

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

Date: 2nd September 2020

FINAL

Summary

1. SPI-M-O's best estimate for **R in the UK is between 0.9 and 1.1**. 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 between 0.9 and 1.0**. **SPI-M-O do not have confidence that R is *currently* below 1 in England**.
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 per day in the UK is between -1% and +2% per day**. Care should be taken when interpreting R and growth rate estimates for the UK as this figure masks wide variation in the number of cases and pattern of how this is changing in different parts of the country.
4. **Particular care should be taken when interpreting the R and growth rate estimates for Scotland, Wales, Northern Ireland, London, East of England and South West**. These estimates are based on low numbers of deaths and / or dominated by clustered outbreaks and so should not be treated as robust enough to inform policy decisions alone.
5. Current levels of immunity are unlikely to significantly mitigate the impact of any new epidemic wave resulting from increased contact rates. Current levels of immunity are expected to have greatest effect if contact rates are kept such that the reproduction number is close to 1.

Reproduction number

6. The reproduction number is the average number of secondary infections produced by a single infected individual. R is an average over time, geographies and communities. Whilst it varies in different geographies and settings of the population, separating transmission within and between these sub-populations increases uncertainty.
7. **SPI-M-O's consensus estimates for R and growth rates are based on a range of models that use all these data sources**, and, as a result, may not fully reflect *recent* changes in transmission.

8. SPI-M-O's agreed national estimates of R are summarised in **Table 1** and **Figures 1 and 2**. SPI-M-O's best estimate for **the UK is that R is between 0.9 and 1.1**. The previous three consensus estimates of R have been included to show the trend in the estimates.
9. SPI-M-O's best estimate for **R in England is between 0.9 and 1.0**. SPI-M-O do not have confidence that R is *currently* below 1 in England.

Growth rates

10. 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 shrinking¹.
11. SPI-M-O's consensus estimate is that **growth rate per day in the UK is between -1% to +2% per day**. SPI-M-O's national estimates of growth rates are summarised in **Table 1**.
12. Rounding and differences between the data streams used in the models included in the combinations account for differences between estimates of R and estimated growth rates. Such variation highlights the importance of applying judgement when using these metrics.
13. 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 approximately flat, marginally growing at around **+0.5% per day over the past 2 weeks in England (95% confidence interval -0.6% to +1.6%)**. 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

14. Estimates of R at regional levels are subject to the same difficulties in interpretation as national estimates, and these are amplified due to the smaller numbers of cases.

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

15. Consensus estimates for the regional growth rates per day in England are also given in **Table 1** and **Figure 3**. For completeness, consensus regional estimates of R for England are given in **Table 1** and **Figure 4**; some of the ranges of R include 1.
16. SPI-M-O's view is that **care should be taken when interpreting the R and growth rate estimates for: Scotland, Wales, Northern Ireland, London, East of England and South West**. This is because these estimates are based on low numbers of deaths and / or clustered outbreaks. SPI-M-O advise that caution should be used when using these R estimates, either because numbers of deaths have fallen to low levels, there is variability in estimates from different data streams, or there is a high degree of variability in transmission, for example, due to a localised outbreak.
17. Care should also be taken when interpreting the R and growth rate estimates for the UK. These figures mask wide variation in the number of cases and patterns of how transmission is changing in different parts of the country.

Incidence

18. Combined estimates from three SPI-M-O models give a 90% confidence interval of **2,000 – 5,000 new infections per day** in England.
19. Modelling from the ONS swabbing survey for the most recent week of the study (19th August to 25th August) estimates that an average of **27,100 people** had COVID-19 in the community in England (credible interval 19,300 to 36,700). In Wales, ONS estimate that an average of **1,400 people** had COVID-19 during this period (credible interval 400 to 3,500). The study also estimates that, during the same week, there were **2,000 new infections per day in England**, with a credible interval of 1,100 to 3,200. Although the ONS survey can directly estimate incidence, it is based on a very small number of positive tests. The ONS data remain broadly flat, in line with SPI-M-O's estimates of R.

