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How might the Covid-19 pandemic influence levels of unplanned hospital use in the medium term?

NHS
Midlands and Lancashire
Commissioning Support Unit

Introduction

This report explores how the COVID-19 pandemic might influence the level of unplanned hospital use in England over the medium term. The report estimates the net impact of two countervailing factors;

1. tens of thousands of people have died as a direct result of the COVID-19 pandemic. Predominately these have been older people many of whom would otherwise have died over the next few years. Usually, as people approach end of life their use of unplanned hospital care rises sharply;

2. substantial numbers of seriously ill COVID-19 patients will survive a period in critical care but be left with increased health needs. Resulting in a rise of their use of unplanned hospital care.

We estimate these impacts during 2021/22, 2022/23 and 2023/24. For the purposes of this report, unplanned care is defined and categorised as; A&E (type 1 and 2 A&E departments); MIU and walk in departments (type 3 and 4 A&E departments); same day emergency admission (emergency admission with no over night stay); and, longer stay emergency admission (emergency admission with one or more overnight stay in hospital).

Excess deaths and changes to population structure in England

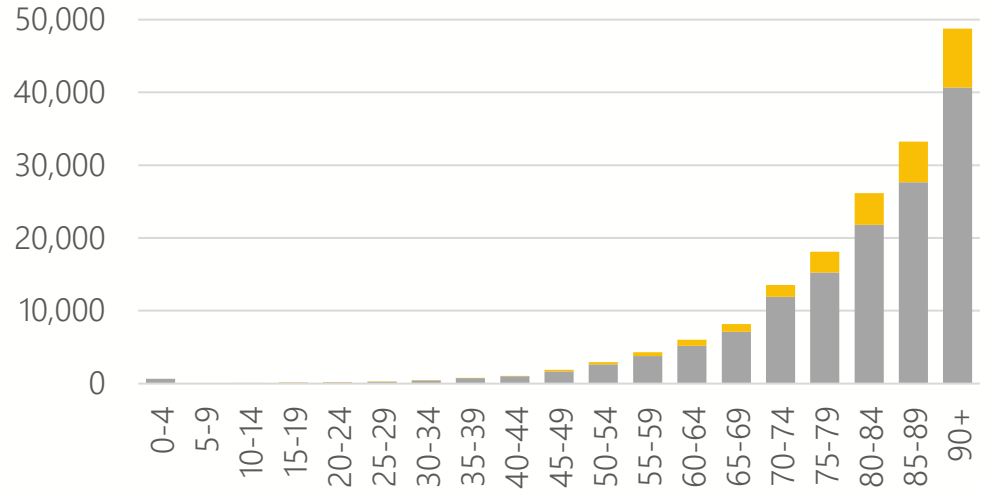
Number of expected and excess deaths by age and gender

Between 3rd January and 26th June 2020, a total of 315,865 deaths were registered across England. This represents 56,143 excess deaths compared to the average number, in same period, over the previous five-years.

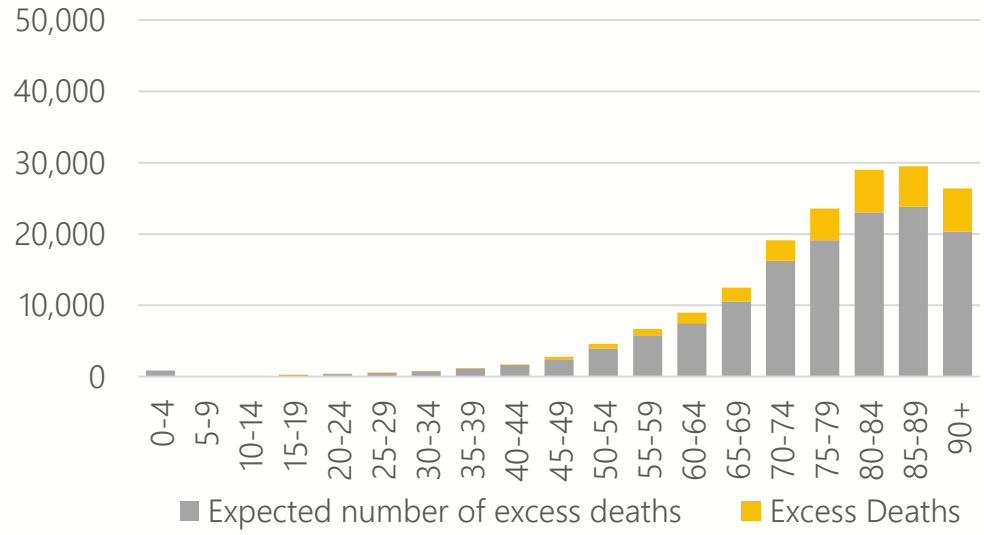
The older the age group, the larger the number of excess deaths. The proportion of excess deaths (above expected deaths) also increased with age.

There were a larger number of excess deaths for females but proportionally more males died than expected.

