Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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CORRESPONDENCE

Variations in operating room staff compliance with mandatory daily electronic COVID-19 symptom screening

Daniel M. Gessner*, Eric Sun and Vikram Fielding-Singh

Department of Anesthesiology, Perioperative and Pain Medicine, Stanford University School of Medicine, Stanford, CA, USA

*Corresponding author. E-mail: dangessner@gmail.com, @dangessner

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Editor—Symptoms of COVID-19 are predictive of infection in healthcare workers.[1] Hospitals in at least 14 countries have reported on implementation of surveillance systems to detect potential COVID-19 infections in healthcare workers, often via screening for COVID-19 symptoms.[2] In the USA, some local government agencies have mandated that healthcare workers be monitored daily for COVID-19 symptoms, and hospitals have implemented electronic systems to screen their staff for symptoms.[3,4]

Electronic symptom screening systems have multiple advantages compared with verbal or paper-based systems[5] and demonstrate some efficacy for detecting infections,[6] but actual individual staff compliance with these systems is unknown. In operating rooms, staff must be physically present and social distancing is difficult to implement, so compliance with symptom screening may be particularly important to prevent staff-to-staff transmission. Here we examine compliance with a mandatory daily electronic symptom screening system in the operating rooms at a large academic medical centre.

Starting in April 2020, in accordance with a mandatory county health department order, our large quaternary care hospital system required all on-site staff to screen for COVID-19 symptoms daily using a mobile-friendly web application accessed via a QR code. The application produced a visual 'receipt' that was required for entry each morning.

From our electronic medical record, we extracted case logs in which nurses in our operating rooms document precise entry and exit times for each staff member. These logs have been maintained as standard hospital policy since well before the pandemic, are used for billing and compliance, and are likely to be accurate. For each day of the study period, we compared these 'gold standard' case logs with records from our symptom screening system. We defined individual compliance as the percentage of staff present in any operating room who completed screening that morning. We defined room compliance as the percentage of operating rooms that exclusively contained compliant staff that morning.

Our study period was 258 weekdays from July 20, 2020 through July 14, 2021. Analysis was conducted using Stata (v17, StataCorp, College Station, TX, USA) and R (v4.2.1, R Foundation for Statistical Computing, Vienna, Austria). Trends in compliance rates were modelled with simple exponential smoothing (0,1,1) autoregressive integrated moving averages. Rates for holidays and days with missing data (n=9) were imputed from nearest neighbours. Factors associated with compliance were modelled with a mixed-effects logistic regression, with random intercepts and slopes for each individual staff member. This study was approved by our Institutional Review Board with a waiver of informed consent.

Across our hospital system, 22 039 unique staff completed 1 839 046 electronic symptom screening forms. There was a median of 42 (inter-quartile range 40–44) operating rooms starting each weekday, involving a total of 1621 staff in a total of 10 289 scheduled first cases. The mean daily rate of overall individual staff compliance was 85.8% (standard deviation 3.9%) over the study period, with a range of 75.9–94.9%. The mean daily rate of room compliance was 31.8% (standard deviation 7.8%), with a range of 8.7–53.7%. Both individual staff compliance (moving average [MA]=−0.91, 95% confidence interval [CI] −0.94 to −0.83, P<0.001) and room compliance (MA=−0.89, 95% CI −0.98 to −0.84, P<0.001) declined significantly over time. Individual staff compliance also varied significantly by role, as compared with the reference group of theatre (circulating) nurses and operating department practitioners (surgical technologists). Attending physician surgeons (odds ratio [OR]=0.25, 95% CI 0.17–0.38, P<0.001), attending physician anaesthesiologists (OR=0.52, 95% CI 0.32–0.83, P=0.006), and surgical physician trainees (OR=0.53, 95% CI

