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

Date: 17th February 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 0.6 and 0.9, and in England and Scotland, it is between 0.7 and 0.9. For Wales and Northern Ireland, R is between 0.6 and 0.9 and between 0.6 and 0.8 respectively.** These estimates are based on the latest data, available up to 15th February, including hospitalisations and deaths as well as symptomatic testing and prevalence studies.

2. SPI-M-O is confident that R is below 1 across all NHS England regions, although the upper limit of the range for the North East and Yorkshire is 1. Although the epidemic continues to decrease across all the nations, transmission is heterogeneous more locally. This heterogeneity contributes to the variation in R estimates and is important for future patterns.

3. SPI-M-O estimates that there are between **13,000 and 35,000 new infections per day in England.**

4. While R is below 1, prevalence is still high across the country.

5. As mentioned in previous consensus statements, R is a lagging indicator. Comparing our previously published R estimates with subsequent estimates made with more complete data available now, these estimates are lagged by two to three weeks. There have been no significant policy changes in England in the past three weeks that would to lead us to believe that this estimate is inaccurate.

Incidence and prevalence

6. Combined estimates from seven SPI-M-O models, using data available up to 15th February, suggest there are between **13,000 and 35,000 new infections per day in England**.

7. The ONS community infection survey for the most recent week of the study (6th to 12th February) estimates that an average of **481,300 people had COVID-19** in the community in England (credible interval **451,600 to 512,400**). The survey does not include people in care homes, hospitals, or prisons. Estimates from across the four nations of the UK are:

England	481,300 (credible interval 451,600 to 512,400)
Scotland	29,200 (credible interval 24,300 to 34,600)
Wales	24,600 (credible interval 20,100 to 29,400)
Northern Ireland	17,800 (credible interval 13,900 to 22,400)

Reproduction number and growth rate

8. 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].

9. SPI-M-O's consensus estimate is that the **growth rates in the UK and England are both between -6% and -3% per day**. SPI-M-O's national and regional estimates of growth rates are summarised in Table 1 and Figure 6.

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. This should be considered when interpreting the R estimate for the UK given the differences in policies across the four nations.

11. SPI-M-O's best estimate for **R in the UK is between 0.6 and 0.9**, and in **England and Scotland it is between 0.7 and 0.9. For Wales and Northern Ireland, R is between 0.6 and 0.9 and between 0.6 and 0.8 respectively.** SPI-M-O's agreed national estimates are summarised in Table 1 and Figures 4 and 5. R is an indicator that lags by two to three weeks, and these estimates are based on the latest data available up to 15th February.

12. SPI-M-O is confident that R is below 1 in all NHS England regions, although the upper limit of the range for the North East and Yorkshire is 1. The regional R estimates can be seen in Table 1 and Figure 7. While R is estimated to be below 1 across the country, the epidemic appears to be shrinking more slowly in some local authorities compared to others. It is important that these areas are monitored carefully over the coming weeks, particularly once measures start to be relaxed. Investigation of the potential causes for different patterns in these areas would be warranted.

13. While R is below 1, prevalence remains very high. Any relaxation of measures will need to be done carefully and depends on prevalence continuing to fall.

Retrospective estimates of R

14. As mentioned above and in previous consensus statements, R is a lagging indicator. The time delay between someone being infected, having symptoms, and needing healthcare,


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

and the delays in the subsequent data means that SPI-M-O's estimates represent the transmission of COVID-19 over the past few weeks.

15. To investigate the amount of lag, SPI-M-O have produced retrospective estimates of R using the data available on the 15th February and compared these to the consensus estimates produced at the time.

16. Figures 1 and 2 below suggest that consensus estimates are lagged by approximately two weeks. This increases to around three weeks when considering the additional delay due to publication. It is important to note that the amount of lag will vary between models depending on what data are being used. Estimates produced using case data, for example, will be much less lagged than those using deaths.

17. Three weeks is the **minimum** time between making significant policy alterations that might change the value of R and knowing the magnitude and direction of such change through data analysis. If changes in policy are to be informed by data, these time lags, and the time it takes to form a well-found decision, should be factored into future planning.

