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

Date: 28th October 2020

FINAL

Summary

1. SPI-M-O's best estimate for **R in both the UK and England is between 1.1 and 1.3.** Although slightly lower than last week's estimate, this signals that the epidemic continues to grow rapidly, as demonstrated by ONS's community infection survey. **R is almost certainly above 1 in England**, **Scotland, Wales, Northern Ireland, and all regions of England.**
2. SPI-M-O estimate that there are between **50,000 and 63,000 new infections per day in England**. This represents a significant and growing burden of morbidity and mortality.
3. Changing patterns in testing, particularly in younger people, continue to make it difficult to interpret the changing epidemiology. There is some evidence that the rate of growth in new infections may have slowed in some parts of the country. A growth rate that is lower but still positive, however, represents an epidemic that continues to grow rapidly. SPI-M-O's modelled consensus is a **doubling time in the UK for new infections of between 18 and 27 days.**
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, including any impact from recently announced measures**.
5. SPI-M-O's medium-term projections suggest that multiple regions of England, particularly the North West, may breach their first wave peaks for hospital admissions within the next few weeks, possibly even if stringent interventions are enacted immediately.
6. **In order to enable household mixing over the festive period, prevalence needs to be driven down substantially as soon as possible.**

Incidence and prevalence

7. Combined estimates from six SPI-M-O models suggest there are between **50,000 and 63,000 new infections per day in England**. These are slightly lower than last week's estimate, but this is because models have been further refined and does not imply that the epidemic has shrunk. Updated ONS incidence estimates are not available at present.

8. Modelling from the ONS community infection survey for the most recent week of the study (17th to 23rd October) estimates that an average of **568,100 people had COVID-19** in the community in England (credible interval 536,500 to 600,400) – this is a significant increase on their previous estimate.

9. As the ONS survey estimates are based on survey results collected one to two weeks ago and given the current state, it is **highly likely that the epidemic has continued to grow since** and, therefore, the number of new infections each day is likely to be higher than estimated by the survey. The survey does not include people in care homes, hospitals, or university halls of residence.

10. The latest interim findings from the REACT surveillance survey have been reported from 16th to 25th October. Over this time, a weighted prevalence of 1.28% (1.15% to 1.41%) was estimated, the highest observed in any round of the survey and over double their previous round estimate. Particularly high prevalence has been observed in the North West, North East, and Yorkshire and the Humber.[1] REACT estimates for R value and doubling times suggest that the epidemic is growing faster than estimated by SPI-M-O.

Reproduction number, growth rate, and doubling times

11. **There is consensus that the epidemic continues to grow across the country.** There is some evidence that the rate of growth of the epidemic is slowing in some areas of the country. R, however, clearly remains above 1 with high prevalence of disease across much of the country. A lower yet positive growth rate still reflects an epidemic that is growing rapidly. The trend is for higher growth in areas of lower prevalence.

12. 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. Therefore, these estimates should be used as a guide to the general trend rather than a description of the epidemic state in all places.

13. **SPI-M-O's best estimate is that R is between 1.1 and 1.3 in both the UK and England**. SPI-M-O's agreed national and regional estimates are summarised in Table 1 and Figures 4, 5, and 7. These suggest R is almost certainly above 1 in England, Scotland, Wales, Northern Ireland, and all regions in England.

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, and number of

[1] *Footnote added for release: The North East is incorrectly included in this statement.*

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**, including any impact from the measures recently announced.

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 shrinking[2].

16. SPI-M-O's consensus estimate is that the **growth rate in the UK is between +2% to +4% per day**. SPI-M-O's national and regional estimates are summarised in Table 1 and Figure 6. This growth rate suggests **the number of new daily infections was doubling in the recent past every 18 to 27 days in the UK**. As above, these estimates cannot fully reflect any changes in transmission which might have occurred over the past two to three weeks.

Reliability

17. As the number of infections is increasing across the UK, SPI-M-O's view is that there is less variability in the 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. Care should still be taken when interpreting R and growth rate estimates for the UK, due to their inherently lagged nature and the fact these figures mask variation in the number of infections and how transmission is changing in some 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 cannot include future behavioural and policy changes that might reduce transmission, nor do they include seasonality effects that might increase transmission.

