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

Date: 2nd December 2020

FINAL – SIGNED OFF BY SAGE. UPATED 4th DECEMBER FOR CLARITY.

Summary

1. SPI-M-O's best estimate for **R in the UK, England, and Scotland is between 0.8 – 1.0.** Estimates of R for Wales and Northern Ireland are between 0.8 – 1.1 and 0.8 – 0.9 respectively. R is a lagging indicator and these estimates are based on the latest data available up to 1st December.

2. R and growth rates have fallen slightly in recent weeks and all NHS England regions have decreased compared to last week. For the North West of England, Midlands, and North East & Yorkshire, the R estimates are securely below 1. For all other regions, the R estimates are close to or spanning 1.

3. SPI-M-O estimate that there are between **33,000 and 62,000 new infections per day in England.**

4. **Most of the impact of the national restrictions introduced in England on 5th November are now observable in the data, and SPI-M-O expect the reduction in hospital admissions to soon be reflected in deaths.**

5. SPI-M-O continues to consider the impact of the festive period on transmission of SARS-CoV-2. Preliminary analysis from one modelling group suggests that if additional mixing is restricted to three households meeting per day and to the five-day window of relaxations, the total number of days spent mixing within that period may have a large impact on post-Christmas prevalence. **All three groups who considered mixing during the holidays suggest there could be changes in the age distribution of infections over a festive period, specifically a slight shift towards a higher proportion of cases in older and more vulnerable age groups**.

6. SPI-M-O have continued investigating the impact of mass testing on secondary infections. Modelling from one group has examined the benefit that could be realised if everyone took a single lateral flow test before a multi-day gathering inside a home. Based on one set of assumptions around the probability that a lateral flow test will test positive at each point in time post-infection (with any detected infections self-isolating), the group estimate a 23% reduction in the number of secondary infections from testing alone, and a 32% reduction if testing or onset of symptoms are used to identify infections. The reduction would be greater if asymptomatic people were less infectious. Individuals who test negative

alongside all of their household members are much less likely to be false negatives, because risk of infection is correlated within households.

7. SPI-M-O are very concerned that the introduction of mass testing with lateral flow devices and the potential introduction of immunisation without due regard to consistent recording of the data will decrease understanding of the epidemic considerably. Considerable effort needs to be made to ensure that mass testing results (negative and positive) are differentiated in data streams, and that the number of immunisations given by age, place and time are accurately recorded and made widely available.

Incidence and prevalence

8. Combined estimates from seven SPI-M-O models, using data available up to 2nd December, suggest there are between **33,000 and 62,000 new infections per day in England**. This is a marginally lower range than last week's estimate. Modelling from the ONS community infection survey for the most recent week of the study (22nd to 28th November) estimates that there were **25,700 new infections per day in England** (credible interval of 22,300 to 29,400). ONS's estimates should be considered more up to date than SPI-M-O's.

9. The ONS survey estimates that, during the same week, an average of **521,300 people had COVID-19** in the community in England (credible interval 490,600 to 552,600) – this is notably lower than their estimate for the previous week. This study reflects changes in prevalence more rapidly than the clinical data on which SPI-M-O's modelling is based. The equivalent estimates for the devolved administrations are:

England	521,300 (credible interval 490,600 to 552,600)
Scotland	40,900 (credible interval 31,500 to 51,800)
Wales	18,100 (credible interval 12,100 to 25,500)
Northern Ireland	9,500 (credible interval 6,000 to 14,100)

Reproduction number and growth rate

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, England, and Scotland is between 0.8 – 1.0. Estimates of R for Wales and Northern Ireland are 0.8 – 1.1 and 0.8 – 0.9, respectively.** R is a lagging indicator and these estimates are based on the latest data available up to 1st December. SPI-M-O's agreed national and regional estimates are

summarised in Table 1 and Figures 2, 3, and 5. SPI-M-O are not confident that R is less than one in Wales.