Expected and excess deaths in period for: **females**



Expected and excess deaths in period for: **males**



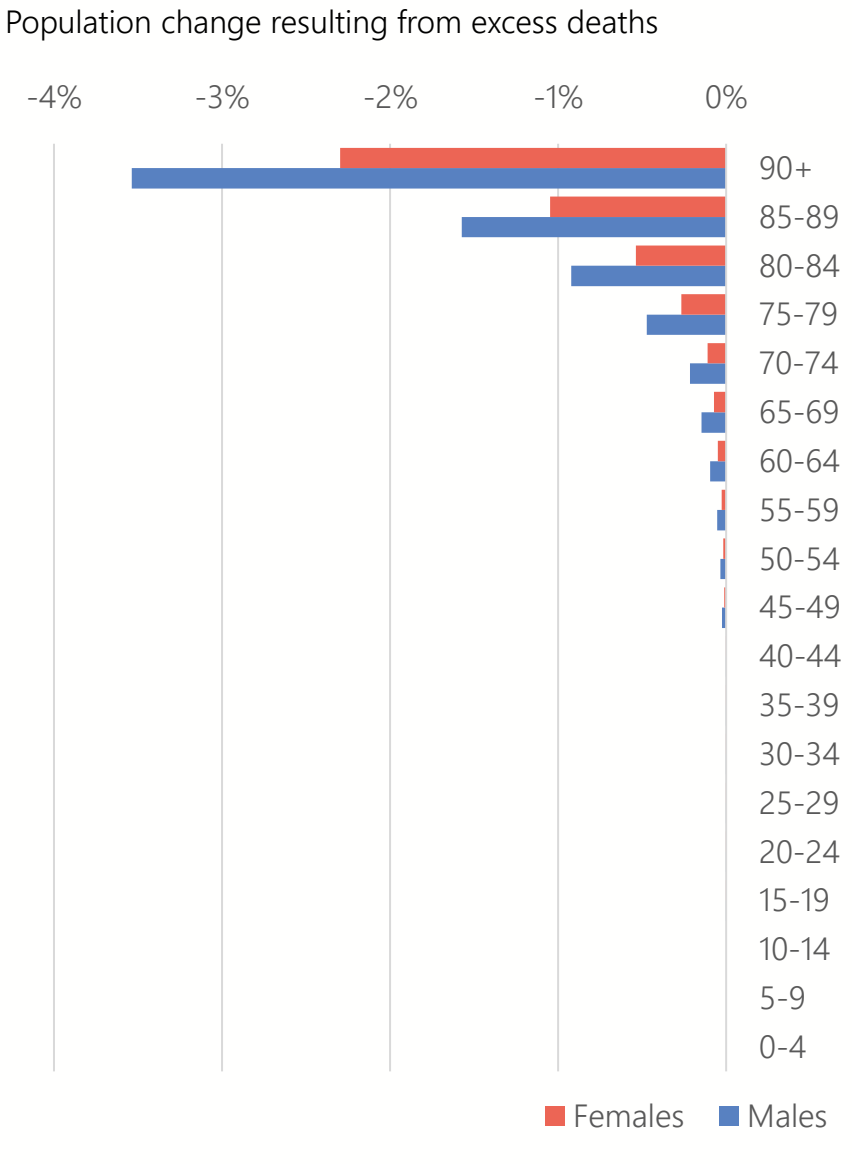
Source: *Office for National Statistics – weekly and yearly deaths in England and Wales. England adjusted 94.12%.*

Effect of excess deaths on population structure

These excess deaths have altered the population structure in England.

Male populations are proportionally more effected than female and increasingly so with age.

For the very oldest (those aged 90 and over) the number of excess deaths has led to a reduction in the size of this population of 2.3% for women and 3.5% for men.



Source: *Office for National Statistics – England population projections 2018.*

Estimating the impact of excess deaths on unplanned care

Calculating the level of unplanned care without COVID-19

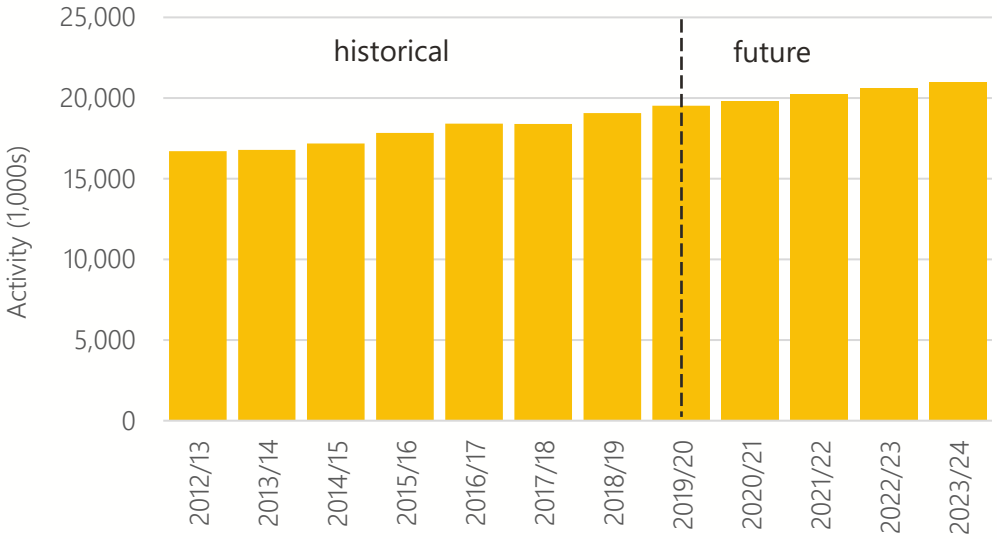
Before considering how levels of unplanned care may be effected in the future we examine what the level of unplanned care would have been in the absence of the COVID-19 pandemic.

