

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

Date: 23rd 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 1.2 and 1.4. R is estimated to be between 1.1 and 1.3 for Scotland, 1.0 and 1.4 for Wales, and 0.9 and 1.3 for Northern Ireland.** These estimates are based on data available up to 21st June, including hospitalisations, deaths, symptomatic testing, and longitudinal studies.
2. SPI-M-O estimates that there are between **13,000 and 23,000 new infections** per day in England.
3. SPI-M-O considers that the policy conclusions of their modelling of Step 4 of the Roadmap¹ remain valid.

Incidence and prevalence

4. Combined estimates from four SPI-M-O models, using data available up to 21st June, suggest there are between **13,000 and 23,000 new infections per day in England.**
5. During its most recent week (13th to 19th June), the ONS community infection survey estimates that an average of **122,500 people had COVID-19** in the community in England (95% credible interval **103,900 to 142,500**). The survey does not include people in care homes, hospitals, or prisons. Estimates from across the four nations of the UK are:

England	122,500 (95% credible interval 103,900 to 142,500)
Scotland	24,400 (95% credible interval 16,800 to 33,500)
Wales	3,700 (95% credible interval 1,600 to 6,600)
Northern Ireland	2,600 (95% credible interval 900 to 5,400)

Growth rate and reproduction number

6. 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.

¹ [SPI-M-O: Summary of further modelling of easing restrictions – roadmap step 4](#); SAGE 92, 9th June 2021

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

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

England is between **+3% to +5% per day**,
Scotland is between **+2% to +4% per day**,
Wales is between **+1% to +6% per day**, and
Northern Ireland is between **-2% to +3% per day**.

SPI-M-O's national and regional estimates of growth rates are summarised in Table 1 and Figure 4.

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	Doubling time⁴
England	1.2 to 1.4	+3% to +5%	14 to 19 days
Scotland	1.1 to 1.3	+2% to +4%	18 to 29 days
Wales⁵	1.0 to 1.4	+1% to +6%	12 to 35 days
Northern Ireland⁵	0.9 to 1.3	-2% to +3%	23 days to flat
NHS England region	R	Growth rate per day	Doubling time⁴
East of England	1.1 to 1.3	+2% to +5%	16 to 30 days
London	1.1 to 1.3	+2% to +5%	16 to 27 days
Midlands	1.2 to 1.4	+3% to +6%	12 to 21 days
North East and Yorkshire	1.2 to 1.5	+4% to +8%	9 to 16 days
North West	1.1 to 1.4	+3% to +6%	12 to 20 days
South East	1.1 to 1.3	+2% to +5%	15 to 28 days
South West	1.3 to 1.7	+6% to +11%	6 to 11 days

8. 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.

9. SPI-M-O's best estimate for **R in England is between 1.2 and 1.4. R is estimated to be between 1.1 and 1.3 for Scotland, 1.0 and 1.4 for Wales, and 0.9 and 1.3 for Northern Ireland.** SPI-M-O's agreed national estimates are summarised in Table 1 and Figure 3, and these are based on the latest data available up to 21st June.

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 As R approaches 1, halving time (less than 1) or doubling time (greater than 1) rapidly tend towards infinity. Any estimates with a halving or doubling time of more than 40 days have been described as flat.

⁵ 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.

10. R is an indicator that lags by two to three weeks and therefore does not reflect any behavioural changes that have happened during this time. Regional estimates can be seen in Table 1 and Figure 5.
11. At some point in the future, the number of cases in England will plateau and then start to fall as a result of vaccination, natural immunity, seasonality, and behaviour change. It is very difficult to determine in advance the precise date at which this will occur. It is likely that it will happen at different times in different parts of the country, depending on local levels of immunity and behaviours.
12. SPI-M-O continues to produce medium-term projections of the epidemic. Note that these extrapolate the observed data and cannot include the impact of future behaviour changes. The most recent projections show that at current levels of transmission extant immunity and future vaccination are able to prevent exponential growth in hospitalisations. Future behaviour changes will result in higher transmission.

