

COVID-19: PCR screening of asymptomatic health-care workers at London hospital

The exponential growth in coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) across the UK has been successfully reversed by social distancing and lockdown.¹ RNA testing for prevalent infection is a key part of the exit strategy, but the role of testing for asymptomatic infection remains unclear.² Understanding the determinants of asymptomatic or pauci-symptomatic infection will provide new opportunities for personalised risk stratification and reveal much-needed correlates of protective immunity, whether induced by vaccination or natural exposure. To address this, we set up COVIDsortium (NCT04318314), a bioresource focusing on asymptomatic health-care workers (HCWs—doctors, nurses, allied health professionals, administrators, and others) at Barts Health NHS Trust, London, UK, to collect data through 16 weekly assessments (unless ill, self-isolating, on holiday, or redeployed) with a health questionnaire, nasal swab, and blood samples and two concluding assessments at 6 month and 12 months. HCWs were self-declared as healthy and fit to work for study visits. Participants were not given swab results, and those with symptoms or in self-isolation resumed study visits on return to work.

Across London, case-doubling time in March, 2020, was approximately 3–4 days. The number of nasal swabs testing positive for SARS-CoV-2 peaked on March 30, 2020, suggesting infections peaked on March 23, 2020, the day of UK lockdown. COVIDsortium was established with all national and local permissions in 7 days. Recruitment started on March 23, 2020, and was completed 8 days later.

Here we present the SARS-CoV-2 PCR results from nasal swabs collected at the first five time-points

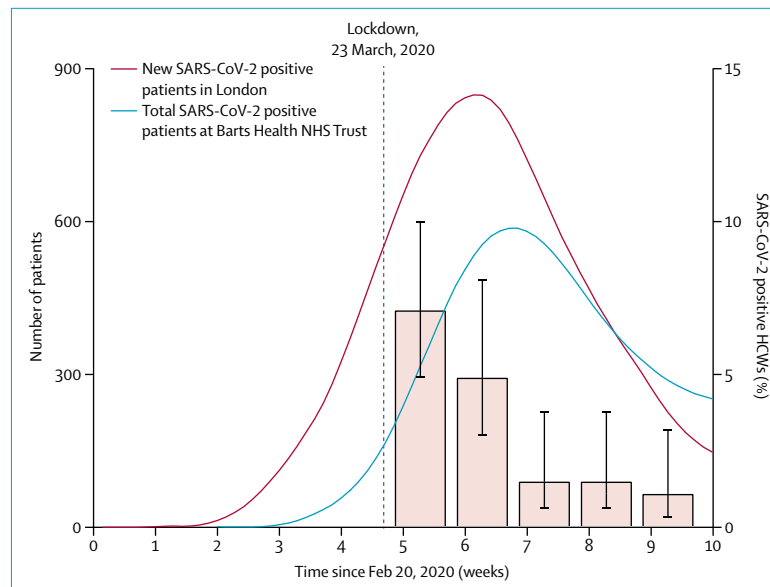


Figure: Number of patients testing positive for SARS-CoV-2 in Greater London and Barts Health NHS Trust and proportion of the HCW study cohort with SARS-CoV-2-positive nasal swab

The left y-axis shows number of daily new SARS-CoV-2 positive patients in the Greater London area, derived from Public Health England data (red curve) and the total number of SARS-CoV-2 positive inpatients at Barts Health NHS Trust (blue curve). Both curves show 7-day averages. The right y-axis shows the percentage (95% CI) of asymptomatic HCWs in this study with SARS-CoV-2 positive swabs in the first 5 weeks of testing. COVID-19=coronavirus disease 2019. SARS-CoV-2=severe acute respiratory syndrome coronavirus 2. HCWs=health-care workers.

from the first 400 participants (figure). We show the number and percentage of asymptomatic HCWs who tested positive for SARS-CoV-2 on consecutive weeks from March 23, 2020: 28 (7.1%; 95% CI 4.9–10.0) of 396 HCWs in week 1, 14 (4.9%; 3.0–8.1) of 284 HCWs in week 2, four (1.5%; 0.6–3.8) of 263 HCWs in week 3, four (1.5%; 0.6–3.8) of 267 HCWs in week 4, and three (1.1%; 0.4–3.2) of 269 HCWs in week 5 (figure). Seven HCWs tested positive on two consecutive timepoints, and one HCW tested positive on three consecutive timepoints. During this time, 50 HCWs (not necessarily those who were SARS-CoV-2 positive) self-isolated for symptoms. Of the 44 HCWs who tested positive for SARS-CoV-2, 12 (27%) had no symptoms in the week before or after positivity.

HCWs have been particularly hard hit by the COVID-19 pandemic, with high reported rates of infection from Italian data,³ raising concerns about the effectiveness of personal protective

equipment and of nosocomial transmission.⁴ Public fear of hospitals is also currently high, and many serious and treatable diseases are presenting late with adverse outcomes.⁵ Testing of HCWs has so far been restricted to symptomatic individuals, and no studies have reported serial testing in high-exposure asymptomatic volunteers. If our results are generalisable to the wider HCW population, then asymptomatic infection rates among HCWs tracked the London general population infection curve, peaking at 7.1% and falling six-fold over 4 weeks, despite the persistence of a high burden of COVID-19 patients through this time (representing most inpatients). Taken together, these data suggest that the rate of asymptomatic infection among HCWs more likely reflects general community transmission than in-hospital exposure. Prospective patients should be reassured that as the overall epidemic wave recedes, asymptomatic infection among HCWs is low and unlikely to be a major source of transmission.



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These data reinforce the importance of epidemic multi-timepoint surveillance of HCWs. The data also suggest that a testing strategy should link population-representative epidemiological surveillance to predict prevalence, with adaptive testing for symptomatic individuals at times of low prevalence, and rapidly expanding to include the asymptomatic HCWs during possible new infection waves.

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