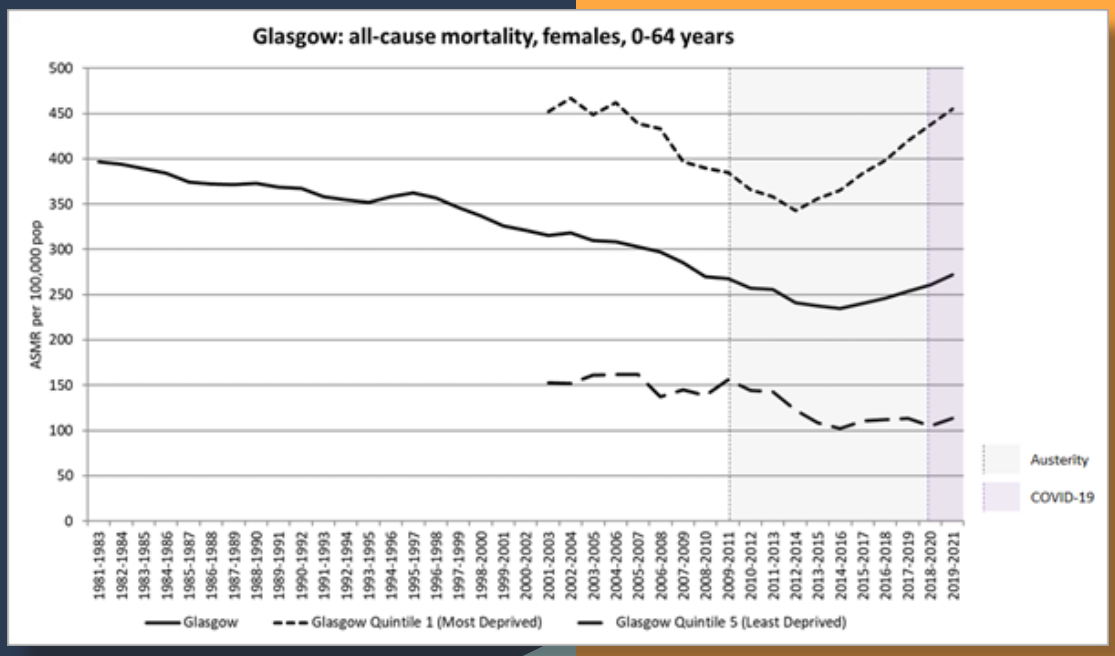
Changing mortality rates in Scotland and the UK

an updated summary



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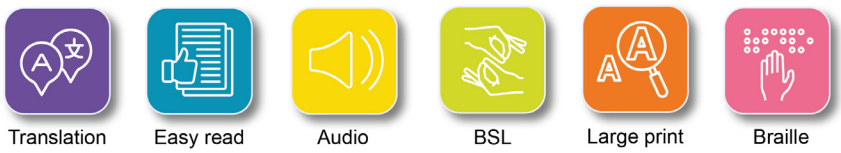

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Contents

Summary

There is now a large body of evidence detailing the unprecedented changes to mortality rates that have taken place in Scotland, and across the wider UK, in the past ten years. These trends, including increasing death rates among poorer communities and the end to decades of previously continual improvement at country level, predate the COVID-19 pandemic, but have been made worse by it.

Detailed research has attributed these changes principally to the implementation of UK Government austerity policies which have adversely impacted on the health of poorer populations across the UK. Since we published a critical assessment of all that evidence in 2022, yet more important research has emerged in the academic literature.

This paper:

(1) briefly summarises that new evidence for a wide audience; and

(2) updates previously-published mortality trends for Scotland and its largest cities to include the most recent years of data available.

In doing the above this paper provides further evidence of detrimental changes to different aspects of population health: further widening of all-cause and cause-specific mortality inequalities, a dramatic reversal of previously declining mortality rates among socioeconomically deprived populations, an unprecedented decline in healthy life expectancy, and worsening trends in poor mental health. The (much smaller) contribution of obesity to stalled national mortality trends is also quantified.

The changes, and the causes of the changes, to population health in Scotland and the UK are now very clear; the required policy responses from different governments are also very clear. Political will and action to implement those policies is urgently required.

Background and aims

Much has been published recently regarding the hugely concerning, unprecedented, changes to mortality rates[i] that have been observed across all parts of the UK since around 2012: stalled improvement at country level, increased death rates among poorer populations, and a considerable widening of inequalities.

This material includes a comprehensive report (and accompanying animation) published by the Glasgow Centre for Population Health (GCPH) and the University of Glasgow (UoG) in May 2022: this highlighted the large body of evidence, both international and from within Scotland and the UK, that has attributed these changes to the effects of the UK Government austerity policies that were first introduced in 2010 and which have impacted particularly on poorer populations by means of cuts to both social security payments and to vital public services[1-3].

Since then, yet more important evidence has emerged, and more years of mortality data are available to analyse. Given that, the aims of this paper are twofold:

- To very briefly summarise the findings of new, relevant, research that has been published recently in the academic literature.
- To update previously-published mortality analyses to cover (1) the period prior to the COVID-19 pandemic (i.e. up to the end of 2019) and (2) the two years of the pandemic (i.e. up to the end of 2021).

[i] Note that, for simplicity, in this summary we refer principally to (age-standardised) mortality rates (ASMRs). However, a number of the studies referred to in the paper use related measures such as life expectancy. Both ASMRs and life expectancy estimates are calculated from exactly the same mortality and population data: they are just different ways of expressing the same information.

Methods

We summarise recently published work in which we (GCPH and colleagues) have been involved, as well as other relevant material published by others: the latter material has been identified from ongoing research activities which have included literature searches.

The updated analyses use mortality and population data from the National Records of Scotland. Age-standardised mortality rates (ASMRs) were calculated for (1) all ages and (2) 0-64 years. This was done at national (Scotland) and city (Glasgow, Edinburgh, Aberdeen, and Dundee) level for all-cause deaths, and for different individual causes. Analyses were undertaken by socioeconomic deprivation quintile using both national, and city-specific quintiles (i.e., based on dividing each city's population into fifths according to level of deprivation) of the Scottish Index of Multiple Deprivation (SIMD)[4]. Analyses cover the years 1981-2021, and update previously published analyses – full details of all definitions and methodologies employed are included in the above mentioned publication[5].

Results 1 – Updated evidence on the causes of the changed mortality trends

In this section we briefly highlight some of the relevant evidence that has emerged in recent times. We do this in two parts. First, the 'what we already know' box below summarises the main findings of the GCPH/UoG report published last year: that report was based on a critical assessment of all available evidence at the time of writing. Second, we briefly synthesise evidence published since publication of that report.

What we already know[1]

- Prior to the early 2010s, mortality rates had improved consistently across all nations of the UK for a great many decades: the only major exceptions to this were periods of pandemic or war.
- However, around 2012 improvements at country level either slowed or stopped, and death rates among the 20% most socioeconomically deprived populations actually increased.
- These changes have been observed for males and females, almost all age groups, and in relation to many different causes of death.
- International evidence has shown that different forms of austerity policies (in effect, cuts to public spending[ii]) have detrimental impacts on population health.
- In the UK, the 'dose' of austerity has been particularly severe: under the Conservative-Liberal Democrat coalition, the UK Government sought to cut approximately £85 billion from public spending, including tens of billions from social security; a large body of evidence has associated these cuts with the changes to mortality rates.

[ii] Note that austerity is usually associated with/described as cuts in public spending, but in economic terms it is much more specifically measured as the government's fiscal balance of expenditure and revenue after accounting for changes in unemployment. Austerity in the UK, introduced in 2010, has been dominated by cuts to public spending, particularly local government and social security.

Evidence demonstrates how the cuts have impacted on population health through well-understood causal pathways involving increased poverty, loss of important services, higher levels of stress and poor mental health among affected populations, increased death rates for various age groups (including some associated with changes to health and social care) and for different causes (including those associated with important services such as addictions), and ultimately changes to overall mortality rates and life expectancy, especially among poorer and more vulnerable populations.