To do this we predict the future expected level of activity using a seasonal ARIMA (Autoregressive integrated moving average) approach, for each type of unplanned care.

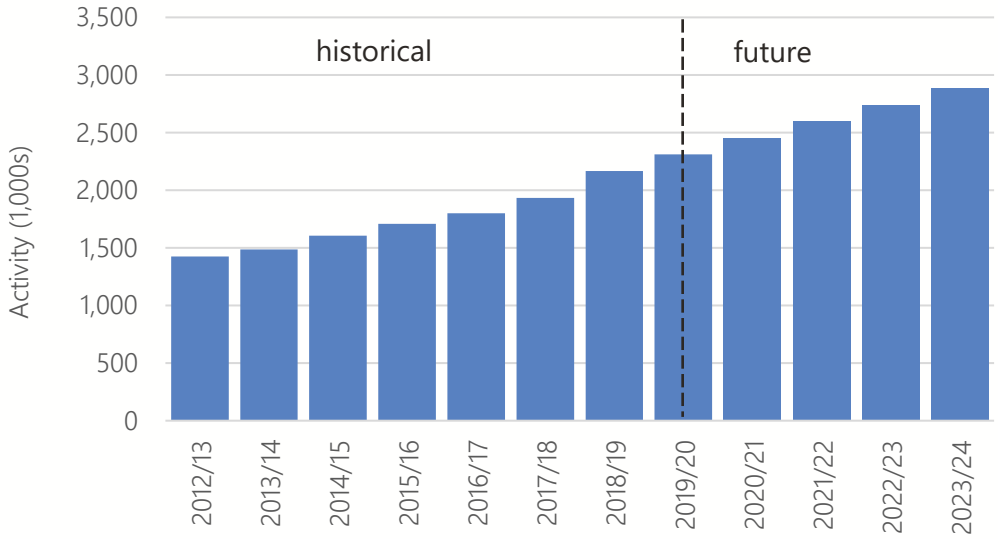
This shows that levels of unplanned care were expected to increase steadily through 2021/22 to 2023/24 for each type of unplanned care.

Level of unplanned care without COVID-19

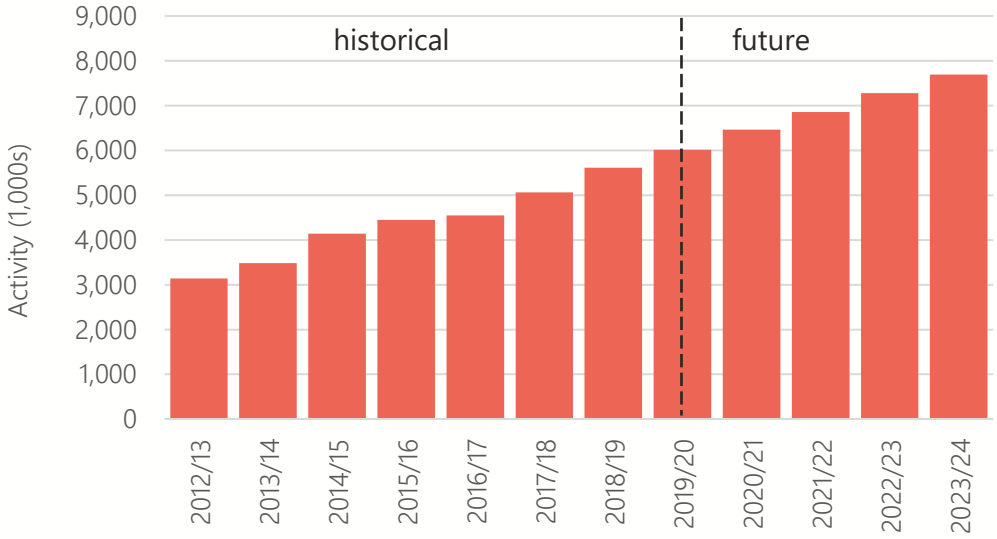
Historical and predicted future activity: A&E consultant led



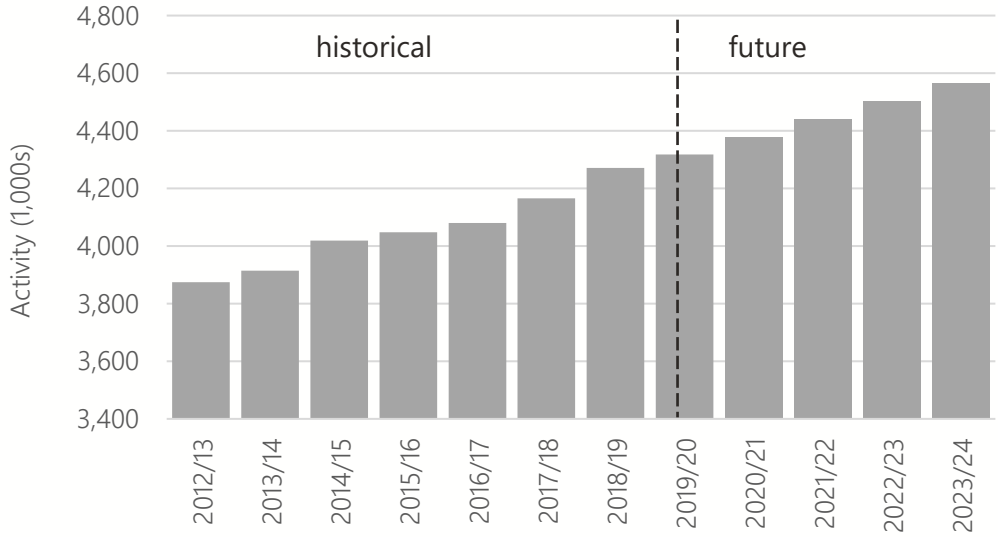
Historical and predicted future activity: Emergency Admission Same Day



Historical and predicted future activity: A&E MIU and walk in centre



Historical and predicted future activity: Emergency Admission Overnight Stay



Source: *NCDR SUS data.*
ARIMA results for each type of activity included in appendix

Reduction in unplanned care as a result of excess deaths

We now consider the effect of this sudden and substantial number of excess deaths on levels of unplanned care.