Immunity

20. Evidence from serology studies show that only a small proportion of the UK population have antibodies to SARS-CoV-2. Estimates from REACT, ONS and NHSBT are all around 5-6%. The exact relationship between serological positivity and immunity is unclear, but this does represent a minimum bound for the proportion of people infected with SARS-CoV-2 to date.
21. It is a long-established result in infectious disease epidemiology that the level of population immunity required to keep the reproduction number below 1 is lower when immunity results

from naturally occurring infection than if it were distributed at random, uniformly across the population. This is because of heterogeneity in people's behaviour and their placement in the community contact structure. Some groups will be more central to transmission than others, for example health care workers and those mixing more in the community. Thus, the first 6% percent of the population to become immune will reduce transmission by more than 6%. The strength of this effect will depend on how heterogeneous contact patterns are and how consistent these groups are over time (e.g. whether healthcare workers early in the outbreak and later in the outbreak are almost the same group or not), as well as the characteristics of immunity.

22. However, people's relative exposure to infection now is not the same as in March due to changes in behaviour, working patterns and COVID-security measures. Despite this heterogeneity, current levels of immunity are not sufficiently high that they are expected to have a major effect on the overall dynamics of an epidemic in the event of a winter resurgence. However, at present it could be the difference between the reproduction number being at or slightly above 1. The benefit of current levels of immunity will be maximised if policies are maintained that keep the transmission rates so R is around 1.
23. The high levels of exposure faced by groups of health and social care workers in the epidemic to date mean that they are likely to have much higher levels of immunity. Interim results from the REACT-2 study estimate a seropositivity rate of around 12% among people with client-facing roles in care homes or patient facing healthcare roles. This, combined with improved testing and infection control measures means that it is a realistic possibility that these groups would have lower transmission rates than seen in spring.
24. Although seroprevalence is higher in some regions such as London, behaviour and contact patterns also varies between regions. It is very difficult to unpick the difference between behaviour and immunity using ecological studies comparing seroprevalence and incidence. We cannot conclude that pre-existing levels of immunity will prevent cases to rise in London.
25. The presence and scale of any further wave in autumn or winter will be highly dependent on the extent of reduction in transmission from social distancing and COVID-secure measures, and any effects such as immunity or loss of immunity are likely to only play a very minor role.
26. The experience of other countries with previously high attack rates should be considered when drawing conclusion about the nature of immunity to COVID-19. We are likely to learn

first about the potential for reinfection from the international picture rather than the experience of UK alone.

27. Data on the effect of immunity are required to predict the impact of waning and partial immunity on future transmission.

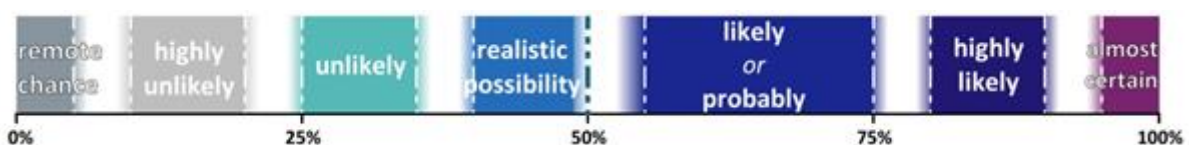
Current situation in Europe

28. It has been noted that the number of confirmed cases has been significantly increasing in many European counties in recent weeks, but a rise on the same scale has not occurred in the UK. There are several possible explanations for why this is the case which are hard to unpick, and the ultimate reason may be a combination of them:

- Lockdowns were lifted later in the UK than elsewhere and the UK may have reduced true incidence levels further than elsewhere. Mobility data suggest that the UK is returning to normal more slowly than France or Spain. For example, a much larger proportion of the UK workforce remain at home than in France.
- Recent contact studies in Belgium and Netherlands imply that contact rates there have increased more rapidly than in the UK. This and the previous effect are acting to keep transmission rates in the UK lower.
- The effectiveness of test and trace systems varies between countries. The effect of test and trace on transmission in the UK is unknown, but it is possible that it is having more impact than in other countries.

29. SPI-M-O are concerned about the developing situation around the importation of infection from people arriving in the UK. Whilst this is a small minority of infections in the UK it poses a threat. Although testing at borders is unlikely to have significant impact on importation rates, it would provide important epidemiological surveillance data and potentially reduce onwards transmission if it results in through higher adherence to quarantine periods and activating onwards contact tracing. As heterogeneity increases globally, the importation of infection is likely to remain a source of outbreaks in the UK.

