

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

Date: 2nd June 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 England is between 1.0 and 1.2. R is estimated to be between 1.1 and 1.3 for Scotland, 0.8 and 1.2 for Wales, and 0.7 and 1.1 for Northern Ireland.** These estimates are based on data available up to 28th May, including hospitalisations, deaths, symptomatic testing, and longitudinal studies.
2. SPI-M-O estimates that there are between **3,000 and 6,000 new infections per day in England.**
3. Updated estimates of the increased transmissibility of B.1.617.2¹ (henceforth referred to as delta) compared to B.1.1.7¹ (henceforth referred to as alpha) are converging around 40% to 60%. There has been a changing pattern as to when and where this variant has been circulating, through different places and different communities. Infections are now spilling across the whole population. There are clear indications from many sources that this variant has some degree of reduced vaccine efficacy and disentangling any transmission advantage from this or reinfection potential in real time is not straightforward.
4. Data underpinning estimates of epidemic metrics, such as R, are at least two weeks out of date, and are yet to fully reflect the rapid increases of transmission seen as a result of delta, and are only just beginning to see changes due to the relaxation of measures on 17th May in England feeding through. How these two factors interact will be vital.
5. Preliminary analyses considering the implications of this increased transmissibility advantage for the government's Roadmap suggests that **taking Step 4 later both delays the peak of hospital admissions and shrinks their total number** compared to progressing with the Roadmap relaxation on 21st June.

Incidence and prevalence

6. Combined estimates from six SPI-M-O models, using data available up to 28th May, suggest there are between **3,000 and 6,000 new infections per day in England.**

¹ [The World Health Organisation recently recommended using letters of the Greek alphabet when referring to SARS-CoV-2 variants.](#) Current variants of concern labelling stands as B.1.1.7 as alpha, B.1.351 as beta, P.1 as gamma, and B.1.617.2 as delta.

7. During its most recent week (23rd to 29th May), the ONS community infection survey estimates that an average of **85,600 people had COVID-19** in the community in England (credible interval **71,900 to 100,900**). The survey does not include people in care homes, hospitals, or prisons. Increasing numbers of cases that are “not compatible with the UK variant” were also detected and, while these are not necessarily the delta variant, it is likely and indicates its increasing prevalence. Estimates from across the four nations of the UK are:

England	85,600 (credible interval 71,900 to 100,900)
Scotland	7,700 (credible interval 4,100 to 12,500)
Wales	2,900 (credible interval 1,000 to 5,800)
Northern Ireland	2,300 (credible interval 800 to 4,800)

Growth rate and reproduction number

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 speed at which an epidemic is growing or shrinking².

9. SPI-M-O’s consensus estimates for the **growth rates in the four nations are:**

England is between **0% and +3% per day**,
Scotland is between **+2% and +5% per day**,
Wales is between **-3% and +1% per day**, and
Northern Ireland is between **-5% and 0% per day**.

SPI-M-O’s national and regional estimates of growth rates are summarised in Table 1 and Figure 5.

10. The reproduction number (R) is the average number of secondary infections produced by a single infected individual; it is an average over time, geographies, viral variants and communities. This should be considered when interpreting the R estimate for England, given the current local heterogeneity in epidemiological situations.

11. SPI-M-O’s best estimates for **R in England is between 1.0 and 1.2. R is estimated to be between 1.1 and 1.3 for Scotland, 0.8 and 1.2 for Wales, and 0.7 and 1.1 for Northern Ireland.** SPI-M-O’s agreed national estimates are summarised in Table 1 and Figure 4, and these are based on the latest data available up to 28th May. R is an indicator that lags by two to three weeks and therefore does not reflect the full impact of behavioural changes that have happened during this time. Nor can it reflect the rapid emergence over the past two weeks of the delta variant or the full impact of the easing of restrictions in England on 17th May. Regional estimates can be seen in Table 1 and Figure 6.

