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

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

## Summary

1. It is highly likely that the overall reproduction number, **R**, in the UK has been below 1 in recent weeks. SPI-M-O's best estimate for **the UK is that R remains between 0.7 and 0.9.**

2. 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 -5% and -1% per day**.

3. Estimates of R and the growth rates per day are less reliable and less useful in determining the state of the epidemic when disease incidence is low or where there is significant variability in the population, for example, local outbreaks. Both are average measures and will smooth over outbreaks at small spatial scales or over short periods of time.

4. **Care should be taken when interpreting the R and growth rate estimates for Scotland, Wales, Northern Ireland, London, North West, South East, and South West.** This is because these estimates are based on low case numbers and / or dominated by clustered outbreaks, and are insufficiently robust to inform policy decisions.

5. As prevalence of infection falls, national and regional forecasts become less meaningful and it becomes increasingly important to monitor the level of transmission at a local level to detect and respond to local outbreaks.

## 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. Uncertainty in R increases as the number of infections decrease. 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 remains between 0.7 and 0.9**. The previous three consensus estimates of R have been included to show the trend in the estimates.

8. **Any changes in transmission patterns that may have occurred in the last two to three weeks will not yet be reflected in the epidemiological data, nor therefore in SPI-M-O's estimates of R**.

## Growth rates

9. For small daily changes, the growth rate is approximately the proportion by which the number of infections increases or decreases each day, i.e. the rate at which an epidemic is growing or shrinking[1].

10. SPI-M-O's consensus estimate is that the epidemic is slowly shrinking in the UK, with a growth rate each day that can be interpreted as **-5% and -1% per day**. SPI-M-O's agreed national estimates of growth rate are summarised in **Table 1**.

11. Rounding and difference in the models used in the combinations account for differences between estimates of R and growth rates. Such variation highlights the importance of applying judgement based on these metrics rather than relying solely on their values.

## Regional variation

12. 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. Publishing several estimates increases the statistical chance that one of them is high by chance. SPI-M-O does not have confidence that regional R estimates are sufficiently robust to inform regional policy decisions.

13. 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.

## Reliability of R and growth rates

14. R becomes an unreliable measure for informing policy when case numbers fall 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.

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[1] The growth rate, $\lambda e^{\lambda t}$ is the slope of the exponential curve $y = e^{\lambda t}$, where $y$ is the number of new infections, and $t$ is time, given in days. This approximates to $\lambda$ at small values of $t$.

15. SPI-M-O's provisional framework suggests that **care should be taken when interpreting the R and growth rate estimates for: Scotland, Wales, Northern Ireland, London, North West, South East, and South West.** This is because these estimates are based on low case numbers and / or clustered outbreaks.

16. **SPI-M-O recommends these estimates are accompanied with the following wording "Low case numbers and/ or a high degree of variability in transmission across the region means these estimates are insufficiently robust to inform policy decisions".**

### Incidence

17. The relationship between infection, symptoms, swab positivity, hospitalisation, and death is becoming clearer, but uncertainties remain in estimating the number of new daily infections.

18. Combined estimates from three SPI-M models give a 90% confidence interval of **3,000-11,000 new infections per day** in England.

19. Data from the ONS swabbing survey for the most recent week of the study (midpoint of week at **9 July**) estimates that an average of 24,000 people would have swabbed positive for SARS-CoV-2 in the community in England (confidence interval 15,000 to 34,000). The study also estimates that during the same week, incidence was 0.02 new infections per 100 people followed for 1 week, with a confidence interval of 0.01 to 0.05. Although the ONS survey can directly estimate incidence, it is based on a very small number of positive tests.

20. Despite a slight change in methodology, ONS modelling of the trend over time suggests that both the decline in the number of people swabbing positive and incidence of new infections has levelled off in recent weeks.

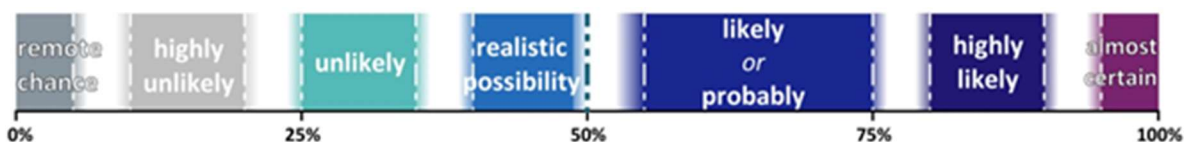### Annex: PHIA framework of language for discussing probabilities