20. SPI-M-O have also modelled scenarios where measures are introduced on either 2nd November or 9th November that reduce R to 0.6, which is then sustained for the entire following six weeks. This is to illustrate the most optimistic scenario (in terms of minimising

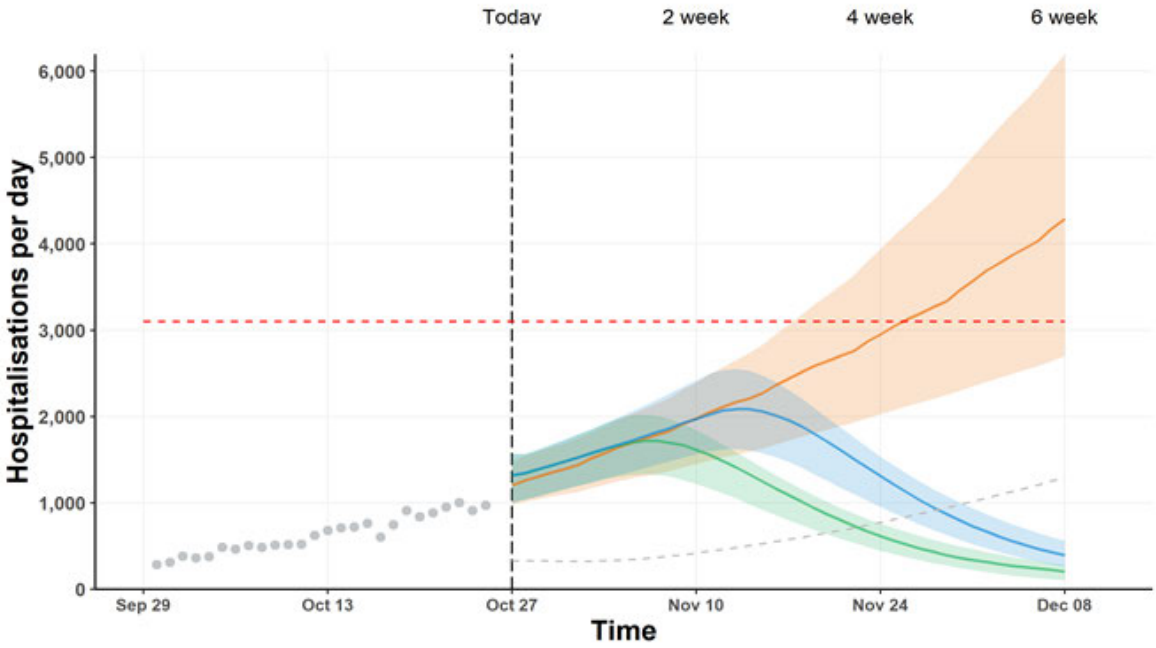
[2] Further technical information on the growth rate can be found in Plus magazine.

direct COVID-19 mortality and morbidity) that SPI-M-O consider to be plausible and is around the value of R seen in the community in early April.

21. All three scenarios are broadly in agreement for the next one to two weeks for hospitalisations and deaths, as these are largely already determined by infections to date. Beyond two weeks, the projections become more uncertain with greater variability between models. This reflects the large differences that can result from distinct data streams and the influence of small deviations in estimated growth rates and current incidence.

