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

Date: 9th September 2020

SIGNED OFF BY SPI-M-O CO-CHAIRS ON BEHALF OF SPI-M

Summary

1. SPI-M-O's best estimate for **R in the UK is between 1.0 and 1.2.** This 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 of the country as a whole.

2. SPI-M-O's best estimate for **R in England is also between 1.0 and 1.2.** It is highly likely that the epidemic is rapidly moving from a series of local outbreaks to a widespread increase in transmission across the country; **Scotland, Northern Ireland, and all regions of England have an R that is higher than or spans 1.0.**

3. The growth rate records how quickly the number of infections is changing each day. SPI-M-O's consensus estimate is that **the growth rate in the UK is between -1% and +3% per day**, while the estimate for the growth rate in **England is between +1% and +4% per day**.

4. These estimates **do not yet fully reflect any recent changes in transmission** from the past two to three weeks as a result of, for example, the reopening of schools in England.

5. It is **almost certain that an increase in infections will lead to increases in hospitalisations and deaths**, and there are already initial indications of hospital admissions increasing.

6. The current situation is in line with the latest reasonable worst-case scenario (RWCS), where incidence doubled once in August and once in the first two weeks of September, before re-imposed measures halt this growth. Under this scenario, there is an average incidence of approximately 11,900 infections per day for the second week of September in England. SPI-M-O's estimated incidence range for England at present is 2,300 to 12,500 new infections per day, in line with estimates from ONS and REACT surveillance studies.

Situation update

7. During the first wave of the epidemic, almost all testing took place in hospitals. As individuals admitted to hospitals are disproportionately likely to be older, so would be the associated age profile of confirmed infections during that time. **The current age profile of**

confirmed infections, therefore, should not be compared with those reported before July 2020.

8. Evidence from serological studies published in the spring show the same pattern of early infections concentrated amongst the young in the first wave of the UK epidemic. Samples gathered from blood donors in the North West from 13th to 17th April 2020 showed that 16.5% of 17- to 29-year olds had antibodies, indicating prior infections. At that time, the equivalent figure for 60- to 70-year olds was just 2.3%.[1]

9. Studies of contact patterns have shown a greater increase in activity amongst younger people. The CoMix survey has shown large increases across all age groups, particularly in the younger age groups, during the month of August. In the USA, France, and Spain, increases in infections in younger age groups rapidly spread to other people and resulted in growth in hospitalisations and deaths. There is no reason that the same patterns would not occur in the UK.

10. It is highly likely that the epidemic is rapidly moving from localised outbreaks to incidence increasing across the country, with the reproduction number (R) greater than 1 in most England Local Authority Districts (see regional variation below for further information).

Reproduction number

11. 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.

12. **SPI-M-O's best estimate for the UK is that R is between 1.0 and 1.2; this is also the case for England**. SPI-M-O's agreed national estimates of R are summarised in **Table 1** and **Figures 2 and 3** and the previous three consensus estimates of R are included to show the trend.

13. SPI-M-O's consensus estimates for R and growth rates are based on a range of models that use a variety of data sources, including deaths, hospital admissions, and infections detected through testing. As a result, these estimates cannot yet reflect the most recent changes in transmission from the past two to three weeks that may be a result of, for example, reopening of schools in England. Further upcoming likely changes in transmission also concern SPI-M-O, such as the return of university students. It is highly

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[1] Footnote added for release: PHE surveillance; SARS-CoV-2 antibody seroprevalence in adult blood donors (NHSBT), using Euroimmun test adjusted for sensitivity and specificity

likely that, unless the causes of this increase in transmission are curtailed, incidence will grow exponentially, and hospitalisations and deaths will start to follow the same pattern.

