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

Date: 11th November 2020

FINAL – SIGNED OFF BY SPI-M-O CO-CHAIRS ON BEHALF OF SPI-M-O

Summary

1. SPI-M-O's best estimate for **R in the UK is between 1.0 and 1.2 and in England is between 1.1 and 1.2.** Estimates of R for Scotland and Wales span 1 (0.8-1.1 and 0.9-1.2 respectively), and SPI-M-O's estimate for Northern Ireland has decreased slightly (0.8-1.0). 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 all NHS England regions.
2. SPI-M-O estimate that there are between **55,000 and 81,000 new infections per day in England**, broadly in line with last week's estimate (58,000 to 83,000 new infections per day).
3. Although estimates of R have fallen slightly in recent weeks, the latest estimate remains above 1 in England, suggesting the epidemic has continued to grow. SPI-M-O's modelled consensus is a **doubling time for new infections of 28 to 63 days in the UK, and 22 to 43 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**. **This includes the national restrictions introduced in England on 5th November.**
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 latest estimated value to below 1.1.
6. Contacts of known index cases are currently required to self-isolate for 14 days. A shorter isolation period might be preferable if it results in more people coming forward for testing and improves adherence to self-isolation. If individuals are much less infectious during the second week after infection, even a modest increase in adherence to test and self-isolation

would more than compensate for any extra infections resulting from a one-week isolation period.

Incidence and prevalence

7. Combined estimates from seven SPI-M-O models, using data available up to 10th November, suggest there are between **55,000 and 81,000 new infections per day in England**. Modelling from the ONS community infection survey for the most recent week of the study (31st October to 6th November) estimates that there were **47,700 new infections per day in England** (credible interval of 39,500 to 59,600). The ONS survey also does not include people in care homes, hospitals, or university halls of residence.

8. The ONS study estimates that, during the same week, an average of **654,000 people had COVID-19** in the community in England (credible interval 619,400 to 689,800) – this is a slight increase on their previous estimates. The equivalent estimates for the devolved administrations are:

England	654,000 (credible interval 619,400 to 689,800)
Scotland	39,700 (credible interval 28,300 to 52,800)
Wales	35,300 (credible interval 25,500 to 46,600)
Northern Ireland	17,800 (credible interval 11,500 to 25,800)

Reproduction number, growth rate, and doubling times

9. 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.

10. **SPI-M-O's best estimate for R is between 1.0 and 1.2 for the UK and between 1.1 and 1.2 for England.** Estimates of R for Scotland and Wales span 1 (0.8-1.1 and 0.9-1.2 - respectively), and the estimate for Northern Ireland has decreased slightly (0.8-1.0). SPI-M-O's agreed national and regional estimates are summarised in Table 1 and Figures 3, 4, and 6.

11. There is evidence that the rate of growth of the epidemic is slowing in some areas of the country. SPI-M-O is no longer confident that R is above 1 in all NHS England regions. The consensus estimate of R in the North West spans 1 (0.9-1.1), whilst the lower bound of the estimated R range for London and the North East and Yorkshire is 1.0. The prevalence in the North West and North East and Yorkshire, however, remains high and significant levels of healthcare demand and mortality will persist until prevalence falls significantly.

12. **R is highest in regions where prevalence is lowest**. 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. This includes the national restrictions introduced in England on 5th November and recent changes in the devolved administrations.**

13. 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 shrinking[1].

14. SPI-M-O's consensus estimate is that the **growth rate in the UK is between +1% to +3% per day and in England is between +1% to +4% per day**. SPI-M-O's national and regional estimates are summarised in Table 1 and Figure 5. These growth rates suggests **the number of new daily infections was doubling in the recent past every 28 to 63 days in the UK and every 22 to 43 days in England**. As SPI-M-O are not confident that the epidemics in the devolved administrations and some regions of England are growing, their doubling times may not be finite.

Reliability

15. 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.**

Medium-term projections and other scenarios

16. SPI-M-O continues 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 yet reflect the impact of the new interventions

[1] Further technical information on the growth rate can be found in Plus magazine.

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

17. 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 ranging between 0.6 and 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. **It will take another week or two to see the impact of new measures in England in the data and hence to be able to differentiate between these scenarios.**

18. Figure 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 scenarios run over a six-week period from 10th November. The grey band is the SPI-M-O medium term projection of the expected epidemic *without any further interventions* from *5th November*. Figure 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.