12. **Most of the impact of the national restrictions introduced in England on 5th November are now observable in the data, and SPI-M-O expect the reduction in hospital admissions to soon be reflected in deaths**. While R has decreased from the levels estimated in previous weeks, estimates may continue to decline further next week due to this lag, even if the decrease in transmission ends during that time.

13. The epidemic is shrinking in most NHS England regions, with all the regions having a lower bound of R below 1. Only two of the NHS England regions, London and the South East, have upper bound R estimates above 1 (both at 1.1). Although SPI-M-O's estimates of R for these regions span 1, the delay between recent trends and reflection in the latest data means R estimates may continue to decline in the future.

14. 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].

15. SPI-M-O's consensus estimate is that the **growth rate in the UK is between -3% to -1% per day**. The growth rate estimate for **England is between -3% to 0%**. SPI-M-O's national and regional estimates of growth rates are summarised in Table 1 and Figure 4.

The impact of a festive break in relaxations

16. SPI-M-O continues to consider the impact of the festive period on transmission of SARS-CoV-2. One modelling group has analysed time-use data to consider possible changes in age distribution of infections over a festive period. They consider contacts in home, school, work, and social visit settings; work and school contacts inevitably reduce for the relevant age groups over the holidays however social visits lead to increased transmission, particularly in the older, more vulnerable age groups. Different scenarios of overall mixing patterns (including normal, current and pre-national intervention) do not change very much the proportion of infection that could happen in these older age groups.

17. Preliminary work from another modelling group analysed five different scenarios considering household bubbles and transmission within them between 23rd to 27th December, across five different scenarios that assume additional mixing is limited to these five days and to three households per day. As with the other group's analysis, the more

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

days over which additional mixing happens, the greater the increase in incidence in the over 65s.

18. The total number of days spent mixing within that period may have a large impact on post-Christmas prevalence. It is likely that **visiting loved ones over the holiday period for one or two days would be considerably less risky than spending the entire time together**.

19. There is significant uncertainty as to how people's behaviour will change over the holidays. This, combined with the situation at the point of entering the time between 23rd and 27th December, will affect prevalence going into 2021. With schools and many workplaces closed, transmission in these settings and their associated age groups is likely to fall, but may be replaced by riskier interactions in other, social settings with older, more vulnerable individuals and consequently lead to more severe cases of disease.

20. The outcome of relaxation over the festive period remains highly uncertain. The rules in place would greatly restrict mixing compared to most years; if adherence to these restrictions is high then it is highly unlikely that the prevalence will double. Transmission to elderly and more vulnerable people might increase the incidence of disease more than the incidence of infection. Healthcare seeking and testing-seeking behaviour will change over the festive period. This, and possible disruption in data cycles, mean that it could taken several weeks to fully understand what happened in that time.

