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.

the UK Government's Living with COVID-19 strategy, access to free community testing ended for most of the population.[1] These policy changes were reflected in the number of COVID-19 cases reported in England. Cornelia Adlhoch and Helena de Carvalho Gomes[2] discussed how surveillance systems for SARS-CoV-2 need to be representative to ensure the provision of high-quality information to understand the ongoing impact of COVID-19.

Following the changes to testing, we investigated trends and demographics of 10 862 278 COVID-19 cases reported to the UK Health Security Agency between Nov 1, 2021, and June 30, 2022, detected by PCR at National Health Service (NHS) laboratories or in the community. Of the 10 862 278 positive cases that were extracted, 10 356 716 (95·3%) were community cases. Within this group, there was a shift from most reported cases being identified by laboratory-reported PCR to mostly by self-reported lateral flow device (LFD), coinciding with the cessation of PCR confirmatory testing of initial LFD-positive results on Jan 11, 2022.

After stratifying by deprivation quintiles, the trends in community LFD-tested cases initially followed that of NHS-tested cases, with the highest daily incidence rates observed in the most deprived populations and the lowest daily incidence rates observed among the least deprived populations. However, after Jan 11, 2022, this trend reversed, whereby the highest incidence rates of community LFD-tested COVID-19 cases were among the least deprived groups (appendix).

When evaluating by ethnic group, the highest incidence of NHS-tested COVID-19 cases was consistently observed in the Other ethnic groups, with the lowest rates observed among the White ethnic groups (appendix). From Jan 11, 2022, the highest rates of LFD-tested community cases were reported among White ethnic groups, followed by Mixed or multiple ethnic groups (appendix), and lowest among Black or Black British ethnic groups.

These differences between cases tested through the NHS (mostly by PCR) and by LFDs in the community indicate that there are potential inequalities associated with testing and reporting, and that changes to testing policies had varying impacts on surveillance within the population. Throughout the pandemic, case detection within England has never reached 100%,[3] and with the end to widespread testing, this will have decreased further.

More caution is required in interpreting COVID-19 surveillance data with changes to SARS-CoV-2 testing in England. It is important to monitor cases by deprivation and ethnic group using health care-based testing for this aim, to support ongoing work in addressing inequalities. Potential inequalities associated with accessing and reporting testing must be considered in the development of all surveillance systems.

We declare no competing interests. This work was performed as part of the UK Health Security Agency's responsibility to monitor COVID-19 during the current pandemic.

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Uncoupling of all-cause excess mortality from COVID-19 cases in a highly vaccinated state

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Since March, 2020, excess mortality—the number of all-cause deaths exceeding the baseline number of expected deaths—has been observed in waves coinciding with COVID-19 outbreaks in the USA and worldwide.[1,2] However, after February, 2022, the reported number of COVID-19-associated deaths decreased despite a notable spring wave of infections primarily due to omicron subvariants (BA.2, BA.2.12.1, BA.4, BA.5).[3] Until now, it has been unknown whether the spring, 2022, COVID-19 wave in Massachusetts, USA, was associated with all-cause excess mortality.

Accordingly, we assembled population data (2014–19) and weekly mortality data (January, 2015–February, 2020) provided by the Massachusetts Registry of Vital Records and Statistics (MRVRS) and applied seasonal autoregressive integrated moving averages to project the weekly number of expected deaths for the state for the pandemic period (Feb 3, 2020–June 26, 2022). We summed age-specific mortality to create state-level estimates and additionally corrected for the lower-than-expected state population owing to cumulative excess mortality recorded during the pandemic (for a more detailed description, see appendix p 1).[4–6] Weekly observed deaths provided by the MRVRS are more than 99% complete for all study weeks. Case, wastewater, and hospitalisation data were accessed from publicly available databases.[7,8] Analyses were conducted with R (version 4.1.2). The MRVRS deemed the study exempt from institutional review board review.