Figure 1: Retrospective estimates of R in England compared to previous SPI-M-O consensus estimates. The coloured lines are the retrospective estimates produced by different modelling groups based on data available on the 15th February. The dark shaded area is the combined numerical range and the light shaded is the combined range after rounding. The vertical bars are SPI-M-O's consensus estimates on the date they were produced (four days prior to publication).
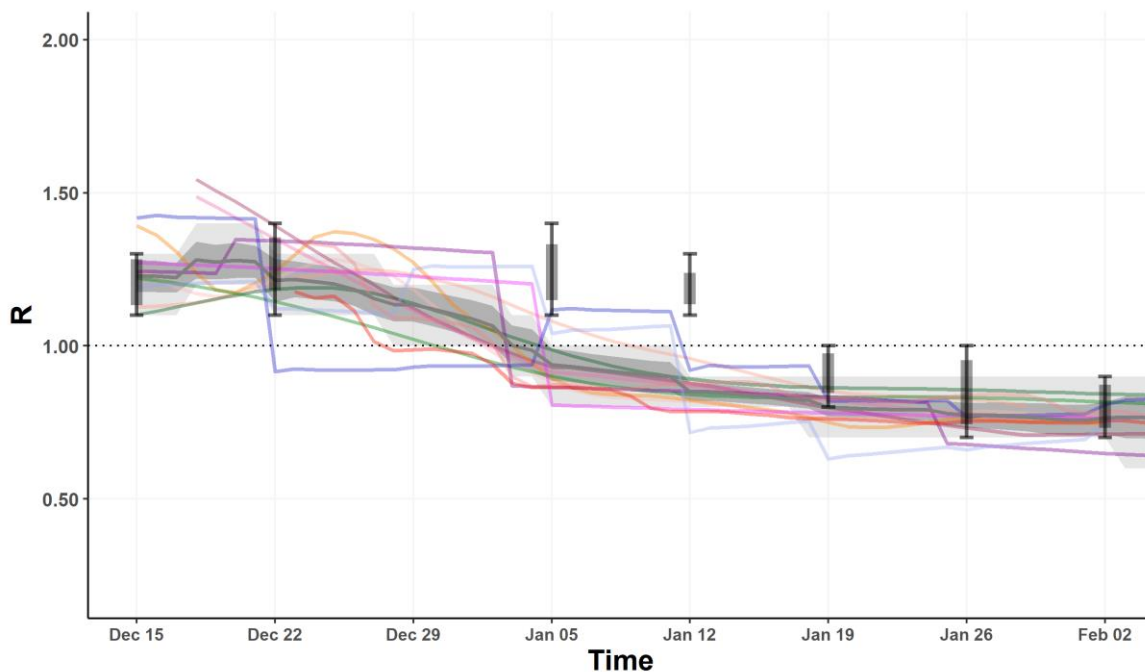
