

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

Date: 13th January 2021

All probability statements are in line with the framework given in the Annex.

Summary

1. SPI-M-O's best estimate for **R in the UK is between 1.2 and 1.3, while England is between 1.1 and 1.3**. Estimates of R for Scotland, Wales, and Northern Ireland are between **1.0 and 1.4, 0.8 and 1.1, and 0.9 and 1.3 respectively**.
2. SPI-M-O estimate that R is above 1 in all NHS England regions except for London, whose estimate spans 1. SPI-M-O are particularly concerned about the North West and South West regions, where viral transmission is increasing. There are indications that transmission in the East of England, London, and South East regions is reducing.
3. SPI-M-O estimate that there are between **113,000 and 253,000 new infections per day in England**.
4. R is a lagging indicator and these estimates are based on the latest data available up to 11th January. These estimates, therefore, cannot fully reflect the latest measures across the four nations including the lockdown in England from 5th January. The delays in the data streams are still unwinding from the festive period, and estimation and projection are less accurate at turning points, leading to higher levels of uncertainty.
5. A subset of the same SPI-M-O models that are used to produce medium-term projections have been used to explore the possible impact of the national lockdown. Scenarios that assume a range of decreased R values (between 0.8 and 1.2) over the next six weeks suggest that by mid-February hospital occupancy will still be at the extremely high levels seen recently, even in the more optimistic scenarios where R is sustained below 1. **It will take two to three weeks to be able to differentiate which of these scenarios is closest to the trajectory of the epidemic.**

Incidence and prevalence

6. Combined estimates from six SPI-M-O models, using data available up to 11th January, suggest there are between **113,000 and 253,000 new infections per day in England**.
7. Data included in the ONS community infection survey for the most recent week of the study (3rd to 9th January 2021) estimates are currently undergoing further quality assurance and are unavailable at the present time.

Reproduction number and growth rate

8. 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. This should be considered when interpreting the R estimate for the UK given the differences in policies across the four nations.
9. **SPI-M-O's best estimate for R in the UK is between 1.2 and 1.3, while England is between 1.1 and 1.3.** Estimates of R for Scotland, Wales, and Northern Ireland are between **1.0 and 1.4, 0.8 and 1.1, and 0.9 and 1.3 respectively.** SPI-M-O's agreed national estimates are summarised in Table 1 and Figures 4 and 5.
10. R is a lagging indicator and these estimates are based on the latest data available up to 11th January. These estimates, therefore, do not *fully* reflect the latest measures across the four nations, including the relaxation during festive period and lockdown in England from 5th January.
11. SPI-M-O estimate that R is above 1 in all NHS England regions, with the exception of London whose estimate spans 1 (between 0.9 and 1.2). These regional R estimates can be seen in Figure 7. There is some evidence that those areas that have had higher prevalence levels and been under more stringent restrictions for longer recently – i.e. East of England, London, and South East – are already experiencing declines in the numbers of people infected. SPI-M-O are concerned, however, about the North West and South West regions, where viral transmission is increasing. Care Homes, particularly in the South East, are seeing increases in cases, and those in the South West would be vulnerable if community prevalence there increases.
12. 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 shrinking¹.
13. SPI-M-O's consensus estimate is that the **growth rate in the UK is between +2% and +5% per day**, and between **+1% and +4% in England**. SPI-M-O's national and regional estimates of growth rates are summarised in Table 1 and Figure 6.

Medium-term projections and other scenarios

14. SPI-M-O continue to produce projections for the medium term, 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,

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

such as hospital admissions and deaths. They do not include any behavioural and policy changes. In particular, they cannot yet reflect the *full* impact of the national lockdown in England announced on 5th January 2021. Projections are particularly uncertain during periods of transition, for example when significant interventions are introduced; it is difficult to project when a peak might happen and how large it might be. As a result, these projections when used to support planning only extend to the next two weeks.

15. A subset of the same SPI-M-O models that are used to produce the medium-term projections have been used to explore the potential impact of the national lockdown. Scenarios have been produced that assume a range of decreased R values from between 0.8 and 1.2. These scenarios run for six weeks until the middle of February to illustrate what SPI-M-O consider to be a plausible range of possible trajectories (in terms of COVID-19 hospital admissions, hospital occupancy, and mortality). The medium-term projections for six weeks are included on these plots to provide context but are not suitable for regular planning purposes. **It will take two to three weeks to see the full impact of lockdown in England in the data and hence to be able to differentiate between these scenarios.**
16. Neither SPI-M-O's medium-term projections nor these scenarios include the impact of vaccines on these trajectories. SPI-M-O do not yet have access to the necessary NHS England rollout timelines for vaccination or detailed data on who has been vaccinated. These data are already critical for SPI-M-O to be able to provide scientific evidence to SAGE, including accurate R estimates and projections. SPI-M-O anticipate that access to these relevant data will be resolved very shortly and so will aim to include the potential impact of vaccination in any future iterations.
17. As discussed previously, it will take two to three weeks for a vaccine to induce an immune response, and approximately a further two weeks for an infected person to require hospitalisation. There will be a lag of around four weeks before the benefits of vaccines are seen on hospital admissions, and even longer for deaths. The impact of vaccination on these scenarios over this time period to mid-February, therefore, would be expected to be limited.
18. Figures 1, 2, and 3 show the combined scenarios for hospital admissions, hospital occupancy, and deaths respectively over a range of R values (0.8 – blue; 0.9 – green; 1.1 – yellow; 1.2 – red). The scenarios run over a six-week period from 12th January. The grey band is the SPI-M-O medium-term projection of the expected epidemic *without the impact of any further interventions* from the same date.

19. As seen with R numbers and growth rates, regional variation continues, and becomes more apparent in scenarios. Figures 8, 9, and 10 show the equivalent charts for NHS England regions and Scotland. These changes partly depend on the demographics, number of susceptible individuals, and current levels of prevalence in these regions.

