

SPI-M-O: Consensus Statement on COVID-19

Date: 4th November 2020

FINAL – SIGNED OFF BY SPI-M-O CO-CHAIRS

Summary

1. SPI-M-O's best estimate for **R in both the UK and England remains between 1.1 and 1.3**. Estimates of R for Scotland and Northern Ireland span 1 (0.9-1.1 and 0.9-1.2 respectively), and SPI-M-O's estimate for Wales has decreased slightly (1.0-1.3). Given the increasingly localised approach in managing the epidemic, national level estimates are less meaningful than previously. Broadly, estimates of R are highest in regions of England where prevalence is lower. SPI-M-O no longer have confidence that R is above 1 in the North West NHS England region, although prevalence there remains very high.
2. SPI-M-O estimate that there are between **58,000 and 83,000 new infections per day in England**.
3. Although R fell slightly during October, it remains above 1 so the epidemic continues to grow. SPI-M-O's modelled consensus is a **doubling time for new infections of 20 to 31 days in the UK, and 19 to 28 days in England**.
4. The delay between initial infection, developing symptoms, the need for hospital care, and death means these estimates **cannot fully reflect recent changes in transmission that might have occurred over the past two to three weeks**.
5. SPI-M-O continue to produce medium term projections looking ahead six weeks assuming no policy or behavioural changes occur. With interventions announced for England from 5th November, modelling groups have considered the impact of a range of values for R from this date for four weeks. At this stage, it is not possible to say with certainty which trajectory is most plausible, but it is highly unlikely that R would fall to a value as low as 0.6 and it is highly likely it will reduce from the current value to below 1.1.
6. Initial analysis suggests that tier 3 measures in England have had a noticeable impact on transmission, but it is not yet clear whether they have been sufficient to reduce R below 1. It is too early to see the effect of the fire-break that has been enacted in Wales. Further work is being undertaken to assess the impact of the different interventions.

Incidence and prevalence

7. Combined estimates from six SPI-M-O models, using data available up to 3rd November, suggest there are between **58,000 and 83,000 new infections per day in England**.

Modelling from the ONS community infection survey for the most recent week of the study (25th to 31st October) estimates that there were **45,700 new infections per day in England** (credible interval of 37,700 to 59,600).

8. As these ONS estimates are based on survey results collected one to two weeks ago and given the recent state of the epidemic in England, it is **highly likely that the epidemic has continued to grow since then**. The number of new infections each day in England, therefore, is likely to be higher than that estimated by the survey. The ONS survey also does not include people in care homes, hospitals, or university halls of residence.
9. The ONS study estimates that, during the same week, an average of **618,700 people had COVID-19** in the community in England (credible interval 583,100 to 655,000) – this is a significant increase on their previous estimates. The equivalent estimates for the devolved administrations are:

England	618,700 (credible interval 583,100 to 655,000)
Scotland ¹	47,300 (credible interval 33,200 to 65,300)
Wales	27,100 (credible interval 12,200 to 50,600)
Northern Ireland	24,900 (credible interval 13,400 to 42,300)

Reproduction number, growth rate, and doubling times

10. The reproduction number is the average number of secondary infections produced by a single infected individual. R is an average value over time, geographies, and communities. Given the divergence in policies across the four nations that constitute the UK, the estimate of R for the entire UK has become less meaningful in recent weeks.
11. **SPI-M-O's best estimate is that R is between 1.1 and 1.3 for both the UK and England. There is consensus that the epidemic continues to grow in England.** Estimates of R for Scotland and Northern Ireland span 1 (0.9-1.1 and 0.9-1.2 respectively), and the estimate for Wales has decreased slightly (1.0-1.3). SPI-M-O's agreed national and regional estimates are summarised in Table 1 and Figures 3, 4, and 6.
12. There is some evidence that the rate of growth of the epidemic is slowing in some areas of the country, and SPI-M-O are no longer confident that R is now above 1 in the North West, where the R estimate is 1.0-1.1. The prevalence in North West England is very high and significant levels of healthcare demand and mortality will persist until R is reduced well below 1 and remains below 1.
13. **R is highest in regions where prevalence is lowest.**

¹ Scotland data refers to most recent two weeks of the ONS COVID-19 Infection Survey

14. SPI-M-O's consensus R and growth rate estimates are based on a range of models that use a variety of data sources including deaths, hospital admissions, mobility and number of individuals testing positive. The delay between initial infection, developing symptoms and the need for hospital care, means that **such estimates cannot yet fully reflect the most recent changes in transmission from the past two to three weeks.**
15. For small daily changes, the growth rate is approximately the proportion by which the number of infections increases or decreases per day, i.e. the rate at which an epidemic is growing or shrinking².
16. SPI-M-O's consensus estimate is that the **growth rate in both the UK and England is between +2% to +4% per day.** SPI-M-O's national and regional estimates are summarised in Table 1 and Figure 5. This growth rate suggests **the number of new daily infections was doubling in the recent past every 20 to 31 days in the UK and every 19 to 28 days in England.** As SPI-M-O are not confident that the epidemics in the devolved administrations are growing, their doubling times may not be finite.

