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.

Coronial autopsies identify the indirect effects of COVID-19

Indirect increases in morbidity and mortality resulting from movement restrictions imposed during the COVID-19 pandemic have been identified as a public health concern.[1] Deaths registered in England and Wales exceeded the 5-year average by almost 50 000 during the first 2 months of lockdown, which started on March 23, 2020.[2] Confirmed COVID-19 accounted for the majority of deaths; the remaining excess deaths (>12 000) could reflect undiagnosed COVID-19 or alternatively, deaths from unrelated conditions. Similarly, in the USA, only 65% of excess deaths during March and April, 2020, were attributed to COVID-19.[3]

The coronial system of death investigation in England and Wales serves to identify and investigate unnatural deaths. Sudden unexpected deaths of unknown cause and deaths for which circumstances suggest unnatural causes prompt coronial referral. In 2019, 40% of all deaths in England and Wales were referred to a coroner, of which 39% proceeded to autopsy.[4] In addition to having a medicolegal function, coronial autopsies provide important mortality data that can be used to inform public health policy. Coroners' pathologists obtain detailed information about the circumstances of death from various sources and are able to provide a medical opinion on contributory factors in the investigation of deaths. The coronial system has led to legislative interventions aimed at reducing future deaths.[5]

The coronial system of death investigation has continued to function during the COVID-19 pandemic; at John Radcliffe Hospital (Oxford, UK), we did 67 autopsies on behalf of Her Majesty's Coroner of Oxfordshire during the first 2 months of the lockdown period. This number was significantly lower than that during the same period in 2018 due to a reduction in coronial autopsy requests following sudden natural deaths (appendix). Review of autopsy reports enabled the determination of the relative contributions of undiagnosed COVID-19 and lockdown restrictions on deaths. Of the 67 autopsies done at our hospital during the first 2 months of lockdown, only two autopsies identified COVID-19 that was undiagnosed before death. More frequently, reduced access to health-care systems associated with lockdown was identified as a probable contributory factor (six cases) or possible contributory factor (eight cases) to death. These causes included potentially preventable out-of-hospital deaths such as acute myocardial infarction and diabetic ketoacidosis, in which patients contacted the health services by telephone and were advised to self-isolate at home rather than attending hospital. Direct reference to financial or work pressures caused by COVID-19 was identified in three of ten cases of suicide.

Deaths from drug and alcohol misuse significantly increased during the lockdown period in comparison to the same period in 2018 (appendix), but it was not possible to identify whether individual cases were influenced by COVID-19 movement restrictions.

We believe direct collaboration between autopsy pathologists and public health clinicians can improve evaluation of deaths indirectly caused by COVID-19 at the national level. Lessons learned from an expanded cohort of coronial cases could mitigate the effects of future movement restrictions on mortality during the current pandemic.

We declare no competing interests.

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See **Online** for appendix