20. Even if R is below 1, but infections do not fall quickly, such as an R=0.9 scenario for the next six weeks, hospital occupancy due to COVID-19 will be approximately the same in early February as it is now, i.e. over 30,000. If R is above 1 for the next six weeks, the pressure on secondary care will continue to increase. If infections do not fall fast and stay low, hospitals will be at very high capacity for an extended period.

Figure 1: Six-week scenarios for daily hospital admissions in England over a range of R values (0.8 – blue; 0.9 – green; 1.1 – yellow; 1.2 – red) reflecting the possible impact of the national lockdown, announced on 5th January. The grey band is the SPI-M-O medium-term projection of the expected epidemic without any further interventions or current interventions fully included. 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.

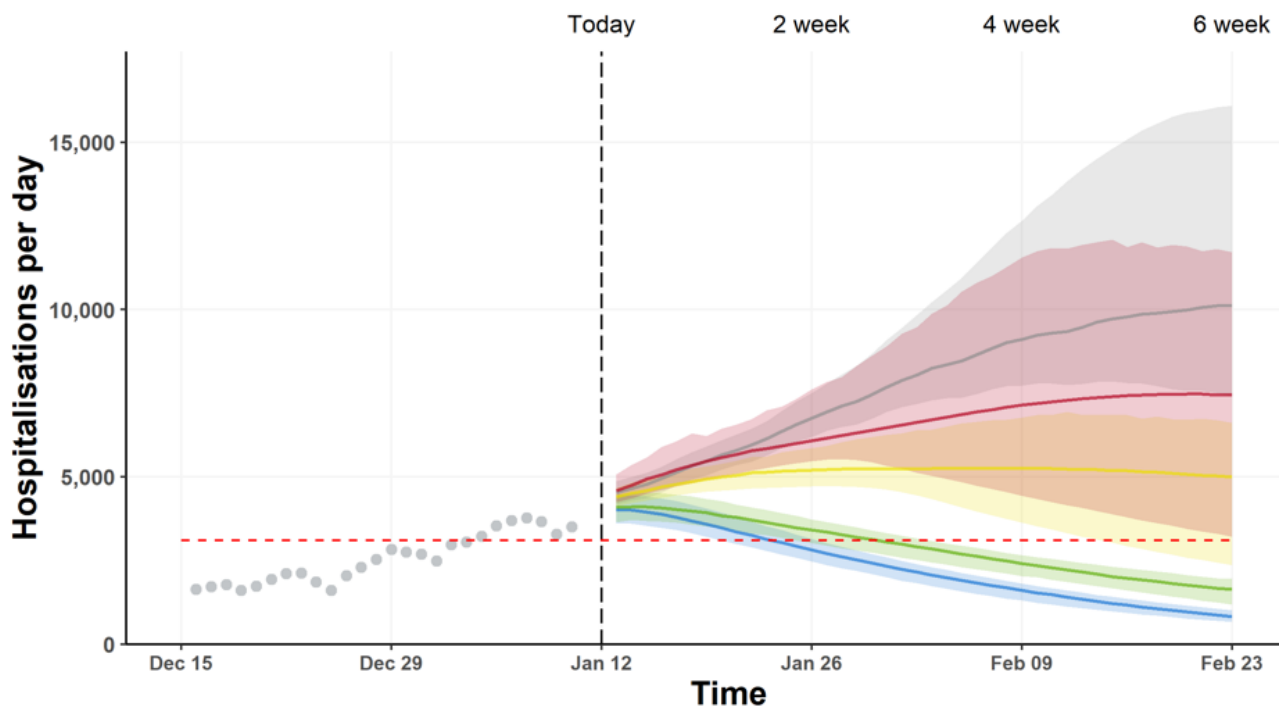


Figure 2: Six-week scenarios for daily hospital occupancy in England over a range of R values (0.8 – blue; 0.9 – green; 1.1 – yellow; 1.2 – red) reflecting the possible impact of the national lockdown, announced on 5th January. The grey band is the SPI-M-O medium-term projection of the expected epidemic without any further interventions or current interventions fully included. All trajectories show interquartile ranges of model combinations as the shaded band.