Newly published evidence

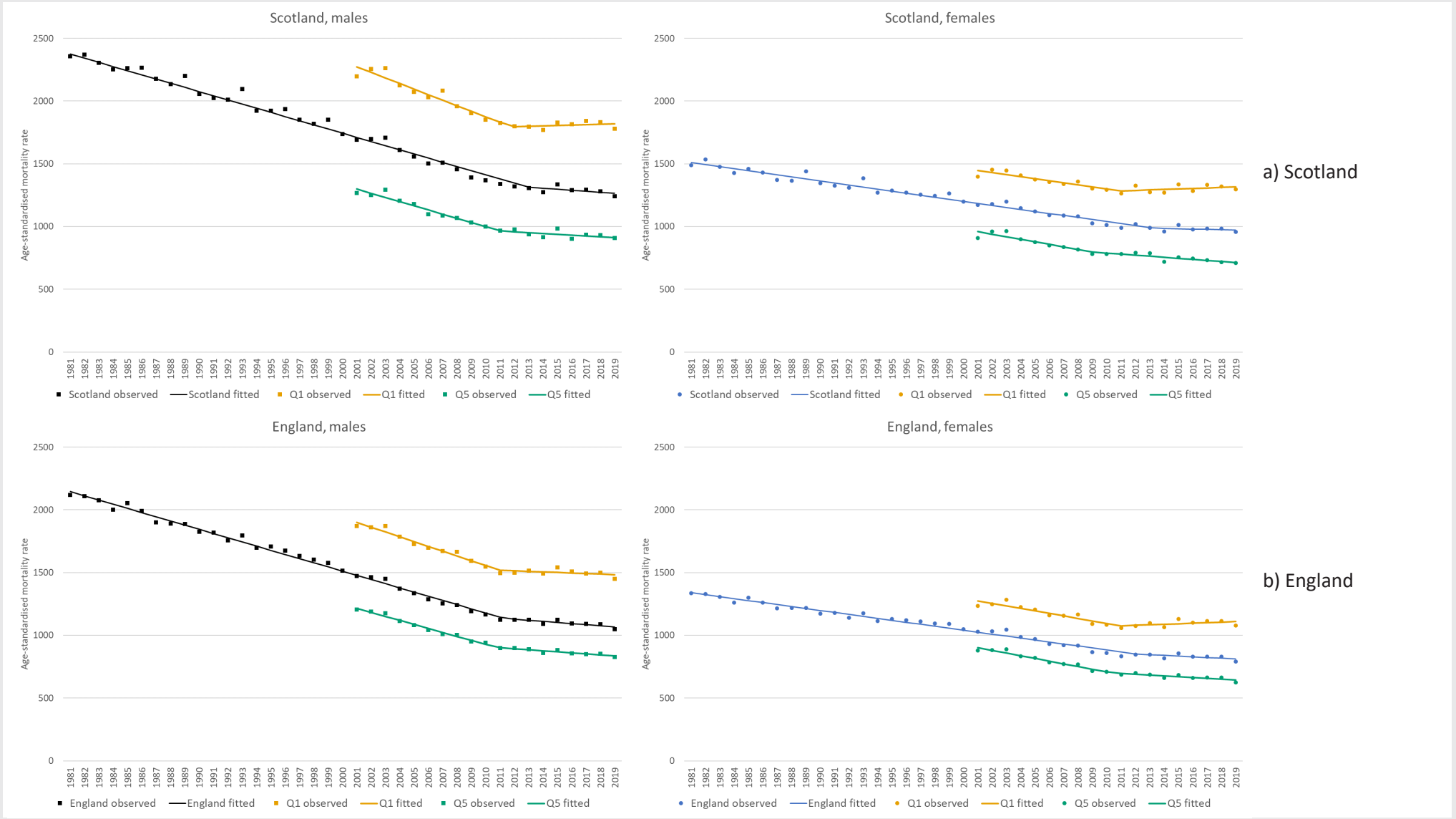
Austerity and mortality in high-income countries:

The results of a complex and detailed set of analyses were published in the *Social Science & Medicine journal* towards the end of 2022[6]. These demonstrated that wherever austerity has been implemented in high-income countries, it has had a negative impact on mortality rates. This is important context in which all the Scottish and UK evidence sits.

Quantifying the mortality changes:

Analyses published in the *Journal of Epidemiology & Community Health (JECH)* in late 2022 showed that compared to what previous long-term trends predicted, an additional c.335,000 deaths occurred in Scotland, England and Wales between 2012 and 2019[7].
The study also sought to examine if there were differences between males and females in terms of when and to what extent mortality changes occurred. Those results were mixed: there was little difference in terms of when rates changed, but rates worsened to a greater degree among females living in the 20% most deprived areas of Scotland and England. **Figure 1** is taken from those analyses and shows the changes in rates that have taken place, particularly among the most deprived populations of both Scotland and England.

Figure 1. *Age-standardised mortality rates (all ages), 1981-2019, (a) Scotland (b) England and their 20% most and least deprived population*[iii].



[iii] On each of the four charts, the dots or squares represent the observed mortality rate in each year; the lines represent the fitted regression lines for the trends – these were included as part of the statistical analyses (segmented regression) to identify when changes ('break points') in the trends took place. Q1 and Q5 represent the most and least deprived quintiles (20% of the population) of each country's population respectively.

Publication imminent

Austerity and mental health:

Descriptive analyses of trends in poor mental health ('psychological distress') in Great Britain will be published in *JECH* in early 2023[8]. The trends broadly mirror those of mortality rates, with a worsening of poor mental health in the population (especially at younger ages) since the implementation of austerity policies (and prior to the COVID-19 pandemic). Given that we would expect to see impacts on morbidity as well as mortality, this is important additional information and reinforces the findings of other recent UK research into the adverse impact of austerity on mental health in the population[9-12].


Trends in healthy life expectancy in the age of austerity

David Walsh, Grant M A Wyper, Gerry McCartney

Trends in healthy life expectancy:

In 2022 we published analyses of long-term trends in healthy life expectancy (HLE) in Scotland[13]. HLE is a measure which combines mortality data with survey-based information on the general health of the population, thereby providing an estimate of the average number of years that people are currently living in good health. The analyses showed a striking decreasing trend in HLE, with a drop of around two years of HLE observed between 2011 and 2019: in a high-income country such as Scotland, this is quite a remarkable finding. The more pronounced decline among people living in the more deprived areas of Scotland means that prior to the pandemic, people in those communities were only living, on average, around 47 years in good health. Some of the trends are shown in **Figure 2**.


BMJ Open

How much of the stalled mortality trends in Scotland and England can be attributed to obesity?

David Walsh, Elaine Tod, Gerry McCartney, Kate Ann Lewin

The role of obesity:

The assessment of evidence undertaken for the 2022 GCPH/UoG report suggested that alongside UK Government austerity policies – the principal cause of the deterioration in mortality rates – a small proportion of the changes might also be attributable to earlier (pre-austerity) increases in levels of obesity in the population. In a paper published at the end of 2022 in *BMJ Open*, we sought to quantify this contribution[14]. This estimated that, in Scotland, between 10% (males) and 14% (females) of the mortality changes observed

at national level might be attributable to the changes in body mass index (BMI) – including increases in obesity – that occurred between the mid-1990s and late 2000s. For England, the figures were higher: 20% and 35% respectively. However, our paper noted that, for a number of reasons, these were likely to be overestimates.

Figure 3 shows some of the results of the analyses. These are for males aged 35-89 years in Scotland (3a) and England (3b), and show: the observed mortality rates for 1991-2019 (red dots); the predicted mortality rate for 2010-19 based on the previous trend since 1991 (black line); and the BMI-adjusted mortality rate (blue dots) – this can be interpreted as the mortality rate that would have been expected if the pre-austerity changes to BMI (including obesity increases) had not taken place. For both populations, the divergence between the predicted and observed mortality rates is clear; and although the BMI-adjusted rates are lower, a large gap remains – thus only a small proportion of the overall difference is 'explained'.

