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.

First experience of COVID-19 screening of health-care workers in England

Since March 10, 2020, the Newcastle upon Tyne Hospitals National Health Service (NHS) Foundation Trust has been screening symptomatic health-care workers for severe acute respiratory syndrome (SARS) coronavirus 2 (SARS-CoV-2). Our decision was based on the following rationale: to maintain the health and welfare of our staff; to enable rapid identification and isolation of infected health-care workers so as to protect patients and the wider community, given that nosocomial transmission has been recognised as an important amplifier in epidemics of both SARS and Middle East respiratory syndrome;[1] and to enable more rapid return to work of staff during this challenging period for the NHS. Importantly, we judged that we had sufficient capacity within our service to absorb this additional testing.

We adapted a pathway previously implemented for community testing for SARS-CoV-2 during the so-called containment phase of the UK response to the coronavirus disease 2019 (COVID-19) outbreak. In our model, staff (mainly hospital employees but also local general practitioners) contact Occupational Health by email. An initial symptom screen is done, and staff with compatible symptoms (ie, new continuous cough or fever) are appointed to testing in a designated screening pod, staffed by trained nurses, within 24 h. Combined nose and throat swabs are taken for SARS-CoV-2 RT-PCR (RdRp assay; Public Health England), and written advice about self-isolation is provided. The results are conveyed within 24 h, again via email. North East Ambulance Service staff are also tested in our Trust and were included in this analysis.

Between March 10 and 31, 2020, we did 1666 SARS-CoV-2 tests in 1654 staff. Overall, SARS-CoV-2 was detected in 240 (14%) tests. The mean age of those testing positive (41·7 years [SD 12·1]) or negative (40·6 years [11·5]) was similar (*t* test p=0·168). 12 staff were retested due to recurrent symptoms (mean interval 8 days, range 2–18). In one of these cases, repeat testing at 14 days resulted in detection of SARS-CoV-2.

Initially, positivity rates were relatively low, at two (5%) of 38 staff tested on March 10–11, but rose steadily throughout the testing period, to 29 (20%) of 146 staff tested on March 30–31, the last 2 days before analysis. Inspection of the epidemic curve suggested a period of exponential growth from March 10 until around March 24, with a doubling time of 2·2 days (95% CI 2·0–2·4; appendix). From March 24 onwards, the rate of increase appeared linear. Consistent with these observations, we could fit an exponential line to the data from March 10 to March 24 (r^2=0·99), whereas data after that date conformed to a linear model (r^2=0·99). These data indicate a notable change in transmission dynamics occurring around March 24. Social distancing measures were implemented by the UK Government on March 20 (school closures) and March 23 (widespread closures or restrictions of businesses and transport).

To explore the occupational roles of staff that underwent testing, we cross-referenced virological data with a prospectively maintained Occupational Health database. Although data were incomplete, we were able to identify staff roles for 1029 staff tested, categorising them into three groups: (1) directly patient facing (eg, nurses, doctors, allied health professionals, porters, etc), (2) non-patient facing but potentially at higher risk of nosocomial exposure (eg, domestic and laboratory staff), and (3) non-clinical (eg, clerical, administrative, information technology, secretarial, etc).

As the screening criteria initially prioritised those in patient-facing roles, most staff were in group 1 (834 [81%] of 1029), with a minority in groups 2 (86 [8%]) or 3 (109 [11%]). We hypothesised that staff in patient-facing roles would experience a higher rate of SARS-CoV-2 infection, although comparison of positivity rates by χ^2 test yielded no evidence of a significant difference between these groups (group 1: 128 [15%] of 834; group 2: 14 [16%] of 86; group 3: 20 [18%] of 109; group 1 *vs* group 2: odds ratio 1·08, 95% CI 0·59–1·97; group 1 *vs* group 3: 1·24, 0·74–2·09; p=0·71), suggesting that nosocomial transmission from patients to staff was not an important factor. This is consistent with observations in China, where staff testing was widespread.[2]

These data provide several important insights into the COVID-19 epidemic in England. Given that non-clinical staff had similar positivity rates to frontline staff, we conclude that current isolation protocols and personal protective equipment appear sufficient to prevent high levels of nosocomial transmission to frontline staff in our setting. Rather, the data appear to reflect wider patterns of community transmission. Due to the national testing strategy during the analysis period, no data are available on community spread of SARS-CoV-2 in non-hospitalised populations in England; thus, our dataset is highly informative. We observed a shift in transmission dynamics around March 24, concurrent with steps taken by the UK Government to implement social distancing: schools were closed on March 20, with more widespread measures to close non-essential shops, pubs, and restaurants and limit public transport following on March 23. Although it is not possible to assign causality, it seems plausible that these measures have affected community transmission of SARS-CoV-2 in our region.

Our testing protocol has enabled 1414 health-care workers to return more rapidly to NHS service in the past 3 weeks, the vast majority returning

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See Online for appendix

to direct patient care. Beyond this obvious benefit, we speculate that testing might have additional positive effects on health behaviour, by providing health-care workers with the confidence that they can self-isolate with mild symptoms, knowing that a rapid negative result will enable them to return to work in a timely manner. This might lessen the desire of staff with mild symptoms to soldier on, in fear of abandoning colleagues for 7–14 days, thereby inadvertently contributing to nosocomial transmission.

Several limitations to these data should be acknowledged. We were unable to identify staff roles for more than a third of those tested. Furthermore, no data on symptoms or outcomes are available. Ongoing prospective data collection will aim to capture both of these elements in due course. The small number of non-clinical staff tested meant that it was not possible to meaningfully compare transmission dynamics between these groups, where more complex patterns might exist. Finally, we acknowledge possible insensitivity of the SARS-CoV-2 RdRp assay,[3] which might provide unwarranted reassurance in some cases. Nevertheless, we view this as a risk reduction rather than elimination strategy, and continue to stress that staff with a negative test should not return to work until their symptoms have substantially improved. National guidance is anticipated on this issue.

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