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

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

Nation	R	Growth rate per day
England⁴	1.0 to 1.2	0% to +3%
Scotland	1.1 to 1.3	+2% to +5%
Wales⁴	0.8 to 1.2	-3% to +1%
Northern Ireland⁴	0.7 to 1.1	-5% to 0%
NHS England region	R	Growth rate per day
East of England	1.0 to 1.2	0% to +3%
London	1.0 to 1.2	0% to +3%
Midlands	1.0 to 1.2	-1% to +2%
North East and Yorkshire	0.9 to 1.1	-2% to +1%
North West⁴	1.1 to 1.3	+2% to +5%
South East	1.0 to 1.2	0% to +4%
South West⁴	0.8 to 1.1	-3% to +1%

12. R estimates are averages over populations, viral variants, and areas. The combination of clustered outbreaks in some areas and declines in others means the estimates are difficult to interpret and less reliable than usual. For example, the England estimate is dominated by large clustered outbreaks in the North West, which in turn is comprised of further sub-regional outbreaks. The situation could change quickly, especially after restrictions were relaxed further on 17th May, for example the North West would reach peaks of hospital admissions seen in January 2021 with just four or five doublings.
13. Aside from these caveats, SPI-M-O believes that the incidence of infection is starting to rise and will return to clear exponential growth in the next few weeks with a constant doubling time.

Delta and S-gene positivity

14. Data on the delta variant and S-gene positivity status continues to allow SPI-M-O to consider what this variant's transmission advantage may be. While some clusters seem to be plateauing, others are growing with increases in cases and extending across wider

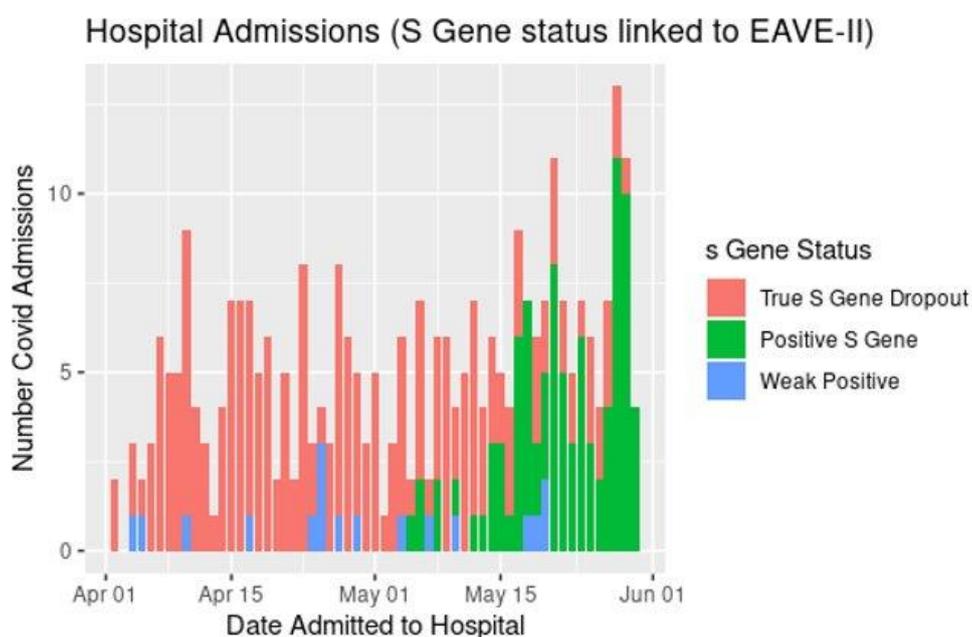
³ The estimated intervals for R and growth rate may not exactly correspond to each other due to the submission of different independent estimates and rounding in presentation.

⁴ Particular care should be taken when interpreting these estimates as they are based on low numbers of cases, hospitalisations, or deaths and / or are dominated by clustered outbreaks and so should not be treated as robust enough to inform policy decisions alone.

areas i.e. regions rather than local authorities. The number of clusters is also increasing across the country.