Figure 2. *Healthy life expectancy (HLE), Scotland and 20% most and least deprived populations 1995-2019.*

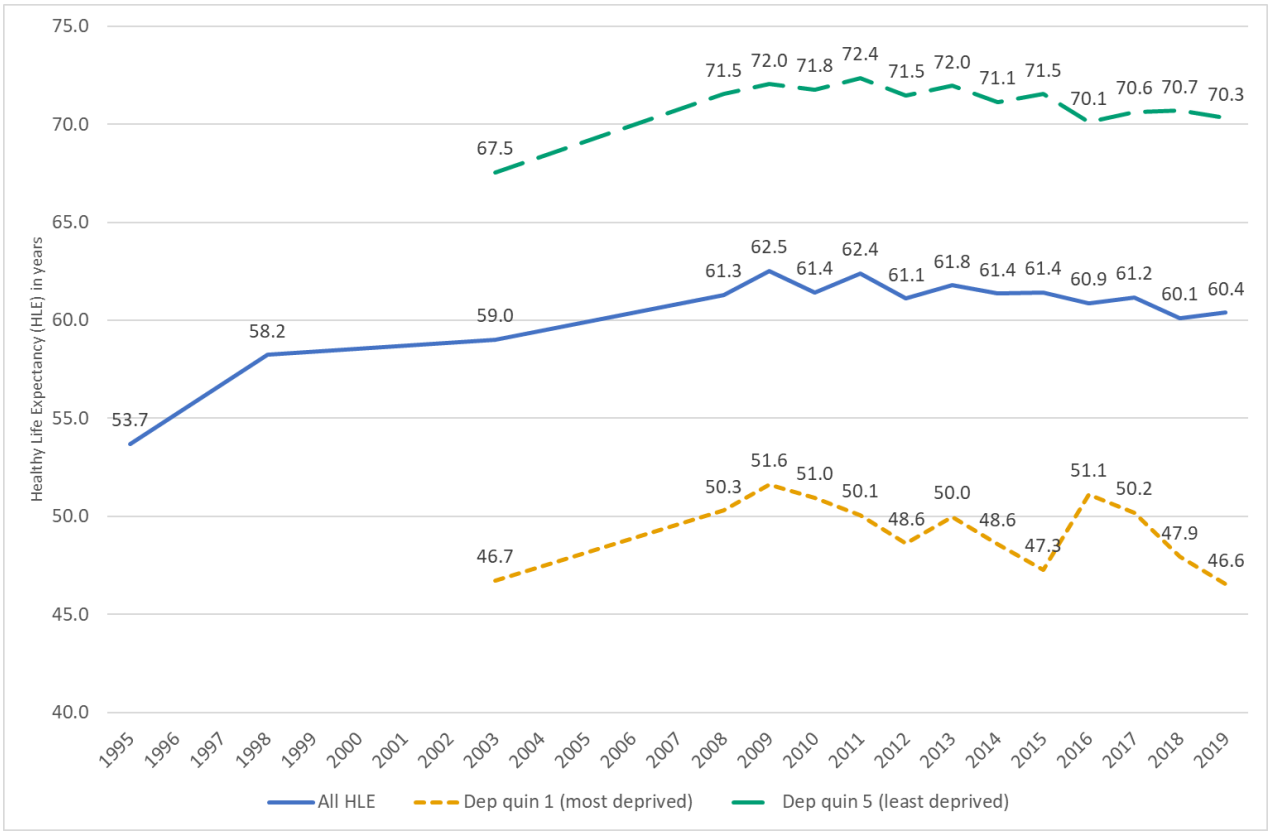
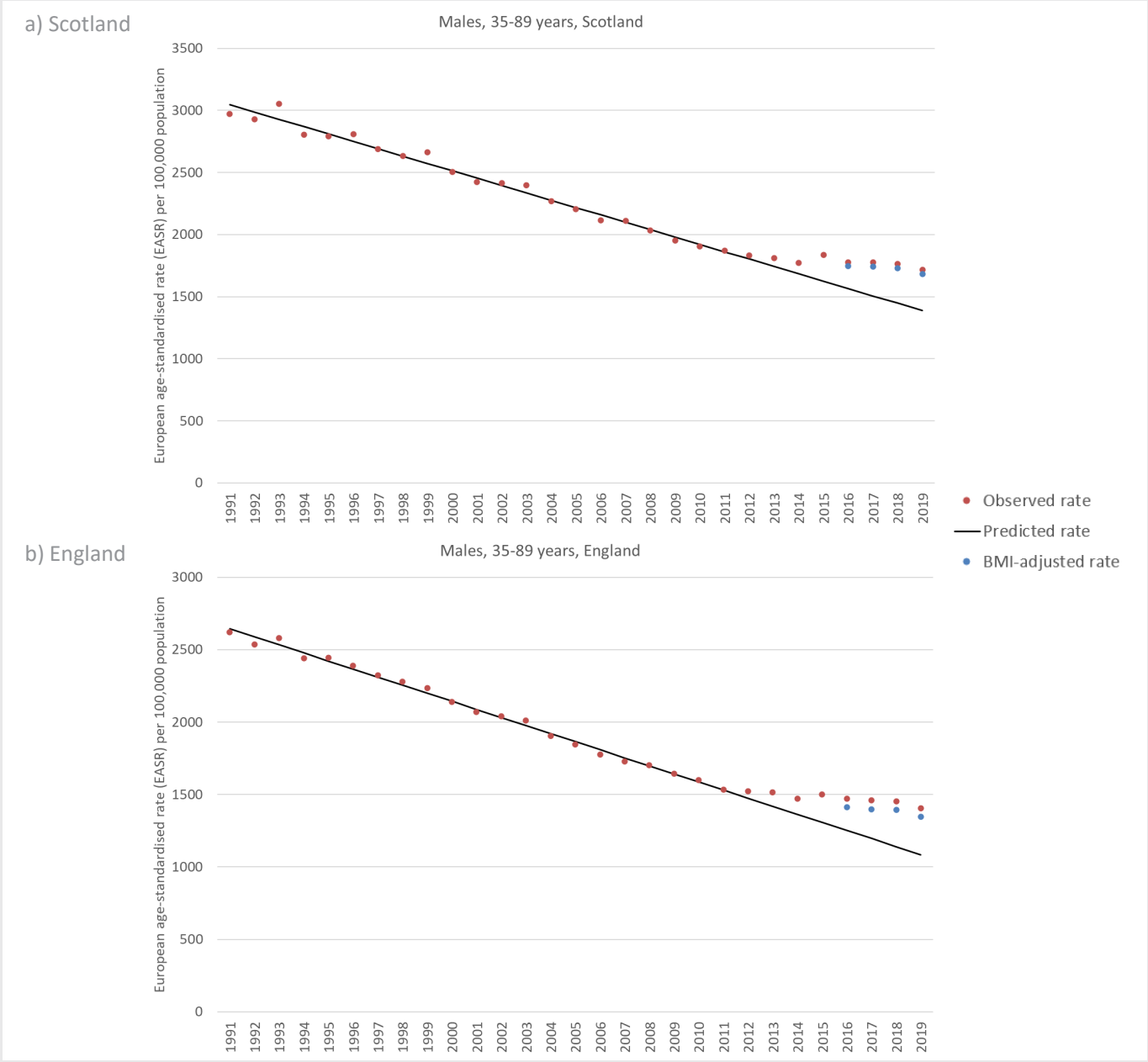


Figure 3. *Observed, predicted and BMI-adjusted age-standardised mortality rates, males 35-89 years, Scotland and England 1991-2019. Note slightly different y-axis scales.*



All of this new research adds to the already large evidence base. Much of the existing evidence was included in the 2022 GCPH/UoG report. This included: descriptive analyses of the mortality changes observed across different parts of the UK (discussed earlier in this paper) [5, 15-23]; research into the composition, scale and geographical impact of the UK Government's austerity cuts [24-26]; evidence of the impact of austerity on poverty and associated social determinants of health [27-30]; and research demonstrating the causal impact of austerity policies on overall mortality and life expectancy [31-34], mortality at different ages [35] and for particular causes [36-38], child health outcomes [39, 40], and poor mental health [9-12].

