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Covid-19 in remote and rural communities

In this policy briefing, we describe how population age and location could affect regional Covid-19 death rates in the UK. Our findings show significant differences in the projected death rates between the constituent countries of the UK, between its regions and within regions. This is mainly due to older and younger people living in different areas. With small towns and rural areas generally comprised of older communities, they could see heavy population losses if the virus spreads widely across the UK.

Studies have already shown that countries with older populations are likely to see higher hospitalisation and mortality (death) rates than those with young people during the Covid-19 pandemic. Population age structure varies across countries, but even more so within countries' regions. A recent study from the UK shows a substantial separation between young and old age groups in where they live. This 'spatial segregation' between young and old may limit the spread of the virus within the UK. However, it is also clear that it will make some communities more vulnerable to the Covid-19 pandemic than others.

Key Points:

- *Death rates from Covid-19 could be between 50% and 80% higher in rural communities and remote small towns than in large urban areas.*

- *Within urban regions, there are also 'pockets' of high projected death rates.*

- *Overall, the areas with high and low fatality rates tend to be clustered. This is because, in the UK, older and younger age-groups tend to live in different residential areas.*

Introduction

The rapid spread of Covid-19 has become a major public health threat and challenge for many countries. Studies show that hospital admissions and deaths from Covid-19 vary significantly across population subgroups. The objective of our study is to investigate how mortality from Covid-19 is expected to vary across spatial units in the UK and to identify vulnerable communities.

Main findings

Regional patterns

We calculated the number of expected deaths in Great Britain (England, Wales and Scotland) by geographical units using age-specific infection fatality rates by sex and different infection prevalence rates. As expected, we saw clear spatial patterns. Overall, the projected death rates are much lower in the major UK cities and their surrounding areas, i.e. London, Bristol, Cardiff, Birmingham, Manchester, Liverpool, Glasgow and Edinburgh (see Figure 1 for England and Wales opposite). These are all areas with a relatively young population. In contrast, the projected mortality rates are high in small towns and rural areas. The settlement geography of Britain also leads to distinct regional patterns. We project relatively high fatality rates in large areas of South-West England (in Devon and Cornwall, also in Somerset and Dorset), in Central and North Wales and Northern England (Cumbria, Northumbria and North Yorkshire).

Interestingly, expected death rates are also high in some coastal areas of East and South-East England (e.g. Norfolk and Sussex). This shows the spatial clustering of old (and very old) populations. In Scotland, fatality rates are high in Southern Scotland (Dumfries and Galloway, South Ayrshire and Scottish Borders) and in North-West Scotland (Highlands and Islands).

Urban-rural variation

We also calculated infection fatality rates by area type, separately for England and Wales, and for Scotland. We did this using the ONS and NRS urban-rural classifications of lower census output areas. The analysis shows that most deaths are expected to occur in urban areas. This is not surprising as the majority of the UK's population lives in cities. However, a different picture emerges when we calculate the number of expected deaths relative to the population size. Projected death rates from Covid-19 are significantly higher in small towns and rural settlements. The highest death rates are projected in remote small towns and rural areas. Infection fatality rates there are as much as 80% and 50% higher than those in major urban areas in England and Scotland, respectively.

Conclusion

In many industrialised countries, including the UK, there is significant separation between where older and younger people live. If we know how the infection fatality rates vary by age, we can calculate expected death rates in geographical units if the virus spreads widely across the country.

The analysis showed that the projected infection fatality rates are high in small towns and rural areas. These include large parts of South-West England, coastal areas of South-East England, Central and North Wales, Northern England, Southern Scotland and North-West Scotland, all regions with relatively older populations. In contrast, projected mortality rates are low in the major UK cities and their surrounding areas where the majority of people are young or middle-aged.

Overall, the absolute number of deaths is still expected to be the largest in urban areas where most of the UK's population lives. However, the death rates (or the number of expected deaths per 1,000 population) are projected to be 50-80% higher in remote small towns and rural areas than in large urban areas. Our analysis shows that, within urban areas, there are 'pockets' with high projected death rates. This suggests that different age groups also live separately within metropolitan areas.

Policy implications

The study identifies areas where people are at high risk because of their characteristics (i.e. old age). Policy-makers can use the findings to find ways of reducing transmission of the virus to these communities. This information could also be used by the NHS to plan resource allocation if the pandemic is to last a long time, and the virus is to spread to all corners of the UK.

Our study also warns of the long-term socio-cultural impacts of the pandemic in addition to short-term public health and economic effects. If the virus spreads to remote communities in the Scottish Highlands and Islands, Central and North Wales, and Cornwall, with relatively old populations, the Welsh-, Gaelic- and Cornish-speaking populations are projected to experience heavy population losses. In the case of the two latter groups, this could challenge the very existence of these unique linguistic communities with long histories.