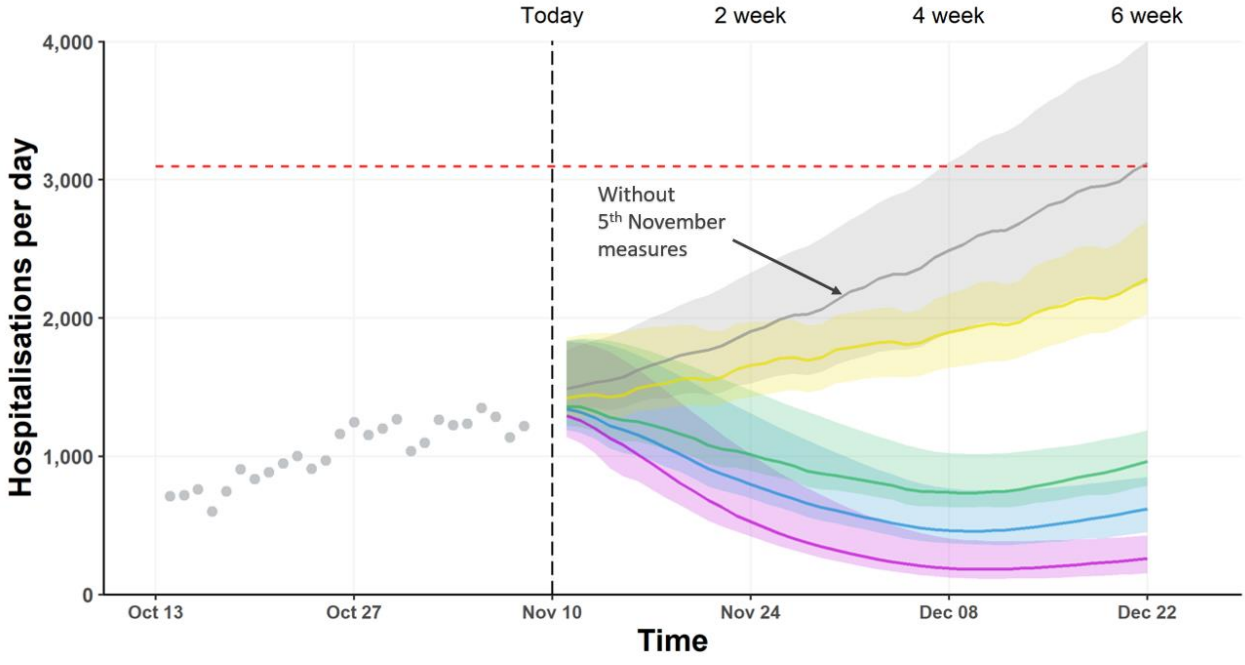
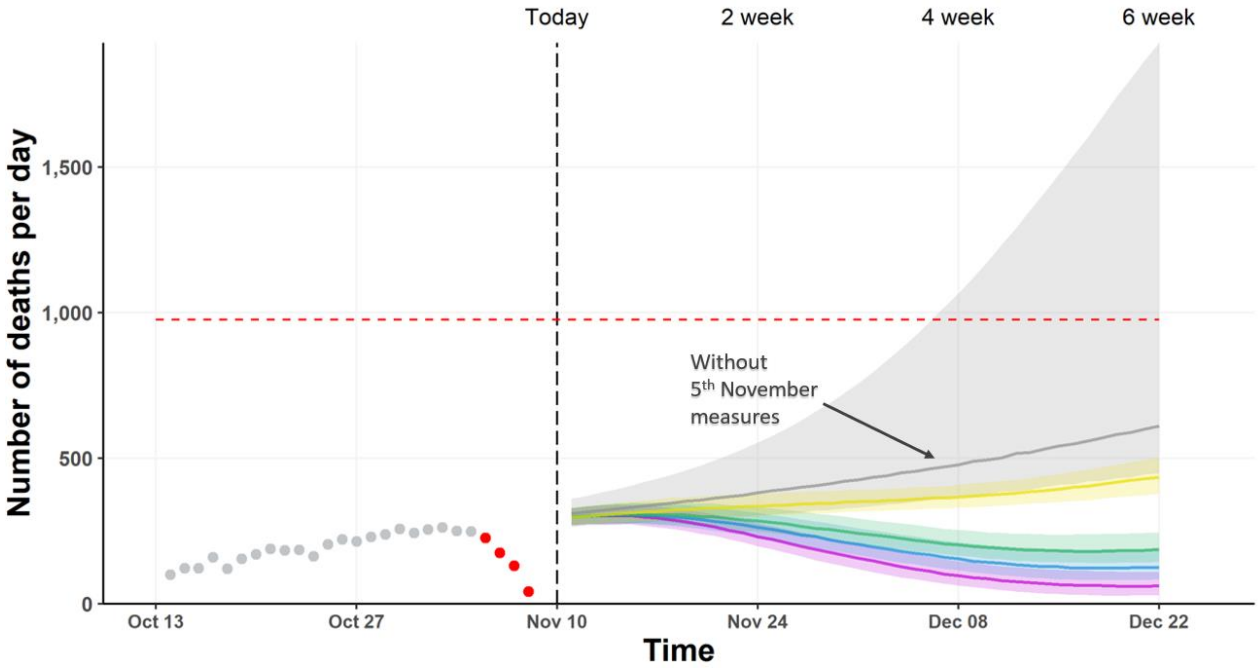


