

## 'Test, test, test' even after death: persistence of SARS-CoV-2 RNA in postmortem nasopharyngeal swabs

Over 57 000 deaths have been attributed to COVID-19 in the UK.<sup>1-3</sup> It is feared that the true figure is higher as there were over 16 000 'excess' deaths between March and June 2020 in which COVID-19 was not a certified cause.<sup>1-4-6</sup> Non-COVID causes, possibly related to the lockdown, would have accounted for some of this difference. However, the lack of community testing and challenges of performing autopsies<sup>7</sup> mean that many COVID-19 deaths remain undetected.

Missed infections represent lost opportunities on many levels. Incomplete mortality data underestimate the burden of disease, particularly in high-risk groups who may not seek medical care. Unrecognised COVID-19 deaths have serious public health implications and impede effective contact tracing. Postmortem confirmation of SARS-CoV-2 infection would further our understanding of the pathogenesis of this novel disease and assist pathologists and coroners in determining the probable cause of death, as well as the need for an autopsy.<sup>8</sup>

Deaths reported to the London Inner South coroner this year exceeded those in 2019 by 45% in January, 104% in February, 39% in March and 49% in April. The majority of cases had respiratory involvement. We present our experience of postmortem swab testing and the utility of this approach to identify COVID-19 deaths. From 26 March to 3 July 2020, we tested nasopharyngeal swabs from 118 deceased individuals for SARS-CoV-2 RNA by real-time PCR. One-third were positive (39/118, 33%). The median age of those with confirmed infection was 65 (range 28-96) and two-thirds were men. Nineteen (49%) were of white ethnicity and 20 (51%) were from black, Asian or

minority ethnic groups. Two-thirds were overweight or obese. Swabs were found to be positive even when obtained several days after death. The median time from death to swabbing was 9 days (IQR 7-12) and in one individual a positive swab had been obtained 29 days after death. There was no association between the time since death and the amount of viral RNA in the sample. The result enabled the cause of death to be certified without autopsy in 20 (51%) swab-positive cases. In 19 swab-positive individuals, the swabs were taken at autopsy and the histopathological findings were consistent with COVID-19. None of the 39 autopsies performed following a negative swab revealed signs of COVID-19.

The correlation of postmortem swab results with histopathological evidence of COVID-19 indicates this approach is effective. It was remarkable that SARS-CoV-2 RNA could be detected up to a month after death, though it is not known if this represented transmissible virus. Although we do not advocate postmortem swabbing as a replacement for autopsy, we do believe this is an important clinical tool, which should be used routinely in managing suspected COVID-19 deaths.

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