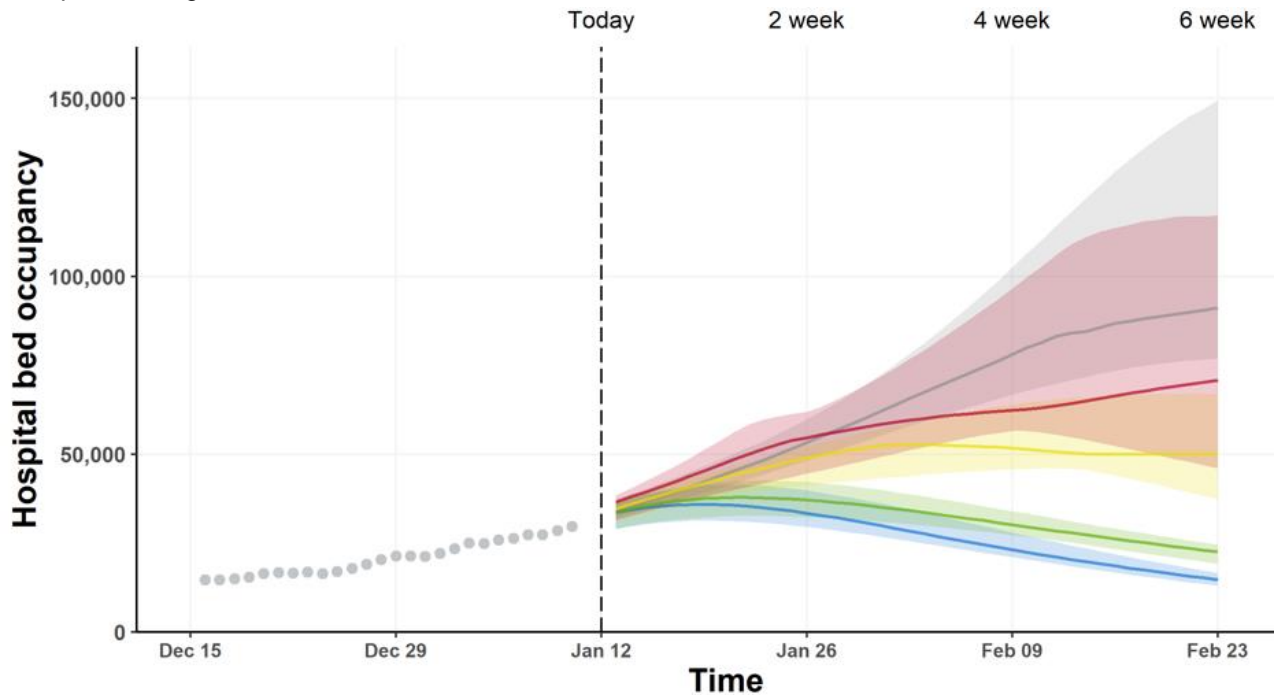
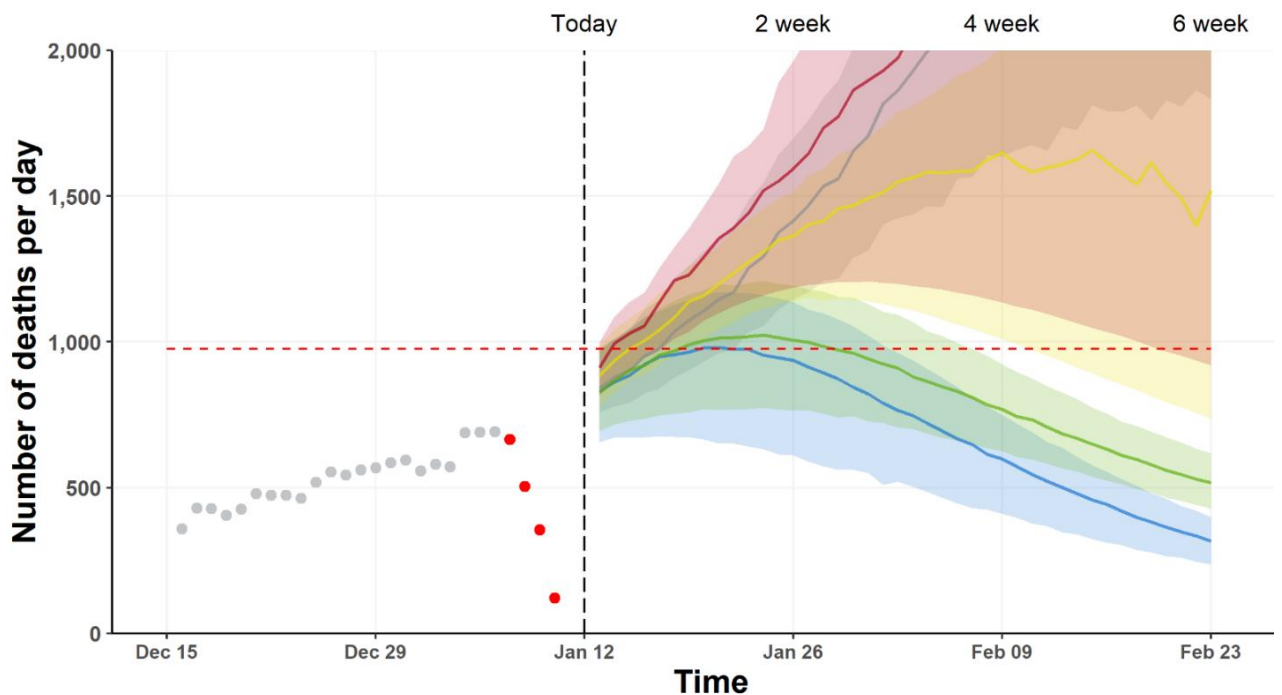


Figure 3: Six-week scenarios for daily deaths in England over a range of R values (0.8 – blue; 0.9 – green; 1.1 – yellow; 1.2 – red) reflecting the possible impact of the national lockdown, announced on 5th January. The grey band is the SPI-M-O medium-term projection of the expected epidemic without any further interventions or current interventions fully included. 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. Red data points highlight that these are likely to be revised upwards in the future due to reporting delays.



Vaccinations

21. SPI-M-O highlight that a further epidemic wave will take place if non-pharmaceutical interventions start being lifted before vaccine rollout is well advanced. This wave would be less likely to return hospital occupancy to levels that endanger the usual standard of care if:

- The number of vulnerable people who are unprotected is low – this will be a combination of the proportion of vulnerable people who have not been vaccinated and the real-world effectiveness of the vaccine against hospitalisations and deaths in these cohorts
- Hospital occupancy is low when such a relaxation takes place
- Prevalence is low when such a relaxation takes place
- Restrictions are lifted gradually, while retaining some basic social distancing measures, such as COVID security and Test and Trace (with high adherence to isolation)

22. In the event of a further epidemic wave due to relaxation, transmission would be highest in the most vulnerable, deprived communities with lowest vaccination coverage, likely leading to explosive epidemics.

23. Reaching herd immunity from vaccination alone may not be possible; it would require very high coverage in all adult age groups and for the vaccine to be highly effective against transmission.

24. The age profile of those being admitted to hospital is less skewed towards the oldest in society than the age profile of deaths. For that reason, vaccines will reduce pressure on the NHS more slowly than they will reduce the number of deaths.