15. The general trend over the past two months of gradually increasing R continues and SPI-M-O expect national and regional level growth rates to increase further as delta continues to spread across the country. Changes in behaviour as a result of Step 3 of England's Roadmap, which took place on 17th May, will not yet be fully reflected in these data and growth rates will increase further. **At the national level, the decreasing epidemic of alpha has masked the rise of delta resulting in a relatively flat trajectory.** Sustained exponential growth at low prevalence can appear to not be a problem however this can *rapidly* result in very large numbers of infections; a large increase in prevalence will almost certainly lead to significant pressures on the health service.
16. Sequencing suggests a significant majority of S-gene positive cases are delta. Analysis conducted by Public Health Scotland/the EAVE II study suggests that hospital admissions in Scotland, while still few, are now predominated by S-gene positive cases. Figure 1 shows how these cases have come to dominate in just two weeks.

Figure 1: Admissions from community testing where S-gene is known and linking to Early assessment of Anti-virals and Vaccine Effectiveness (EAVE – a subset of all admissions)⁵



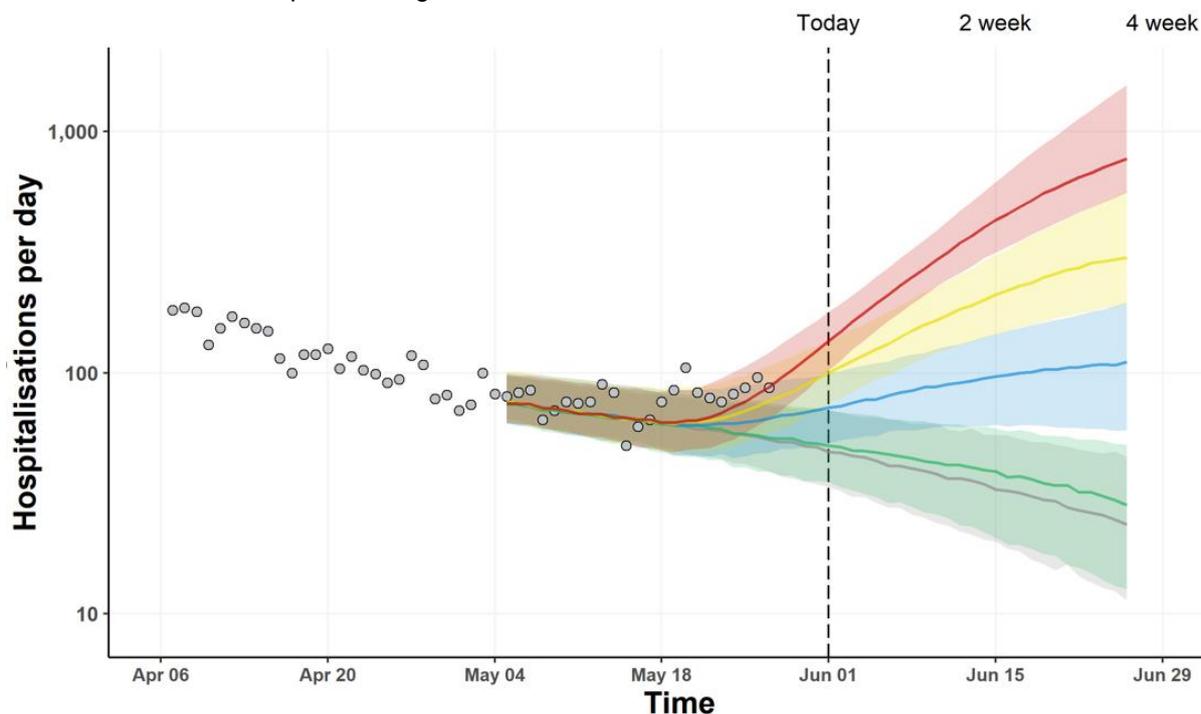
17. On 5th May, SPI-M-O modelled scenarios for several possible values of R following the relaxation of measures on 17th May⁶. When these scenarios were produced, only data up

⁵ Footnote added for release: These data come from a subset of the Scottish population from EAVE-II and the most recent dates will be incomplete

⁶ SPI-M-O: [Summary of further modelling of easing restrictions – roadmap step 3](#), 5th May 2021.

to 30th April was available and the existence of delta was not included in modelling assumptions. Figure 2 shows hospital admissions in England from these scenarios on a logarithmic scale (R = 0.9 – green; R = 1.2 – blue; R = 1.5 – yellow; R = 1.8 – red). **This shows that following a step change in transmission from 17th May, hospital admissions⁷ would remain low until well into June, but a sustained period with R significantly above 1 would result in hospitalisations being considerably higher by 21st June.** The overlapping confidence intervals mean a further one to two weeks of data (i.e. until at least 16th June) will be needed to conclusively differentiate between the current trajectory and the scenarios modelled.