We know that it was predominately older people who were effected by excess deaths. We also know that normally most deaths occur in the elderly. Therefore, many of those dying during this period would have otherwise have died over the coming few years.

Here we redistribute excess deaths as if the COVID-19 pandemic had not happened. We then apply the rates of unplanned care they might have been expected to use (given their age, sex and proximity to death), providing an estimate of the reduction in unplanned care as a result of excess deaths.

Reduction in unplanned care as a result of excess deaths: methodology

By age and gender:

Redistribute excess deaths into deaths that would otherwise have occurred either:

- 1 year in future (died in 2021/22)
- 2 years in future (died in 2022/23)
- 3 years in future (died in 2023/24)
- 4 years in future (died 2024/25)
- Survived more than 4 years

Based on National Life Tables from the Office for National Statistics and the Strategy Unit report Measuring the effect of the coronavirus pandemic on population health

2. **Multiply** number of redistributed deaths from (1) by use of unplanned care for the decedent population in:

   a) In the final year prior to their death (0-12 months); and,
   b) At least on year from death*

3. **Summarise** unplanned care from (2) by financial year. This represents the unplanned care that will no longer take place.

Source: *NCDR SUS data.*
ARIMA results for each type of activity included in appendix

*Note: we use the utilisation rates for people in penultimate year prior to their death (12-24 months) as a proxy for health use in this group

Reduction in unplanned care as a result of excess deaths: results

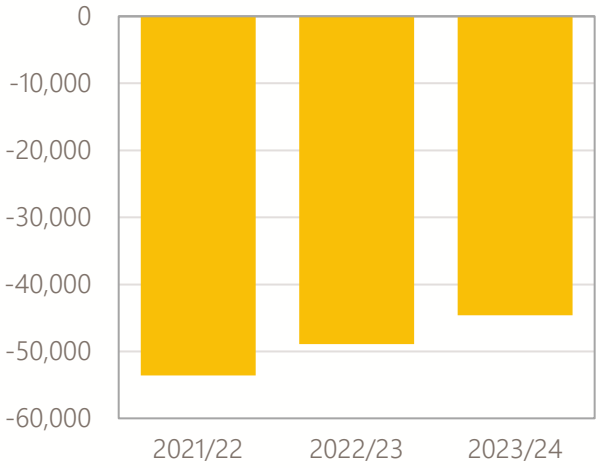
We estimate that premature deaths due to COVID-19 will have an modest impact on levels of unplanned care over the medium term.

The reduction in activity is most strongly exhibited in the the first year (2021/22). However, even in this first year this equates to a drop of only 0.3% in the total level of unplanned activity.

Although small, reductions do differ by the type of unplanned activity. Emergency admissions with overnight stays are the most effected with a reduction of 0.7% in 2021/22.

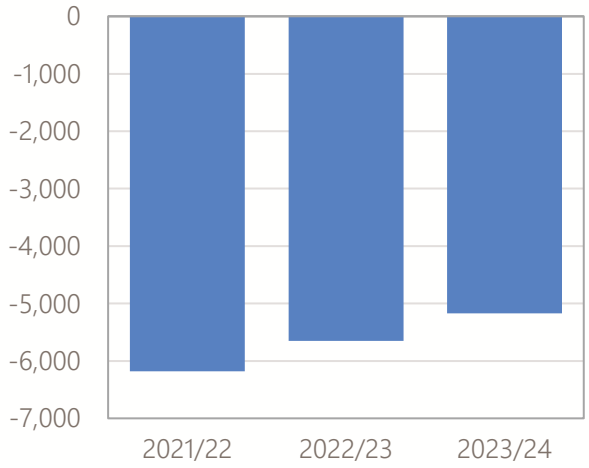
Reduction in unplanned care as a result of excess deaths: results

Reduction in unplanned care: A&E consultant led



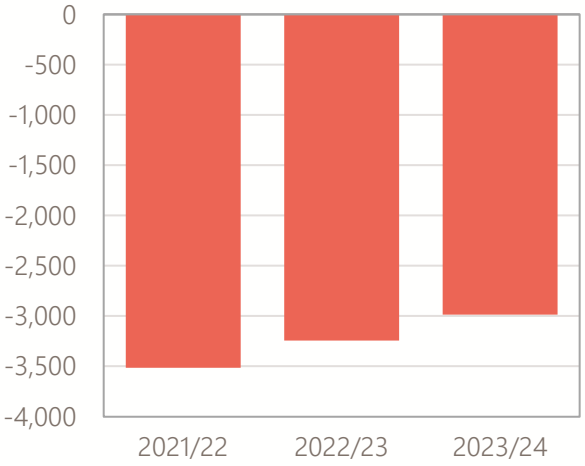
Share of all activity:	-0.26%	-0.24%	-0.22%