25. If, in future, the Government were to follow a strategy of allowing R to be sustained above 1 before vaccines have been offered to all adults, **very high coverage in older and more vulnerable groups is absolutely critical** to avoid the NHS being so stretched that it cannot provide its usual levels of care during in the epidemic that would follow.

Annex: PHIA framework of language for discussing probabilities

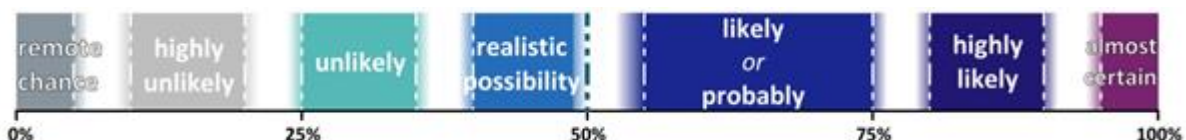


Table 1: Combined estimate of R and the growth rate in the UK, four nations and NHS England regions (90% confidence interval)²

Nation	R	Growth rate per day
England	1.1 – 1.3	+1% to +4%
Scotland	1.0 – 1.4	0% to +6%
Wales	0.8 – 1.1	-4% to +1%
Northern Ireland	0.9 – 1.3	-2% to +4%
UK	1.2 – 1.3	+2% to +5%

NHS England region	R	Growth rate per day
East of England	1.0 – 1.3	0% to +4%
London	0.9 – 1.2	-2% to +3%
Midlands	1.2 – 1.4	+2% to +6%
North East and Yorkshire	1.1 – 1.3	+2% to +5%
North West	1.2 – 1.5	+3% to +7%
South East	1.0 – 1.2	-1% to +3%
South West	1.2 – 1.5	+4% to +7%

² The estimate intervals for R and growth may not exactly correspond to each other due to the submission of different independent estimates and rounding in presentation.

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.