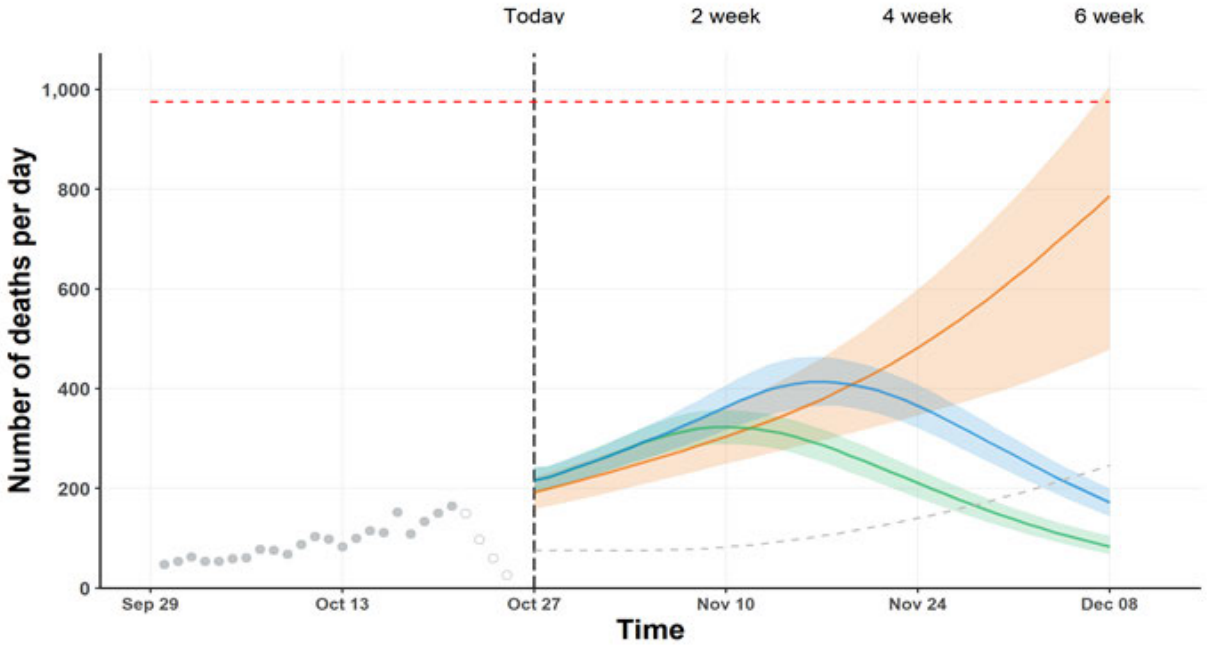
22. Figures 1 and 2 compare the current combined projections for hospitalisations and deaths (orange) with one where stringent measures that bring R to 0.6 are maintained for the entire six weeks from 2nd November (green) or 9th November (blue).

Figure 1: Medium-term projections and two R=0.6 scenario for daily hospitalisations in England. Orange shows the trajectory based on current trends, not including the effects of past or future policy or behaviour changes that have not yet been reflected in data. Green shows a scenario where stringent interventions are introduced on 2nd November and blue shows a scenario where a very stringent intervention is introduced on 9th November. In both, measures are maintained for the duration of the scenario. All trajectories show interquartile ranges of model combinations. The red dashed line is the peak from the first wave of the epidemic in spring 2020. The grey dashed line reflects the current reasonable worst case scenario.



Note: Due to different models forming part of the statistical combination in three scenarios, they do not perfectly align at 27th October.

Figure 2: Medium-term projections and two R=0.6 scenario for daily deaths in England. Orange shows the trajectory based on current trends, not including the effects of past or future policy or behaviour changes that have not yet been reflected in data. Green shows a scenario where stringent interventions are introduced on 2nd November and blue shows a scenario where a very stringent intervention is introduced on 9th November. In both, measures are maintained for the duration of the scenario. All trajectories show interquartile ranges of model combinations. The grey dashed line reflects the current reasonable worst case scenario.



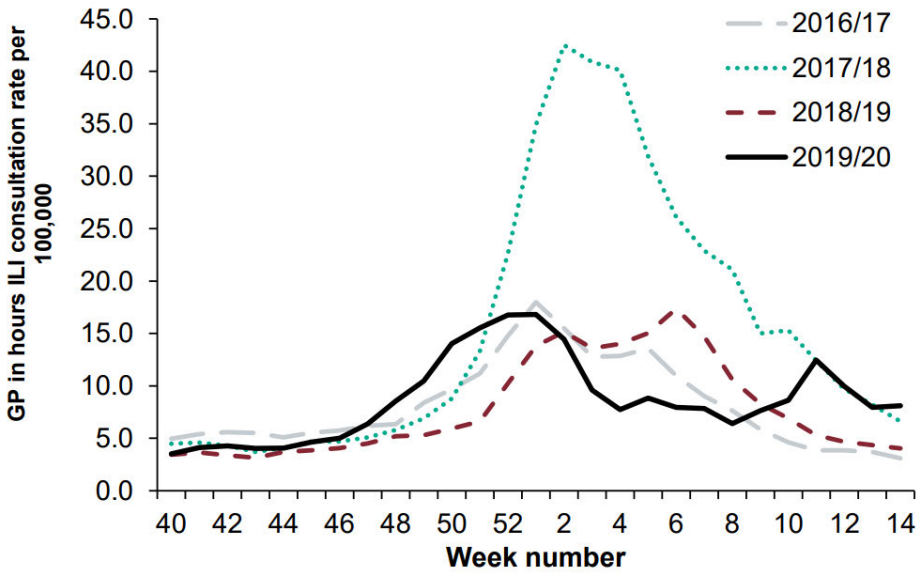
Note: Due to different models forming part of the statistical combination in three scenarios, they do not perfectly align at 27th October.