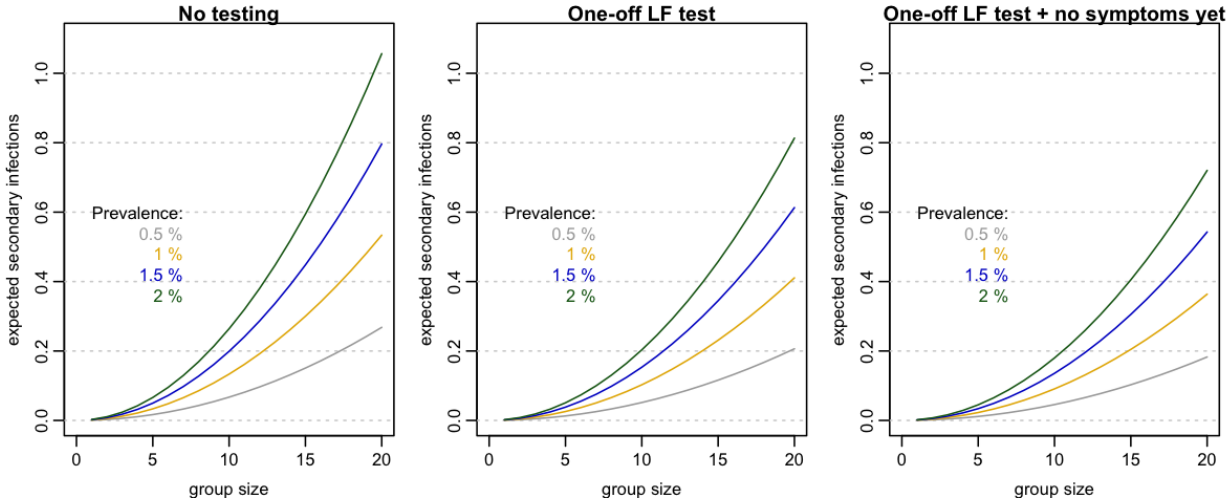
Mass testing

21. Modelling from one group has examined the benefit that could be realised if everyone were to take a single lateral flow test (LFT) before a multi-day gathering inside a home. If 30% of infections are assumed to be asymptomatic, and if such people are as likely to be infectious as those who do have symptoms, then the reduction in the number of secondary infections is more modest than might intuitively be expected. Based on one set of assumptions around the probability that a lateral flow test will test positive at each point in time post-infection (with any detected infections self-isolating), the group estimate a 23% reduction in the number of secondary infections from testing alone, and a 32% reduction if testing or onset of symptoms are used to identify infections. The reduction would be greater if asymptomatic people were less infectious.

22. Figure 1 shows the number of expected secondary infections (vertical axis) for different group sizes (horizontal axis) and prevalence (coloured lines). Note that the number of expected secondary infections increases more rapidly than the group size, and that even

with testing, the probability of a secondary infection is high for all but the smallest group sizes at an estimated current prevalence of 1%.

Figure 1: Expected secondary infections generated by initially infectious attendees at a multi-day gathering with: A) no testing in place; B) a one-off lateral flow test (LFT) test immediately before gathering; C) a one-off LFT test and confirmation that nobody is yet symptomatic immediately before gathering. This assumes that people with asymptomatic infections are as infectious as those with symptoms.



23. Individuals who test negative alongside all of their household members are much less likely to be false negatives, because risk of infection is correlated within households.

Annex: PHIA framework of language for discussing probabilities

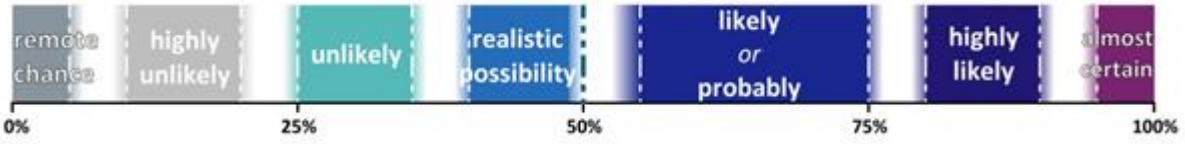


Table 1: Combined estimate of R and the growth rate in the UK, four nations and NHS England regions (90% confidence interval)[2]

Nation	R	Growth rate per day
England	0.8 – 1.0	-3% to 0%
Scotland	0.8 – 1.0	-3% to -1%
Wales	0.8 – 1.1	-3% to +1%
Northern Ireland	0.8 – 0.9	-4% to -1%
UK	**0.8 – 1.0**	**-3% to -1%**

NHS England region	R	Growth rate per day
East of England	0.9 – 1.0	-2% to +1%
London	0.9 – 1.1	-1% to +1%
Midlands	0.8 – 0.9	-4% to -1%
North East and Yorkshire	0.7 – 0.9	-5% to -3%
North West	0.7 – 0.9	-5% to -3%
South East	0.9 – 1.1	-2% to +1%
South West	0.7 – 1.0	-4% to 0%

[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 2: 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.

