Background

Acute respiratory infections (ARI) remain a significant cause of morbidity and pose an important threat to operational readiness to the US military. ARI are leading cause of outpatient illnesses and are responsible for up to 33% of infectious disease hospitalizations in US active duty personnel. It is estimated that ARI accounts for approximately 500,000 clinical encounters among service members each year. These infections are also estimated to be responsible for about 115,000 lost duty days annually. New recruits and advanced trainees are at greatest risk for infection compared to older, experienced service members. Research is needed on the transmission, epidemiology and etiology of ARI to reduce their burden in congregated military trainee populations.

Methods

Design: From Jan to March 2017, we conducted a longitudinal pilot study to: 1) describe ILI distribution and determinants, and 2) detail respiratory pathogens detected in Sx and Asx participants

Population: The study comprised US Army recruits beginning a 9-week Basic Combat Training (BCT) cycle at Ft. Benning, GA.

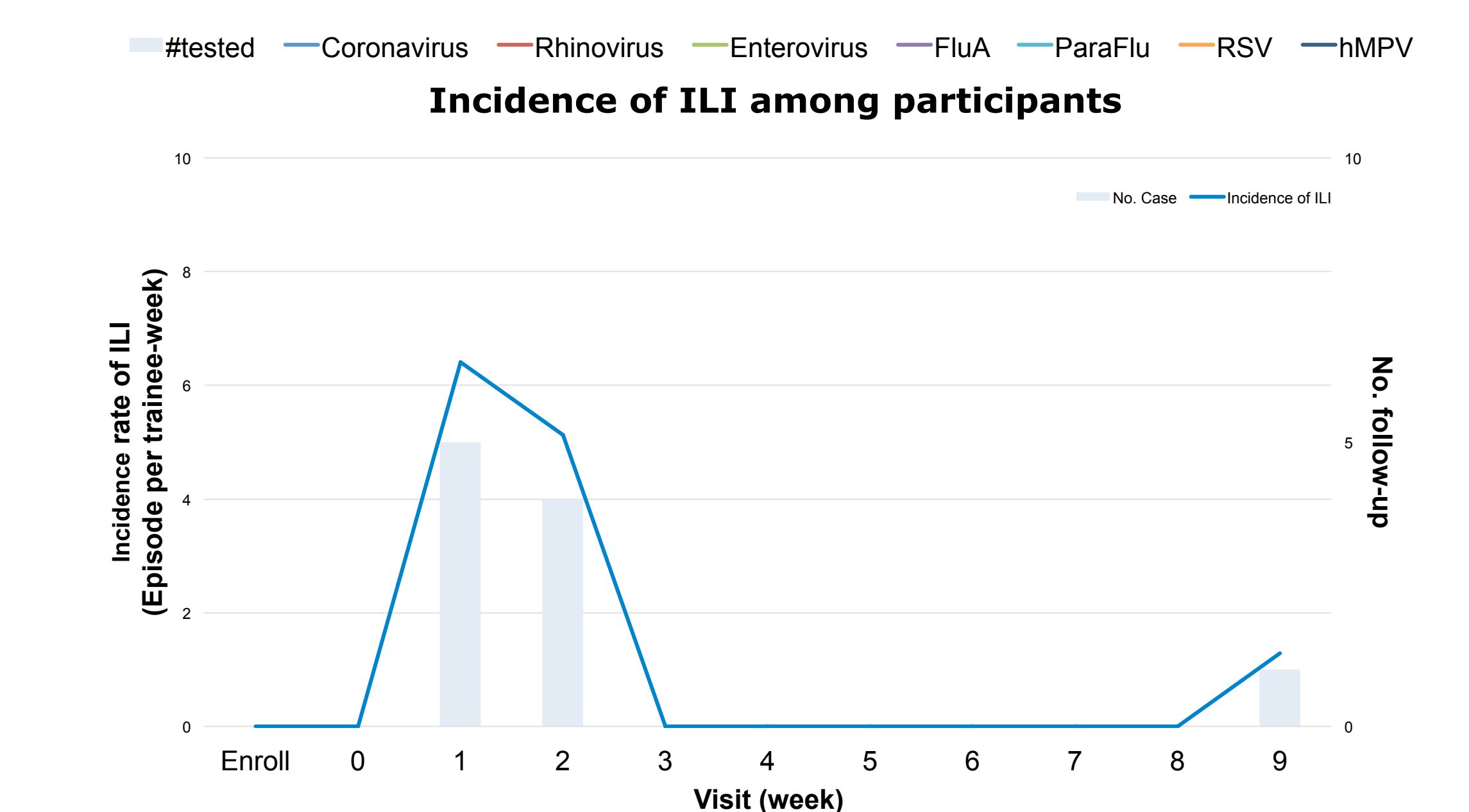
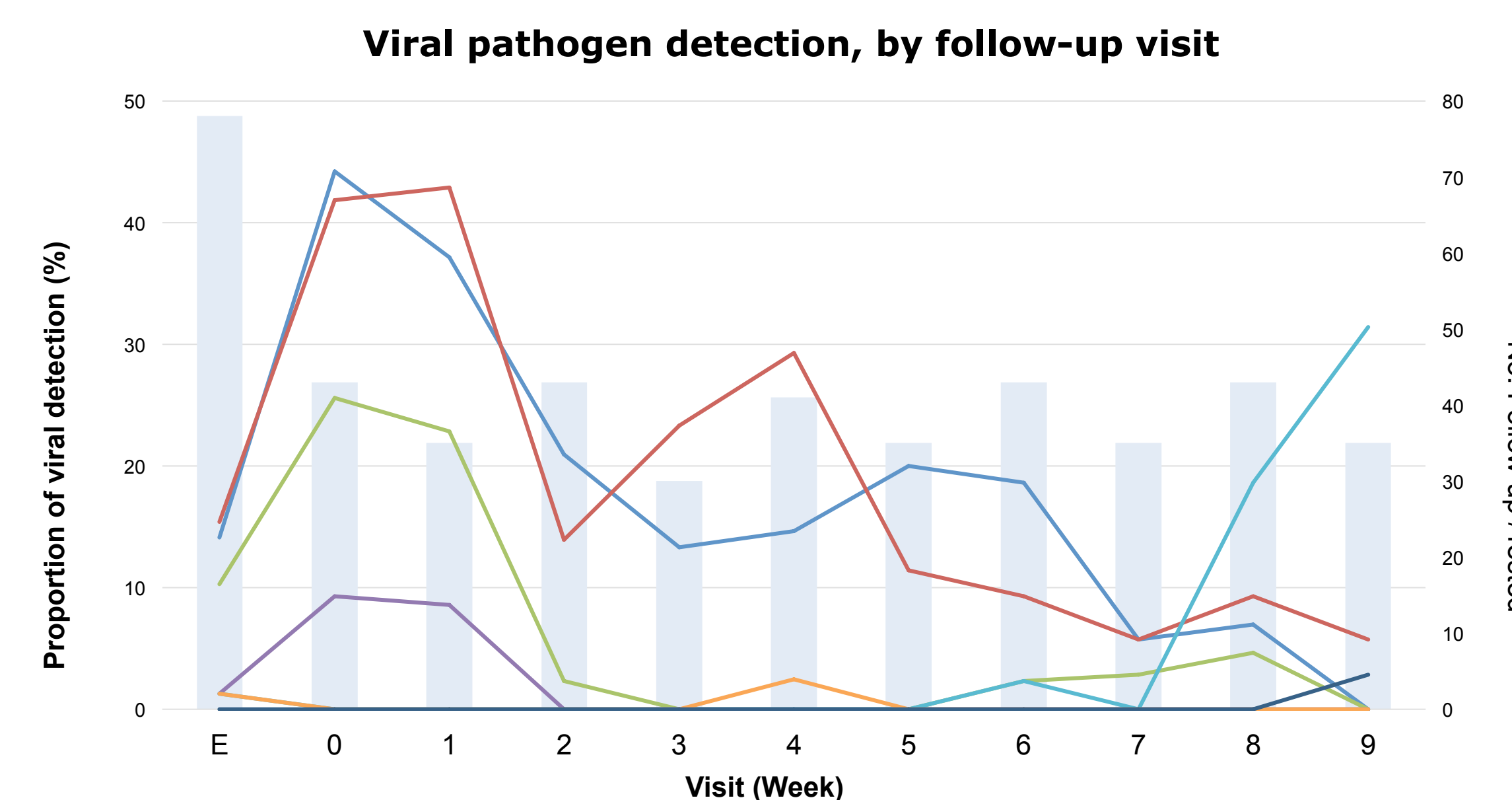
Methods: Staggered, bi-weekly visits occurred from reception through the 9 week training period, with nasal swabs and surveys (all visits) and blood draws at reception and weeks 8 and 9. Nasal specimens will be obtained for the detection of viral and bacterial pathogens using the Diatherix TEM-PCR respiratory panel. Blood samples were obtained for future serologic testing.

Influenza-like Illness (ILI) case definition: An ILI case is defined as medically-attended ILI in a recruit enrolled in the study and has either an oral temperature > 38.0°C (100.4°F), or subjective fever/chills, in addition to cough/sore throat, with onset ≤ 7 days.