Since publication of the report, yet more evidence has come to light, including research demonstrating the association between local government funding cuts and multimorbidity in England[41], the role of 'welfare reform' in increasing food bank use[42], and further evidence of the negative impact of social security cuts (in this case the 'benefit cap') on mental health in the population[43].

Future publications

In addition to all the above, we intend to publish further relevant research in 2023. This includes the results of a **systematic review** of all the international evidence of **the link between austerity and population health outcomes**[44], as well as analyses of the association between **social security cuts and changes to life expectancy**[45] across all local authority areas of Great Britain. Further details can be obtained from the contact information provided in this paper.

Results 2 – Updated mortality analyses

In this section we present the results of updated mortality analyses, with selected results for Scotland and the country's four largest cities. Analyses cover the period 1981-2021, with age-standardised mortality rates (ASMRs) presented as three-year rolling averages. These are updates of previously published material[5]. Periods including austerity (2010 onwards) and the COVID-19 pandemic (2020-21) are highlighted.

The results are presented in three sections:

- All-cause mortality;
- Trends in what have been referred to as the 'diseases of despair' [46, 47], (suicide, and alcohol- and drug-related mortality), as these have been a particular focus of discussion, both in the academic literature and in the media;
- Other common causes of death.

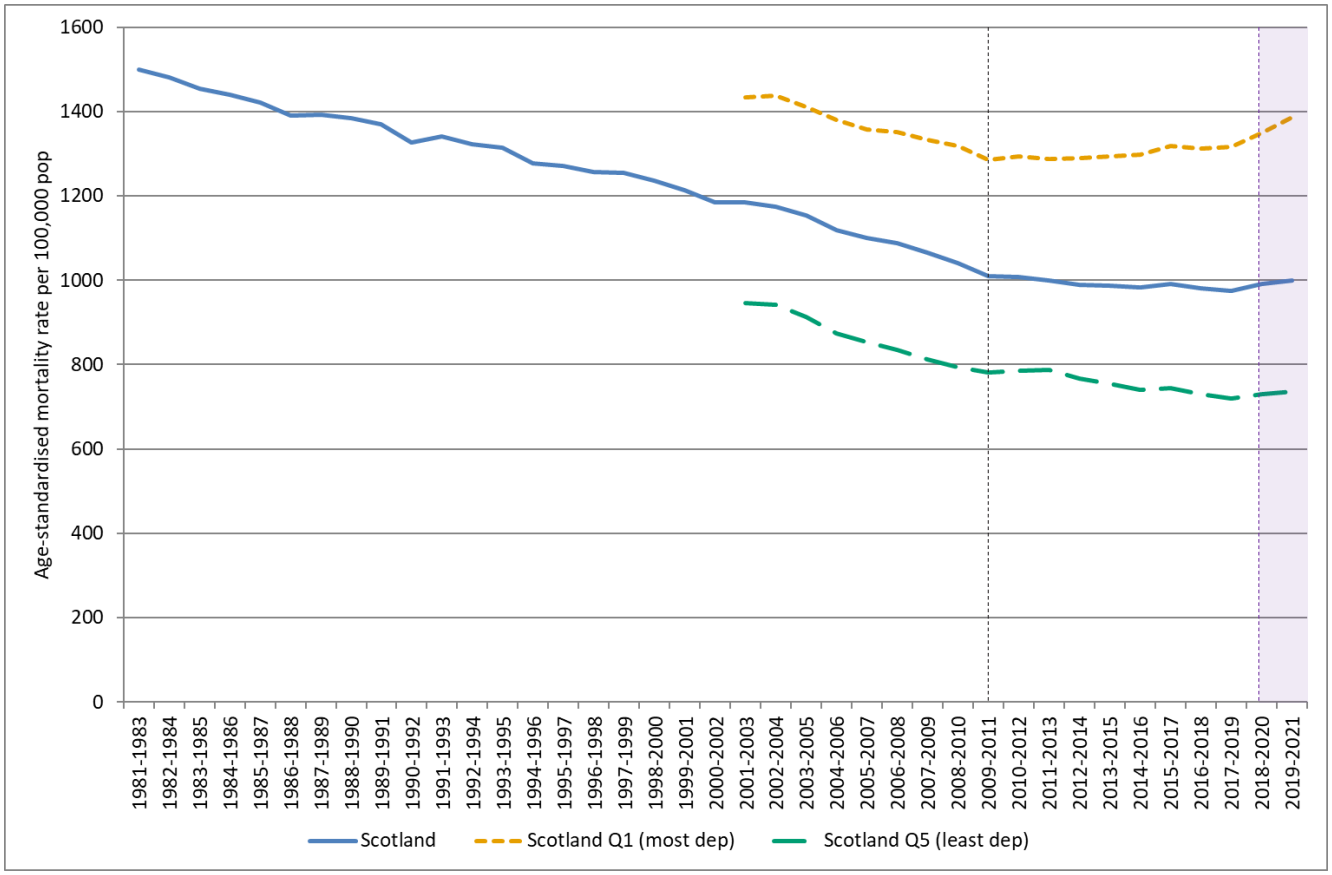
Note that in all charts, the black dotted line represents the start of the period of austerity policies introduced by the UK Government, and the purple dotted line (and shading) marks the period which includes deaths from COVID-19.

Trends in all-cause mortality

All age mortality

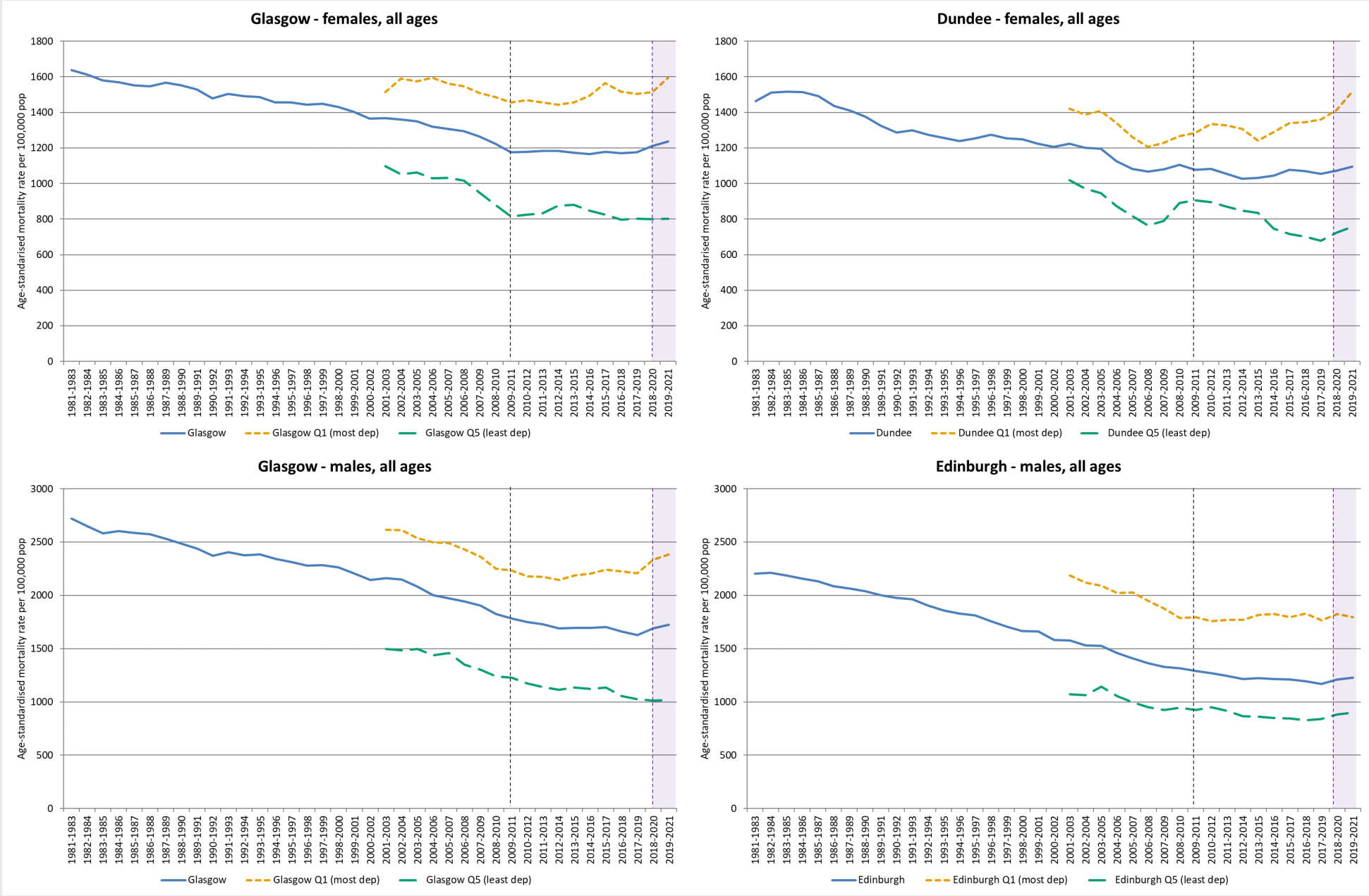
The dramatic changes to all-cause mortality in Scotland in recent years can be clearly seen in **Figure 4**: even prior to the most recent mortality increases associated with COVID-19, the whole population had, from 2009/11 onwards, experienced a stalling of previous improvement while, at the same time, mortality rates among those living in the 20% most socioeconomically deprived areas increased notably. This figure is for females; very similar trends have been seen for males.