Figure 2: Retrospective estimates of R in England compared to previous SPI-M-O consensus estimates shifted backwards two weeks. The coloured lines are the retrospective estimates produced by different modelling groups based on data available on the 15th February. The dark shaded area is the combined numerical range and the light shaded is the combined range after rounding. The vertical bars are SPI-M-O's consensus estimates <u>shifted backwards two weeks</u>.
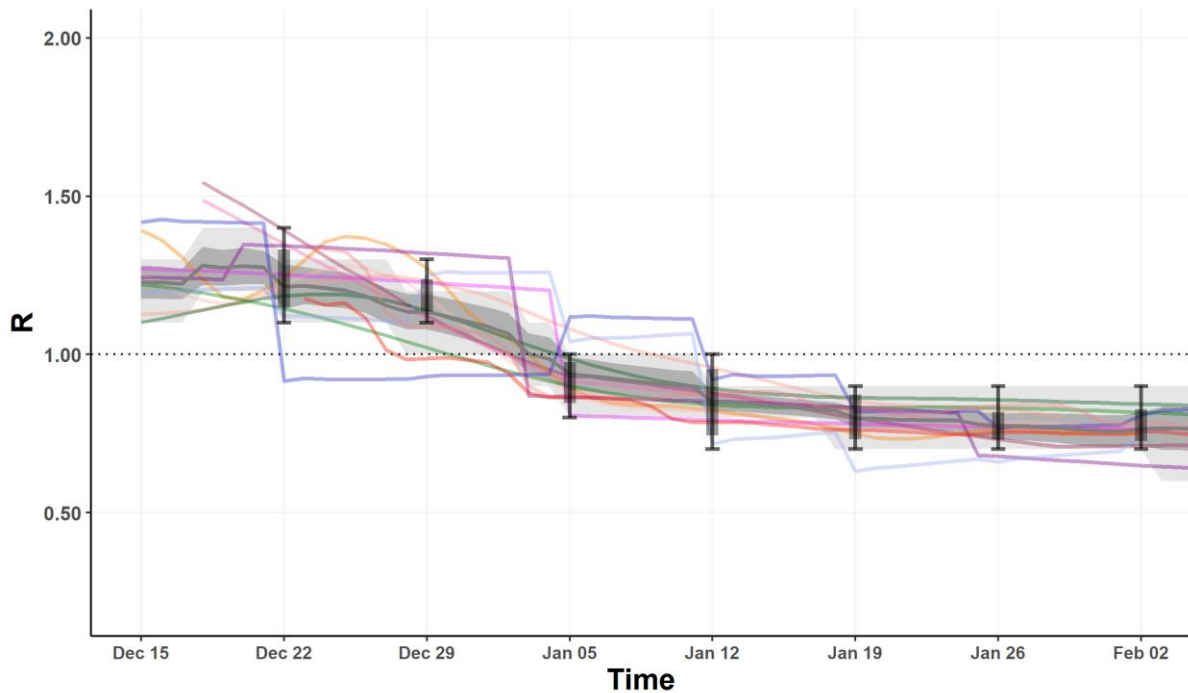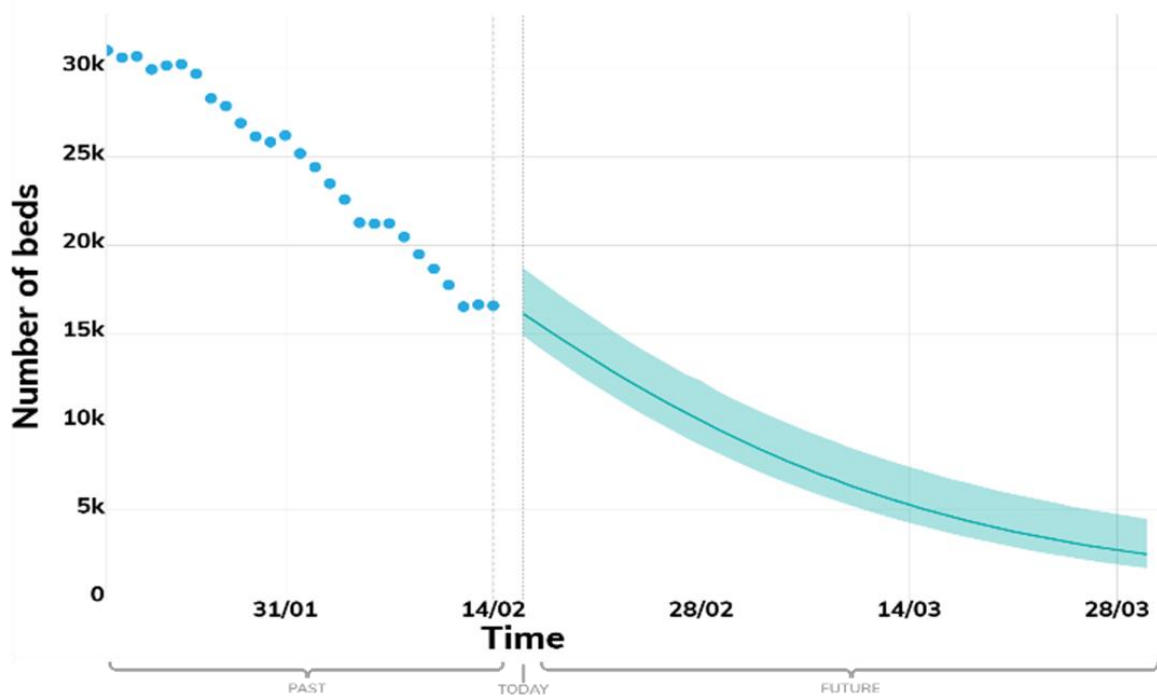

