

## Excess all-cause mortality from January to August 2020: a temporal analysis in 20 countries

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Analysis of all-cause mortality is an important tool to investigate the impact of the COVID-19 pandemic. This study aims to investigate the magnitude and potential determinants of excess all-cause mortality, from January until August 2020, using national mortality databases from 20 countries part of the C-MOR consortium. Excess weekly mortality for 2020 was calculated by comparing observed against expected weekly number of deaths for 2020. Expected 2020 weekly mortality was estimated using 2015-19 data based on a time series model adjusting for time trend and seasonality. The excess mortality was visualized against a stringency index (SI), based on nine government response indicators, downloaded from the Oxford COVID-19 Government Response Tracker. Brazil, Cyprus, France, Ireland, Italy, countries of the UK, Spain and the USA showed a substantial increase in the observed mortality during 2020, which lasted from 1 (Cyprus) to 7 (England and Wales, Scotland) weeks. Australia, Denmark and Georgia observed fewer than expected deaths, whereas in Austria, Estonia, Israel, Norway, Slovenia and Ukraine 2020 mortality was as expected. Italy, Spain, UK and Brazil enforced high SI measures at least after 3 weeks from the first COVID-19 death. Sweden and the USA did not apply high SI measures for the duration of this study. In Austria, Estonia, Israel, Norway, Cyprus, Georgia, Slovenia and Ukraine, measures of high SI were implemented within 2 weeks of the first COVID-19 death. The decreased mortality in Australia is probably attributed to different seasonality patterns coupled with strict control measures. Several but not all countries showed excess all-cause mortality. Excess mortality was shown to be influenced by the seasonality patterns of each country, as well as the promptness of governments to apply high SI control measures. As the pandemic continues, the lessons learned from the first months of the pandemic can prove useful to minimize increases in all-cause mortality.

### Key messages:

- Some countries showed excess all-cause mortality between January and August 2020, whereas others displayed either negligible excess mortality or even a decrease in all-cause mortality.
- Excess mortality may be partly attributed to delayed application of strict control measures whereas lack of excess mortality may be due to seasonality and/or strict control measures.