23. Figure 8 shows the equivalent charts for NHS England regions. The North West region, despite potentially slowing growth, is very close to breaching the first wave peak as are the South East and South West regions. This also appears to be the case for the North East and Yorkshire region. **Importantly, these figures mask significant variation within regions so that some local situations will be significantly worse than implied by this regional view.**

Potential impact of the festive season 2020 and beyond

24. The winter festive period is normally a time for gathering, often with other households from across the country or further afield, and for multiple generations of families to mix. As seen in influenza, (Figure 3), this is often followed by increases in respiratory disease transmission and COVID-19 is likely to be no different.

Figure 3: Weekly all age GP in house consultations for influenza-like illness (ILI) for winter 2016 to 2020 in England[3]



25. During the festive season, people gather together in larger groups, indoors, often having travelled long distances. People have multiple contacts with several different households who are not part of their usual routine, and could do this many times over in a short timeframe. This meeting of households in environments suitable for viral transmission is likely to rewire connection networks in ways that are hard to predict, but will tend to result in a step increase in incidence and prevalence. If vulnerable people are involved in these gatherings the resulting jump in mortality could be considerable.

26. Relaxing measures over the holidays to allow these behaviours could have an impact on R and growth rate; it may increase prevalence in a discontinuous fashion. Very preliminary work from one SPI-M-O group suggests that, for each day that measures are relaxed, five days of stringent measures are required to reduce prevalence again. This “compensatory” action to permit relaxing of measures would be possible before or after the event, although beforehand would be preferable, given the likely intergenerational mixing during the holidays.

27. It is not evident to SPI-M-O whether spreading out such festivities over time or condensing gatherings into, for example, a three-day period would be best to limit transmission. Similarly, the creation of “bubbles” or quarantine periods between events could be beneficial.

[3] PHE 2020: Surveillance of influenza and other respiratory viruses in the UK winter 2019 to 2020

28. **To enable more mixing during the festive period than that which is currently achievable, a substantial reduction in prevalence would be required, preferably enacted as soon as possible.**

Annex: PHIA framework of language for discussing probabilities

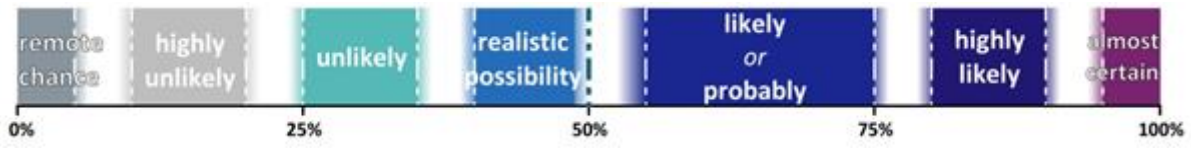


Table 1: Combined estimate of R and the growth rate in the UK, four nations and NHS England regions (90% confidence interval)

Nation	R	Growth rate per day
England	1.1 – 1.3	+3% to +5%
Scotland	1.0 – 1.3	+1% to +5%
Wales	1.0 – 1.3	+1% to +5%
Northern Ireland	1.1 – 1.4	+2% to +6%
UK	**1.1 – 1.3**	**+2% to +4%**

NHS England region	R	Growth rate per day
East of England	1.2 – 1.4	+3% to +6%
London	1.1 – 1.3	+2% to +5%
Midlands	1.2 – 1.4	+3% to +6%
North East and Yorkshire	1.1 – 1.3	+2% to +5%
North West	1.0 – 1.2	+1% to +3%
South East	1.2 – 1.4	+3% to +6%
South West	1.2 – 1.5	+4% to +7%

Figure 4: 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.