Reduction in unplanned care: Emergency admission same day



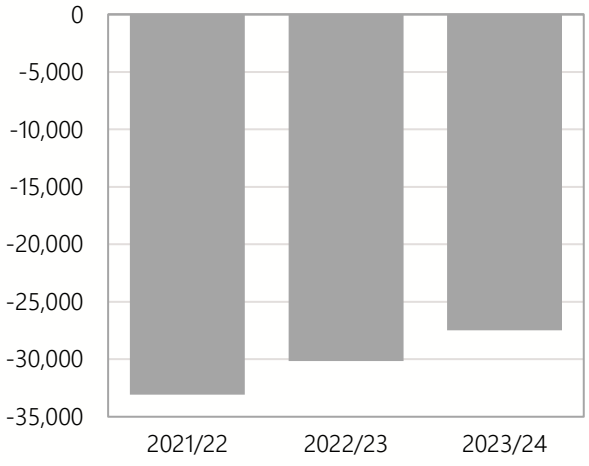
Share of all activity:	-0.24%	-0.22%	-0.20%

Reduction in unplanned care: A&E MIU and walk in centre



Share of all activity:	-0.05%	-0.05%	-0.04%

Reduction in unplanned care: Emergency admission overnight stay



Share of all activity:	-0.75%	-0.68%	-0.62%

Activity shares as share of forecast 2021/22 activity

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Estimating the impact of COVID-19 survivorship on unplanned care

Rise in unplanned care as a result of the increased health needs of the most seriously ill

Although the impacts of COVID-19 on a person's future health are not currently fully understood it is expected that the most seriously ill survivors will be left with some level of increased health need.

Here we estimate the number of seriously ill COVID-19 survivors. We apply to these their potential rate of future unplanned care post discharge. We do this by creating a group of 'proxy COVID-19' patients from historical data. For this proxy population we calculate their rates of unplanned care use, above the general population, in the years post discharge.

We estimate these effects for two groups of COVID survivors; those occupying a critical care bed for less than 12 days, and those occupying a critical care bed for 12 or more days.

Rise in unplanned care as a result of the increased health needs of the most seriously ill survivors: methodologies

By age and gender:

Calculate number of seriously ill COVID-19 survivors. These are defined as COVID-19 patients who spent time in critical care and were discharged alive in the period (3rd January to 26th June 2020).

Identify proxy population of seriously ill COVID-19 survivors, based on historical activity, as those who:

- Were admitted as an emergency
- Spent between 5 to 28 days in critical care.
- Received either basic or advanced or respiratory support.

Estimate future unplanned care health needs of proxy population, above those in the general population, in the following:

- 1 year in future
- 2 years in future
- 3 years in future
- 4 years in future

Source: For calculating actual COVID-19 survivors ICNARC via *NCDR. For proxy population of COVID-19 survivors SUS via NCDR*

Rise in unplanned care resulting from seriously ill COVID-19 survivors: results

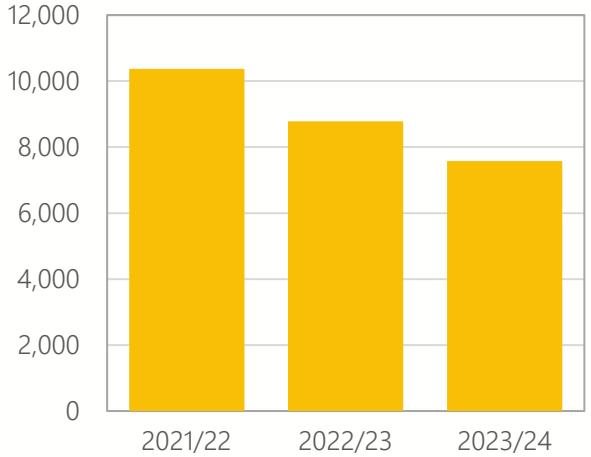
We estimate the increased health needs of seriously ill COVID-19 survivors will also have an extremely modest impact on levels of unplanned care over the medium term.

The rise in activity is again most strongly exhibited in the the first year (2021/22). However, even in this first year this equates to only a 0.05% rise in the total level of unplanned activity.

Although small, these increases do differ by the type of unplanned activity. Emergency admissions with overnight stays are the most effected with an increase of 0.11% in 2021/22.

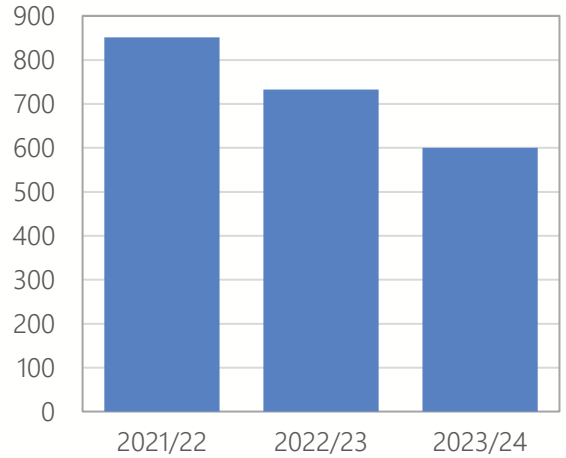
Rise in unplanned care resulting from seriously ill COVID-19 survivors: results