Figure 2: Eight-week scenarios for daily hospital admissions in England on a logarithmic scale over a range of R values (0.9 – green; 1.2 – blue; 1.5 – yellow; 1.8 – red) reflecting the possible impact of the easements from 17th May. The grey lines are SPI-M-O’s medium-term projection of then-current trends. All scenarios show interquartile ranges of model combinations as the shaded band.



Delta, its growth advantage, and the longer-term outlook

18. SPI-M-O has reviewed further updates of modelling that consider the growth advantage of the delta variant from five different modelling groups. Some groups consider the variant’s transmission advantage (how much better the variant spreads biologically), while others consider its growth advantage (which covers multiple factors, including transmission

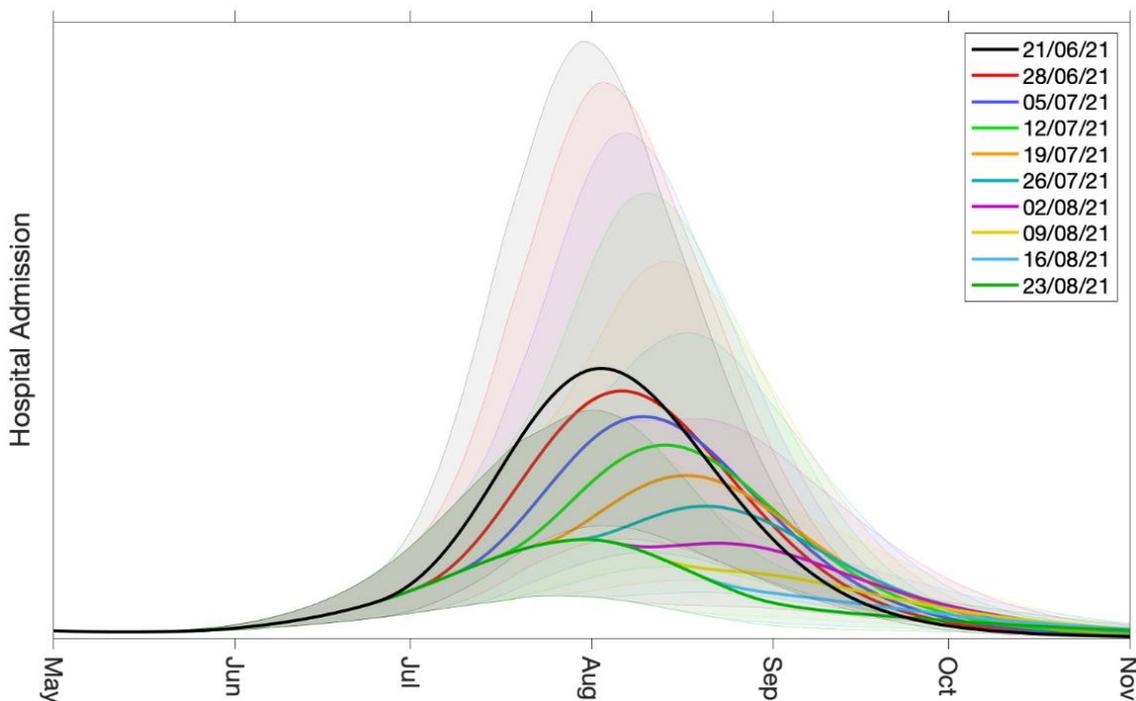
⁷ Hospital admissions as recorded in the NHS England daily COVID-19 situation report; includes patients admitted with confirmed COVID-19 and inpatients diagnosed with COVID-19.

advantage, shorter generation time, reduced vaccine efficacy or immune escape, and communities with more contacts).