Medium-term projections

18. 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; they represent a scenario in which the trajectory of the epidemic continues to follow the trends seen in the data up to the 15th February. The delay between infection, hospitalisation, and death means the projections cannot fully reflect recent changes in transmission.

19. These projections include the potential impact of vaccinations. This has been based on a rollout scenario provided by Cabinet Office for modelling purposes which assumes an average of 2.3 million doses are administered per week across the UK.

20. The real-world effectiveness of vaccines, particularly against infection, is not yet known. The first dose effectiveness against both hospitalisation and death of the Pfizer-BioNTech and Oxford-AstraZeneca vaccines are modelled to be 88% and 70% respectively in line
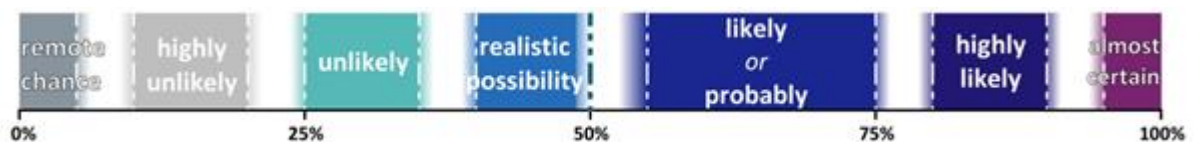
with JCVI's estimates[2]. Both vaccines are also modelled as reducing the risk of infection by 48% after the first dose.

21. SPI-M-O's medium-term projections suggests that if the current trajectory continues, then COVID-19 hospital occupancy in England will fall below 10,000 in early March 2021 (Figure 3).

Figure 3: SPI-M-O six-week projection for daily hospital occupancy in NHS acute trusts in England. Data points shown up to 15th February are taken from the NHS England daily situation report. Median trajectory (solid line) and interquartile range (dark band) of model combinations are shown.

Annex: PHIA framework of language for discussing probabilities

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[2]https://www.gov.uk/government/publications/prioritising-the-first-covid-19-vaccine-dose-jcvi-statement/optimising-the-covid-19-vaccination-programme-for-maximum-short-term-impact

Table 1: Combined estimates of R values and growth rates in the UK, four nations, and NHS England regions (90% confidence interval) [3]

Nation	R	Growth rate per day
England	0.7 to 0.9	-6% to -3%
Scotland	0.7 to 0.9	-6% to -2%
Wales	0.6 to 0.9	-6% to -3%
Northern Ireland	0.6 to 0.8	-8% to -5%
UK	**0.6 to 0.9**	**-6% to -3%**