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

| Nation | R | Growth rate per day |
|---|---|---|
| **England** | 0.8 – 1.0 | -4% to 0% |
| **Scotland*** | 0.5 – 0.9 | -9% to +1% |
| **Wales*** | 0.6 – 0.9 | -7% to +1% |
| **Northern Ireland*** | 0.4 – 0.9 | -11% to +1% |
| **UK** | **0.7 – 0.9** | **-5% to -1%** |

| NHS England region | R | Growth rate per day |
|---|---|---|
| **East of England** | 0.8 – 1.0 | -5% to +1% |
| **London*** | 0.8 – 1.1 | -3% to +2% |
| **Midlands** | 0.7 – 1.0 | -5% to -1% |
| **North East and Yorkshire** | 0.7 – 0.9 | -5% to -1% |
| **North West*** | 0.7 – 1.0 | -6% to -1% |
| **South East*** | 0.8 – 1.0 | -4% to 0% |
| **South West*** | 0.7 – 1.1 | -6% to +2% |

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

**Figure 1:** SPI-M 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.
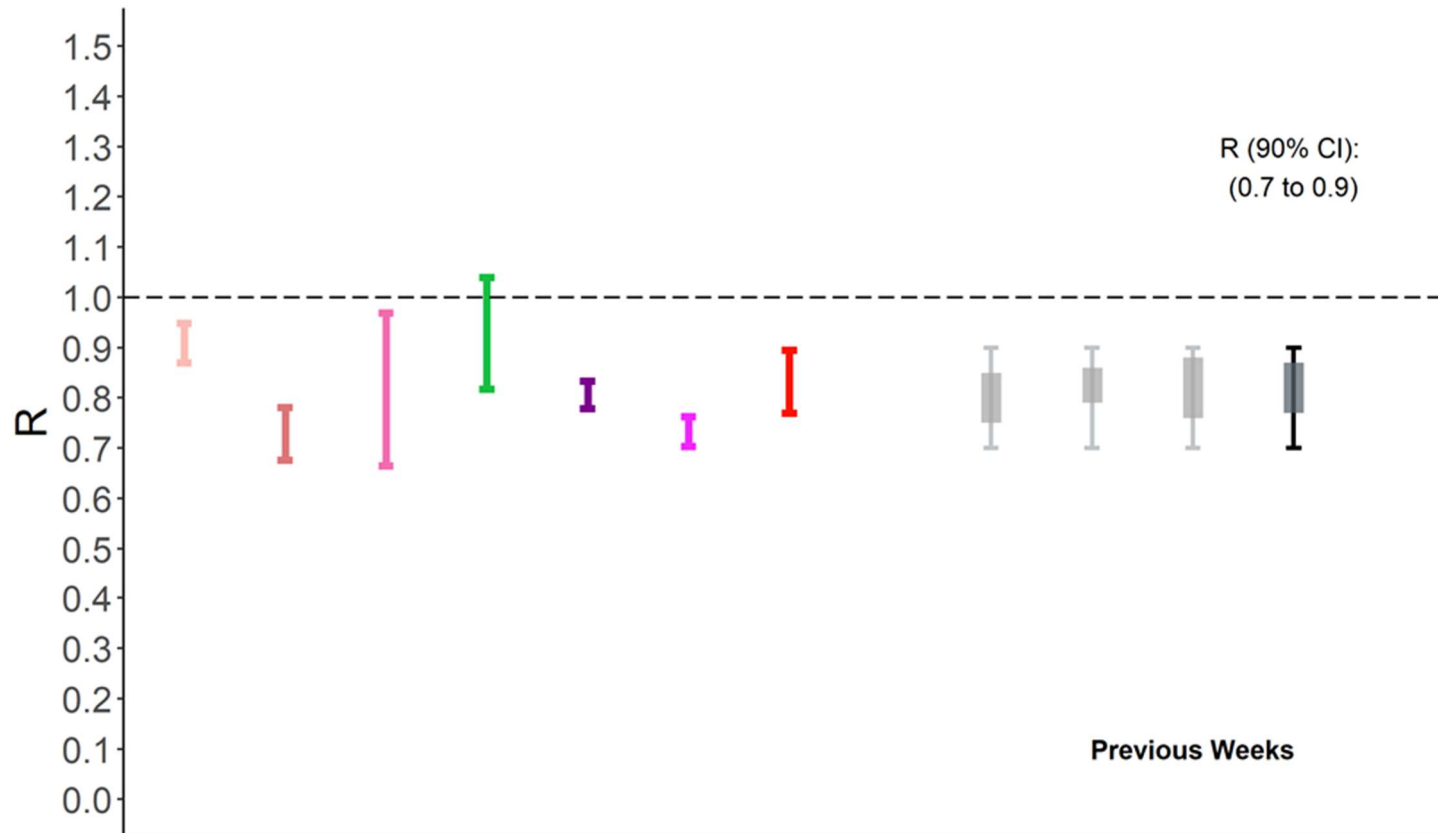


UK

R (90% CI):
(0.7 to 0.9)