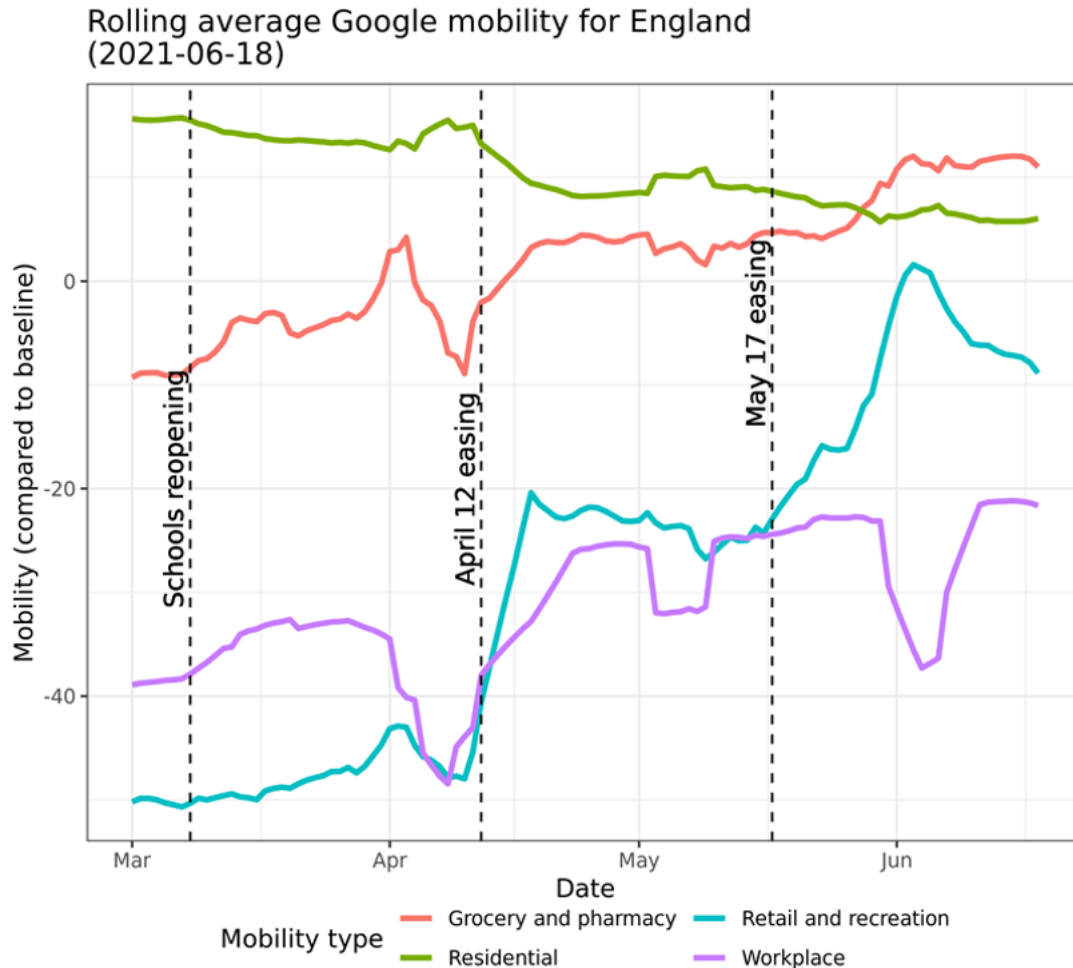
Progression of the epidemic since previous modelling of Step 4 of the Roadmap

13. On 9th June, SPI-M-O summarised the findings of three groups' modelling of Step 4 of England's Roadmap⁶. The key conclusions of that were:
 - All modelling of taking Step 4 of the Roadmap on 21st June showed a large resurgence in infections and admissions. The scale of this resurgence is highly uncertain, and it could be either considerably smaller or larger than previous waves.
 - The key uncertainties were the transmissibility of the delta variant, effectiveness of vaccines against severe disease caused by it, and how behaviours change after Step 4.
 - Even a short delay to Step 4 was modelled as resulting in significant drop in the subsequent peak in hospital admissions.
14. CoMix is a longitudinal study of the number and type of contacts that people make. This has previously shown that the number of contacts made remained very low throughout spring and summer 2020, only rising again in August and September. After dropping to low levels in the lockdown of January 2021, there was a large increase in contacts after Step 2 of the Roadmap. Since Step 3, however, the number of contacts have remained broadly flat including, notably, contacts in workplaces.

⁶ [SPI-M-O: Summary of further modelling of easing restrictions – roadmap step 4](#); SAGE 92, 9th June 2021: Published on 14th June 2021

15. A similar pattern can be seen in Google’s mobility data. While there was a large increase in workplace and recreation mobility following Step 2 of the Roadmap (Figure 1), only the latter has increased after Step 3. Transient changes to workplace mobility in April and early June (and to retail and recreation in early June) are the result of school holidays.

Figure 1: Google mobility data in England. Figure by JBC.



The baseline is the median value, for the corresponding day of the week, during the 5-week period Jan 3-Feb 6, 2020.