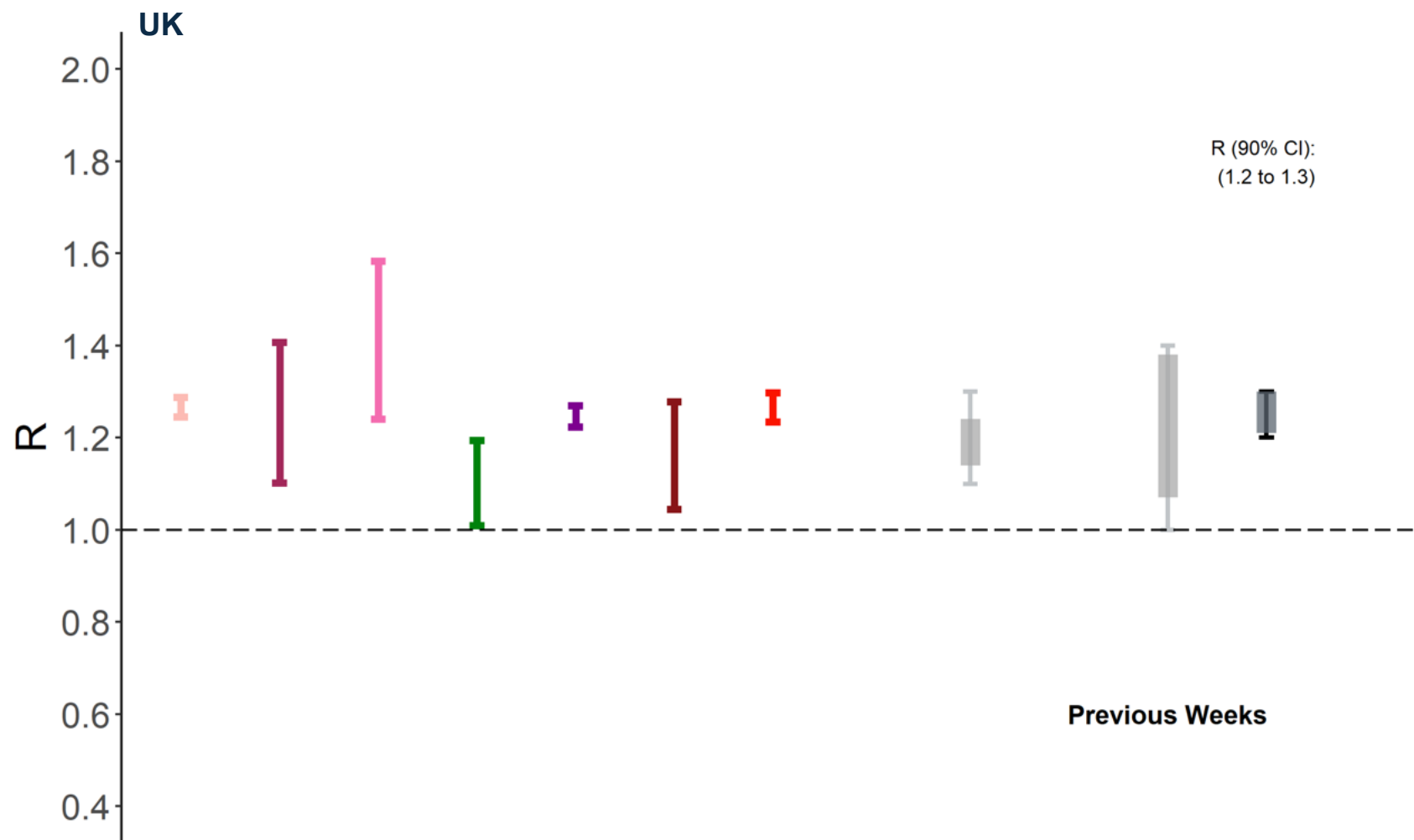


Figure 5: SPI-M-O groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

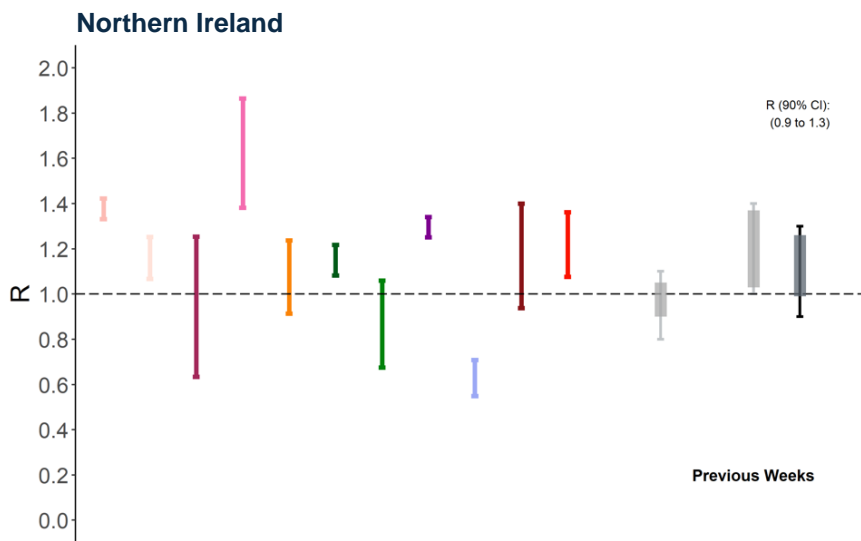
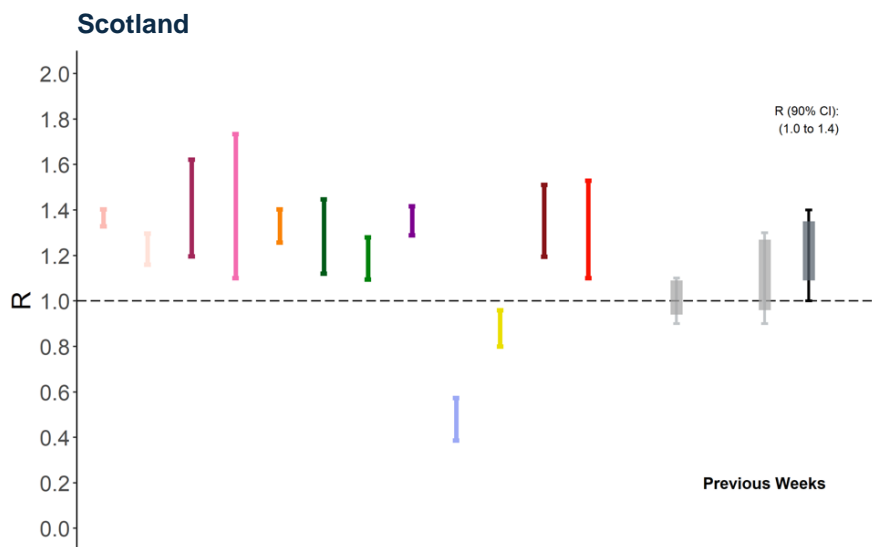
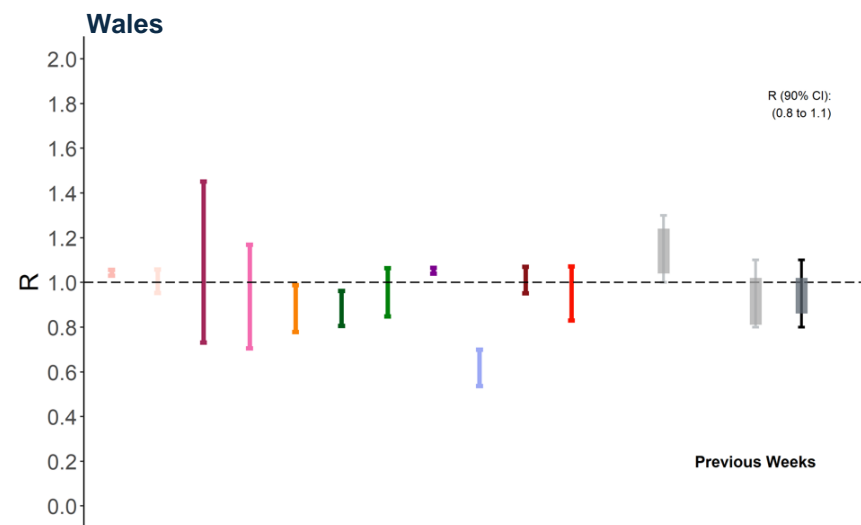
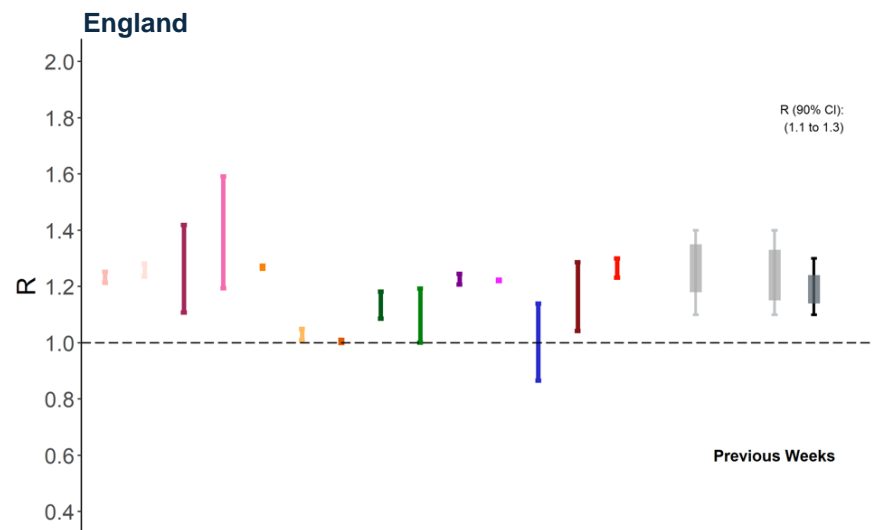


Figure 6: SPI-M-O groups estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different modelling groups. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.