Reliability

17. As the number of infections is increasing across the whole of the UK, SPI-M-O's view is that there is less variability in R and growth rate estimates compared to those made two to three months ago. There may still be high degrees of variability in, for example, a localised outbreak, however **SPI-M-O considers all this week's estimates to be reliable.**
18. As testing becomes more locally led, the application of Pillar 2 testing is varying more from place to place. As a result, it is very hard to interpret changes in pillar 2 testing in different parts of the country

Medium-term projections and other scenarios

19. SPI-M-O continue to produce projections of the epidemic over the next six weeks, combining estimates from several independent models. **These are not forecasts or predictions and cannot reflect recent changes in transmission** that have not yet filtered through into surveillance data, such as hospital admissions and deaths. They do not include any planned behavioural and policy changes that might reduce transmission, nor do they include seasonal effects that might increase transmission. In particular, the medium term projections do not include the impact of the new interventions implemented

² Further technical information on the growth rate can be found in [Plus magazine](#).

in England from 5th November. Projections are particularly uncertain during periods of transition, for example when significant interventions are introduced.

20. With the announcement of national measures for England, a subset of the same SPI-M-O models that are used to produce the medium term projections have been used to explore the possible impact of those interventions. Scenarios have been produced in which the interventions of 5th November lead to decreased R values from 0.6 to 1.1. These scenarios are run for four weeks following 5th November, before returning regional R values to their 4th November values on 2nd December. These illustrate a range of scenarios (in terms of COVID-19 hospitalisations and mortality) that SPI-M-O consider to be plausible over the next six weeks.
21. All four scenarios for hospitalisations and deaths are broadly in agreement for approximately one week, as these are largely already determined by infections that have already happened. **It will take two to three weeks to see the impact of new measures in England in the data and hence to be able to differentiate between these scenarios.** As the four scenarios exploring R = 0.6 – 1.1 were calculated with only a subset of the full suite of models used to calculate the medium term projections, the two sets of plots do not perfectly overlap, even in the first week.
22. Figures 1 and 2 show the combined scenarios for hospitalisations and deaths over a range of R values (0.6 – purple; 0.8 – blue; 0.9 – green; 1.1 – yellow) that might be expected under the interventions implemented on 5th November and maintained for four weeks. The grey band is the SPI-M-O medium term projection of the expected epidemic without any further interventions. Figures 7 and 8 show the equivalent charts for NHS England regions.

Figure 1: Medium-term scenarios for daily hospitalisations in England over a range of R values (0.6 – purple; 0.8 – blue; 0.9 – green; 1.1 – yellow) where interventions are taken on 5th November and held in place for four weeks. The grey band is the SPI-M-O medium term projection of the expected epidemic *without* any further interventions. All trajectories show interquartile ranges of model combinations as the shaded band. The red dashed line is the peak from the first wave of the epidemic in spring 2020.

