Measuring the impact of covid-19

**ORIGINAL RESEARCH** Age and sex disaggregated time series analysis in 29 high income countries

**Excess deaths associated with covid-19 pandemic in 2020**

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**Study question** What was the extent of excess deaths associated with the covid-19 pandemic in 2020?

**Methods** From weekly time series mortality data disaggregated by age and sex from 29 high income countries during 2016-20, the excess deaths (observed versus model predicted expected deaths) were estimated using an over-dispersed Poisson regression model accounting for temporal trends and seasonal variability in mortality. The excess deaths were also standardised to account for the differences in age structure within and across countries.

**Study answer and limitations** An estimated 979,000 (95% confidence interval 954,000 to 1,001,000) excess deaths occurred in 2020 in the 29 high income countries analysed. The highest excess death rates (per 100,000) in men were in Lithuania (285, 259 to 311), Poland (191, 184 to 197), Spain (179, 174 to 184), Hungary (174, 161 to 188), and Italy (168, 163 to 173); the highest rates in women were in Lithuania (210, 185 to 234), Spain (180, 175 to 185), Hungary (169, 156 to 182), Slovenia (158, 132 to 184), and Belgium (151, 141 to 162). The study could not examine important differences by cause of death, ethnicity, social deprivation, and geographical regions within the countries.
What this study adds About one million excess deaths occurred in the 29 high income countries in 2020. Age standardised excess death rates were higher in men than women in almost all countries. No compensatory reduction occurred after peaks of excess deaths. Excess deaths were substantially higher than reported covid-19 deaths in most countries, suggesting that estimating the effects of the ongoing pandemic solely on the basis of covid-19 deaths will substantially underestimate the true burden of the pandemic and the associated policy measures.

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COMMENTARY We must look beyond mortality to the wider burden of pandemic related harms

Over the course of the covid-19 pandemic, daily releases of national statistics on cases and deaths have been widely reported and used to support interventions and judge the success or failure of control measures around the world. However, differences in rates of testing and in reporting of deaths have led to uncertainty about whether national headline figures on deaths are directly comparable.

Excess mortality is an alternative metric, which gives a measure of the number of deaths above that expected during a given time period and thus accounts for additional deaths from any cause during the pandemic, irrespective of how covid-19 deaths are defined.

In this issue, Islam and colleagues present wide variation for acute coronary syndromes and referrals for cancer have been disrupted

Diagnostic and treatment pathways for cancer have been disrupted

29 high income countries. In modelling expected deaths for 2020, the authors account for age and sex differences between countries, as well as for seasonal and yearly trends in mortality over the five preceding years. According to their estimates, except for Norway, Denmark, and New Zealand, all countries examined had significantly more deaths than expected in 2020, with almost one million excess deaths in total and 94 400 excess deaths in the UK alone.

Wide variation

Islam and colleagues found wide variation in the extent to which registered covid-19 deaths account for this increase in total excess deaths. In Israel and France, twice as many reported covid-19 deaths as excess deaths occurred, whereas reported covid-19 deaths accounted for only 20% of excess deaths in Lithuania and South Korea. The cause of this variation is unclear, but could be from differences in access to testing and in both how covid-19 deaths are defined and how doctors complete death certificates, leading to deaths being counted as related to covid-19 in some countries and not in others.

Alternatively, variation might arise from deficits in deaths from other causes. In addition to deaths caused directly by covid-19, deaths will have been decreased indirectly by covid-19, through the economic and social effects of the pandemic and disruption to health systems. Admissions for acute coronary syndromes and referrals from primary to secondary care in the UK, for example, fell during the first wave of the pandemic, which could have indirectly contributed to increased deaths from non-covid-19 causes.

By contrast, reduced incidence of conditions such as influenza and changes in environmental factors such as air pollution...
could have indirectly contributed to lower deaths from other causes. The contribution of covid-19 to all cause mortality is therefore difficult to define precisely, without a better understanding of how all causes of death changed during the pandemic.

Measuring excess mortality alone offers only partial insights into the impact of the covid-19 pandemic on the health of nations. If we are to truly understand and intervene to mitigate the impact of the pandemic, we must also look to quantify excess morbidity within and between nations. A focus on deaths alone gives only a partial picture of the impact of covid-19 on populations, particularly among younger people in whom death from covid-19 is rare. The importance of “long covid,” for example, has recently been highlighted, but the true burden of this condition has yet to be quantified, and policies are urgently needed to overcome its long term challenges.