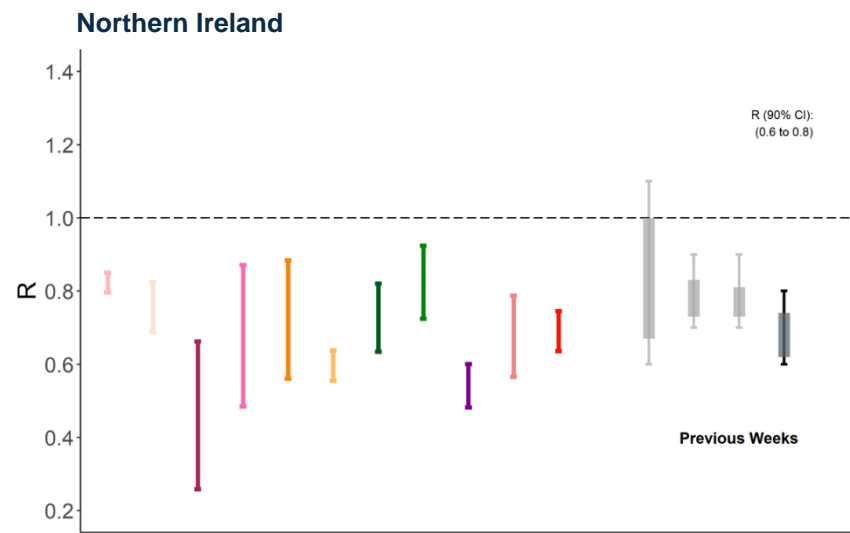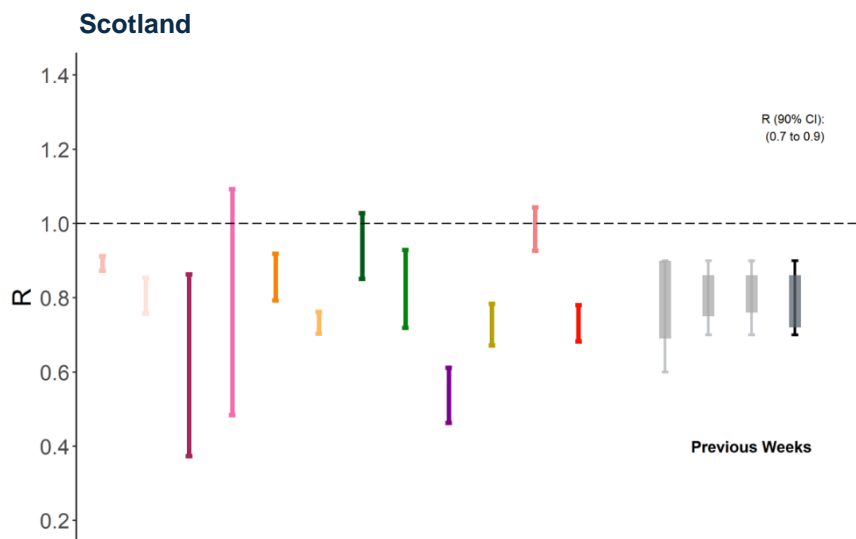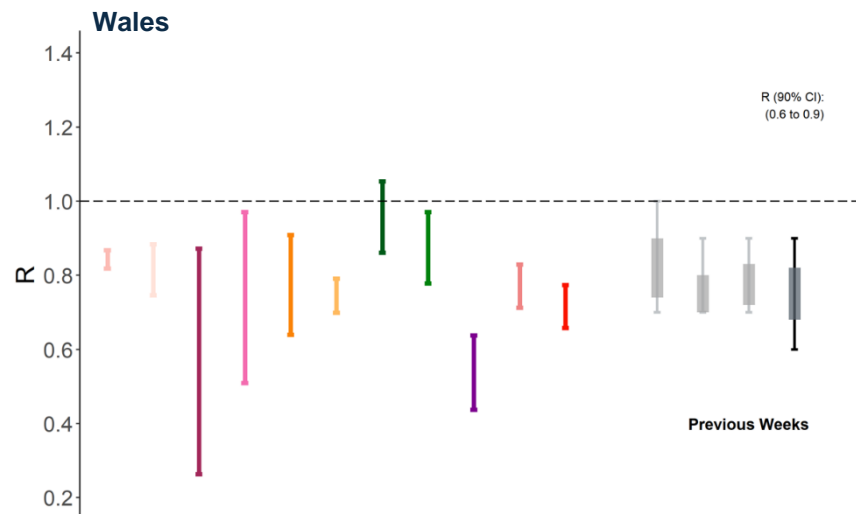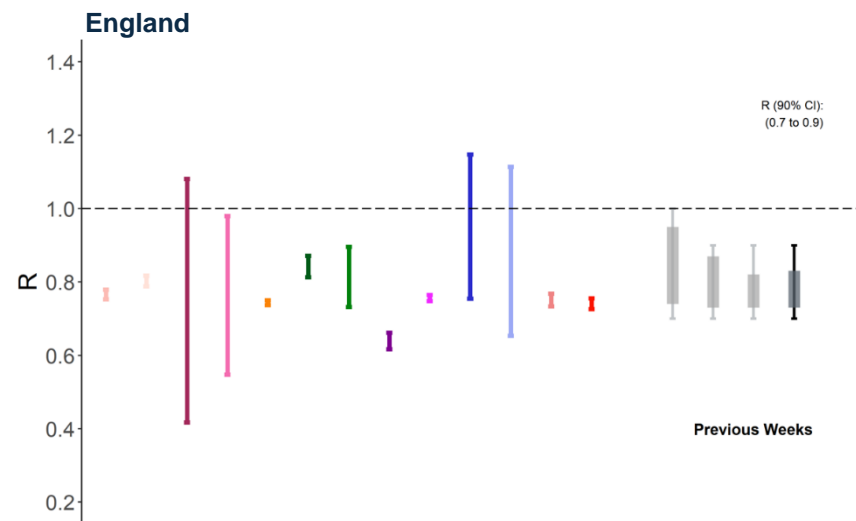| NHS England region	R	Growth rate per day
East of England	0.6 to 0.8	-7% to -4%
London	0.6 to 0.8	-8% to -5%
Midlands	0.6 to 0.9	-7% to -3%
North East and Yorkshire	0.7 to 1.0	-5% to -1%
North West	0.6 to 0.9	-7% to -3%
South East	0.6 to 0.8	-9% to -5%
South West	0.6 to 0.9	-7% to -3%