See **Online** for appendix

In the 18-week period after BA.2, BA.2.12.1, BA.4, and BA.5 subvariants became prevalent (week

See **Online** for appendix

ending Feb 27, 2022; appendix pp 2–3), there have been 0·1 excess deaths per 100 000 person-weeks, corresponding to 134 excess deaths (95% CI −921 to 1189; appendix pp 2–3), despite at least 226 857 newly recorded cases, as evidenced by corresponding substantial spikes in SARS-CoV-2 wastewater levels and changes in testing volume (appendix pp 2, 4–5). This value corresponds to a 97·3% reduction in excess mortality compared with the 8-week initial omicron (B.1.1.529) wave, during which excess mortality was 4·0 per 100 000 person-weeks (2239 excess deaths; 95% CI 1746–2733), and a 92·7% reduction in excess mortality compared with the combined 26-week delta (B.1.617.2) and delta-to-omicron transition periods, during which excess mortality was 1·5 per 100 000 person-weeks (2643 excess deaths; 95% CI 1192–4094). However, new COVID-19-associated hospitalisations continued to occur during this period (figure B), either reflecting background community prevalence or that new COVID-19 cases were less severe or exacerbated chronic medical illnesses enough to require emergency care but not to cause proximate mortality.

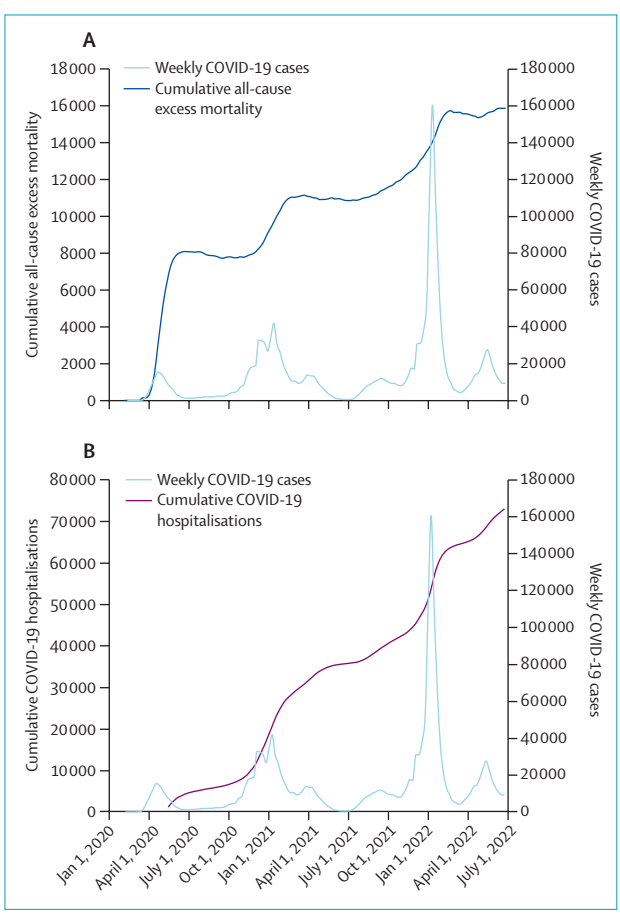

***Figure*: All-cause excess mortality, COVID-19-associated hospitalisations, and confirmed COVID-19 cases in Massachusetts, USA**
(A) Shows the cumulative all-cause excess mortality (blue line) plotted against weekly confirmed new COVID-19 cases (light blue line) in Massachusetts, USA, from February, 2020, through June, 2022.[7] (B) Shows the cumulative number of COVID-19-associated hospitalisations (purple line) plotted against weekly confirmed new COVID-19 cases (light blue line) in Massachusetts, USA, from February, 2020, through June, 2022;[7] hospitalisation data did not become available until May, 2020.

Since the initial COVID-19 outbreak in Massachusetts, USA, there have been periods without excess mortality, corresponding to times of low prevalence (figure A). However, we also have observed two substantial outbreaks not accompanied by excess mortality. The first instance, (late February–June, 2021) corresponded to the phased vaccine rollout period, during which the mean age of newly infected people dropped precipitously and prevalence among people older than 60 years was low (appendix pp 2, 6), probably temporarily reflecting exceptionally high vaccine-conferred protection against SARS-CoV-2 infection among the vaccine-eligible population. The second instance occurred late February–June, 2022). Unlike February–June, 2021, the mean age of newly infected people did not fall during the corresponding 2022 period, and in fact rose (appendix pp 2, 6).

The uncoupling of excess mortality and new COVID-19 cases, in the absence of decreases in the mean age of infected individuals (appendix pp 2, 6), suggests that in our highly vaccinated state, current levels of immunity are considerable, leaving many, if not most, individuals at high risk with substantial protection against the most severe outcomes of SARS-CoV-2 infection. However, given newly emerging variants and the unknown duration of protection from infection and vaccination, further monitoring is warranted.

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