16. SPI-M-O modelled a significant step change in transmission as a result of behavioural changes after Step 3 of the Roadmap, but observed changes have been more gradual. The recent growth rate of hospital admissions has been at the lower end of the modelled scenarios; this is in part due to the relatively modest change in behaviours observed in CoMix and Google mobility data. It remains uncertain how behaviour will change after Step 4, particularly with regards to home working.

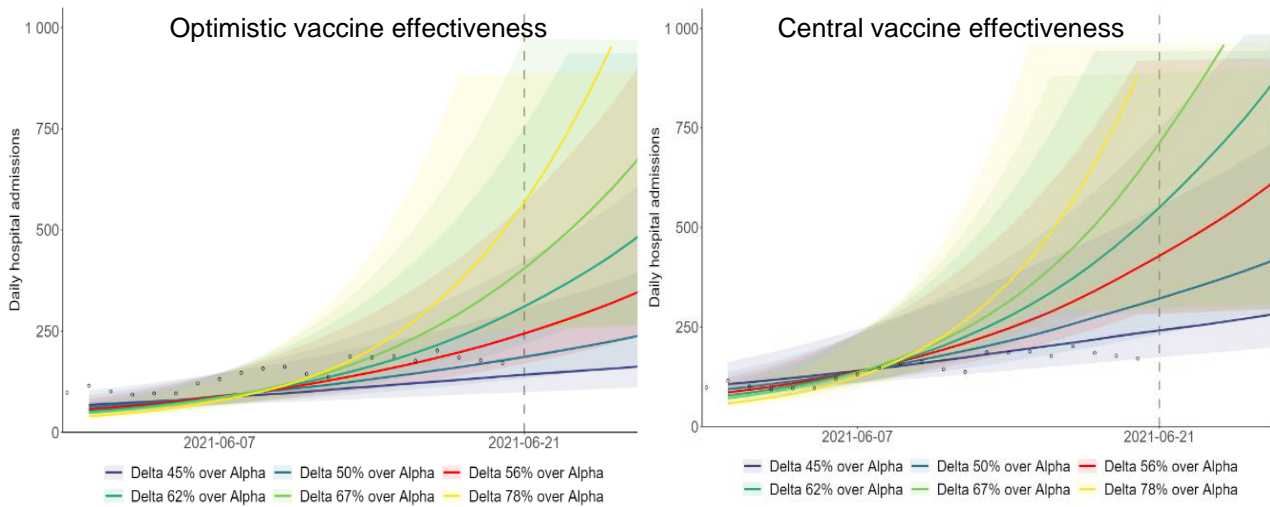
17. SPI-M-O has considered four pieces of work examining how the length of stay of patients in hospital has changed over time. The determinants of average length of stay are complex, and involve factors that include (but are not limited to) the age profile of patients; changing treatment pathways including new therapeutics and use of pulse oximeters; the

number of patients in hospital; the data source used; and the proportion of infections that are acquired in hospitals.

18. Whilst this complexity means that it is difficult to draw firm conclusions about the average and distribution of the length of stay, or about future changes to the average length of stay, there is agreement that there was a clear increase in late 2020, followed by a corresponding drop since January 2021.
19. On 14th June, after SPI-M-O's modelling was completed, Public Health England (PHE) published estimates of vaccines' effectiveness against hospital admission with the delta variant⁷. The estimates were highly uncertain, with the confidence intervals for two dose protection being 75-97% for AstraZeneca and 86-99% for Pfizer.
20. SPI-M-O's modelling considered a wide range of scenarios for the effectiveness of vaccines against admission with the delta variant. Warwick considered scenarios of 86%, 90/91% and 95%, and London School of Hygiene and Tropical Medicine (LSHTM) modelled 81%-90%. These assumptions were therefore consistent with PHE's most recent estimates. Even under the optimistic vaccine effectiveness assumptions, scenarios where transmission was high after Step 4 saw a large peak in hospital admissions.
21. The main roadmap modelling did not account for early estimates that the case hospitalisation rate is higher for the delta variant than for alpha, which could lead to some scenarios being overly optimistic.
22. The last two weeks of data on hospital admissions are consistent with the Step 4 Roadmap modelling. For Warwick (Figure 2), they are in line with either the optimistic vaccine assumptions (left hand plot) or the scenario assuming central vaccine effectiveness and delta having a 45% transmission advantage over alpha (right hand plot, blue line). For LSHTM, they are in line with the 50% transmission advantage scenarios (although hospital occupancy and deaths are overestimated), and the scenario with 30% transmission advantage and a higher degree of vaccine escape against the delta variant.