Rise in unplanned care: A&E consultant led



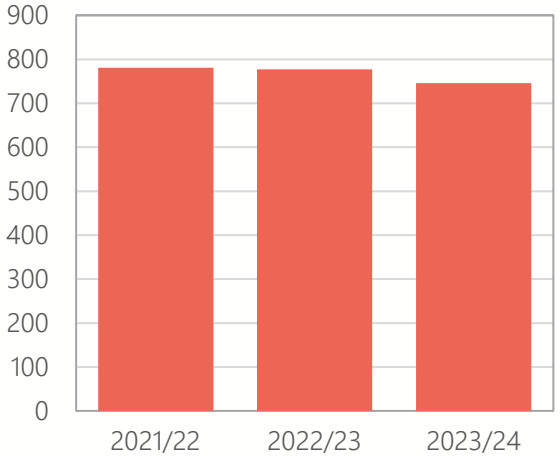
Share of all activity:	2021/22	2022/23	2023/24
	0.05%	0.04%	0.04%

Rise in unplanned care: Emergency admission same day



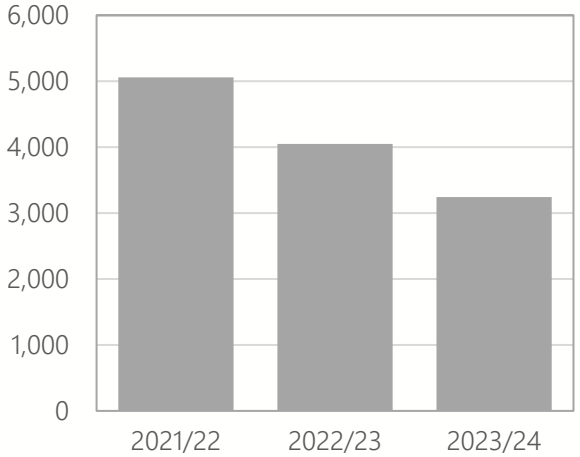
Share of all activity:	2021/22	2022/23	2023/24
	0.03%	0.03%	0.02%

Rise in unplanned care: A&E MIU and Walk in centres



Share of all activity:	2021/22	2022/23	2023/24
	0.01%	0.01%	0.01%

Rise in unplanned care: Emergency admission overnight stay



Share of all activity:	2021/22	2022/23	2023/24
	0.11%	0.09%	0.09%

Activity shares as share of forecast 2021/22 activity

Conclusions

Conclusions

The individual effects of the two factors considered in this report are small. Premature deaths due to the COVID-19 pandemic are estimated to reduce unplanned hospital activity by 0.3% in 2021/22, whilst increased morbidity following critical care stays for COVID-19 are estimated to increase unplanned hospital activity by 0.05% in the same year. The combined effects are smaller still and reduce further throughout 2022/23 and 2023/4.

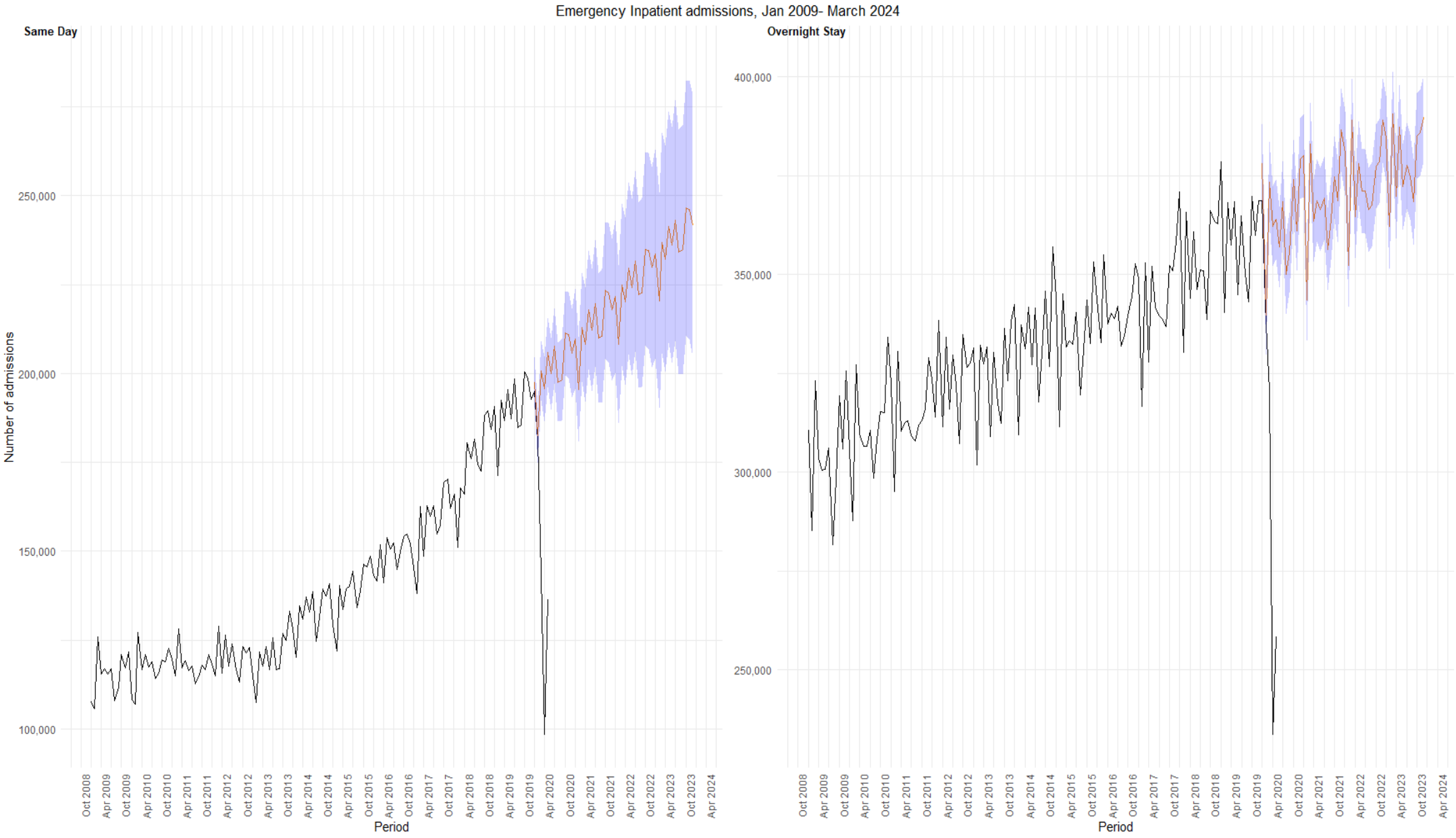
The service area most notably effected is emergency admissions with an overnight stay. We estimate that these two factors will serve to reduce demand for this service by 0.6% in 2021/22.