In considering protective measures during the pandemic crisis and beyond, policy-makers should be aware of these age- and geography-related differences in projected fatality rates. Their strategies should be adjusted accordingly to protect the most vulnerable and to ensure the future of

at-risk communities. When easing or lifting restrictions, the location of communities at high risk have to be carefully considered. There are pockets with elderly communities within the cities (e.g. care homes), but there are also wider urban-rural and regional divisions. Currently, the virus is not widely spread there. However, if the restrictions are lifted and the virus is taken to these communities, the effect may be devastating because of their old population composition.

Re-opening or easing restrictions should happen gradually, and vulnerable populations and communities must be protected. Currently, many remote and rural areas have low infection rates. Therefore, there could be more movements within these and other communities provided that new infections are rapidly detected, traced, and individuals self-isolated. Larger movements between areas and neighbourhoods may be a risk factor until the infection levels are low everywhere in the UK.
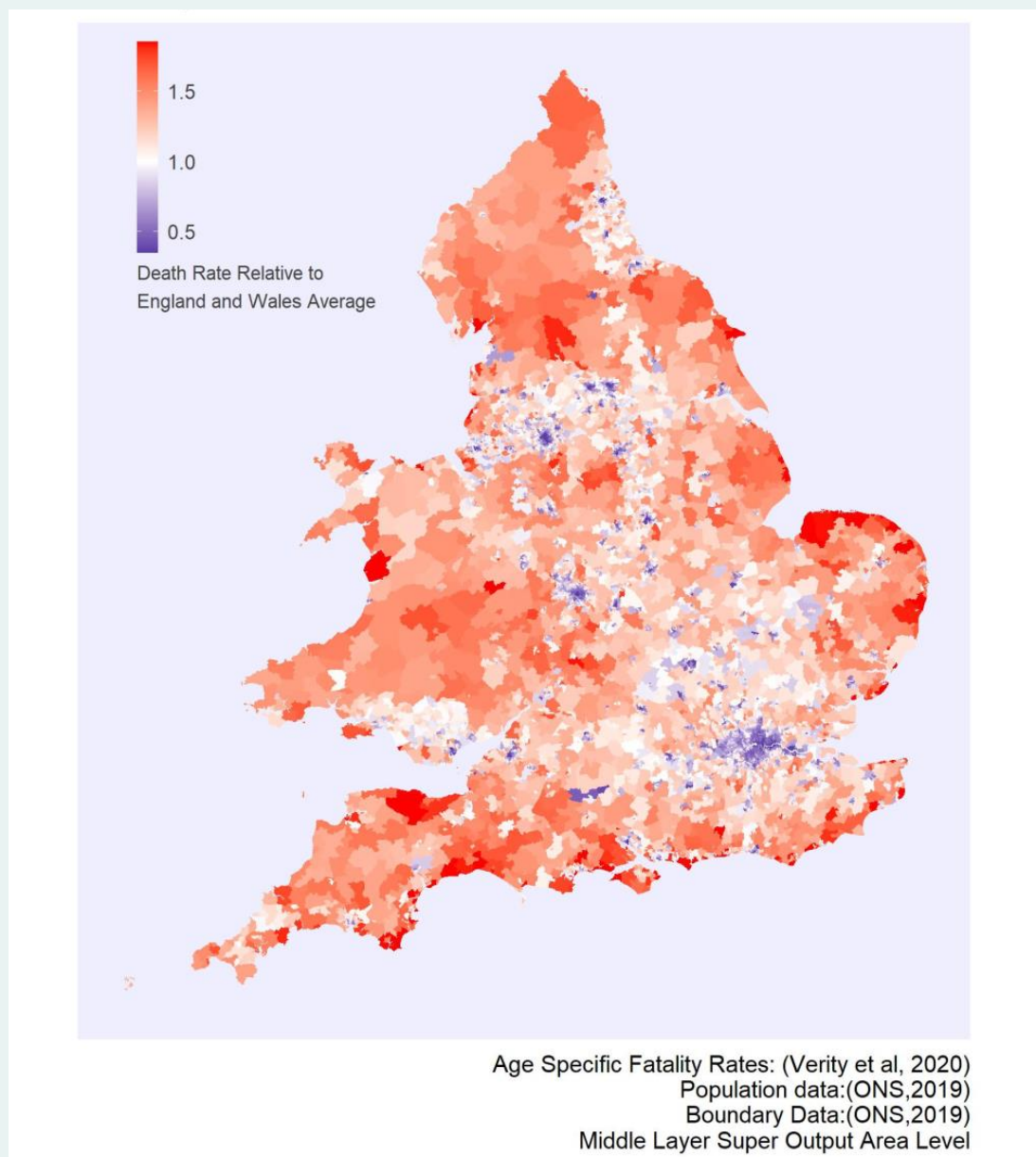

Age Specific Fatality Rates: (Verity et al, 2020)
Population data:(ONS,2019)
Boundary Data:(ONS,2019)
Middle Layer Super Output Area Level

Figure 1: Estimated relative death rates from Covid-19 England and Wales

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