Figure 2: Medium-term scenarios for daily deaths in England over a range of R values (0.6 – purple; 0.8 – blue; 0.9 – green; 1.1 – yellow) where interventions are taken on 5th November and held in place for four weeks. The grey band is the SPI-M-O medium term projection of the expected epidemic *without* 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. The red data points are incomplete due to reporting delays, and are expected to increase.



Testing to reduce isolation period

19. Contacts of known index cases are currently required to self-isolate for 14 days. A shorter isolation period might be preferable if it results in more people coming forward for testing and improves adherence to self-isolation. If individuals are much less infectious during the second week after infection, even a modest increase in adherence to test and self-isolation would more than compensate for any extra infections resulting from a one-week isolation period.

20. Previous work by SPI-M-O (consensus statement from 19th August, tabled at SAGE 52) suggested that a 10-day household isolation period with testing on day 9 would result in transmission potential of an infected contact that is only slightly higher than under a 14-day isolation with no test. Using different modelling assumptions, PHE drew the same conclusion about testing at day 8.

21. This subject has been discussed further by SPI-M-O because of the growing availability of lateral flow devices. The ability of these tests to detect infection at different points in the infection cycle is currently poorly understood. Their value will depend on whether they can detect infected individuals with low viral loads.

22. The expected effectiveness of different isolation strategies depends heavily on the underlying assumptions, particularly with regards to the proportion of index cases and their contacts who isolate on symptoms. Two modelling groups examined this problem.

23. Both groups agreed that, for a given compliance rate, there would be little loss in effectiveness if a move was made from a 14-day isolation period to one with release following a negative lateral flow test on day 10. One group also considered a 10-day isolation period with a test on day 8: If this were a PCR test, it would be slightly more effective than a 14-day isolation period with no test; if a lateral flow test, it would be slightly less effective.

24. There were differing results when looking at a 10-day isolation period with no test. One group's modelling estimated this would be significantly less effective than a 14-day isolation period, while the other estimated the disbenefit would be marginal. The most likely explanation for this is that the former group assumed contacts isolate as soon as the secondary infection occurs, but the latter group assume a 5-day period between the index case starting symptoms and their contacts isolating.

25. The delay from testing of the index case to isolation of contacts and the proportion of contacts who self-isolate will limit the amount of transmission that can be averted through contact tracing. One further advantage to a "test and release" strategy such as these would be the identification of several additional index cases for contact tracing.

26. A third group examined the trade-off between the interplay between compliance to isolation and the length of isolation period. It is not known if shortening isolation periods or testing at their end would improve compliance. This model estimated that that a reduction from a 14- to a 7-day quarantine could be compensated for if an improvement of more than 5% in the probability that infected individuals report, or 12-14% improvement in the probability that households take up and fully adhere to the isolation/quarantine.