19. LSHTM further updated their previously reported estimates for the reproduction number for delta in the UK, based on data from COG-UK. This suggests, assuming no change in generation time, that R for delta in the community ranged from 1.1 to 1.6 across regions implying a 20% to 60% higher growth for delta compared to non-delta variants circulating in the same region; five of the seven NHS England regions had median delta transmission estimated to be at least 40% larger than non-delta. These estimates reflect the average level of transmission across the specific settings where the variant is currently circulating.
20. Another LSHTM group (using data aggregated at the upper tier local authority (UTLA)) also found an association between S-gene positivity and increased growth rates. Comparing UTLAs at the national level, their estimate of increased growth ranged from 26% to 60% compared to alpha, but this was dependent on assumptions of generation time. Using S-gene positivity data, Warwick estimate a transmission advantage (42% (CI 13% to 57%)) of delta (S-gene positive) over alpha (S-gene negative).
21. Analysis from Imperial using both genomic and S-gene positivity data suggests that delta has a growth advantage of between 50% and 100% over alpha and a doubling time of approximately nine days in England.
22. SPI-M-O has also considered a paper from the JUNIPER consortium offering a statistical comparison of the ethnicity and deprivation distributions of S-gene positive and S-gene negative cases over time. Most local authorities considered showed divergences during April 2021, potentially reflecting delta in returning travellers. Whilst the early growth of delta variant was closely related to the communities into which it was first introduced, there is evidence from two groups that the delta variant is now growing in all age groups and ethnicities, and many locations at the same rate. **This suggests that delta has a similar pattern of susceptibility to alpha and provides further evidence of its sustained community transmission.**
23. These estimates of the growth advantage of delta compared to alpha range from approximately 25% to 100%, but they appear to be clustering **around 40% to 60%**. Higher estimates, however, still cannot be ruled out. This uncertainty is dependent on what time period these estimates are measured and what spatial scale is considered. There has been a changing pattern as to when and where this variant has been circulating, through different places and different communities, as shown through the work considering ethnicity. Infections are now spilling throughout the whole population.

24. Data underpinning epidemic estimates such as R are at least two weeks out of date, and are yet to reflect either the rapid increases of transmission seen and are only just beginning to see changes due to the relaxation of measures on 17th May feeding through; how these two factors interact will be vital. There are clear indications from many sources that this variant has some degree of reduced vaccine efficacy and disentangling any transmission advantage from this or reinfection potential is not straight forward.
25. There are three key uncertainties ahead of 21st June: how behaviours and therefore transmission will change; the transmission advantage of delta over alpha; and the effectiveness of vaccines against delta. The first of these cannot be precisely determined until it happens, and will depend, in part, on messaging, individual behaviours and the baseline transmission reductions that are kept in place. More evidence is emerging of both delta's transmissibility and how it is affected by vaccines, but at present SPI-M-O cannot rule out the surge in hospital admissions being either considerably smaller than in January 2021 or requiring rapid re-imposition of measures to prevent that level of occupancy being exceeded.
26. Although hospital admissions are currently very low, admissions in the North West are only four or five doubling times away from their January 2021 peak. The seven-day rolling average of cases in the North West has doubled in the last 12 days. While the relationship between cases and hospitalisations has changed, the link is not broken; a doubling of cases could still result in a large increase in hospital admissions.
27. Preliminary analysis considering the implications of this increased transmissibility advantage for the government's Roadmap suggests that **delaying Step 4, even by only two to three weeks, could significantly reduce the size of an subsequent wave of hospitalisations that could put unsustainable pressure on the NHS**, as well as any subsequent deaths. A slightly longer delay of five weeks could reduce the peak even further, especially if this approximately coincides with the start of England's school summer holidays. Thanks to vaccination, these delays do not only reduce the *height* of the peak but also the *total number of people hospitalised* over the course of the wave.
28. Figure 3 shows *preliminary illustrative* modelling where **taking Step 4 later both delays the peak of hospital admissions and shrinks its size the total number admitted** compared to progressing with the Roadmap relaxation on 21st June. The uncertainty surrounding these curves is large, and waves that are higher or lower cannot be ruled out, however, the general beneficial impact of delay applies regardless.