⁷ [Effectiveness of COVID-19 vaccines against hospital admission with the Delta variant](#)

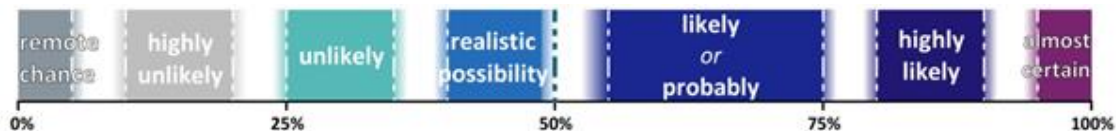
Figure 2: Hospital admissions in England (dots) compared to Warwick’s Step 4 Roadmap modelling with optimistic (left) and central (right) assumptions. Coloured lines correspond to different assumptions of delta’s transmission advantage over alpha. This model assumed that Step 4 occurred on 21st June.⁸



23. Data on hospital admissions are not consistent with LSHTM’s scenarios with 70% transmission advantage of delta and Warwick’s cautious vaccine effectiveness scenarios. Confounding factors (such as the precise vaccine uptake being unclear), however, mean that we cannot formally reject any previously modelled scenarios.

24. Considering all the available evidence, SPI-M-O considers that each of the policy conclusions of their Roadmap modelling given in paragraph 13 remain valid.

Annex: PHIA framework of language for discussing probabilities



⁸ Footnote added for release: The legend for Figure 2 should read 25%, 41%, 56%, 72%, 88% and 119% over alpha, in line with the original analysis.

Figure 3: 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.