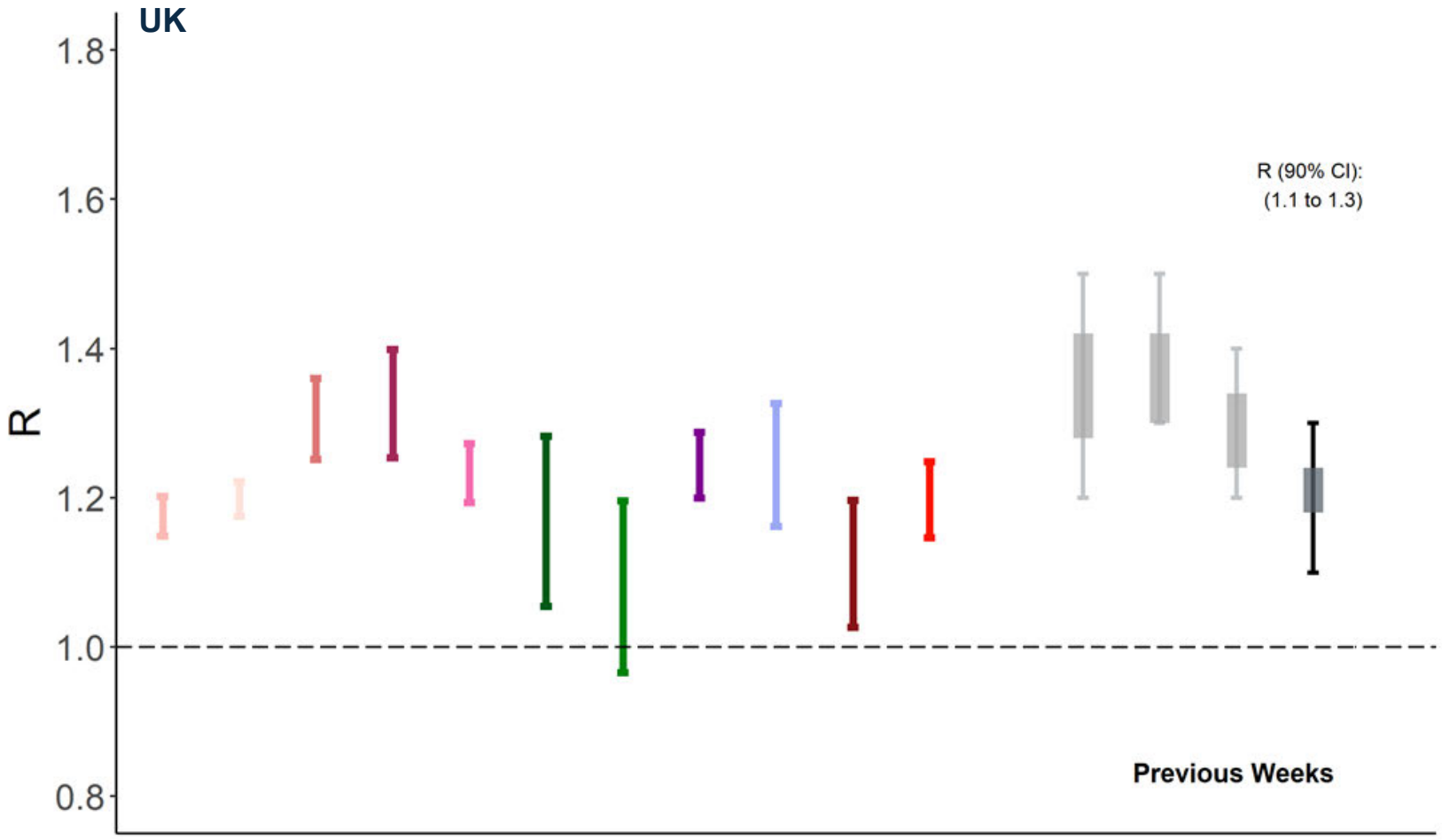


Figure 5: SPI-M-O groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

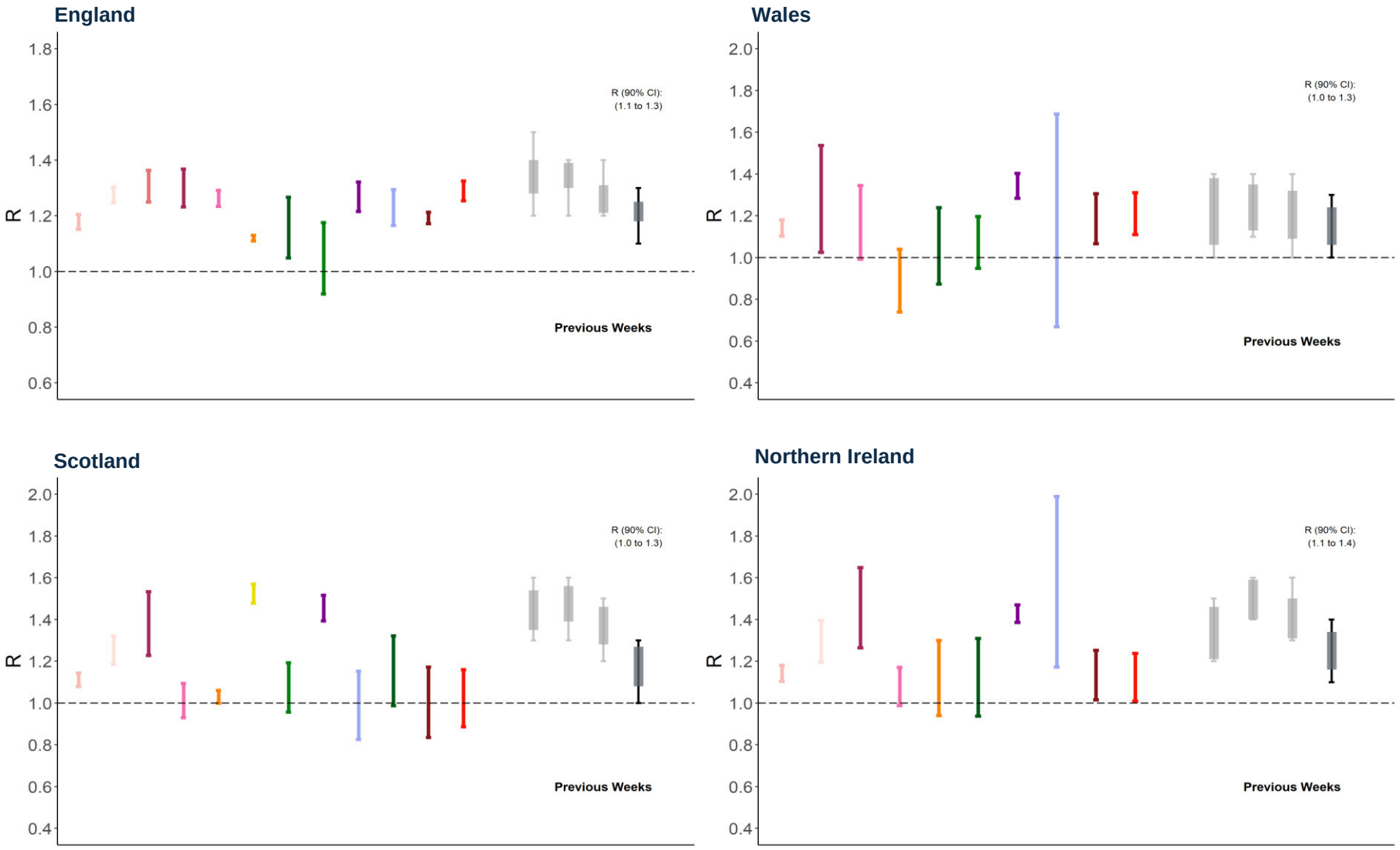


Figure 6: SPI-M-O groups estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different modelling groups. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.