Tracking the hospital use of COVID-19 survivors might increase confidence in these findings.

Our findings rely on a number of assumptions and consider the impacts of two specific factors only. Other effects such as delayed diagnostics and elective treatments on population morbidity or the impact of social distancing measures or fear on infection on health seeking behaviour may have a greater impact.

Appendices

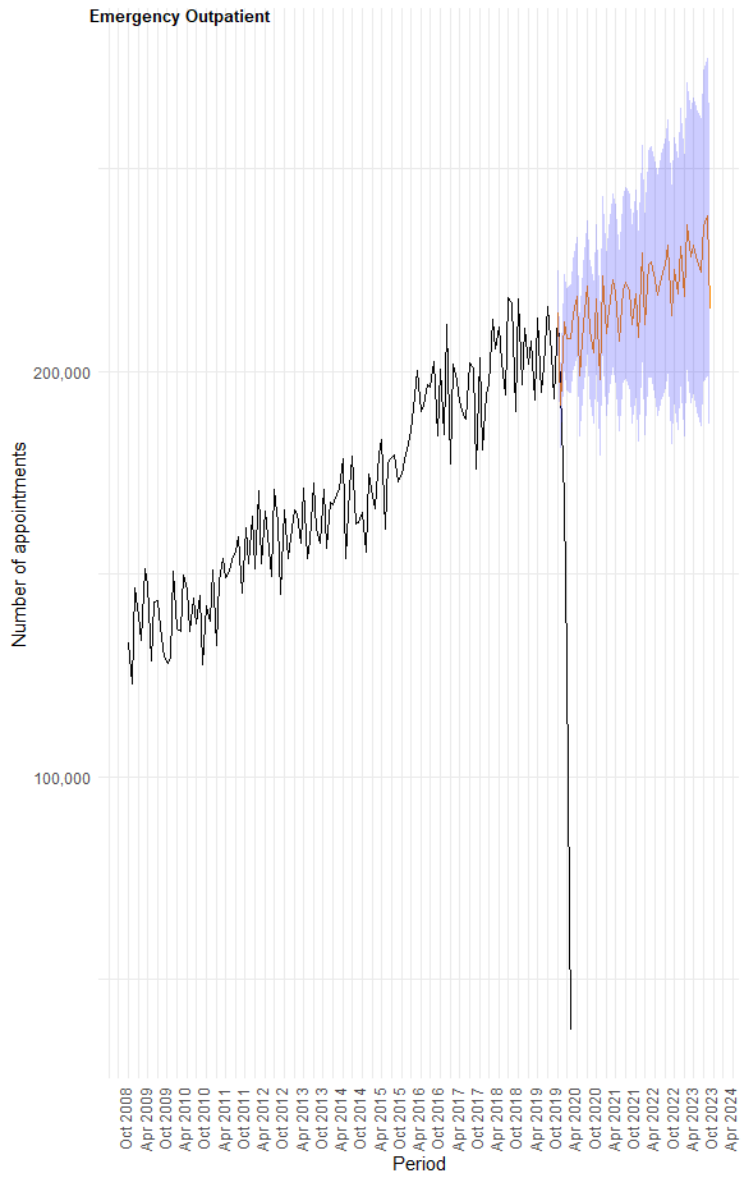
Appendix 1. Activity Forecast

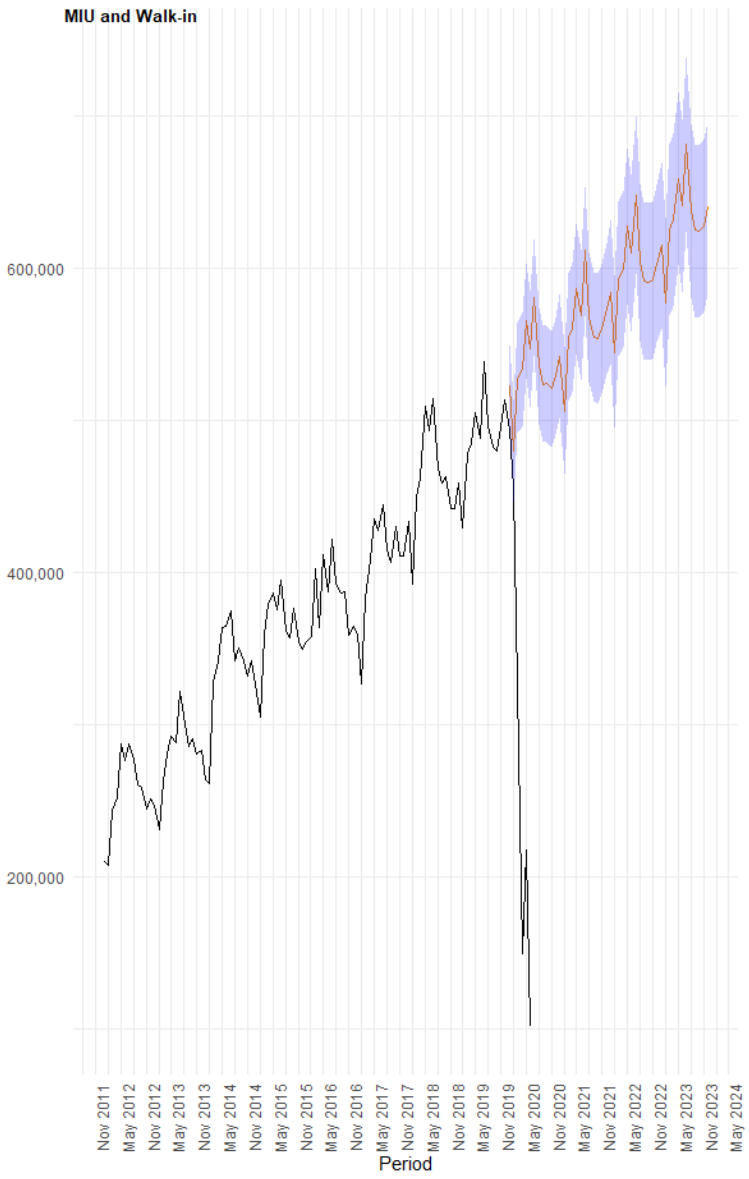


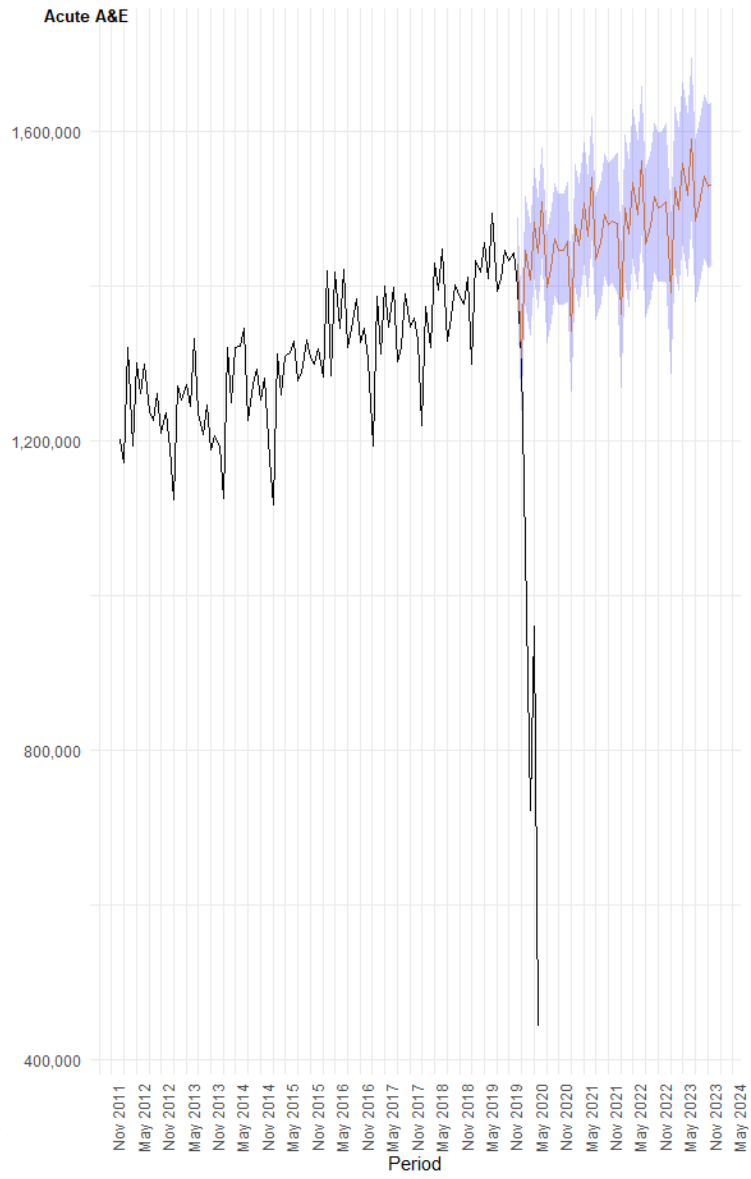
Admissions from 2020-01-01 are predicted based on NCDR data and SARIMA model

Appendix 1. Activity Forecast

A&E Attendances, Jan 2009- March 2024







Admissions from 2020-01-01 are predicted based on NCDR data and SARIMA model

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