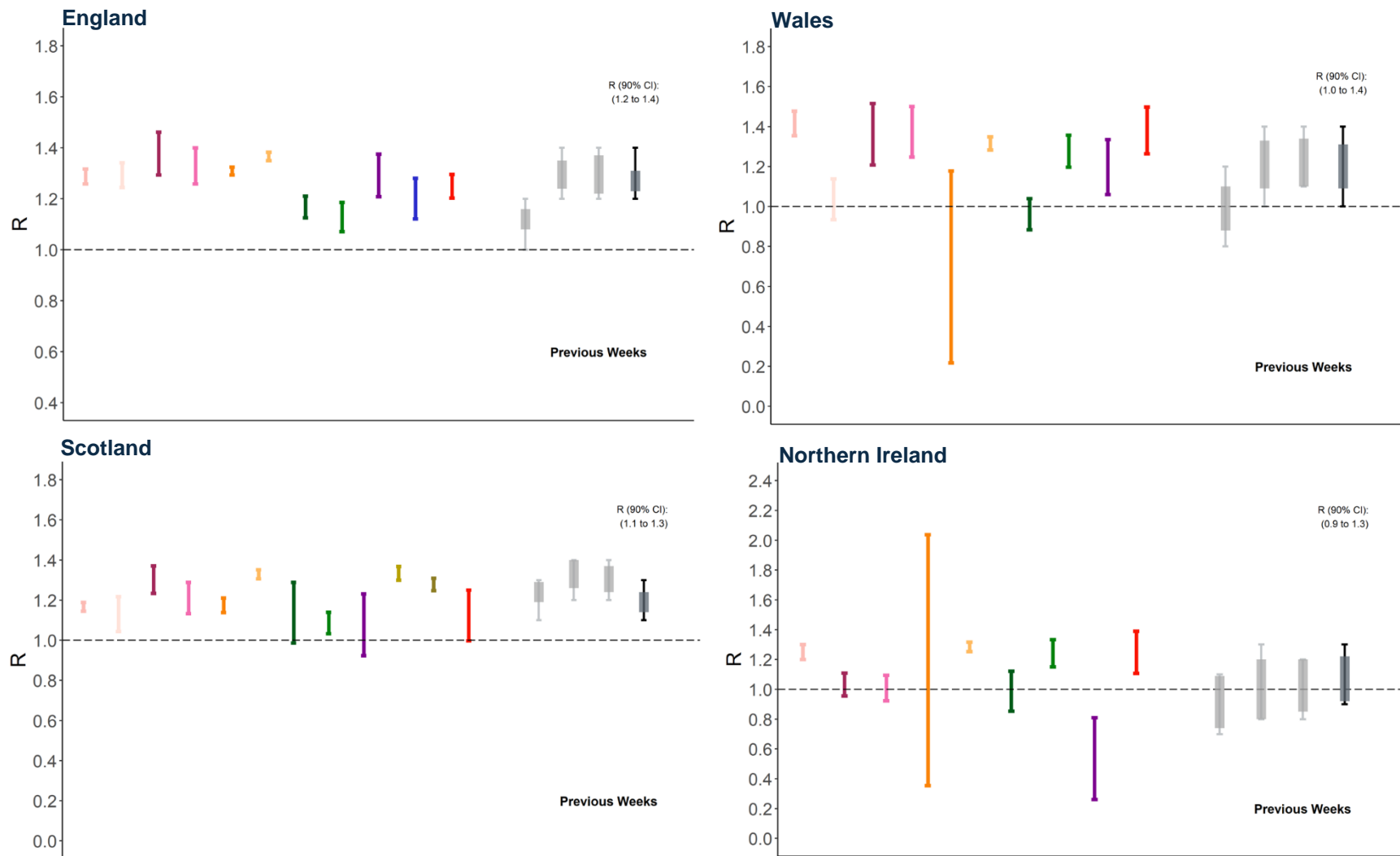


Figure 4: SPI-M-O groups' estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.

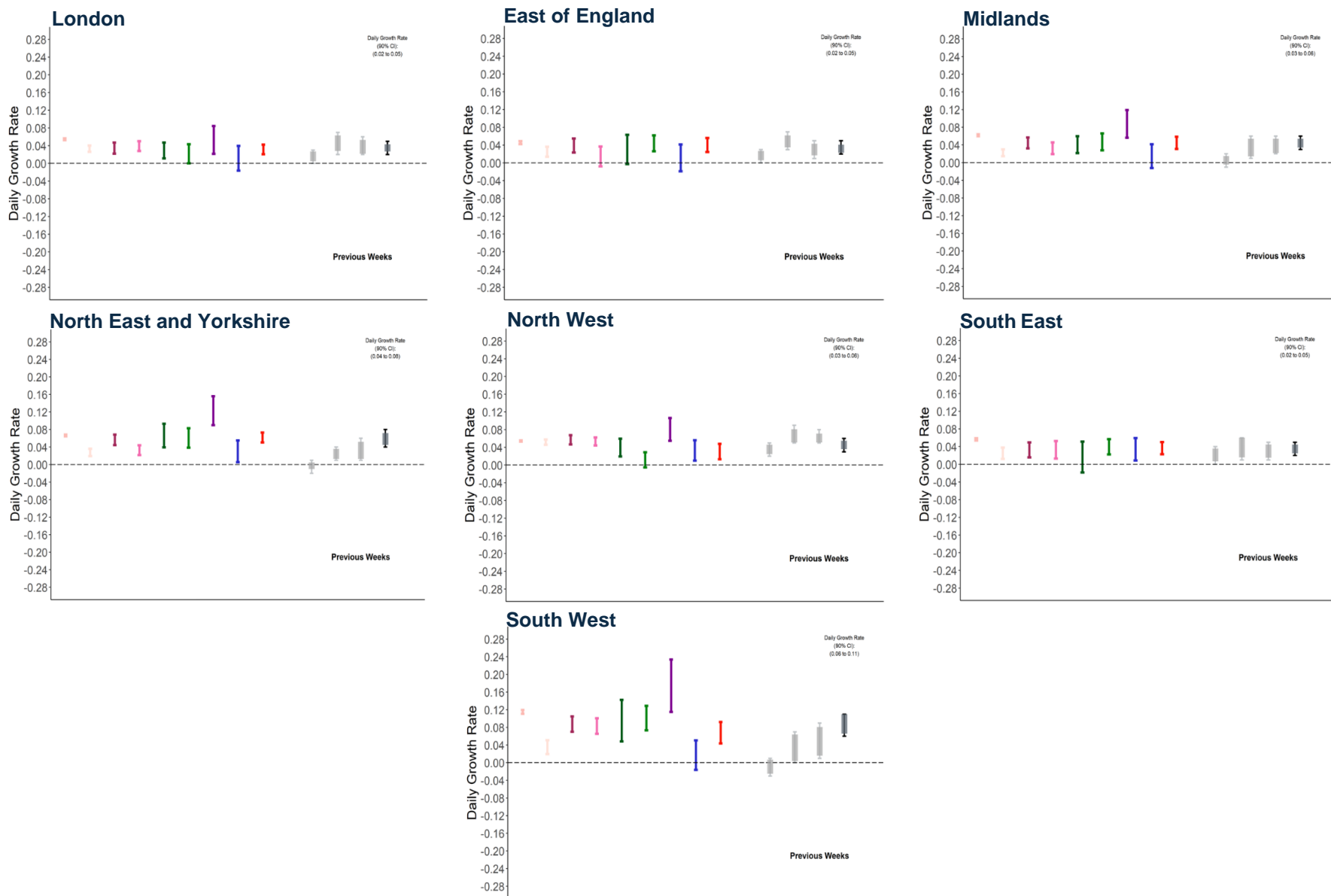


Figure 5: SPI-M-O groups' estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