Figure 4. *Age-standardised all-cause mortality rates (females, all ages), three-year rolling averages, Scotland 1981-2021.*



Given the smaller population sizes and fewer numbers of deaths, there tend to be much greater fluctuations in mortality rates at city level, and this can make the discernment of clear trends more difficult. Nonetheless, a similar worsening of mortality among poorer populations (and associated widening of inequalities) was apparent in the majority of analyses undertaken. For example, **Figure 5** shows similar all-age mortality trends for females in Glasgow and Dundee (top), and for males in Glasgow and Edinburgh (bottom).

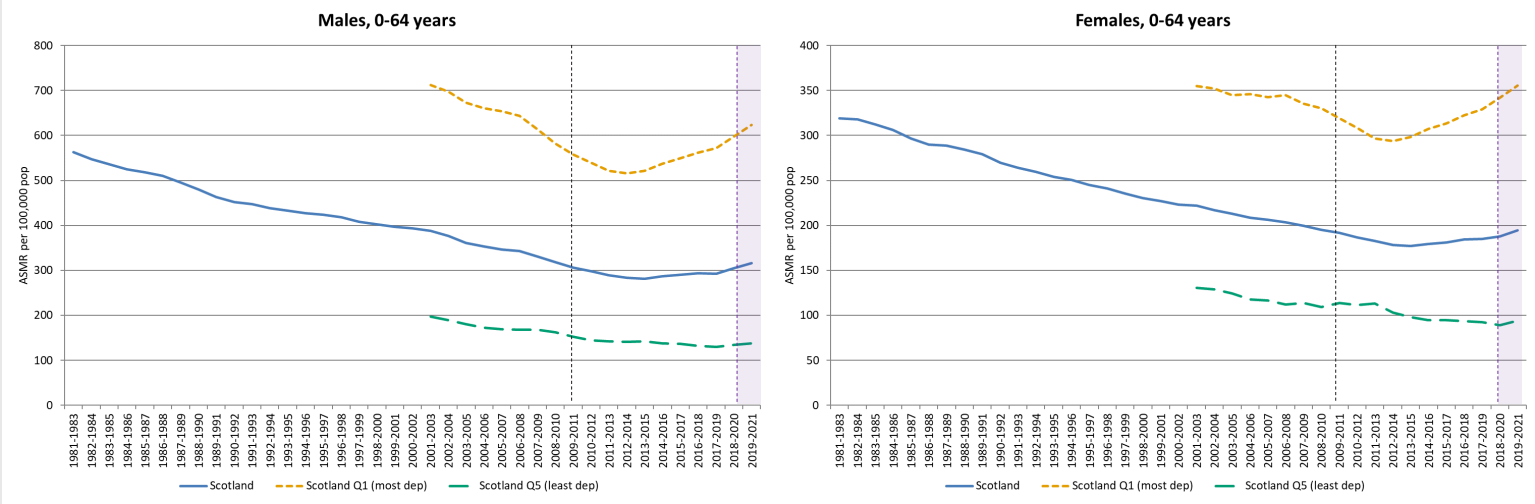
Figure 5. *Age-standardised all-cause mortality rates (all ages), three-year rolling averages, Glasgow and Dundee (females), Glasgow and Edinburgh (males), 1981-2021. Note different y-axis scales for males and females.*



Premature mortality (0-64 years)

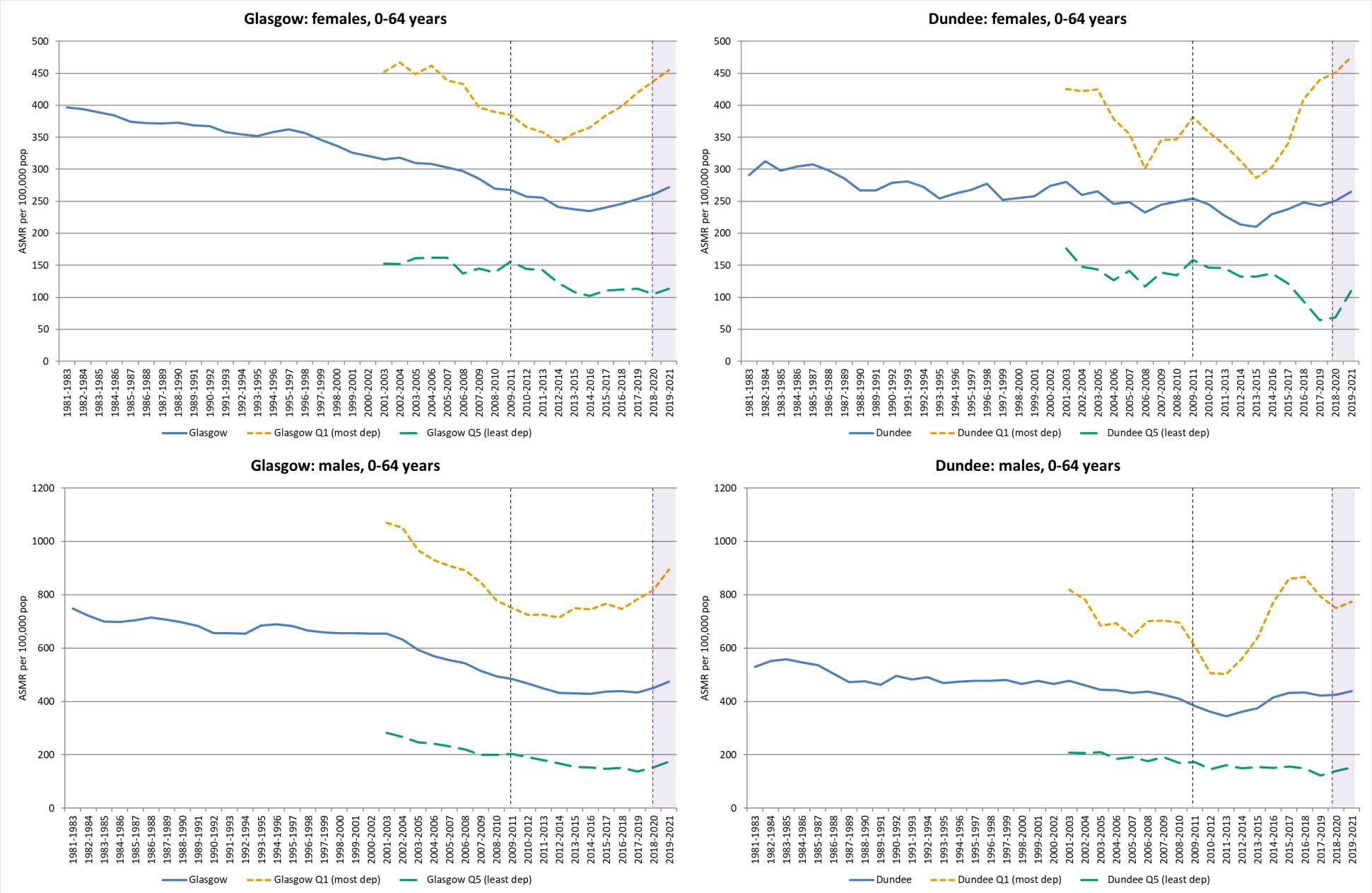
As highlighted in previous publications[1, 5], in Scotland mortality rates have worsened to a greater degree among those aged under 65 years (premature mortality): this is seen both in terms of more sharply increasing death rates among more deprived populations, but also in terms of increases (rather than merely a stalling of improvement) at national level. Both these dramatic changes can be seen for both males and females in **Figure 6**, with the reversal of previously falling mortality rates among the most deprived quintile particularly striking.