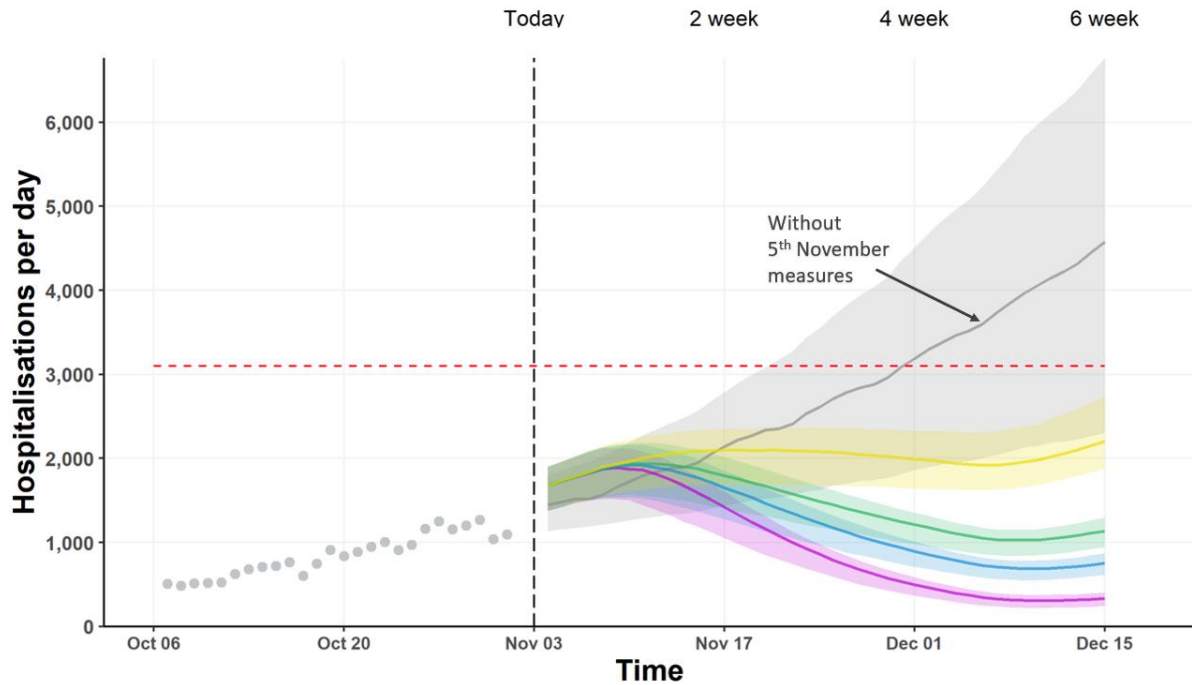
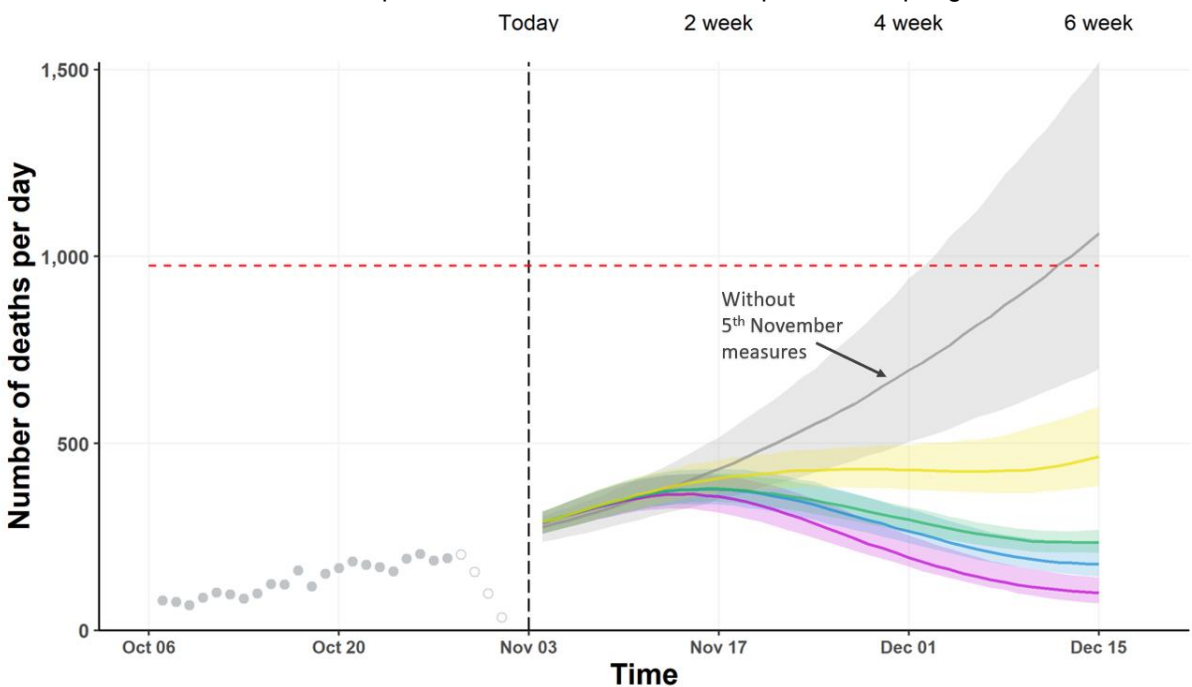


Figure 2: Medium-term scenarios for daily deaths in England over a range of R values (0.6 – purple; 0.8 – blue; 0.9 – green; 1.1 – yellow) where interventions are taken on 5th November and held in place for four weeks. The grey band is the SPI-M-O medium term projection of the expected epidemic *without* any further interventions. All trajectories show interquartile ranges of model combinations as the shaded band. The red dashed line is the peak from the first wave of the epidemic in spring 2020.



Impact of lockdown

23. If well-adhered to, the lockdown measures due to start in England on 5th November are likely to reduce R to less than 1.
24. If this is sustained until 2nd December, the number of hospital admissions and deaths would be expected to fall until at least the second week of December.
25. The longer-term outlook depends on both the nature of non-pharmaceutical interventions that are implemented in England after 2nd December and policies over the festive period. If England returns to the same application of the tiering system in place before 5th November, then transmission will return to the same rate of increase as today.
26. An important consideration of the impact of the new measures will be the development of healthcare and social care associated infections.