Annex: PHIA framework of language for discussing probabilities

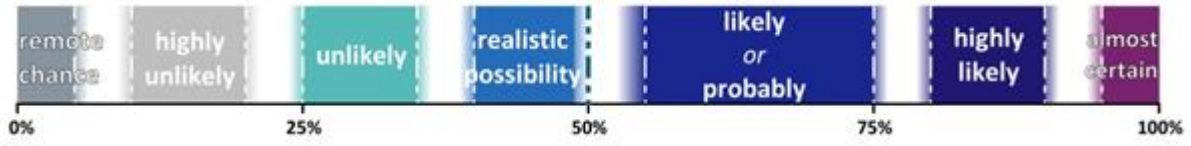


Table 1: Combined estimate of R and the growth rate in the UK, four nations and NHS England regions (90% confidence interval)

Nation	R	Growth rate per day
England	1.1 – 1.2	+1% to +4%
Scotland	0.8 – 1.1	-4% to +1%
Wales	0.9 – 1.2	-3% to +2%
Northern Ireland	0.8 – 1.0	-4% to 0%
UK	**1.0 – 1.2**	**+1% to +3%**

NHS England region	R	Growth rate per day
East of England	1.1 – 1.4	+2% to +5%
London	1.0 – 1.2	0% to +3%
Midlands	1.1 – 1.3	+2% to +5%
North East and Yorkshire	1.0 – 1.2	+1% to +3%
North West	0.9 – 1.1	-1% to +1%
South East	1.2 – 1.4	+3% to +6%
South West	1.2 – 1.4	+4% 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.