Annex: PHIA framework of language for discussing probabilities



OFFICIAL – SENSITIVE**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	0.9 – 1.0	+1% to -2%
Scotland*	0.9 – 1.4	+8% to -1%
Wales*	0.5 – 1.0	-2% to -8%
Northern Ireland*	0.9 – 1.3	+5% to -3%
UK†	0.9 – 1.1	+2% to -1%

NHS England region	R	Growth rate per day
East of England*	0.8 – 1.0	0% to -5%
London*	0.9 – 1.1	+2% to -3%
Midlands	0.8 – 1.0	0% to -6%
North East and Yorkshire	0.8 – 1.0	0% to -3%
North West	0.8 – 1.0	0% to -3%
South East	0.8 – 1.0	+1% to -4%
South West*	0.8 – 1.1	+1% to -4%

*Care should be taken when interpreting these estimates as they are based on low numbers of deaths and/or clustered outbreaks within this area.

† 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 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.

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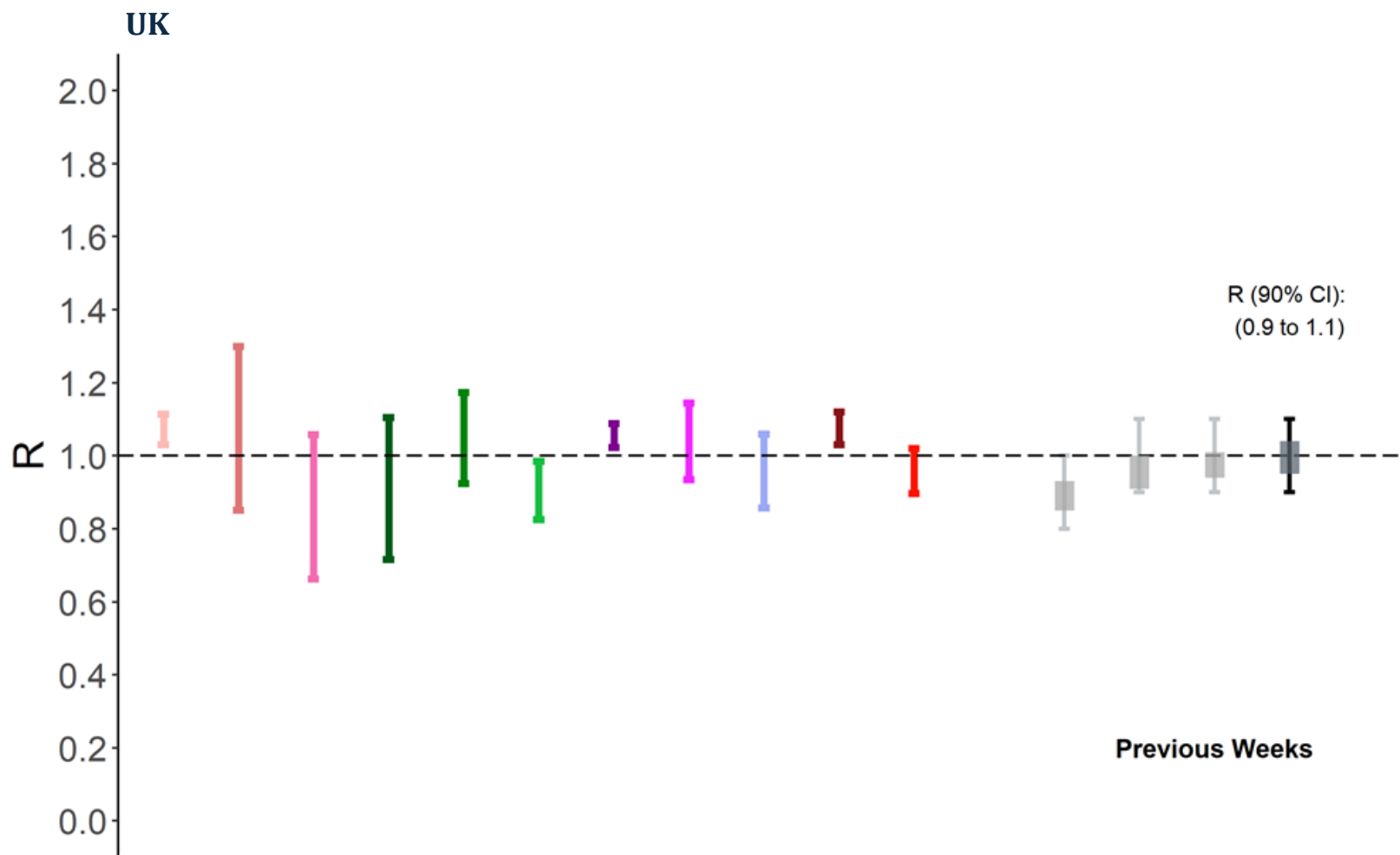