Impact of tiers and measures implemented in the devolved nations

27. SPI-M-O have undertaken initial analysis of England's system of tiers on the trajectory of the epidemic. These are early observations only, with further work to follow in due course as more data become available.
28. Initial analysis shows a clear effect from tier 3 interventions and much less from tiers 1 and 2. It is not yet clear whether tier 3 measures alone are sufficient to reduce the reproduction number below 1.
29. If the highest tier does not reduce R substantially below 1, the tier applied in a locality is based on the number of confirmed cases alone, and application does not take into account growth rate, this can result in all localities rising to the highest tier and plateauing at high prevalence.
30. SPI-M-O have undertaken initial analysis of measures introduced in Scotland, Wales, and Northern Ireland. The devolved administrations have all introduced stricter interventions in recent weeks. These are early observations only, with further work to follow in due course as more data become available.
31. It is too early to get a clear view of the effectiveness of the fire-break introduced in Wales on 24th October but publicly available mobility data show a large reduction in travel patterns.
32. There has been a similar decrease in mobility data in Northern Ireland, following the introduction of their measures on 16th October, as well as a reduction in cases and a

flattening in hospital admissions. There is some uncertainty around how much the reduction in cases is a result of fewer people coming forward for testing during the school holidays.

33. There has also been a slowing in the growth rate in Scotland since measures were introduced in the Central Belt, and a reduction in cases in that nation overall in the last week.

Annex: PHIA framework of language for discussing probabilities

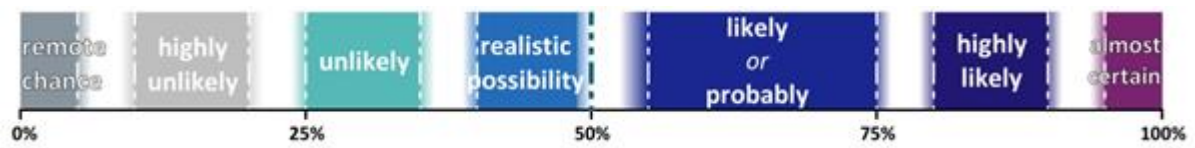


Table 1: Combined estimate of R and the growth rate in the UK, four nations and NHS England regions (90% confidence interval)

Nation	R	Growth rate per day
England	1.1 – 1.3	+2% to +4%
Scotland	0.9 – 1.1	-1% to +2%
Wales	1.0 – 1.3	-1% to +4%
Northern Ireland	0.9 – 1.2	-1% to +2%
UK	1.1 – 1.3	+2% to +4%

NHS England region	R	Growth rate per day
East of England	1.1 – 1.4	+3% to +6%
London	1.1 – 1.3	+2% to +5%
Midlands	1.1 – 1.3	+3% to +5%
North East and Yorkshire	1.1 – 1.2	+1% to +4%
North West	1.0 – 1.1	0% to +2%
South East	1.2 – 1.4	+4% to +6%
South West	1.2 – 1.4	+3% to +7%

Figure 3: SPI-M-O groups' estimates of median R in the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded area represents the combined numerical range and the black bar is the combined range after rounding to 1 decimal place. The UK estimate of R is the average over very different epidemiological situations and should be regarded as a guide to the general trend rather than a description of the epidemic state.