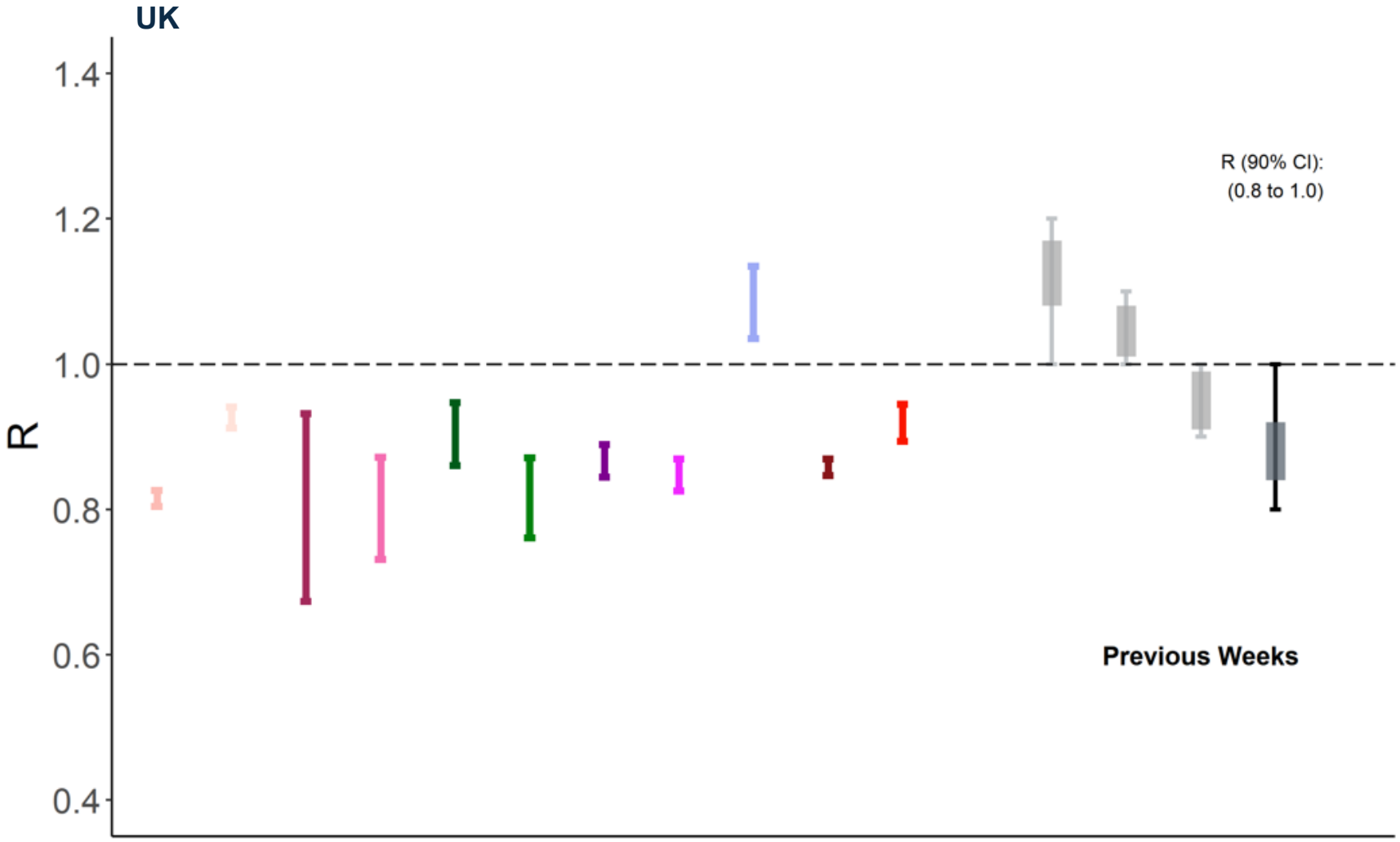


Figure 3: SPI-M-O groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

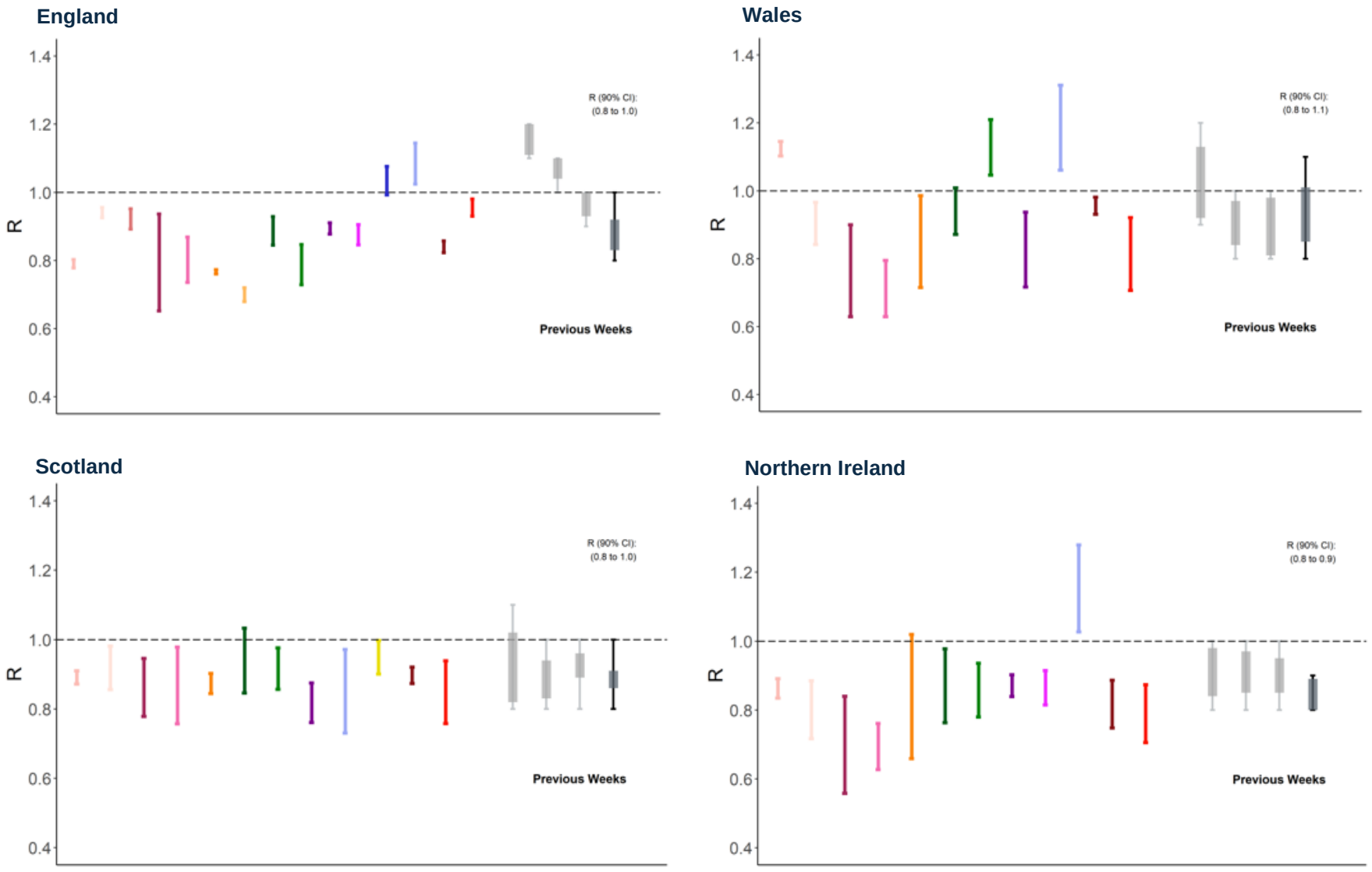


Figure 4: SPI-M-O groups estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different modelling groups. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.