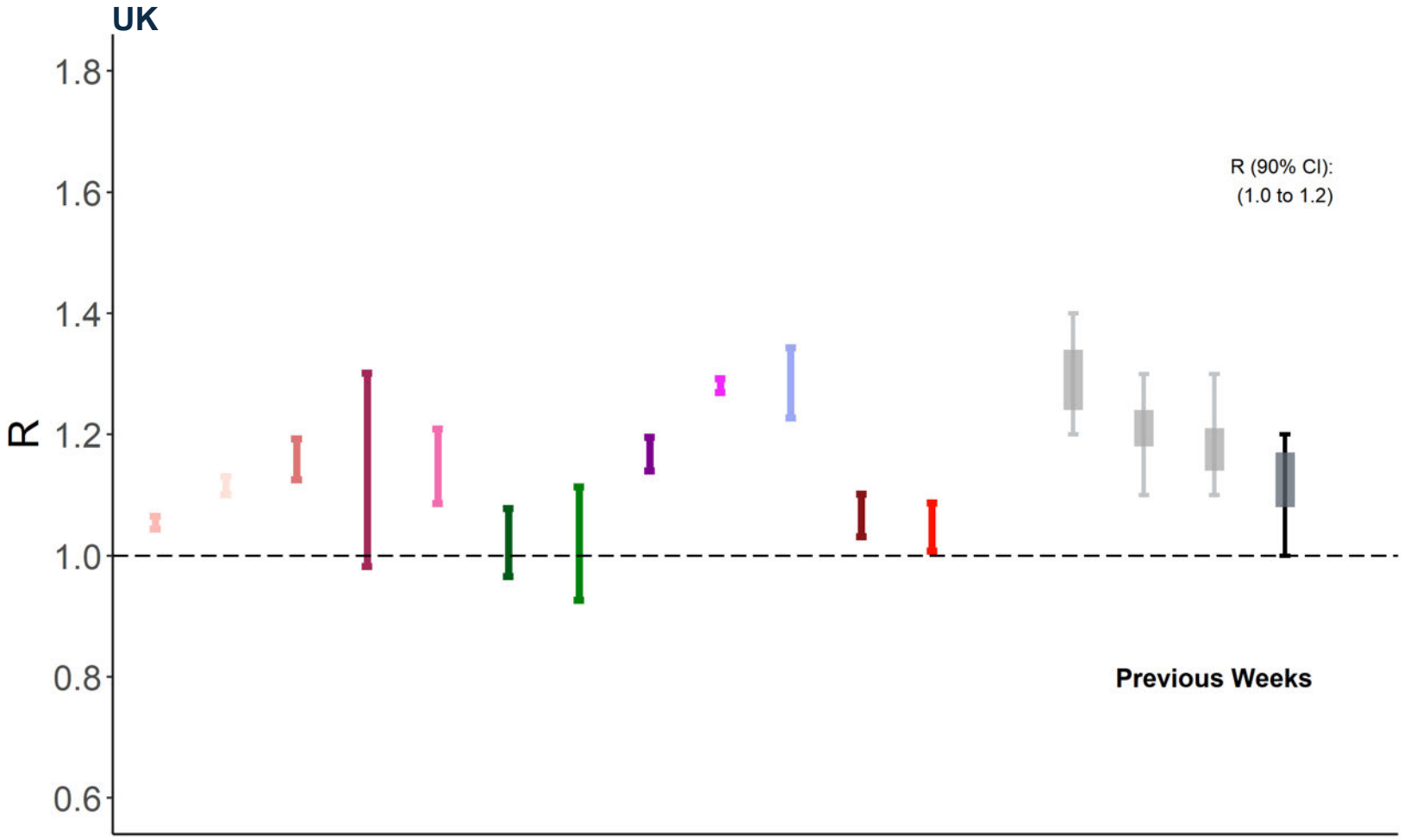


Figure 4: SPI-M-O groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

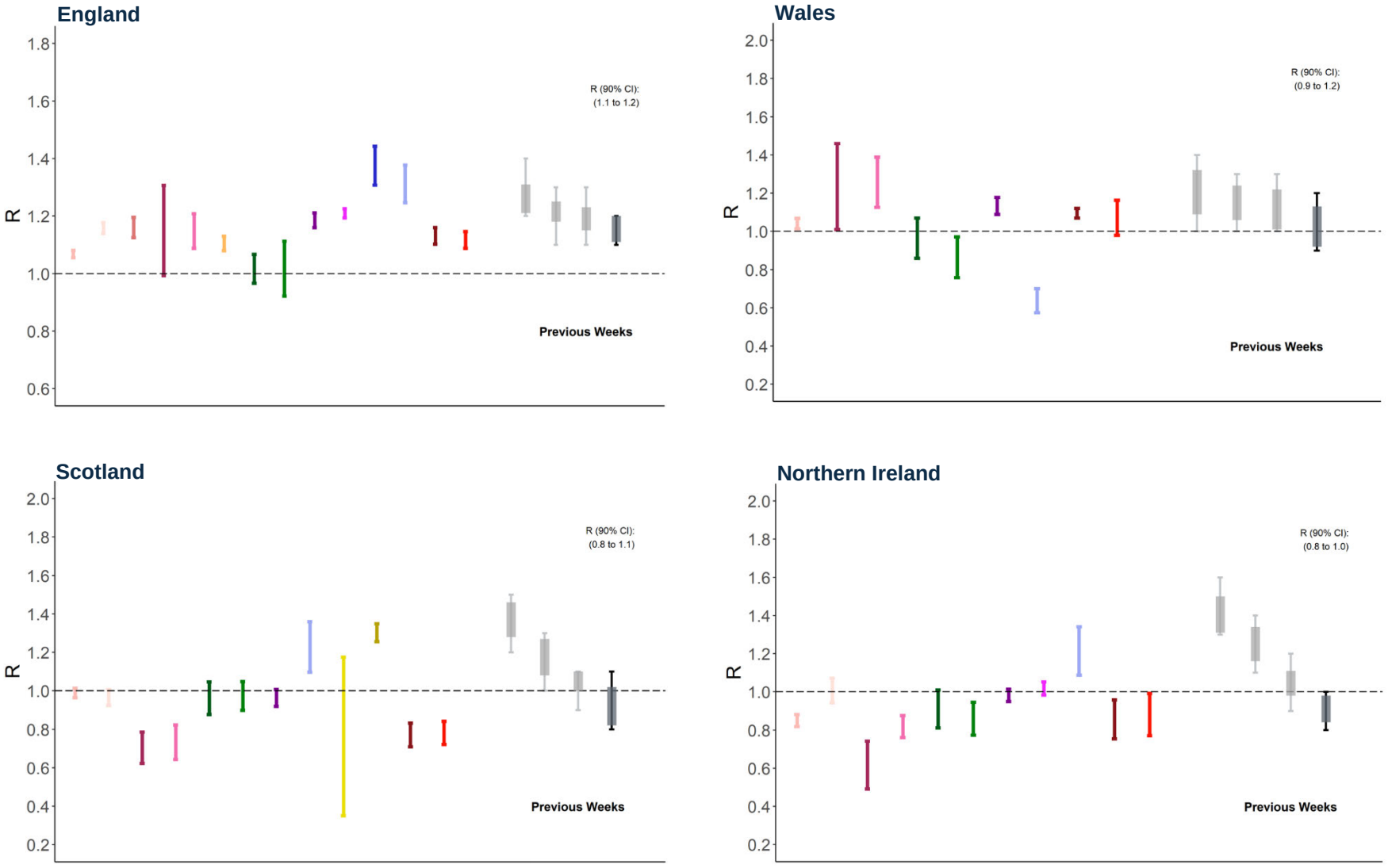


Figure 5: SPI-M-O groups estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different modelling groups. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.