Figure 2: SPI-M-O groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

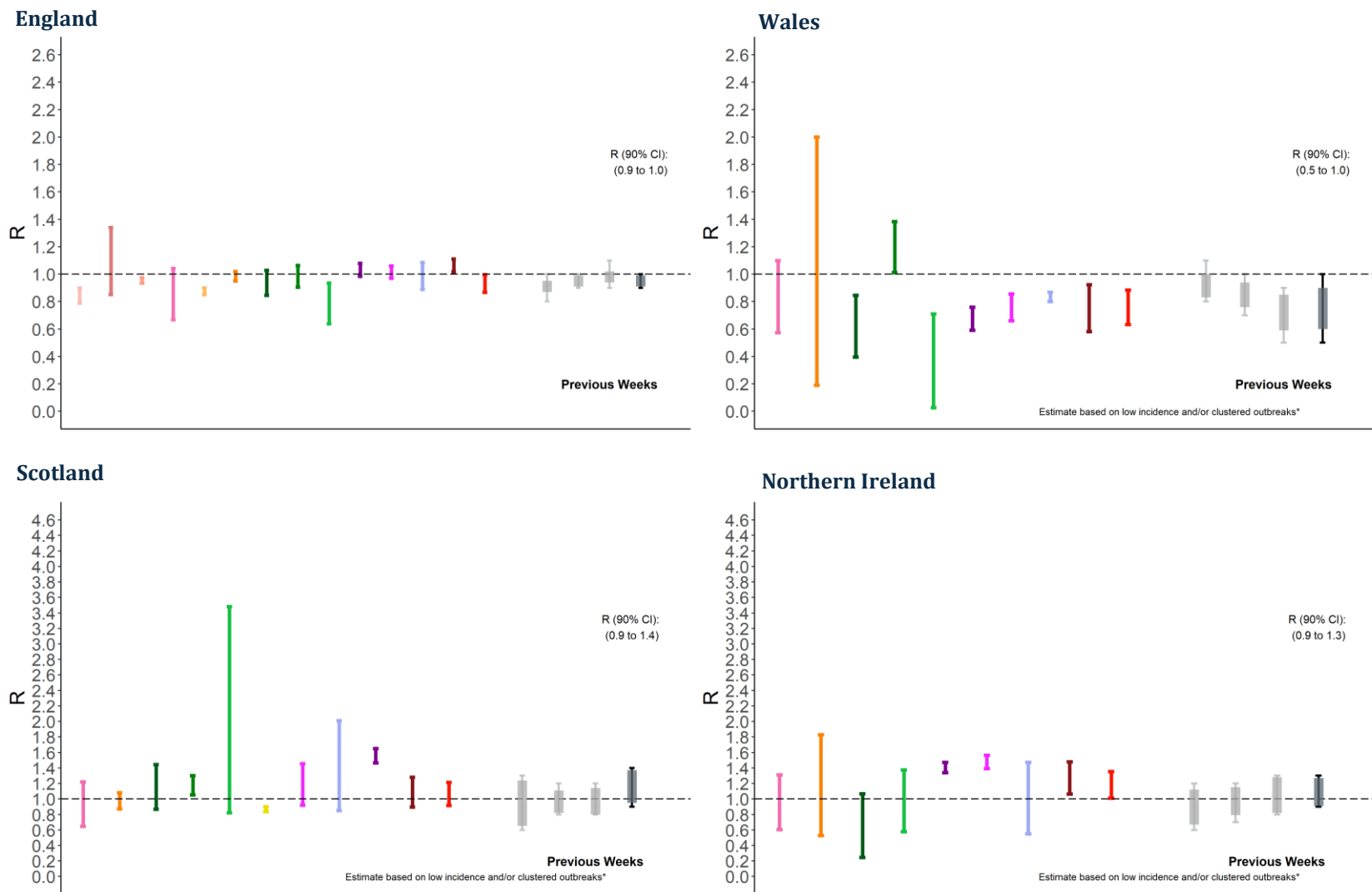


Figure 3: SPI-M-O groups estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different modelling groups. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.