14. The current methodology used to generate SPI-M-O's combined consensus estimate gives equal weight to all models estimates included in it. Inclusion of one model, which uses only death data, in this combination leads to a reduction in the lower bounds for R estimates (in the case of the UK and England, the lower bound of the R range becomes 0.9, rather than 1.0).[2] It is SPI-M-O's expert opinion that this model is unrepresentative of current trends in transmission and so, rather than amending the combination methodology, this model's outputs have been excluded.

Growth rates

15. 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[3].

16. SPI-M-O's consensus estimate is that **growth rate per day in the UK is between -1% to +3% per day**. SPI-M-O's national estimates of growth rates are summarised in **Table 1**.

17. The proportion of pillar 2 tests returning a positive result has the potential to provide an earlier indicator of observed changes in community transmission. Trends in these data, however, are difficult to interpret due to changes in testing behaviour and strategies, particularly in areas of local intervention where testing volumes have increased. Observation of the proportion of people testing positive in pillar 2 data suggests that the epidemic has been rapidly increasing between 20th August and 2nd September, growing at around **+5% per day over the past 2 weeks in England (95% confidence interval +3% to +7%)**. We cannot tell how much this represents a true change in the number of infections, and how much arises from changes in targeting of pillar 2 testing in terms of specific geographic locations or age groups with higher or lower prevalence.

Regional variation and reliability

18. Estimates of R at regional levels can be subject to the same difficulties in interpretation as national estimates and may be amplified due to the smaller numbers of infections for

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[2] Footnote added for release: This statement incorrectly includes England; only the lower bound of the UK is affected.
[3] Further technical information on the growth rate can be found in Plus magazine.

smaller geographies. Consensus estimates for the regional growth rates per day in England are also given in **Table 1** and **Figure 4**. For completeness, consensus regional estimates of R for England are given in **Table 1** and **Figure 5**.

19. Four regions of England now have R ranges with 1.0 (or greater) as their lower bounds and have positive growth rates. All regions' and UK Nations' R ranges include 1 and growth rates span 0 or are positive. This is supported by work from multiple SPI-M-O groups that consider the probability of R being greater than 1 at England local authority district level; one analyses is shown in **Figure 1**. The uniformity of the almost certainty of R being greater than 1 across large parts of the country is evidence supporting the move from local outbreaks to more widespread increases in transmission.

Figure 1: Spatial reproduction number estimates as at 4th September 2020, showing probability of R being greater than 1.
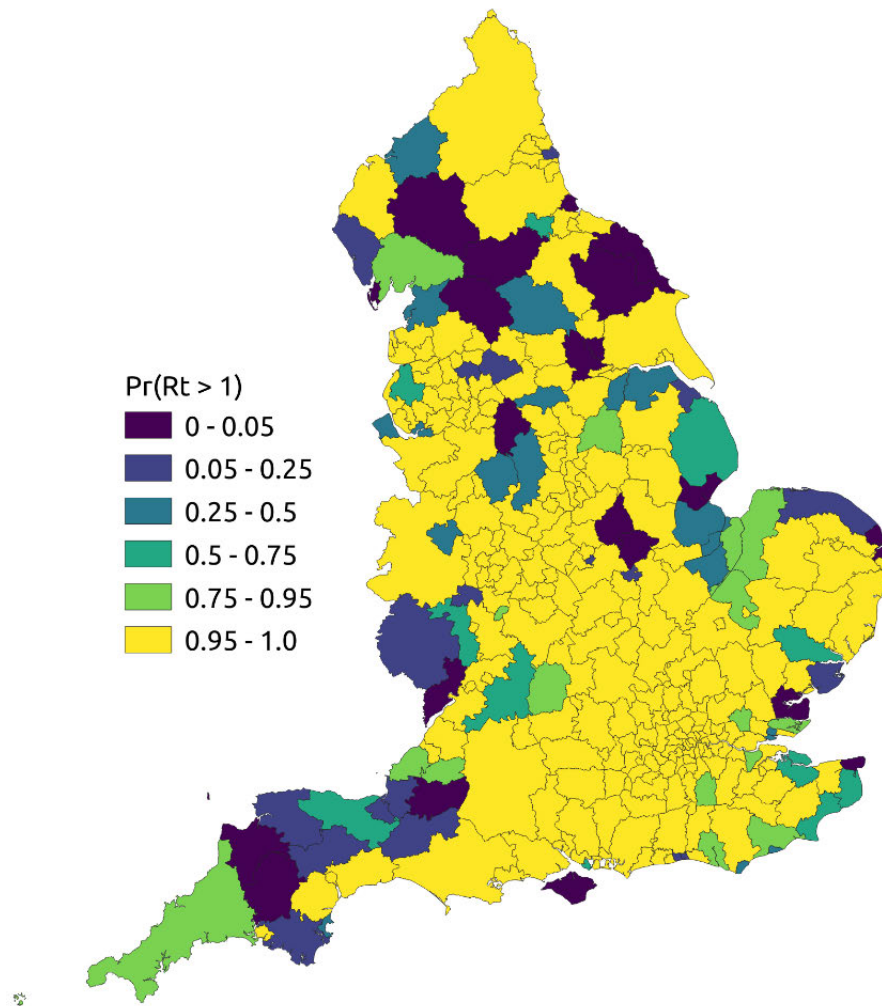
20. As detected infections are increasing across the UK, SPI-M-O's view is that there is less variability in estimates than previously seen. While numbers of deaths have fallen to low levels, there is a consensus in SPI-M-O that these do not reflect the changes in