Figure 6. *Age-standardised all-cause mortality rates (0-64 years), three-year rolling averages, Scotland, 1981-2021.*



As stated, at city level mortality rates fluctuate to a much greater extent. However, the sharp increases in rates among those living in the 20% poorest neighbourhoods can be seen very clearly in different parts of Scotland, particularly Glasgow and Dundee. Trends for both cities for females (top) and males (bottom) are shown in **Figure 7**. In Glasgow, the striking change in mortality rates among those living in the city's more deprived areas means that death rates are now higher than they were 20 years ago. The same is true of Dundee, although rates have obviously fluctuated to a much greater degree.

Figure 7. *Age-standardised all-cause mortality rates (0-64 years), three-year rolling averages, Glasgow and Dundee, 1981-2021.*

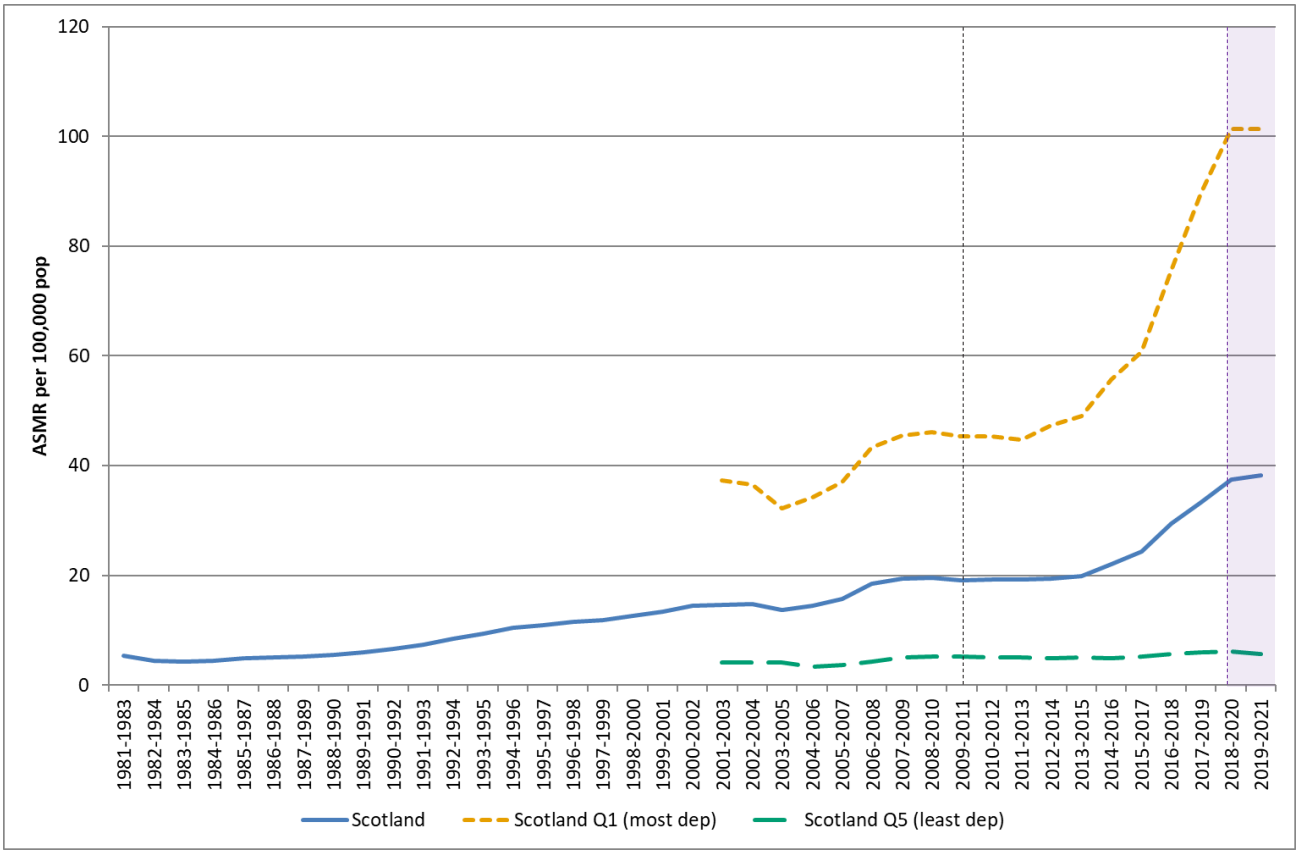


Deaths from alcohol, drugs and suicide

Drug-related deaths

Some (but not all) of the increases in premature mortality (0-64 years) that have been observed in Scotland in the last decade can be attributed to increases in drug-related deaths[1]. Although rates of death for this cause have increased over many years (as has been well documented), it is important to understand that the particular sharp increases in the most recent period have also shown to be influenced by austerity policies[1, 36-38]. A very similar trend to that shown for males in Scotland in **Figure 8** below has been seen in all four cities, and for both males and females (those data not shown here).

Figure 8. *Age-standardised mortality rates for drug-related poisonings*[iv] *(males, all ages), three-year rolling averages, Scotland, 1981-2021.*



[iv] As explained in the original publication, the definition of drug-related poisonings used in these analyses is broader and less precise to that used by the National Records of Scotland in their analyses of drug-related deaths. The absolute number of drug-related poisonings tends to be slightly higher than the number of officially-recorded drug-related deaths; however, the broad trends are very similar[5].

Alcohol-related deaths

Analysis of trends in alcohol-related mortality produces a very complicated picture. At the national level (**Figure 9**), there was a sharp increase in mortality rates in the early 1990s, peaking in the early-to-mid 2000s. Rates then decreased year on year until c.2012 when they started to increase once more; these changes were even more dramatic among more deprived populations. **Figure 9** shows the trend for males; the overall trend for females is very similar (although with lower death rates across the period). Broadly similar trends for males can be seen in Glasgow and Edinburgh (**Figure 10**); there is huge fluctuation in rates in the other two cities (data not shown here).