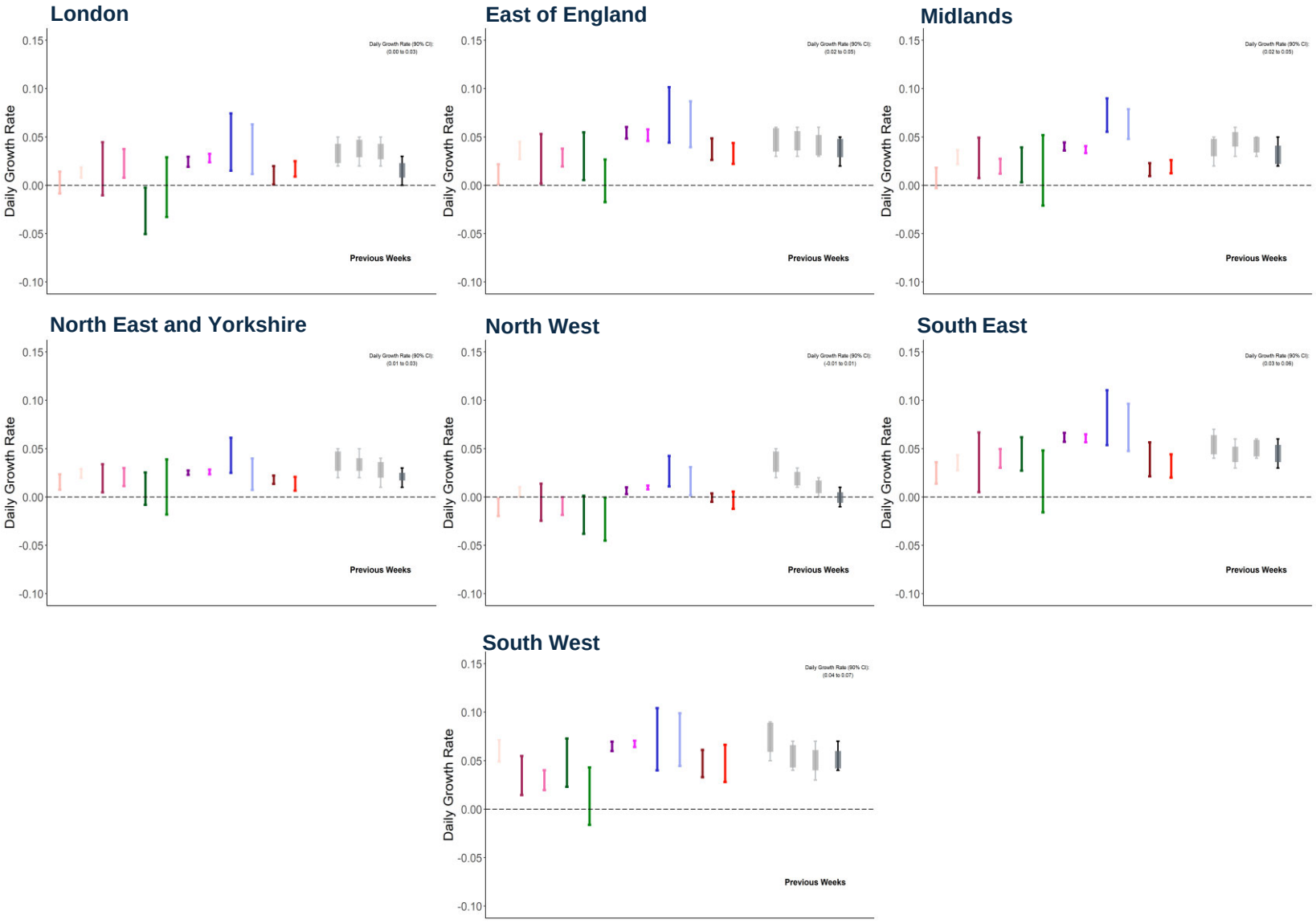


Figure 6: SPI-M-O groups estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