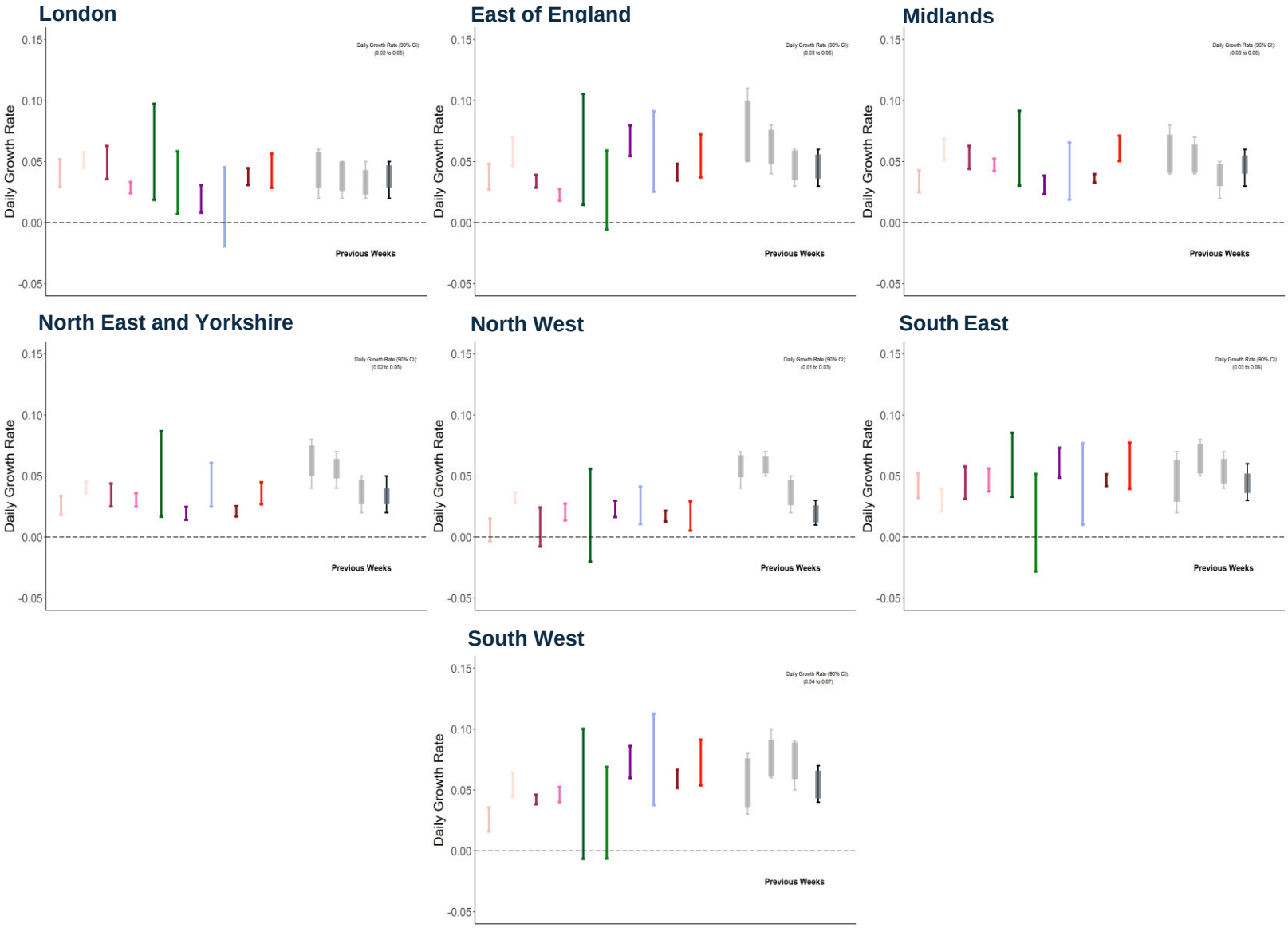
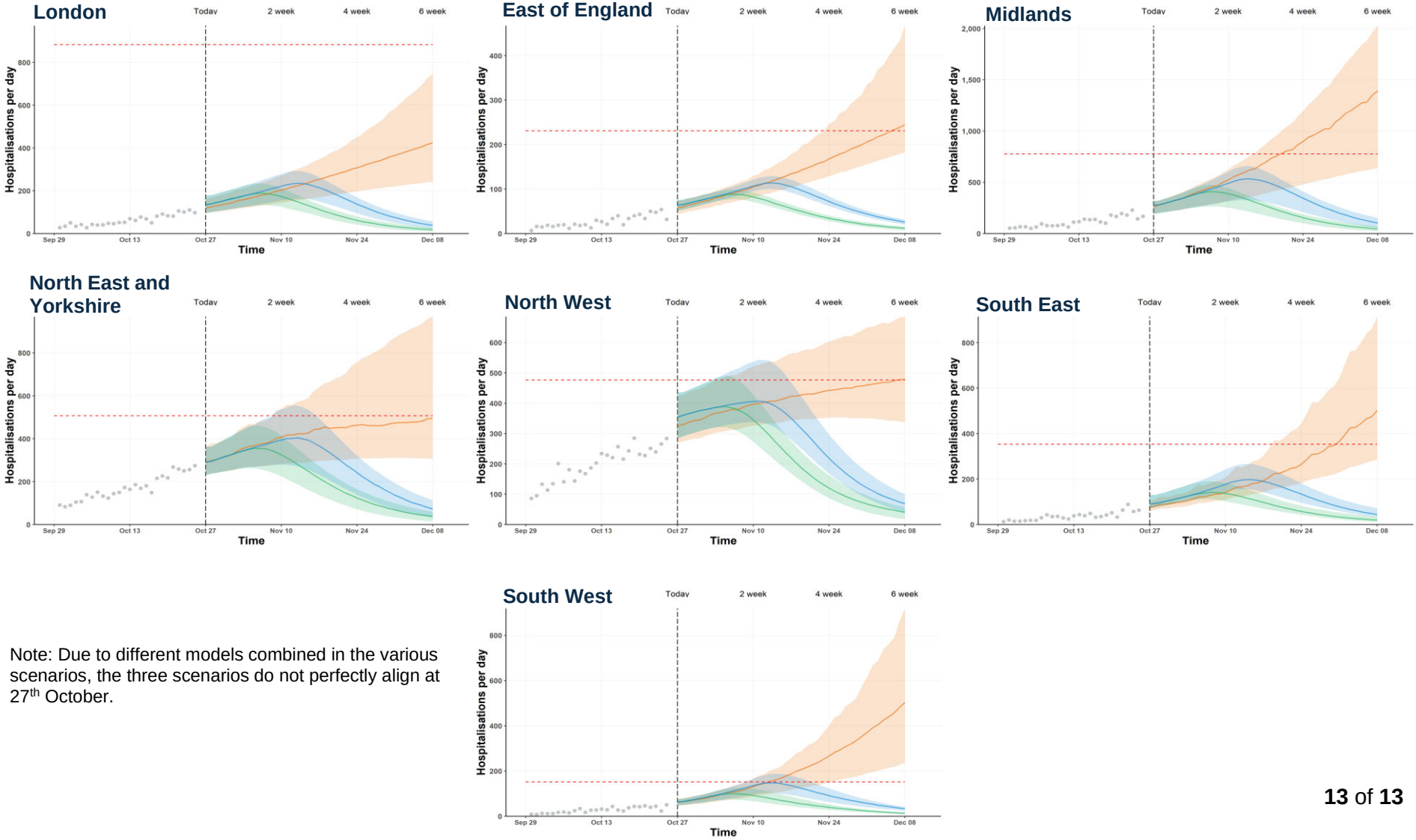


Figure 7: SPI-M-O groups estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

Figure 8: Medium-term projections and two R=0.6 scenario for daily hospitalisations for the seven NHS England regions. Orange shows the trajectory based on current trends, not including the effects of past or future policy or behaviour changes that have yet to be reflected in data. Green shows a scenario where stringent interventions are introduced on 2nd November and blue shows a scenario where these are introduced on 9th November. In both of these, measures are maintained for the duration of the scenario. All trajectories show interquartile ranges of model combinations. The red dashed line indicates the peak during the first wave in spring 2020.



Note: Due to different models combined in the various scenarios, the three scenarios do not perfectly align at 27th October.