transmission being observed elsewhere through, for example, infection data. There may still be high degrees of variability in, for example, a localised outbreak, however, SPI-M-O considers all this week's estimates to be reliable.

21. Care should still be taken when interpreting R and growth rate estimates for the UK as a whole, as these figures mask wide variation in the number of infections and patterns of how transmission is changing in some parts of the country and between the different nations of the UK (see **Table 1**).

Incidence

22. Combined estimates from four SPI-M-O models give a 90% confidence interval of **2,300 to 12,500 new infections per day in England**. This is in line with the recent reported increases in infections found through testing data and this range includes the reasonable worst-case scenario estimate for the numbers of daily infections this week.

23. Modelling from the ONS swabbing survey for the most recent week of the study (30th August to 5th September) estimates that an average of **39,700 people had COVID-19** in the community in England (credible interval 29,300 to 52,700). In Wales, ONS estimate that an average of 1,200 people had COVID-19 during this period (credible interval 300 to 2,800). The study also estimates that, during the same week, there were **3,200 new infections per day in England**, with a credible interval of 2,000 to 4,600.

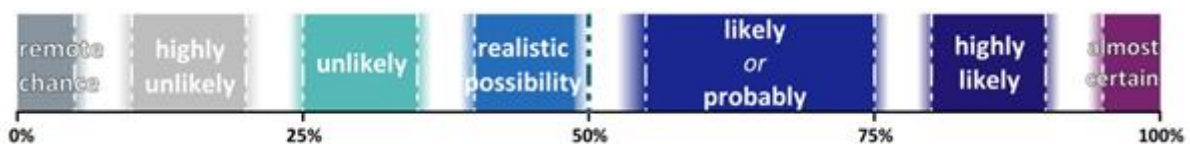## Annex: PHIA framework of language for discussing probabilities

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

Nation	R	Growth rate per day
England	1.0 – 1.2	+1% to +4%
Scotland	1.1 – 1.5	+3% to +9%
Wales	0.7 – 1.0	-5% to +4%
Northern Ireland	0.9 – 1.4	-2% to +6%
UK	**1.0 – 1.2**	**-1% to +3%**