The covid-19 pandemic has resulted in widespread disruption to health systems across the world. Diagnostic and treatment pathways for cancer and other time sensitive conditions have been disrupted, and the monitoring of long term conditions has often taken place through novel telemedicine platforms, if at all.

By April 2021 more than 4.7 million people in England were waiting for hospital treatment, the highest number since records began. Such disruption is likely to lead to poorer health and earlier deaths in countries across the world for many years to come, particularly where covid-19 remains endemic and where health services are unable to function normally. Establishing where health systems have fallen behind, and characterising the true extent of unmet need, is a critical step towards reducing these ongoing harms.

Islam and colleagues’ findings confirm the huge toll of the covid-19 pandemic on mortality in high income countries in 2020. However, its full impact might not be apparent for many years, particularly in lower income countries where factors such as poverty, lack of vaccines, weak health systems, and high population density place people at increased risk from covid-19 and related harm. In the UK, life expectancy in lower socioeconomic groups has fallen in recent years, an inequality likely to be exacerbated by the covid-19 pandemic, without concerted action.

Finally, although mortality is a useful metric, policy informed by deaths alone overlooks what may become a huge burden of long term morbidity resulting from covid-19. An urgent need exists to measure this excess morbidity, support people with long term complications of covid-19, and fund health systems globally to tackle the backlog of work resulting from the pandemic.

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ORIGINAL RESEARCH Double blind randomised controlled trial

Postoperative low molecular weight heparin bridging treatment for patients at high risk of arterial thromboembolism (PERIOP2)

Kovacs MJ, Wells PS, Anderson DR, et al; on behalf of the PERIOP2 Investigators

Cite this as: BMJ 2021;373:n1205

Study question What are the efficacy and safety of dalteparin postoperative bridging treatment versus placebo for patients with atrial fibrillation or mechanical heart valves when warfarin is temporarily interrupted for a planned procedure?

Methods This prospective, double blind, randomised controlled trial recruited participants from 10 thrombosis research sites in Canada and India between February 2007 and March 2016. Participants were aged 18 years or older with atrial fibrillation or mechanical heart valves and were randomly assigned to dalteparin or placebo after the procedure. The primary endpoint was major thromboembolism (stroke, transient ischaemic attack, proximal deep vein thrombosis, pulmonary embolism, myocardial infarction, peripheral embolism, or vascular death) and major bleeding within 90 days of the procedure.

Study outcomes for whole population and subgroups of patients with atrial fibrillation and mechanical valves at 90 days. Data are numbers (percentages) unless indicated otherwise

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Whole study population</th>
<th>Atrial fibrillation</th>
<th>Mechanical valve*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No bridging (n=650)</td>
<td>Bridging (n=820)</td>
<td>Risk difference (95% CI)</td>
</tr>
<tr>
<td>Major thromboembolism†</td>
<td>8 (1.2)</td>
<td>8 (1.0)</td>
<td>0.64</td>
</tr>
<tr>
<td>All deaths</td>
<td>8 (1.2)</td>
<td>6 (0.7)</td>
<td>0.33</td>
</tr>
<tr>
<td>Major bleeding</td>
<td>13 (2.0)</td>
<td>11 (1.3)</td>
<td>0.32</td>
</tr>
<tr>
<td>Major thromboembolism or major bleeding</td>
<td>21 (3.2)</td>
<td>19 (2.3)</td>
<td>0.28</td>
</tr>
<tr>
<td>Major thromboembolism or major bleeding or death</td>
<td>25 (3.9)</td>
<td>24 (2.9)</td>
<td>0.33</td>
</tr>
</tbody>
</table>

*Any one of first seven secondary outcomes: ischaemic stroke, transient ischaemic attack, symptomatic myocardial infarction, peripheral embolism, valve thrombosis, venous thromboembolism (pulmonary embolism or deep vein thrombosis), or vascular death.
†Any one of first seven secondary outcomes: ischaemic stroke, transient ischaemic attack, symptomatic myocardial infarction, peripheral embolism, valve thrombosis, venous thromboembolism (pulmonary embolism or deep vein thrombosis), or vascular death.

CORRECTION

Accuracy of the Hospital Anxiety and Depression Scale Depression subscale (HADS-D) to screen for major depression: systematic review and individual participant data meta-analysis

In this paper by Wu and colleagues (BMJ 2021;373:n972, doi:10.1136/bmj.n972, published 10 May 2021), the abstract should have stated 22 574 participants rather than 25 574 participants.