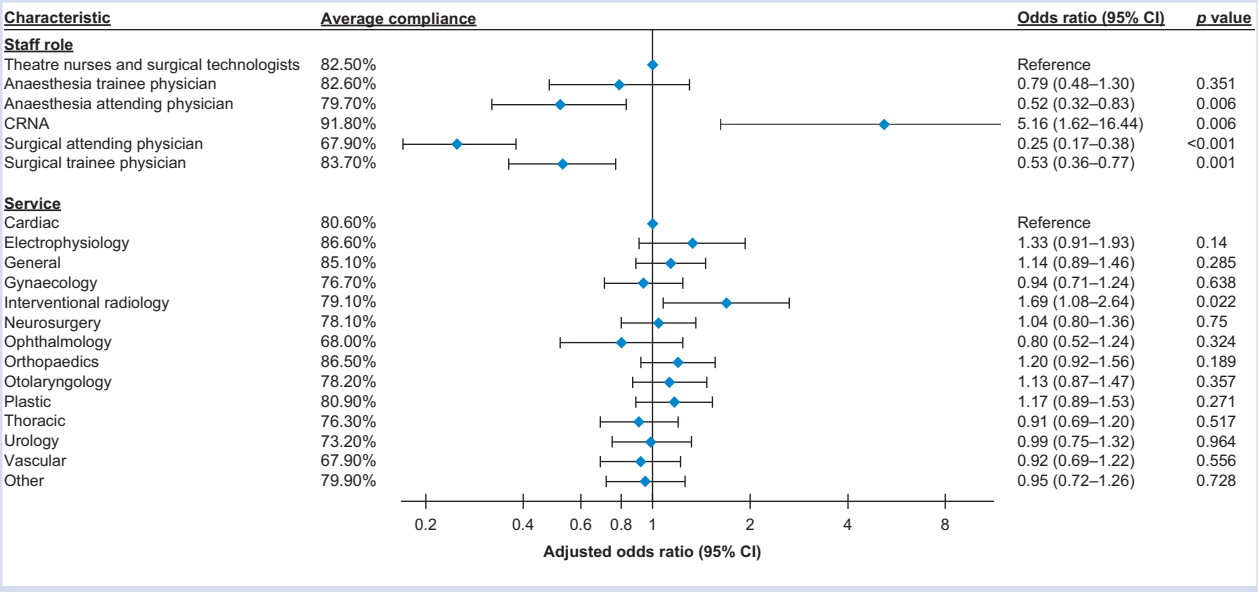

Fig 1. Adjusted logistic mixed-effects model for individual compliance by selected characteristics (n=60 181 staff-case assignments). CI, confidence interval; CRNA, Certified Registered Nurse Anaesthetist.

0.36–0.77, P=0.001) were less likely to comply, and certified registered nurse anaesthetists (OR=5.16, 95% CI 1.62–16.44, P=0.006) were more likely to comply (Fig 1).

Compliance with the electronic symptom screening system differed significantly by staff role and declined significantly over time, and most operating rooms typically had at least one staff member fail to complete electronic symptom screening each day. Although operating room social behaviour is known to vary by role,[7] variation in symptom screening compliance by role was unexpected. This variation may be explained in part by differences in rule adherence between physicians and nurses,[8] but suggests that hospitals implementing electronic symptom screening may not automatically comply with relevant government mandates to screen all staff. This variation also likely reduces any efficacy of the system for detecting infections,[6] for epidemiological surveillance,[9] or for reassurance against the stress[10] caused by an inability to socially distance in the operating room.

The county health department order did not require long-term retention of symptom screening data, but our system was configured to store this data indefinitely. Such systems will inevitably produce a large and unique dataset that is tempting to leverage for research. These results suggest that screening data may contain unexpected variation that should be considered. Hospitals should also assess whether these systems comply with local data privacy and protection regulations, since they contain personally identifiable information.

Limitations of this study include data from a single centre and an inability to explain reasons or methods for non-compliance with the electronic screening system. Mandatory electronic symptom screening systems are easy to implement, can help satisfy regulatory requirements, and may deter staff from working while ill, but screening data should be approached with caution, and factors influencing individual compliance should be investigated.

Declarations of interest

The authors declare that they have no conflicts of interest.

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