Figure 3: Illustrative modelling from Warwick that uses cautious vaccine effectiveness assumptions to show the impact on scale and timing of a peak in hospitalisations if Step 4 is taken on 21st June (black) and how this might change if this were delayed by weekly intervals. Solid lines show the median of the distribution. Shaded areas show 95% confidence intervals.



29. **Additional time before taking Step 4 would allow for more vaccinations to happen thus reducing the proportion of the population susceptible to COVID-19**, particularly with vaccinations in age groups that have more contacts. It would also slow the rate of increase and move the peak into the school holidays. At present, it is very difficult to determine whether progressing with Step 4 would lead to the NHS being put under unsustainable pressure and so trigger a need for restrictions to be re-imposed. Waiting until it is clear how the rapid increase in cases of delta will affect hospital admissions would allow for more clarity and certainty as to whether Step 4 can happen safely. If things progress more smoothly than current data might suggest, opening up could happen more quickly than if data are more problematic – under these circumstances, it would take longer to relax measures safely and require much stricter measures to keep the virus under control.
30. Previous analysis by SPI-M-O⁸ has shown that splitting Step 4 into two stages – firstly with more stringent measures followed by more relaxed ones – could also reduce the overall size of any wave.

⁸ [SPI-M-O: Summary of further modelling of easing restrictions – roadmap step 3](#), and [University of Warwick: Roadmap scenarios and sensitivity – Steps 3 and 4](#); SAGE 88 5th May 2021.