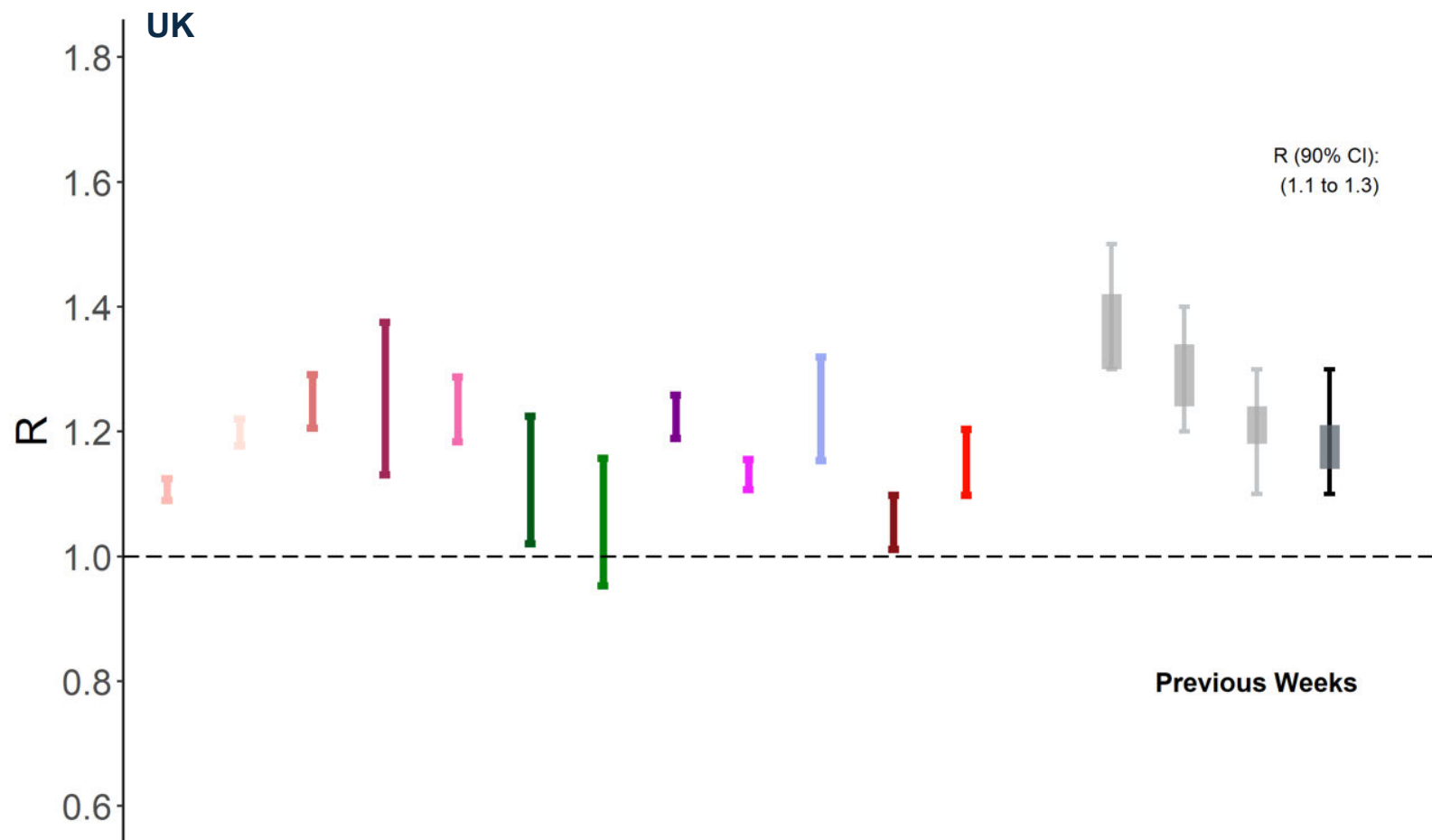


Figure 4: SPI-M-O groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

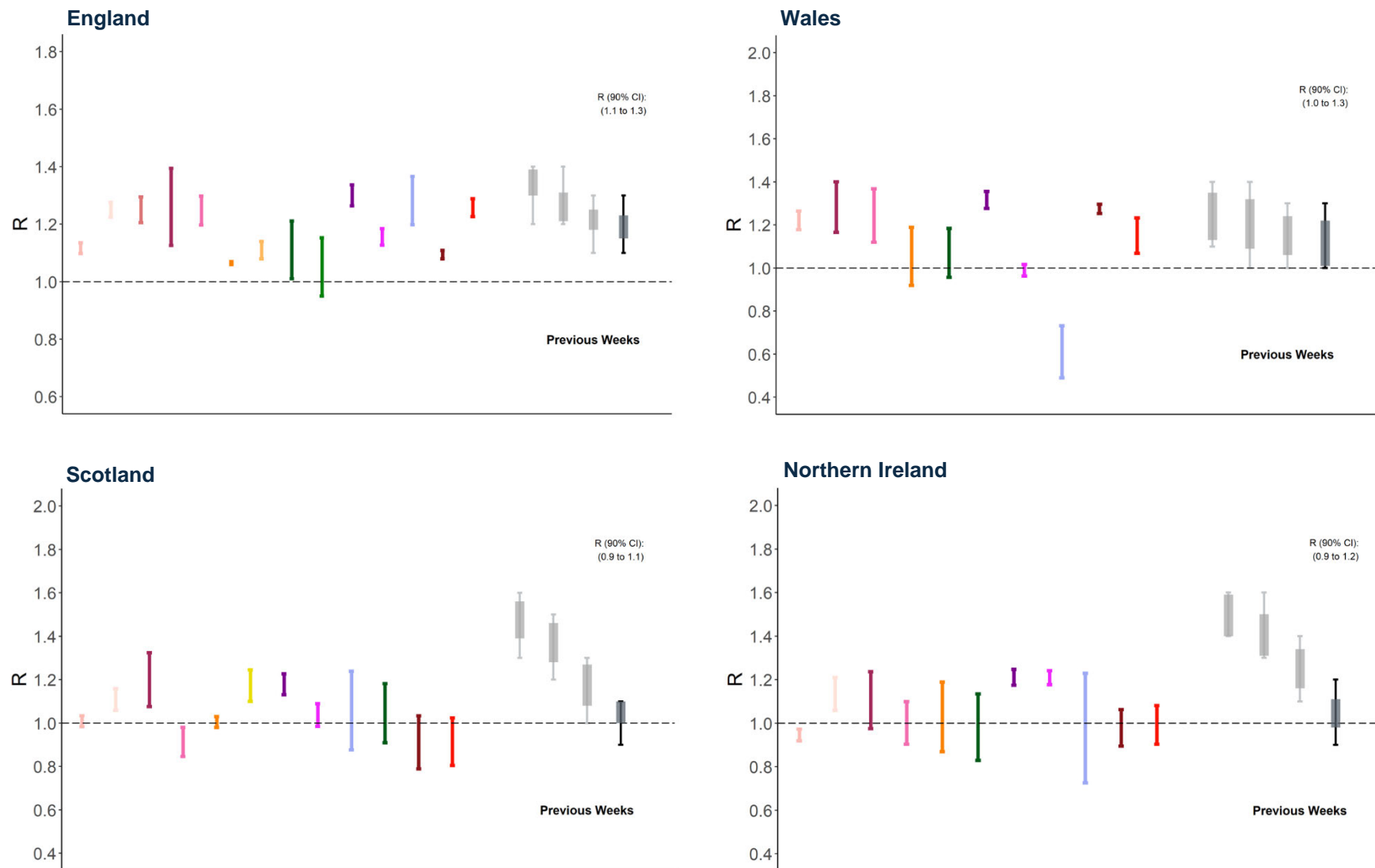


Figure 5: SPI-M-O groups estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different modelling groups. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.