Figure 9. *Age-standardised mortality rates for alcohol-related causes (males, all ages), three-year rolling averages, Scotland, 1981-2021.*

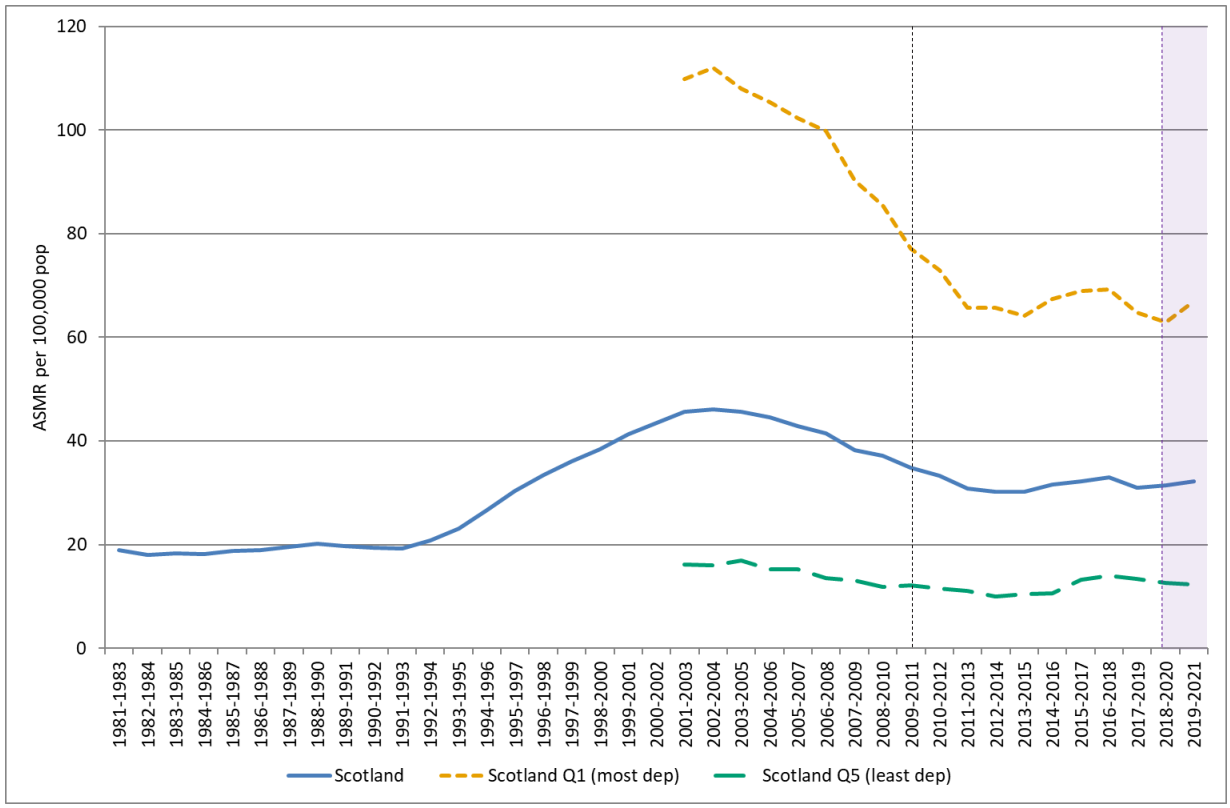
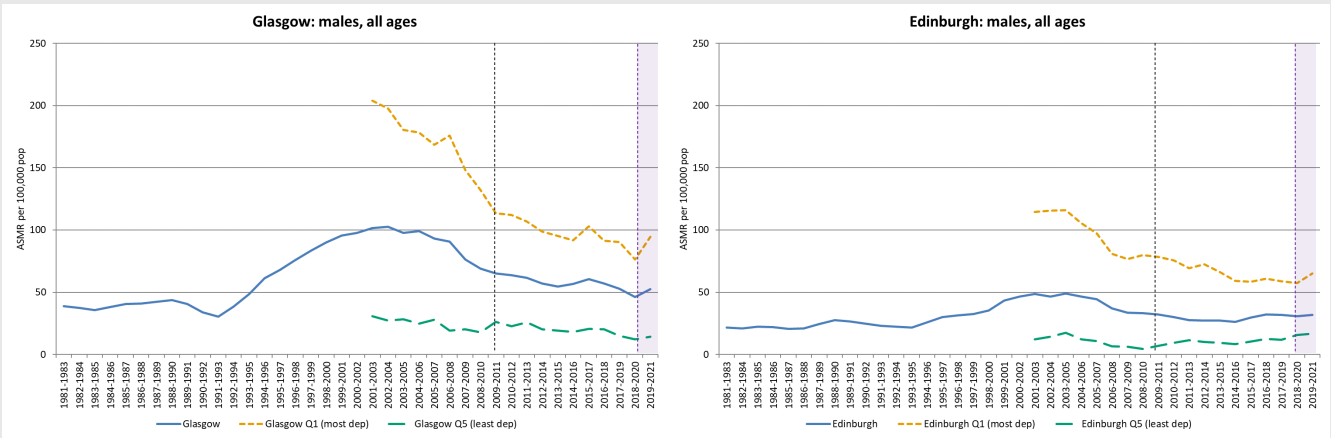


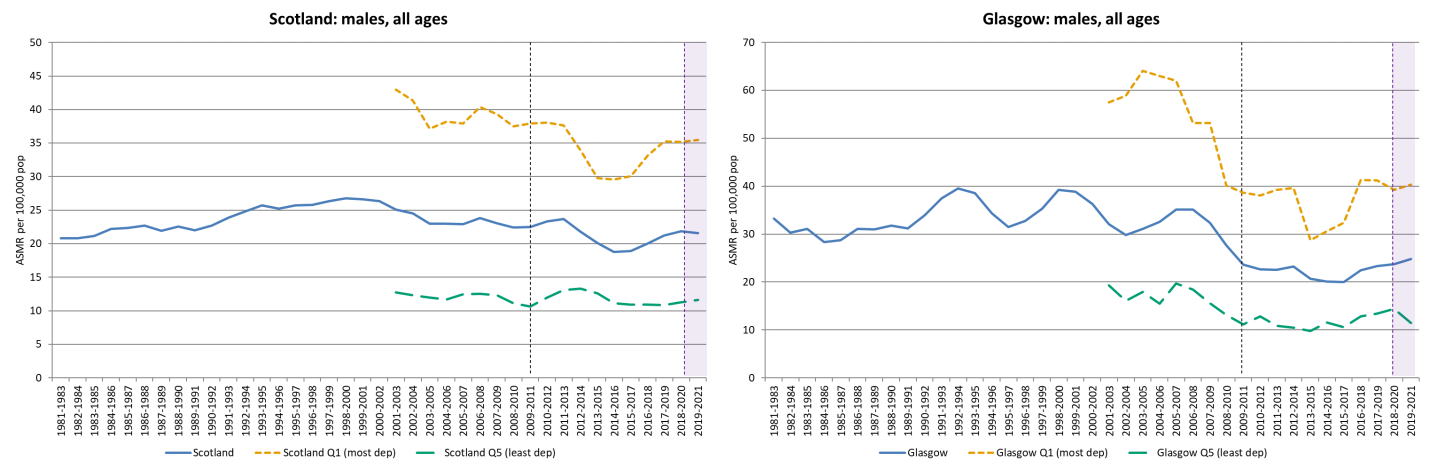
Figure 10. *Age-standardised mortality rates for alcohol-related causes (males, all ages), three-year rolling averages, Glasgow & Edinburgh, 1981-2021.*



Suicide

Even at the national level, mortality rates for suicide can fluctuate considerably, making interpretation problematic. Among males in Scotland (**Figure 11**), previously increasing trends started to decline in the early 2000s. However, there was an increase in rates – particularly notable among those living in the 20% most deprived neighbourhoods – from the mid-2010s; whether this marks the start of a longer upward trend, or merely reflects further fluctuation caused by relatively small numbers, is currently unclear. Broadly similar trends – but with much greater fluctuation in rates – can be observed for males in Glasgow (also **Figure 11**). Fluctuation of rates is even more marked for females (data not shown).