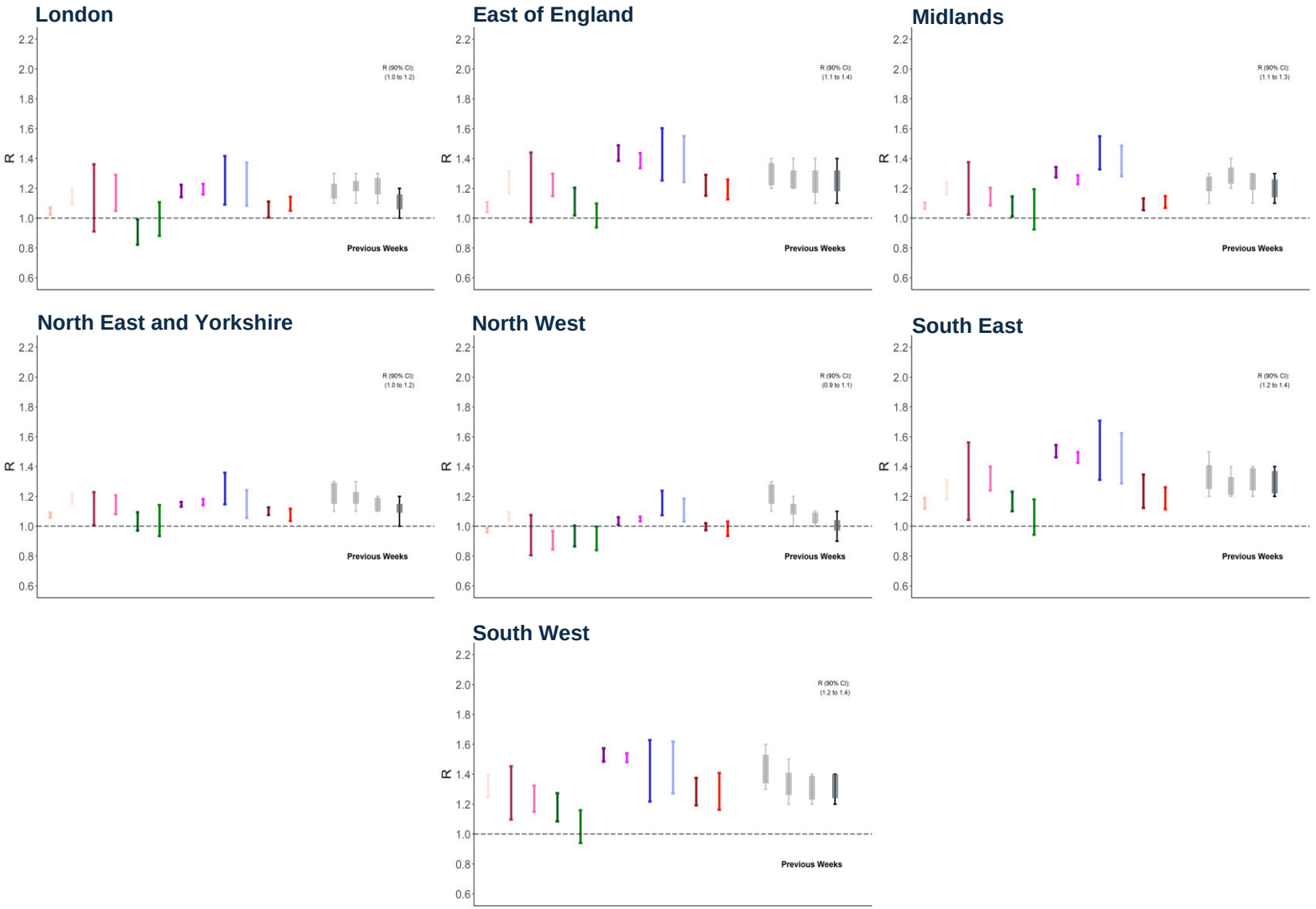


Figure 7: Medium-term scenarios taken from a subset of SPI-M-O models for daily hospitalisations in the seven NHS England regions over a range of R values (0.6 – purple; 0.8 – blue; 0.9 – green; 1.1 – yellow) where interventions are taken on 5th November and held in place for four weeks. The grey band 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.