Annex: PHIA framework of language for discussing probabilities

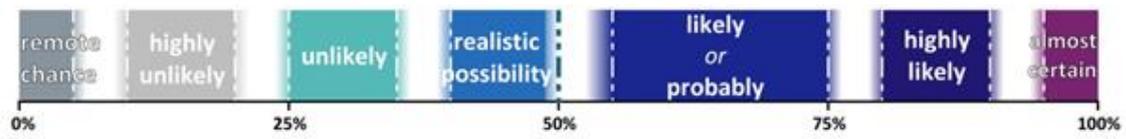


Figure 4: SPI-M-O groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

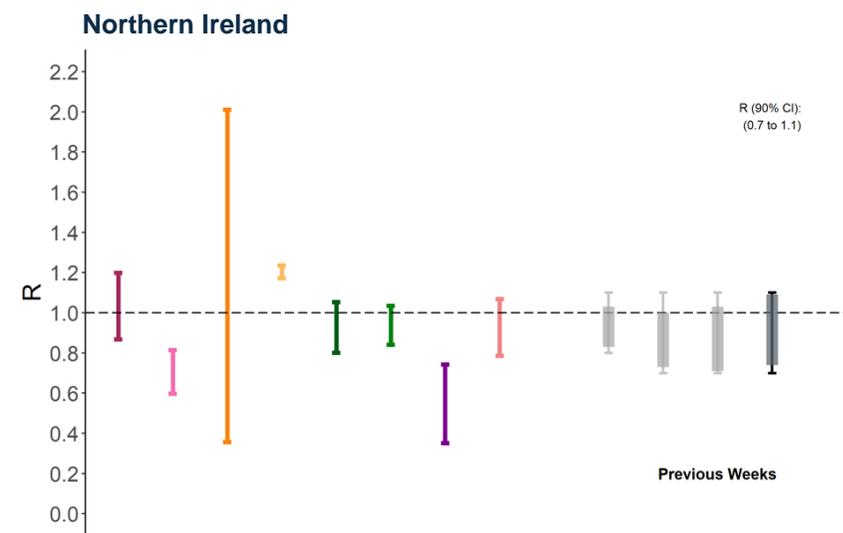
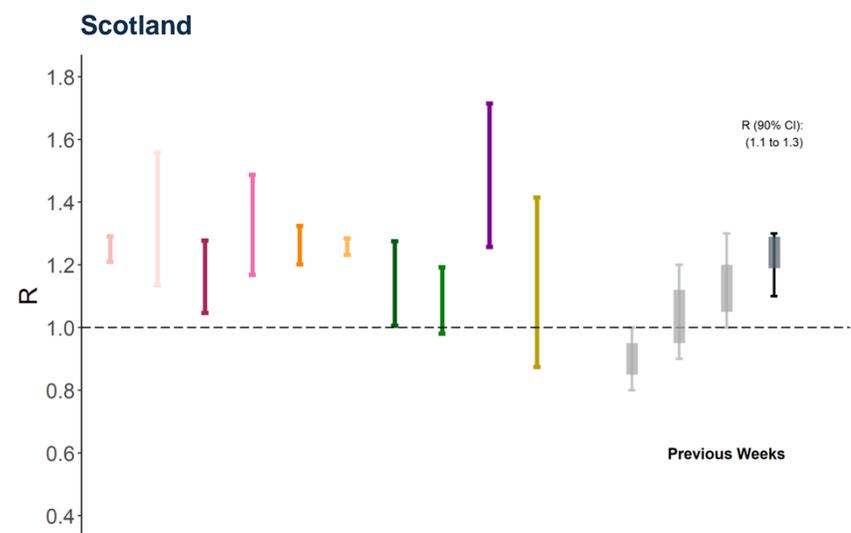
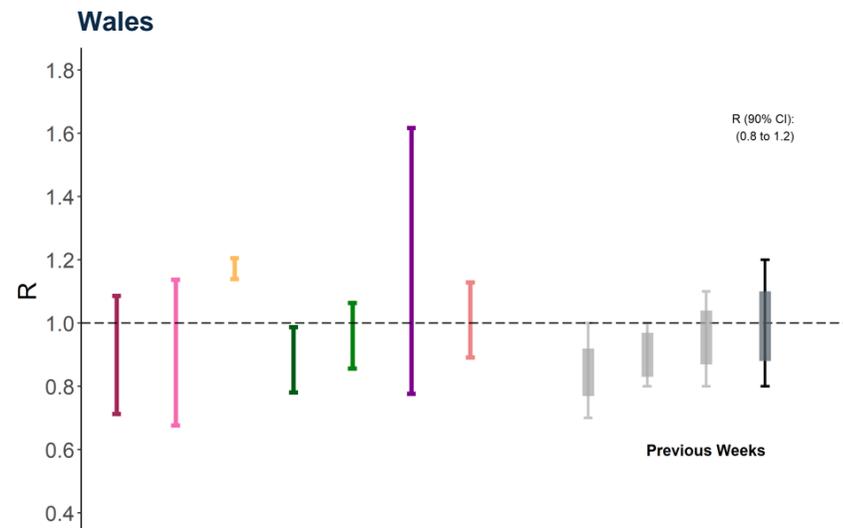
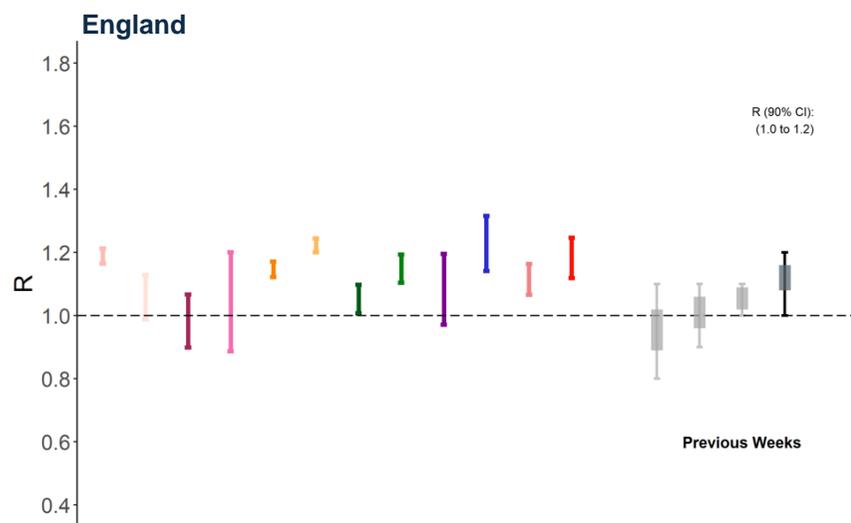


Figure 5: SPI-M-O groups' estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.