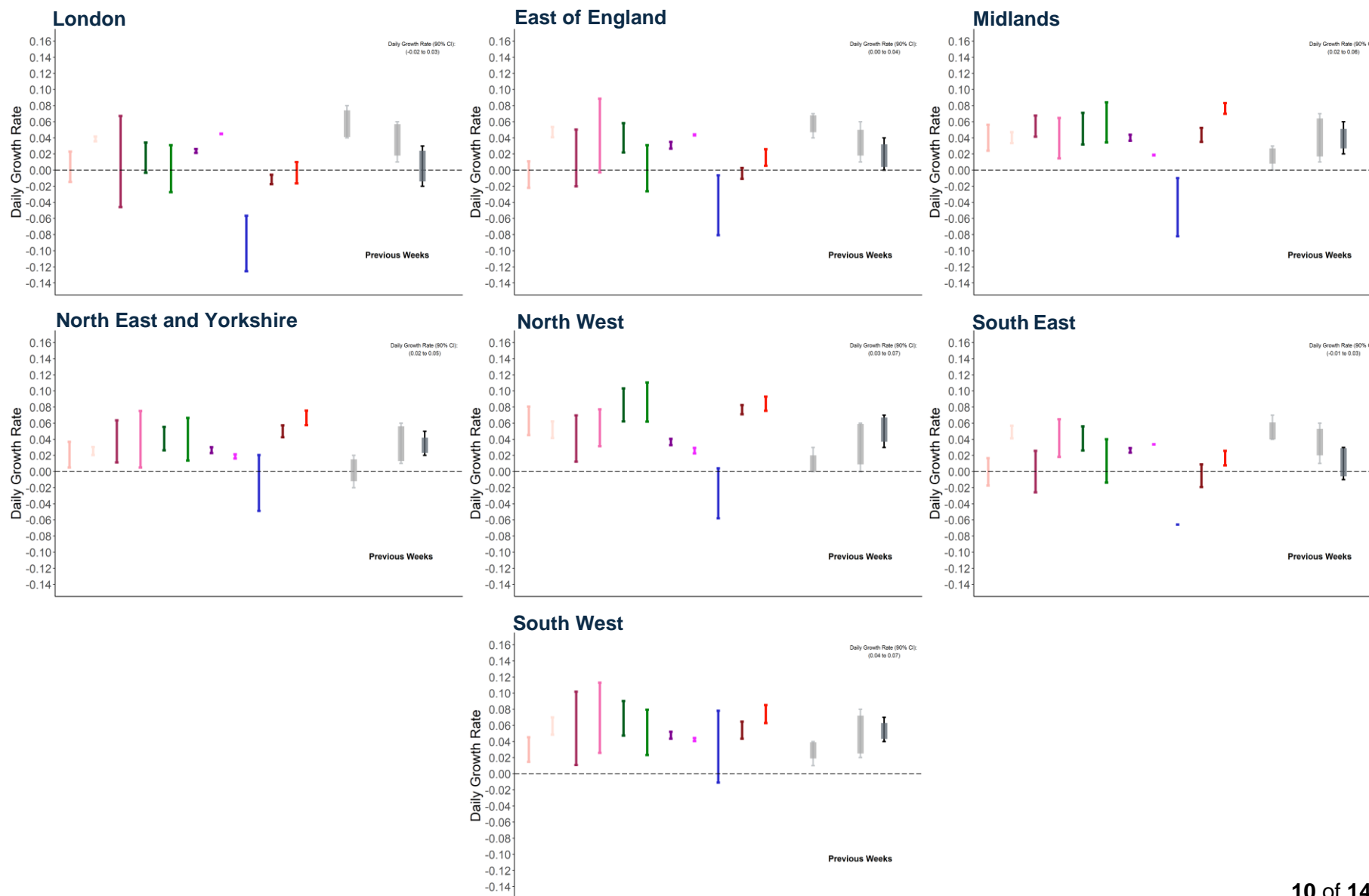


Figure 7: SPI-M-O groups estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