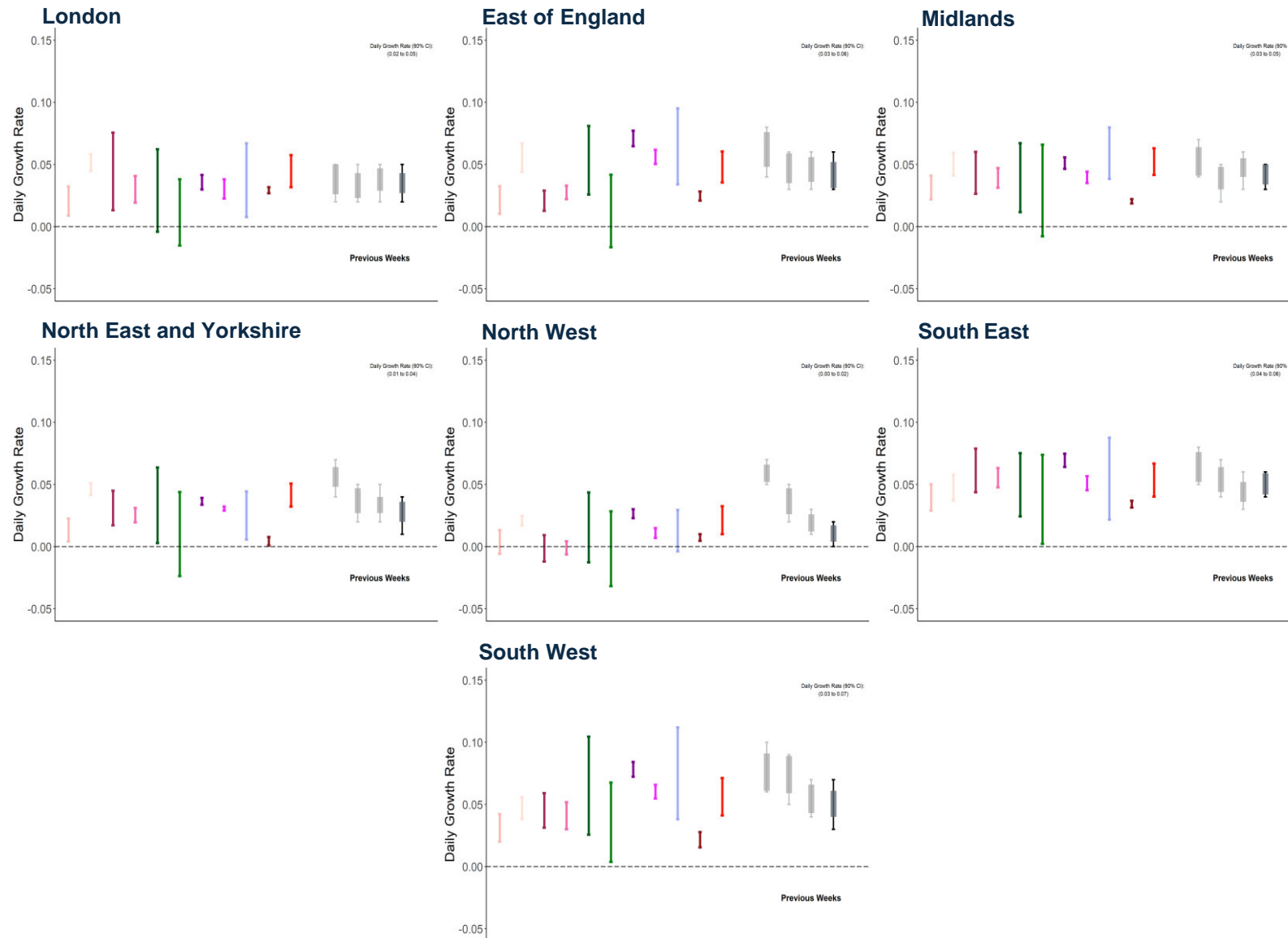


Figure 6: SPI-M-O groups estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

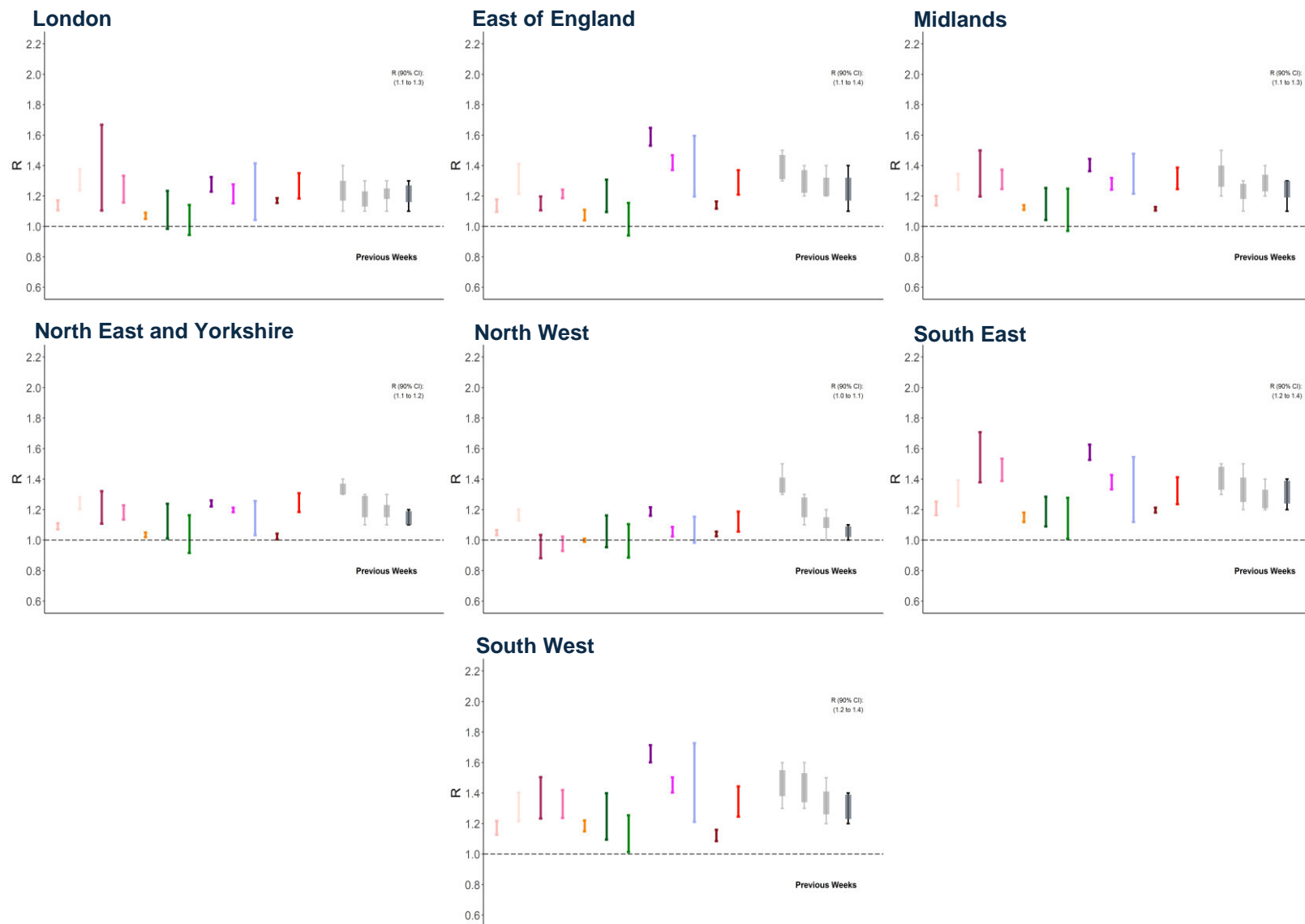


Figure 7: Medium-term scenarios taken from a subset of SPI-M-O models for daily hospitalisations in the seven NHS England regions over a range of R values (0.6 – purple; 0.8 – blue; 0.9 – green; 1.1 – yellow) where interventions are taken on 5th November and held in place for four weeks. The grey band is the SPI-M-O medium term projection of the expected epidemic *without* any further interventions. All trajectories show interquartile ranges of model combinations as the shaded band. The red dashed line is the peak from the first wave of the epidemic in spring 2020.