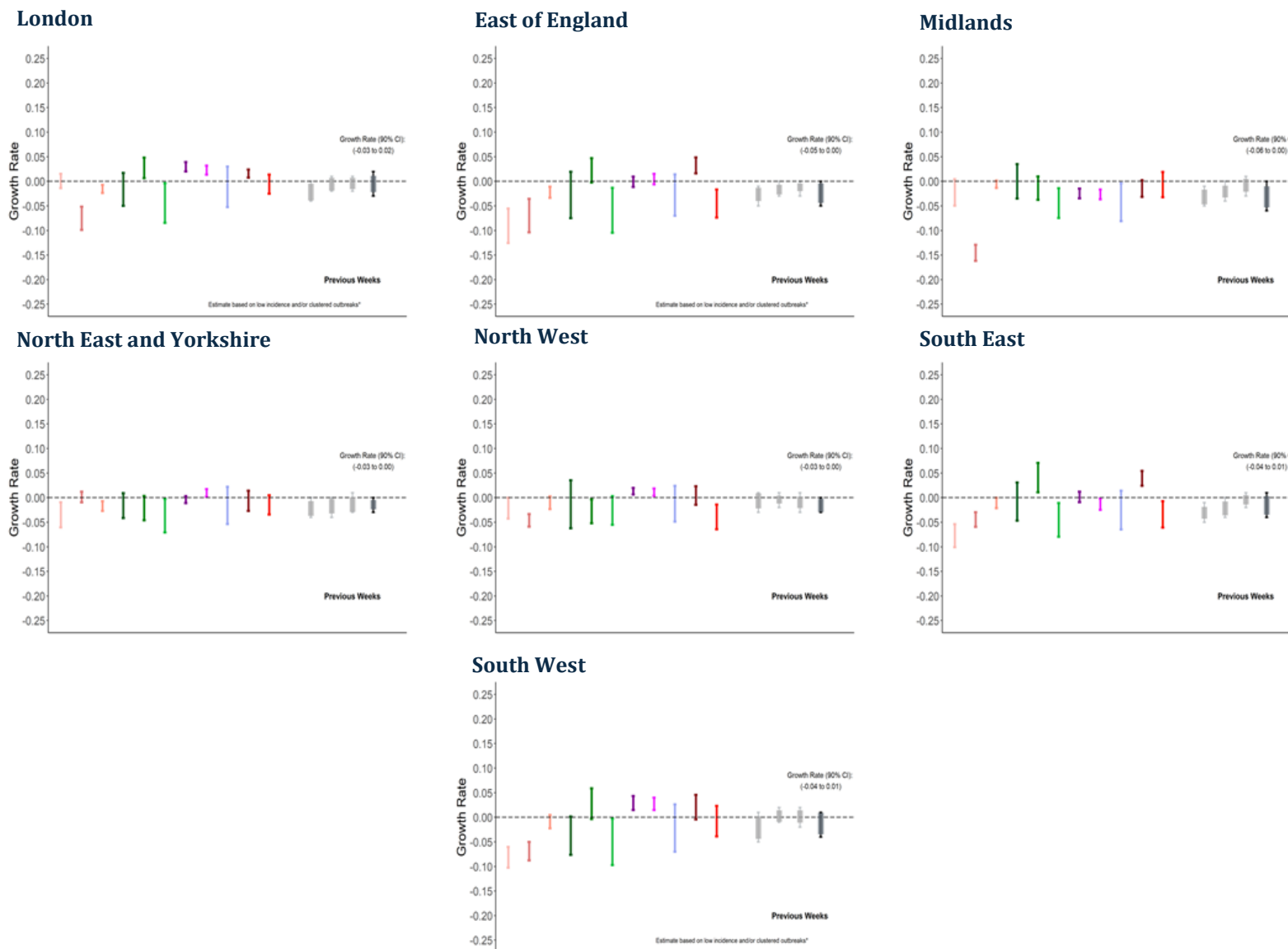


Figure 4: SPI-M-O groups estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