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

Figure 1: 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.
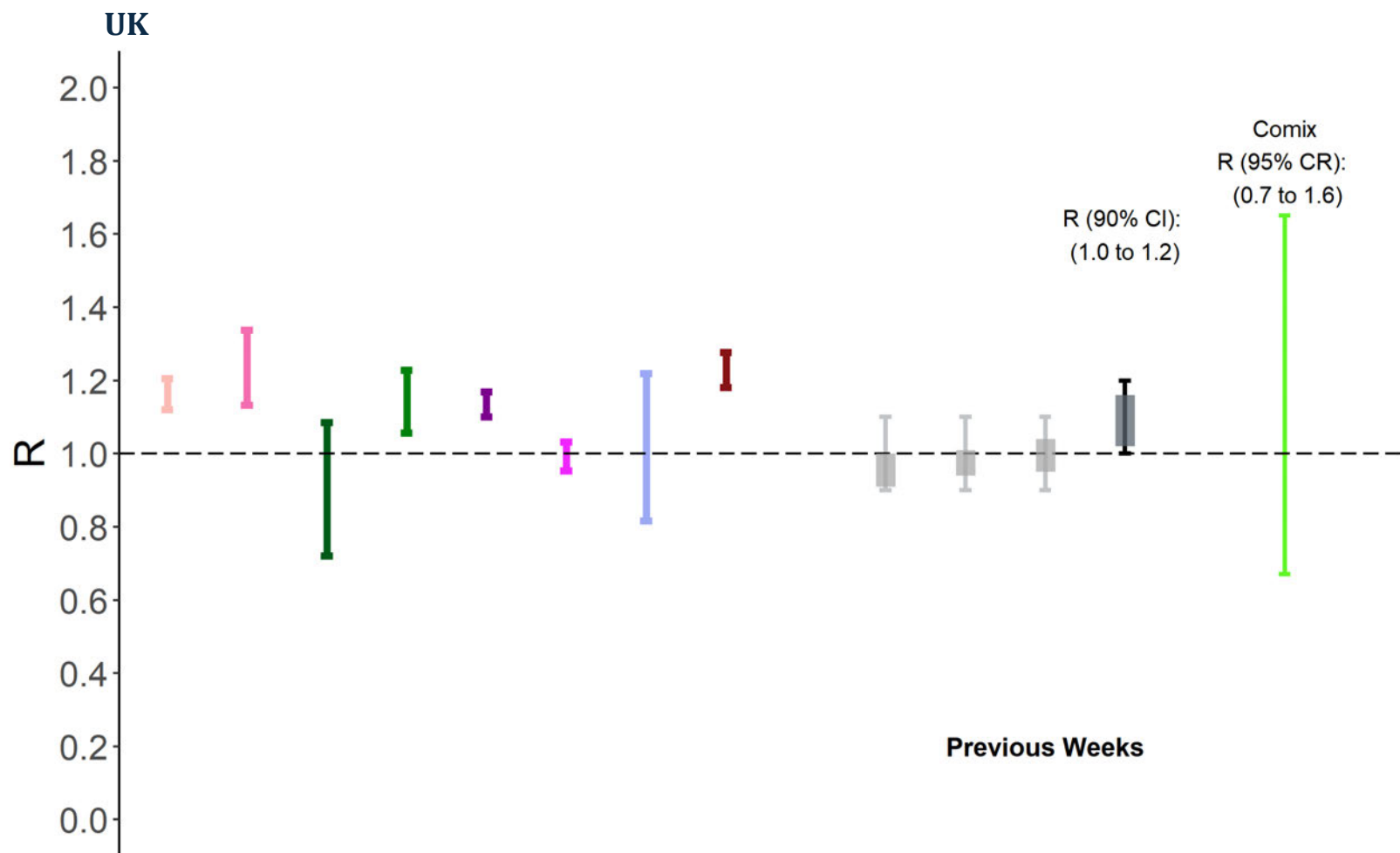