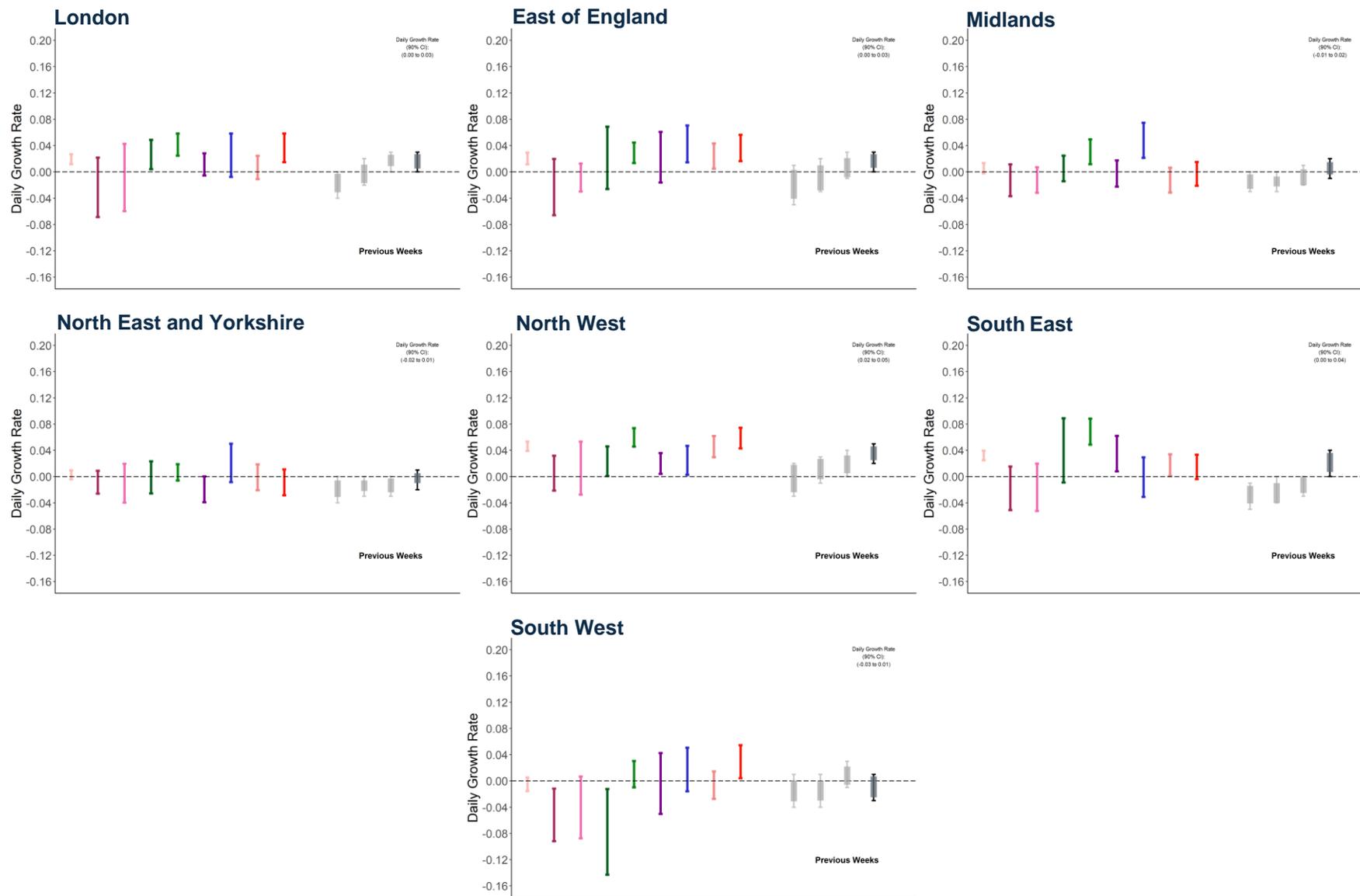


Figure 6: SPI-M-O groups' estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