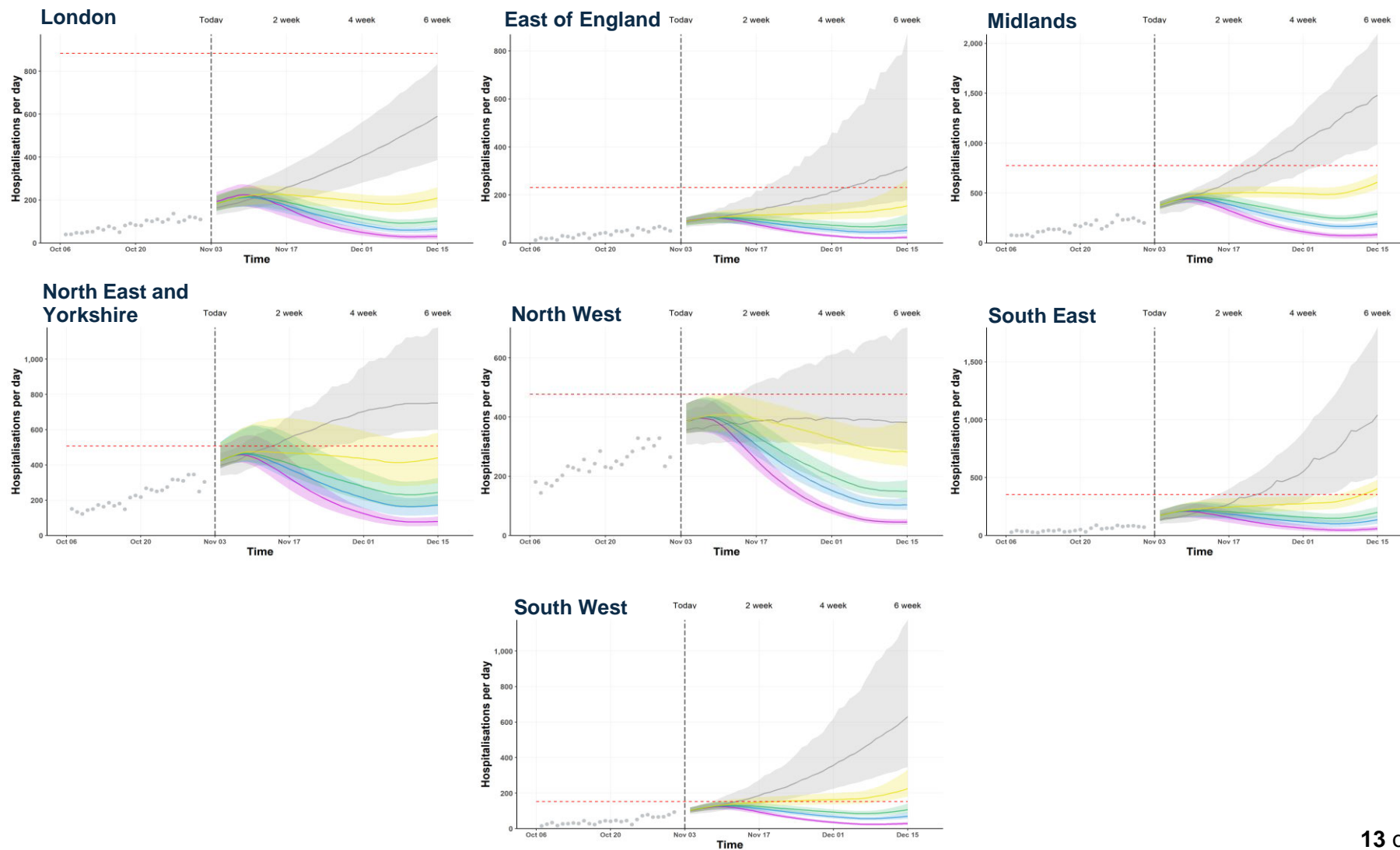


Figure 8: Medium-term scenarios taken from a subset of SPI-M-O models for daily deaths in the seven NHS England regions over a range of R values (0.6 – purple; 0.8 – blue; 0.9 – green; 1.1 – yellow) where interventions are taken on 5th November and held in place for four weeks. The grey band is the SPI-M-O medium term projection of the expected epidemic *without* any further interventions. All trajectories show interquartile ranges of model combinations as the shaded band. The red dashed line is the peak from the first wave of the epidemic in spring 2020.