Figure 2: SPI-M-O groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.
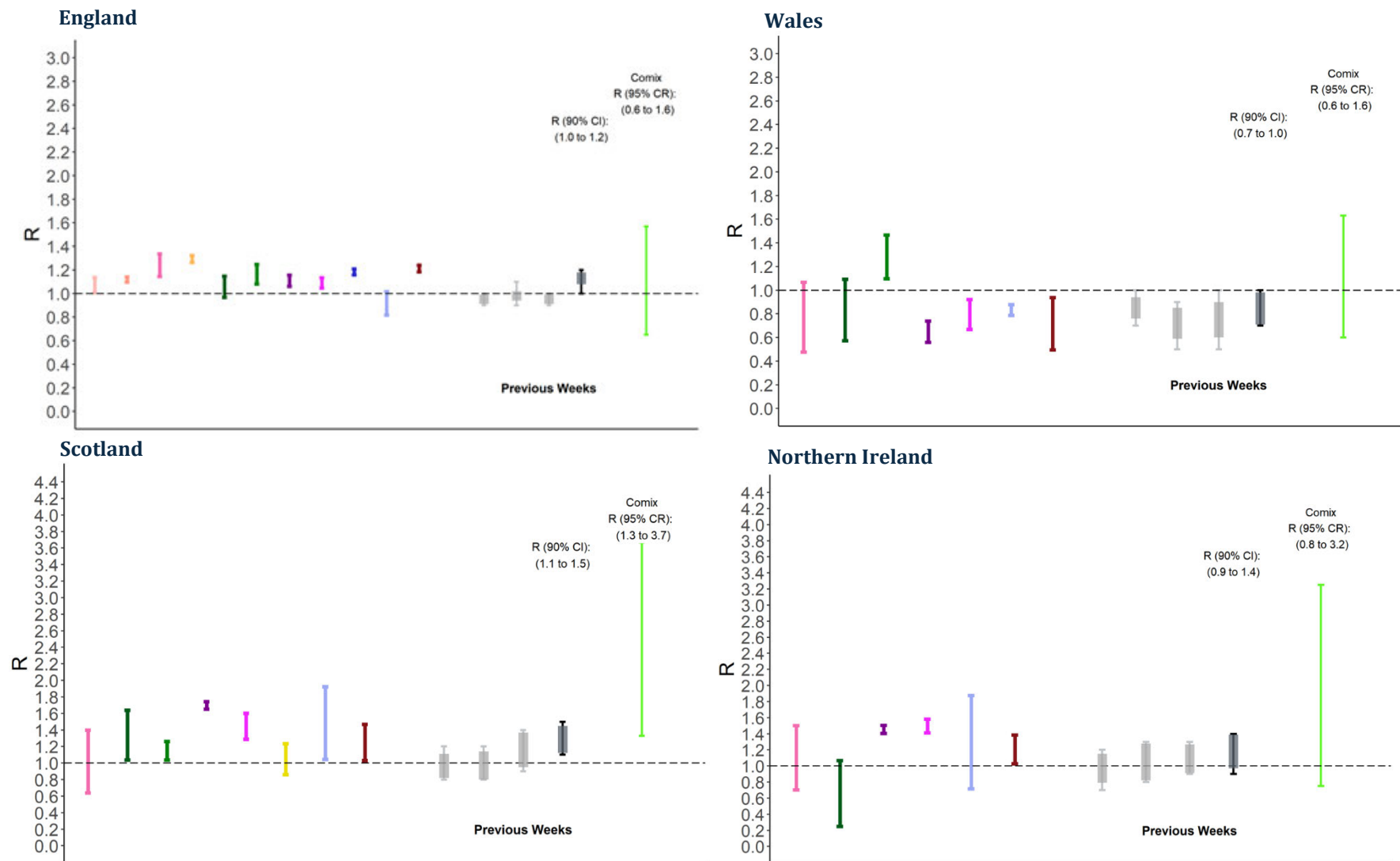
Figure 3: SPI-M-O groups estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different modelling groups. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.
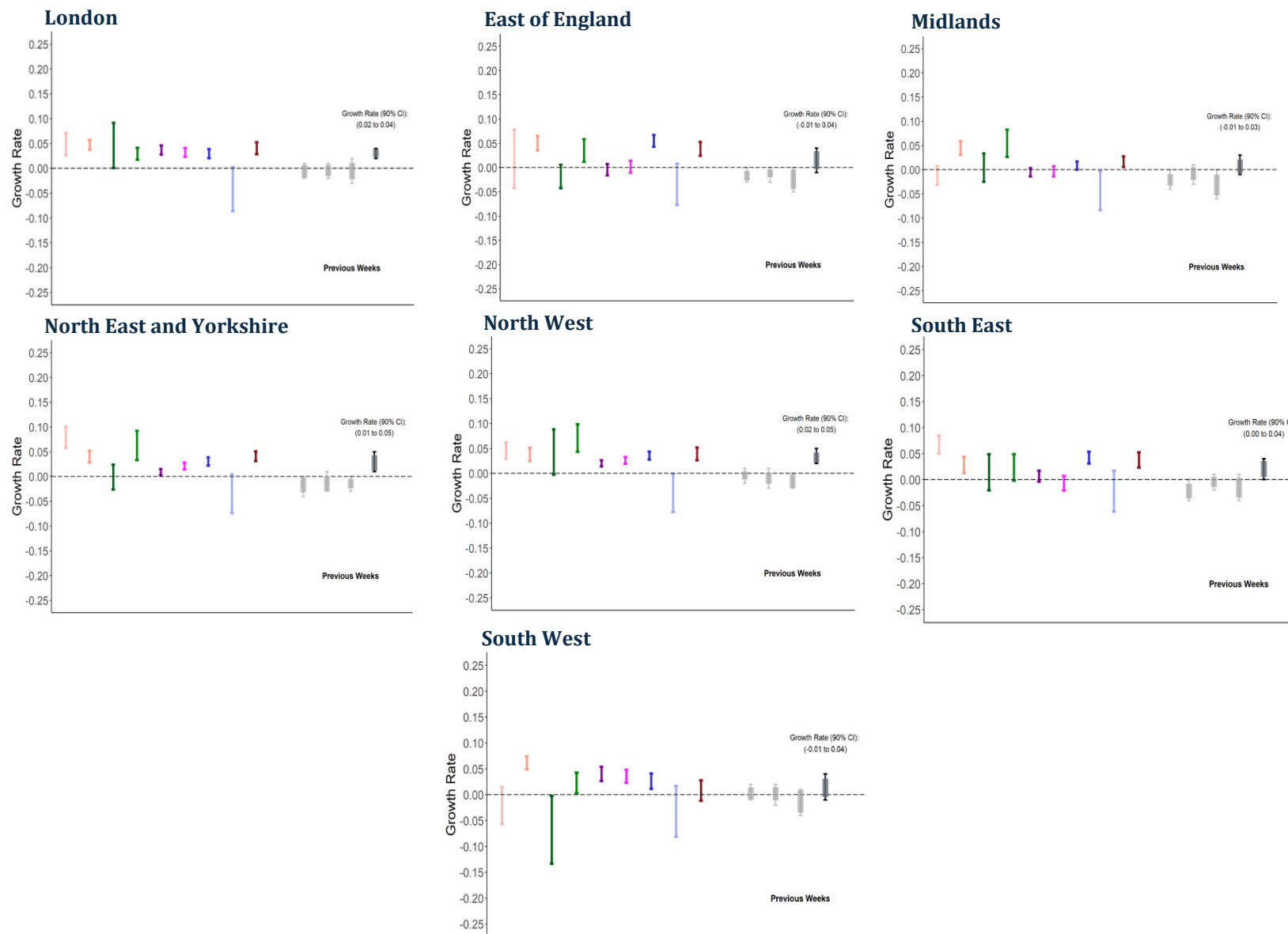
Figure 4: SPI-M-O groups estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.