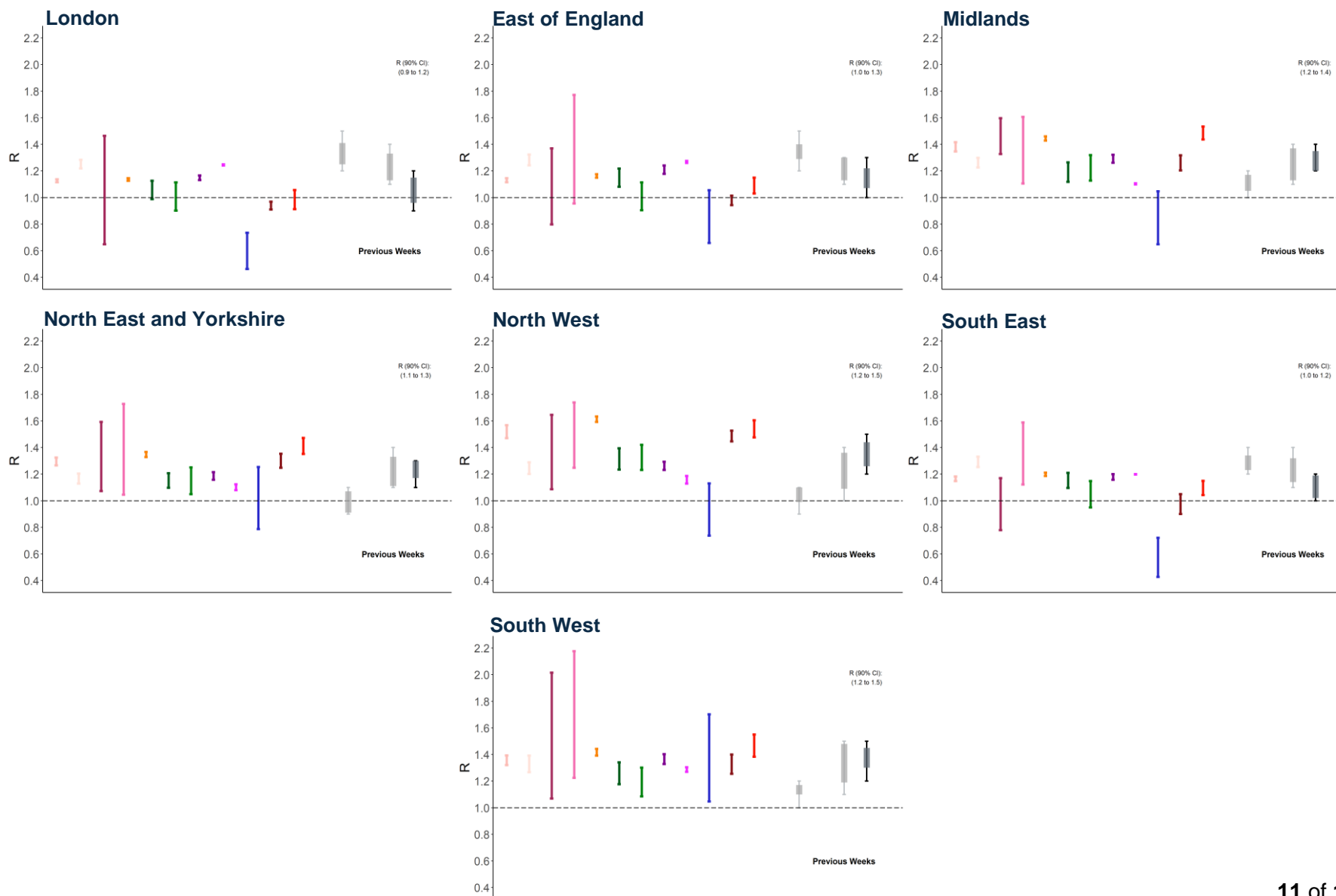


Figure 8: Six-week scenarios taken from a subset of SPI-M-O models for daily hospital admissions in the seven NHS England regions and Scotland over a range of R values (0.8 – blue; 0.9 – green; 1.1 – yellow; 1.2 – red) reflecting the possible impact of the national lockdown, announced on 5th January. The grey band is the SPI-M-O medium-term projection of the expected epidemic without any further interventions or current interventions fully included. 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. Red data points highlight these will likely be revised due to reporting delays.