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[3] The estimate intervals for R and growth rate may not exactly correspond to each other due to the submission of different independent estimates and rounding in presentation. R estimate intervals for the UK may not exactly correspond to its constituent nations for the same reason.

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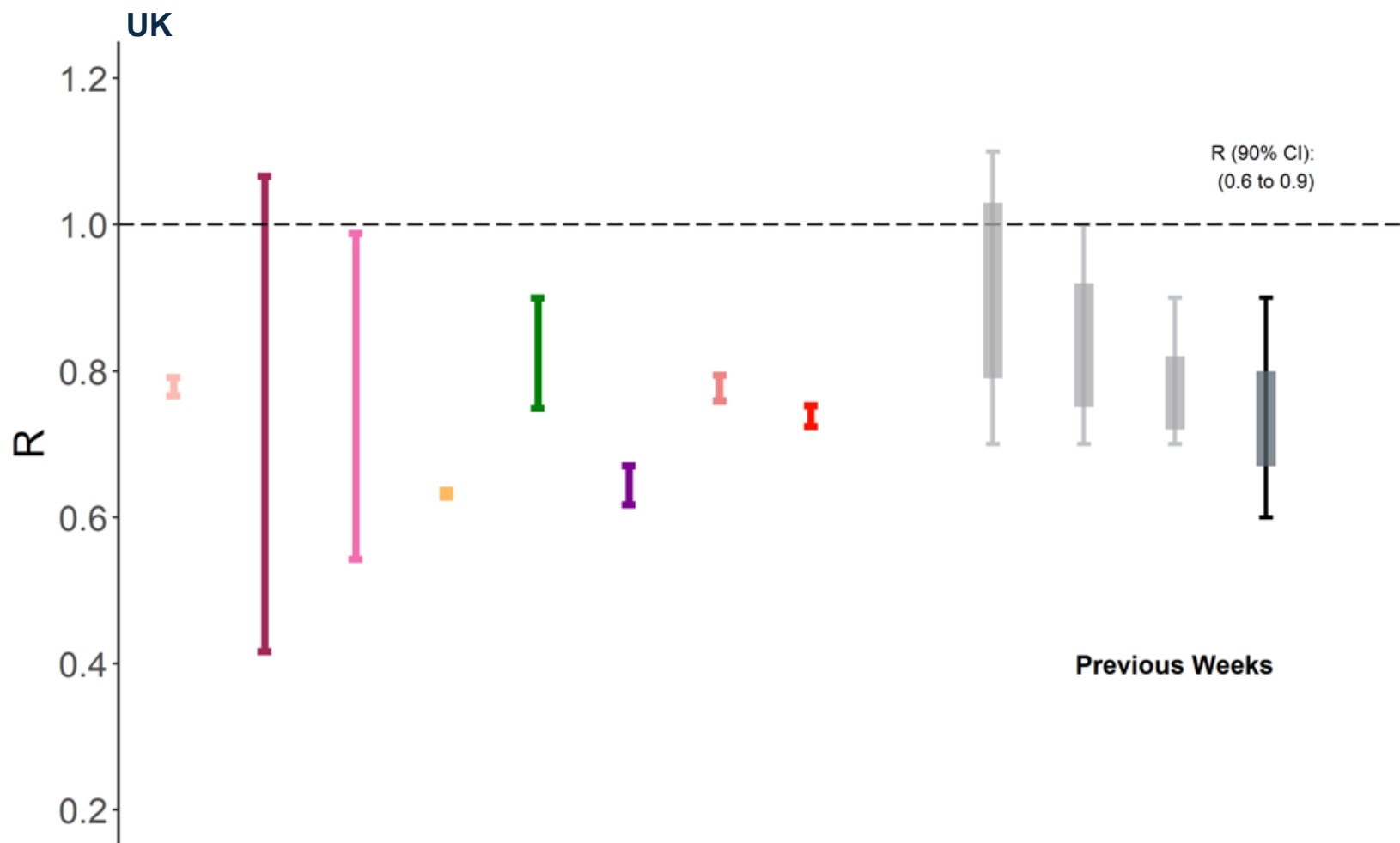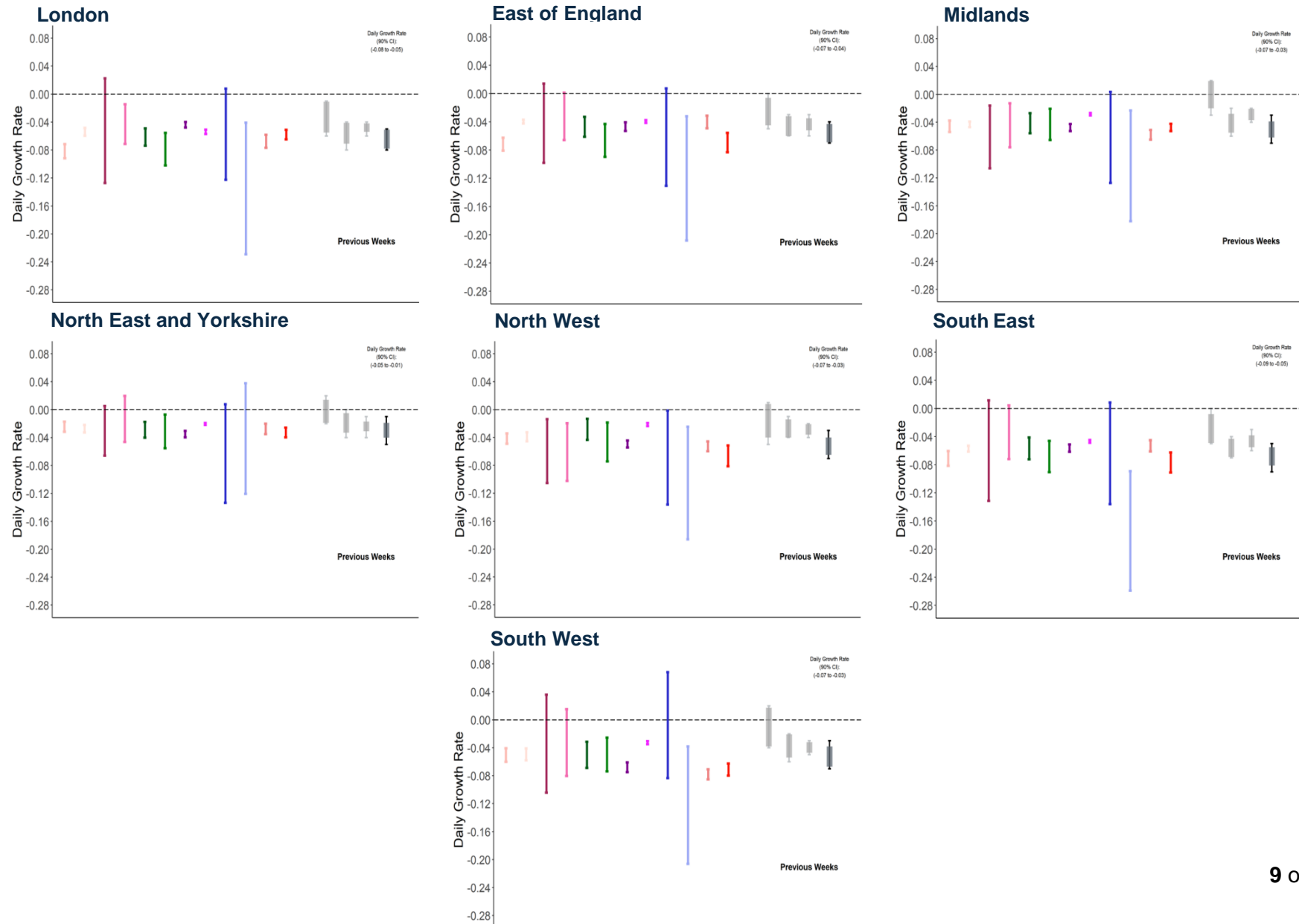
Figure 5: SPI-M-O groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

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.