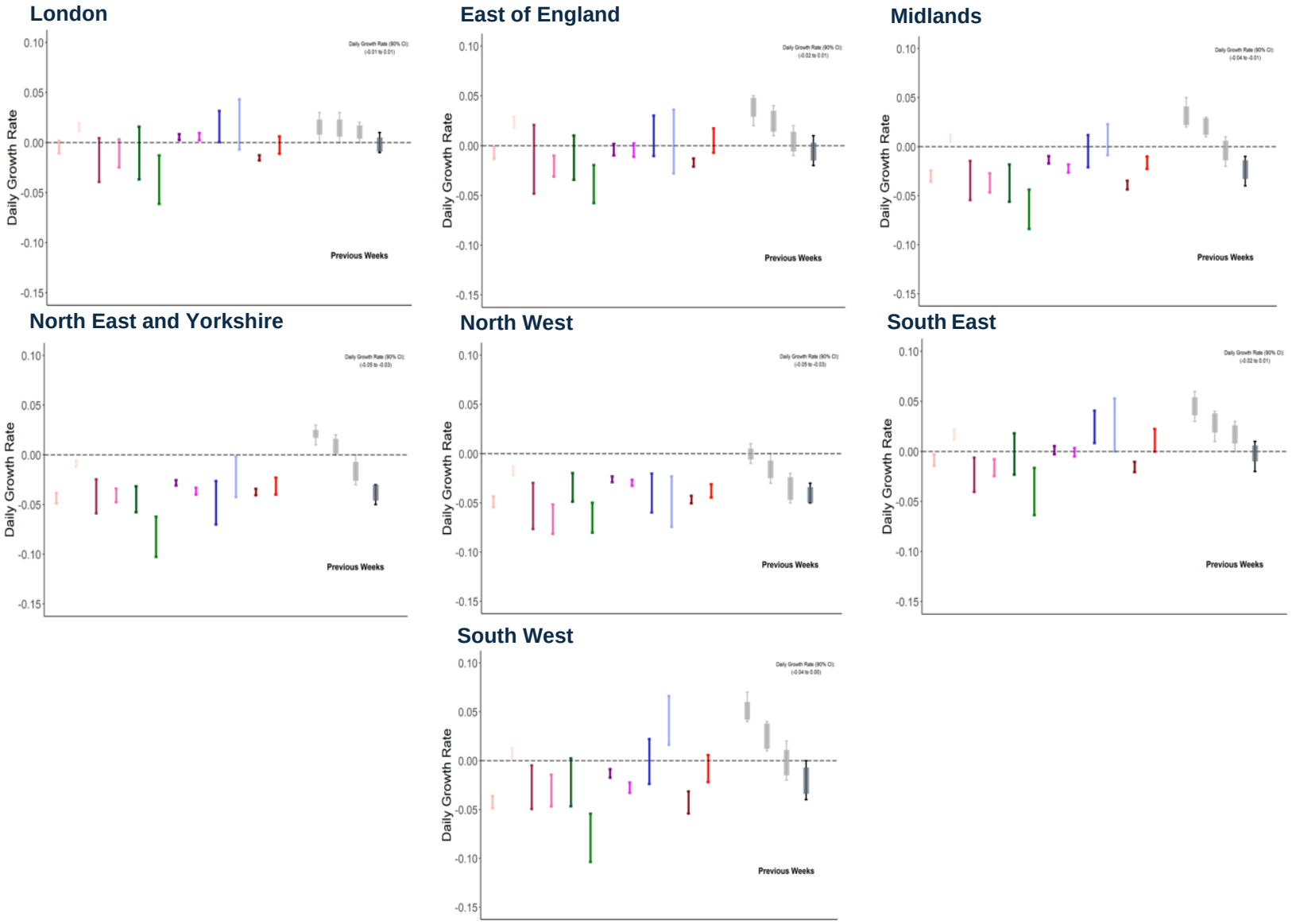


Figure 5: SPI-M-O groups estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.