Figure 11. *Age-standardised mortality rates for suicide (males, all ages), three-year rolling averages, Scotland and Glasgow, 1981-2021.*



Common causes of death

In the original country- and city-based mortality analyses (published in 2020, and using data up to 2017)[5], we showed a worsening of mortality rates among the most deprived populations in the most recent period (and a resulting widening of inequalities) for the vast majority of causes of death examined. This reflects other published evidence that the austerity-driven changes in mortality have been observed for almost all causes of death[1, 20, 21].

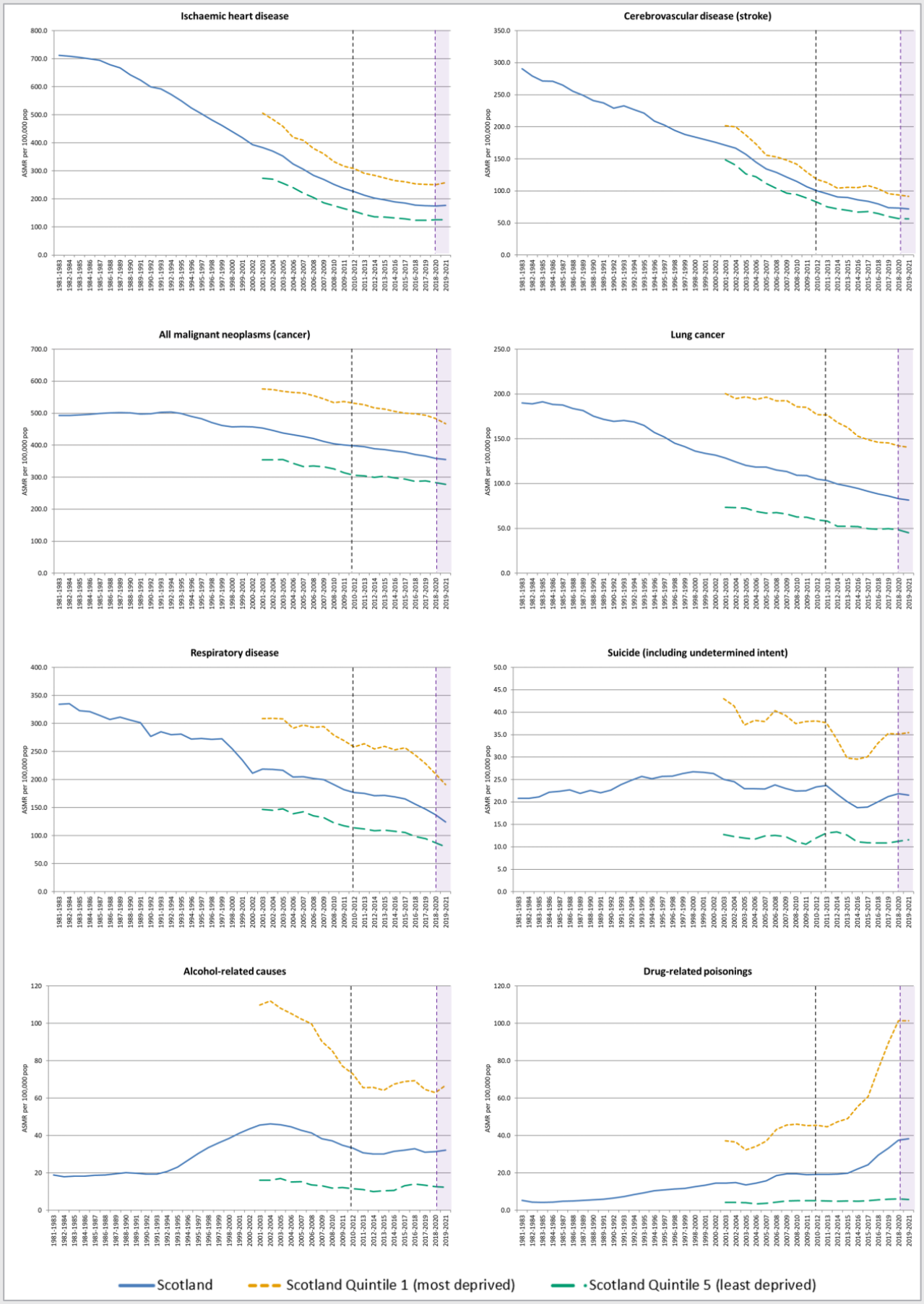
Updating these analyses to the end of 2021, and thereby including two years of the pandemic, results in a slightly more complex picture. Trends in eight causes of death are presented in **Figure 12**[v].

[v] The original analyses included ten causes of death, not eight. 'External causes' (recent increases which have been highly influenced by increases in drug-related poisonings) and motor vehicle traffic accidents (MVTAs) (numbers of which are very small) have been omitted.

As we have already seen, a widening of inequalities has been observed for alcohol- and drug-related mortality and, to a lesser degree, suicide; similar adverse trends can also be seen for ischaemic heart disease (IHD), particularly among men. Less clear trends are evident for deaths from cerebrovascular disease (stroke) and all cancers, while there has been a small improvement (in terms of a slight narrowing of inequality) for lung cancer mortality (again, especially for males). There has also been a notable decline in mortality from respiratory disease in the last two to three years: at least in part, this is likely to be attributable to older people dying from COVID-19 who might otherwise have died from another respiratory condition. These trends are shown for females in **Figure 12** and males in **Figure 13**.

Figure 12. *Age-standardised mortality rates for eight different causes of death (females, all ages), three-year rolling averages, Scotland, 1981-2021.*

Figure 13. *Age-standardised mortality rates for eight different causes of death (males, all ages), three-year rolling averages, Scotland, 1981-2021.*



Conclusions

This paper briefly summarises further important evidence regarding concerning trends in population health in Scotland, and in other parts of the UK. This includes:

- examples of increasing all-cause mortality rates at country level (e.g., all-cause premature mortality), city level, and among the more deprived populations
- dramatic reversals of previously declining death rates among most affected populations
- particularly concerning adverse trends for deaths from drug-related and alcohol-related causes, and ischaemic heart disease
- increases in poor mental health in Scotland and England
- declining healthy life expectancy (i.e., a reduction in the average number of years the Scottish population lived in good health)
- evidence demonstrating that these changes have been caused by UK Government austerity measures introduced from 2010 onwards
- a quantification of the contribution of obesity to country-level mortality changes in Scotland and England
- updated analyses showing that the widening of mortality inequalities evident from around 2012 have been exacerbated by deaths from COVID-19

Given the events of the past fifteen years – recession, austerity, a pandemic and now a cost-of-living crisis – it is perhaps easy to forget that the UK is one of the wealthiest countries on earth; the wealth is just unequally distributed to an enormous degree. It goes without saying, therefore, that in such a wealthy society – be that in the UK as a whole, or in Scotland as a constituent nation – the health of the population should be improving, not becoming worse. The impact of austerity on mortality rates is likely to be made worse not just from the continuing fall-out from the COVID-19 pandemic (including impacts on health services and the economy), but also because of the current cost-of-living crisis[48]: new modelling research suggests that even after taking into account UK

Government mitigation measures (reductions in household energy costs and additional cost-of-living support payments), premature mortality is likely to increase by over 6% in Scotland in 2022/23, with the impact even greater among the country's more deprived populations[49].

The appalling trends, and broader evidence, reported here require urgent action. A total of 40 separate policy recommendations – aimed at different levels of government, and based on multiple themes including social security, employment, taxation, public services and more – were presented in the GCPH/UoG 2022 report[1]. Key actions included: reversing austerity measures and protecting the health and wellbeing of vulnerable populations through the development of a more comprehensive and protective social security system; practical measures to increase the availability of 'good work'; redistributing income through broader and more progressive taxation measures; protecting public services through increased funding; changing drugs legislation to improve some of the drugs harm trends presented in this report; and specific actions to eliminate fuel poverty.

The evidence for what has occurred, and its underlying causes, is clear; the evidence of what needs to be done is also clear. What is required is political action.

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