Results

Characteristic (n=78)	n	%
Caucasian	41	53
Median age: 21 yrs (IQR 19-24 yrs)		
High school/GED	59	76
Current Smoker	10	13
Exposed to 2 nd Hand smoke	43	55
≥ 4 residents in same HH prior to enrollment	43	55
Children < 5 yrs in HH	18	23
Cover mouth/nose with elbow for sneeze/cough	73	94
Wash hands after sneeze/cough	52	67
Use hand sanitizer after sneeze/cough	52	67
Received influenza vaccine in current season	10	13
Close to ILI case in past 2 wks prior to enrollment	18	23
Had ILI at enrollment	12	15
Had ILI within 2 wks prior to enrollment	12	15

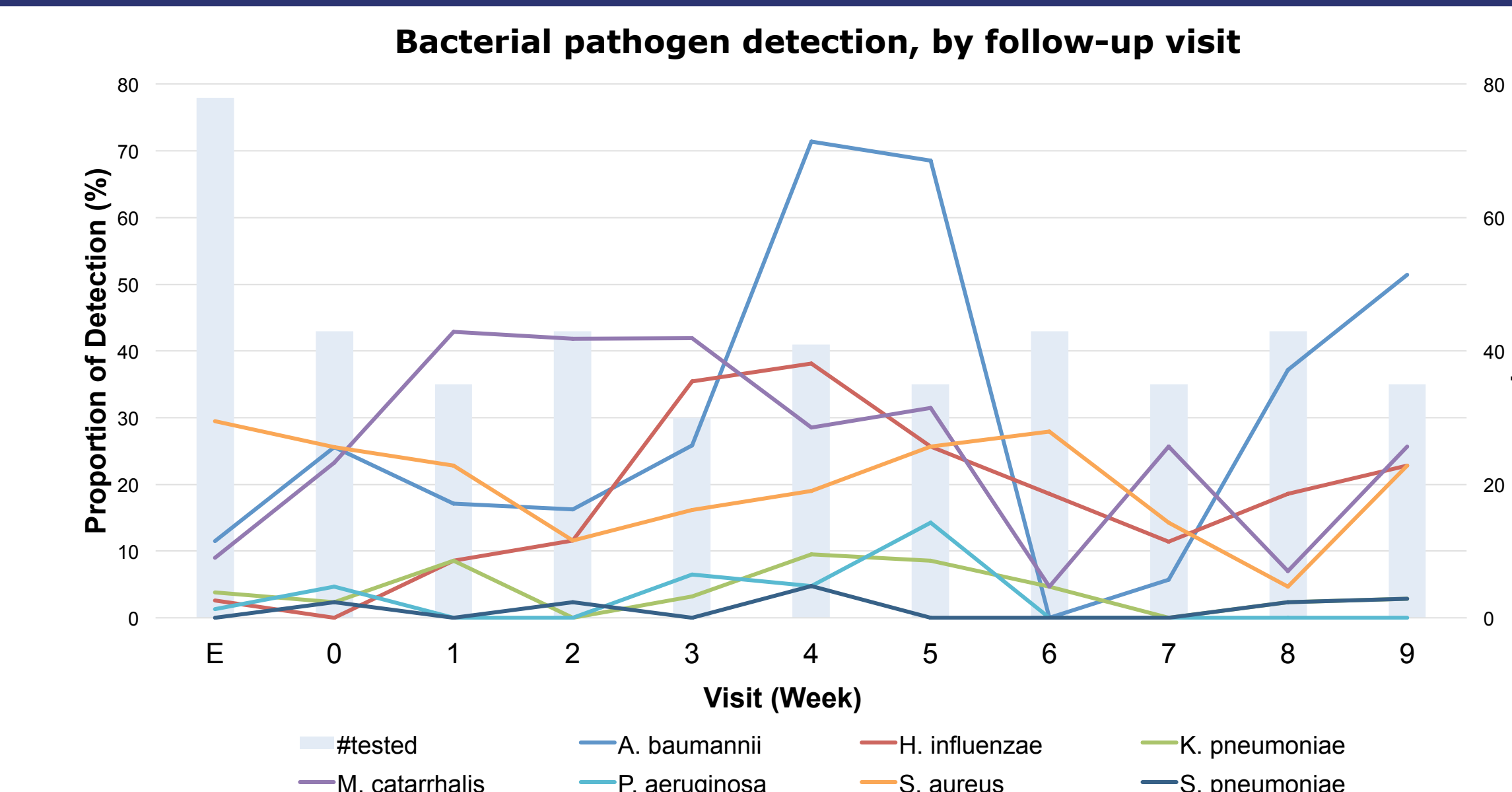
Results (cont.)



ILI Cases: Viral Pathogen Distribution (n=10)

Pathogens	n	(%)
Human coronavirus 229E + Influenza A	1	10
Rhinovirus	1	10
Human coronavirus 229E + Rhinovirus	2	20
Human coronavirus 229E + Enterovirus	1	10
Enterovirus + Influenza A	1	10
Enterovirus + Rhinovirus	1	10
Human coronavirus 229E	1	10
Parainfluenzae 3	1	10
No detection	1	10

Results (cont.)



Conclusions

- Symptomatic ILI associated with coronavirus, rhinovirus, and enterovirus, in addition to influenza in the early weeks of training
- Same viral pathogens circulated widely among healthy recruits, along with bacterial pathogens
- No discernable ILI risk factors
- Next steps:
 - Describe ILI transmission patterns
 - Summarize operational burden
 - Study ILI dynamics in larger trainee cohort

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