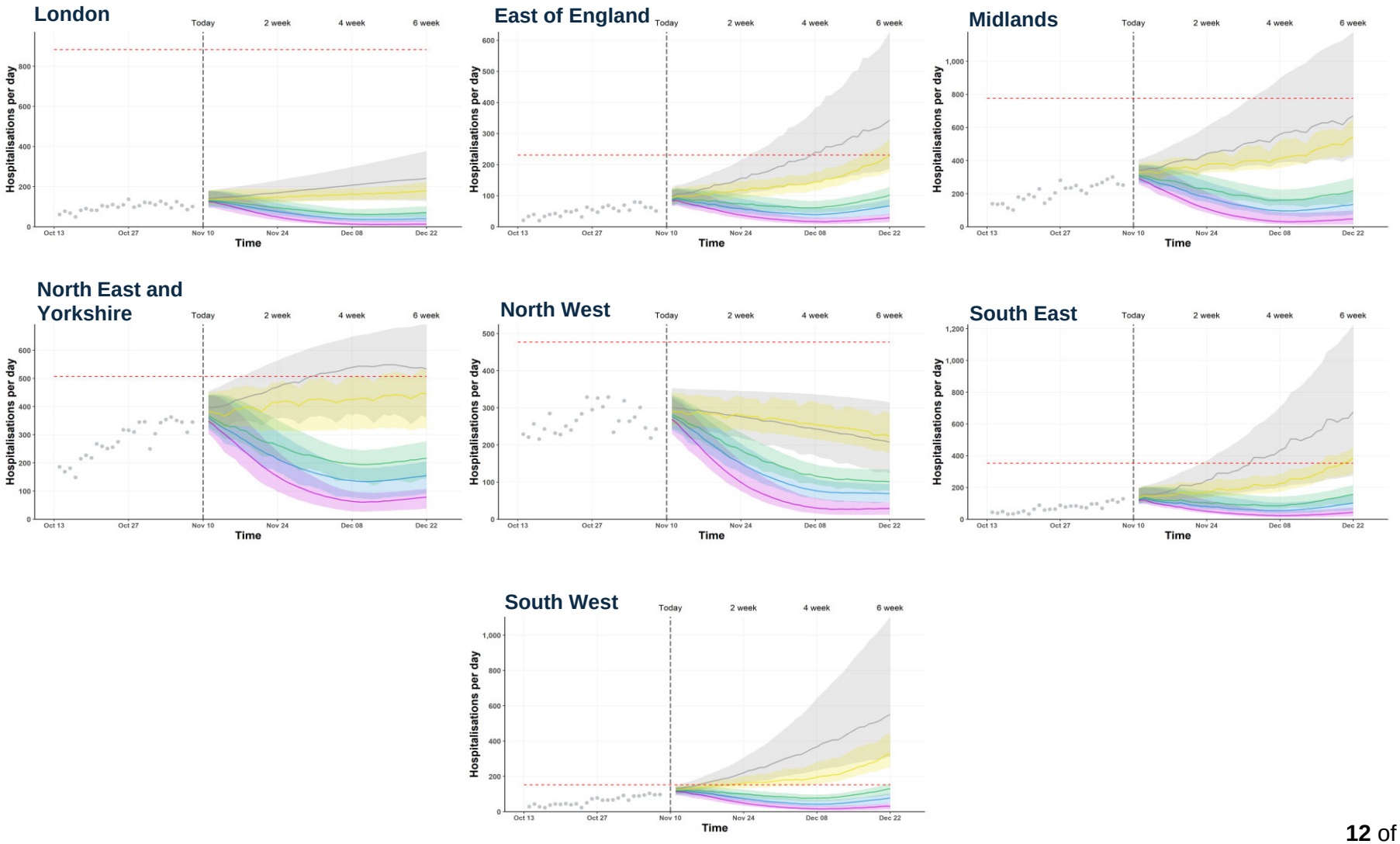


Figure 8: Medium-term scenarios taken from a subset of SPI-M-O models for daily deaths in the seven NHS England regions over a range of R values (0.6 – purple; 0.8 – blue; 0.9 – green; 1.1 – yellow) where interventions are taken on 5th November and held in place for four weeks. The grey band is the SPI-M-O 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. The red data points are incomplete due to reporting delays, and are expected to increase.