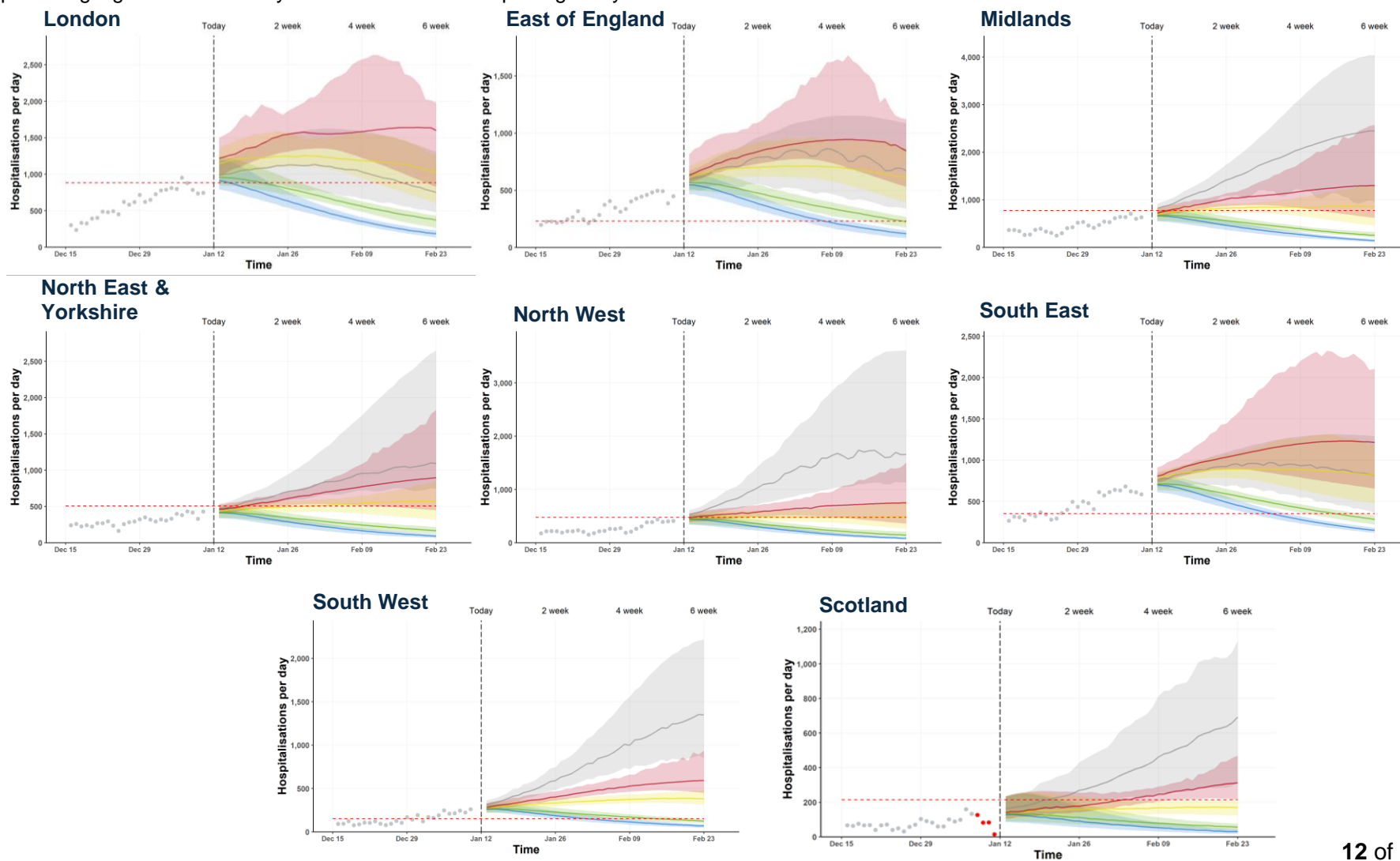


Figure 9: Six-week scenarios taken from a subset of SPI-M-O models for daily hospital occupancy in the seven NHS England regions and Scotland over a range of R values (0.8 – blue; 0.9 – green; 1.1 – yellow; 1.2 – red) reflecting the possible impact of the national lockdown, announced on 5th January. The grey band is the SPI-M-O medium-term projection of the expected epidemic without any further interventions or current interventions fully included. All trajectories show interquartile ranges of model combinations as the shaded band.

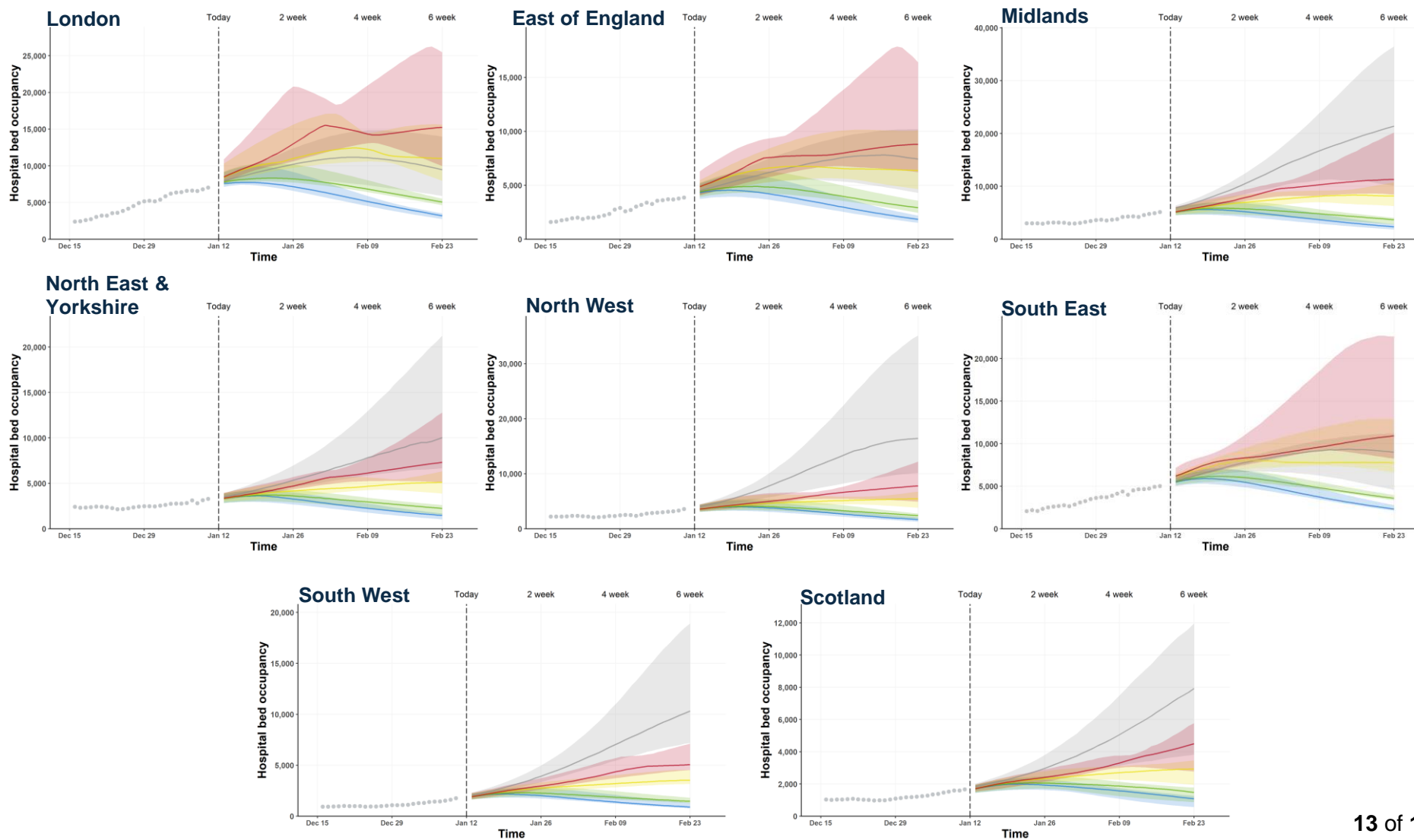


Figure 10: Six-week scenarios taken from a subset of SPI-M-O models for daily deaths in the seven NHS England regions and Scotland over a range of R values (0.8 – blue; 0.9 – green; 1.1 – yellow; 1.2 – red) reflecting the possible impact of the national lockdown, announced on 5th January. The grey band 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. Red data points highlight that these are likely to be revised upwards in the future due to reporting delays.