Previous Weeks

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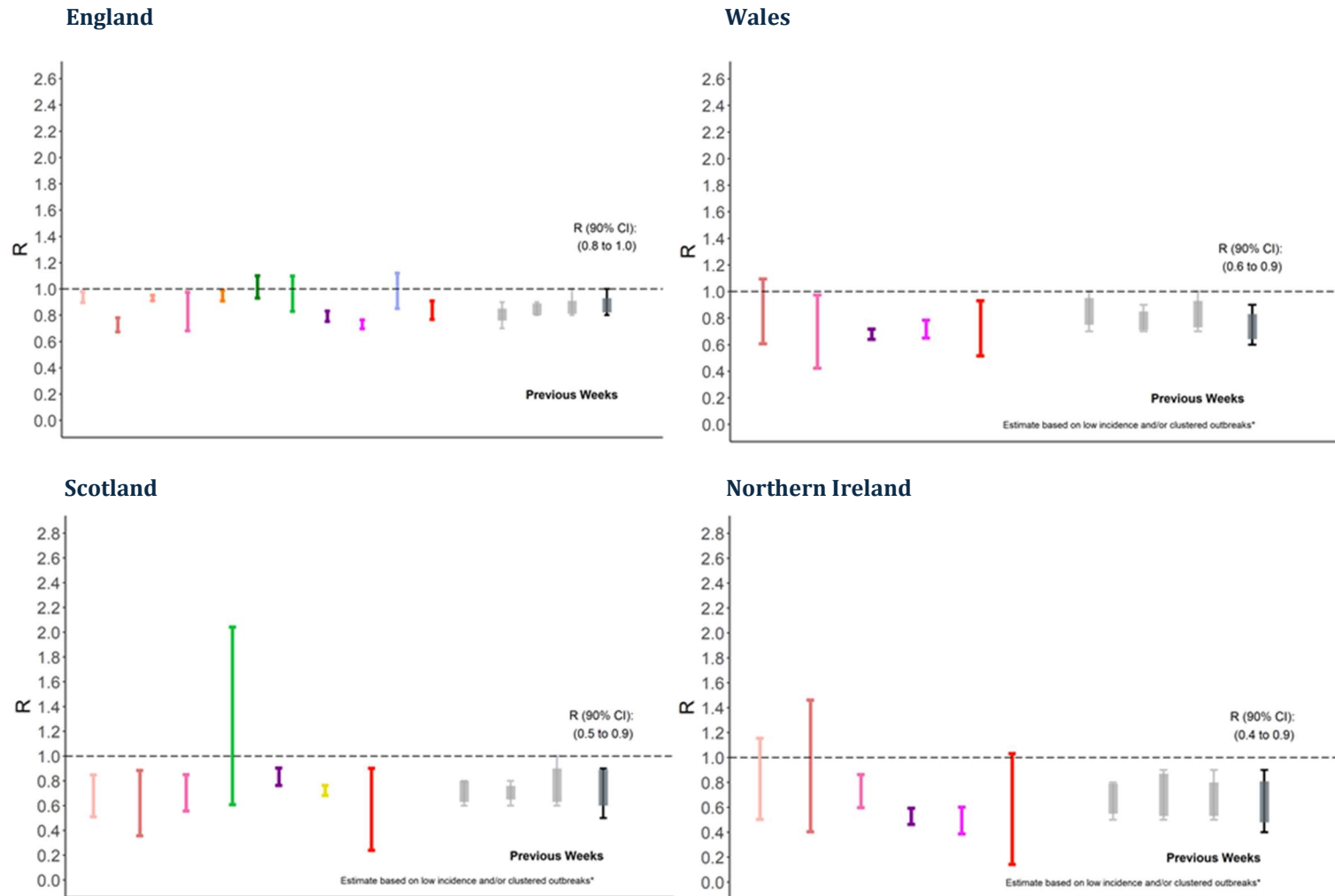
**Figure 3:** SPI-M groups estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different modelling groups. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.
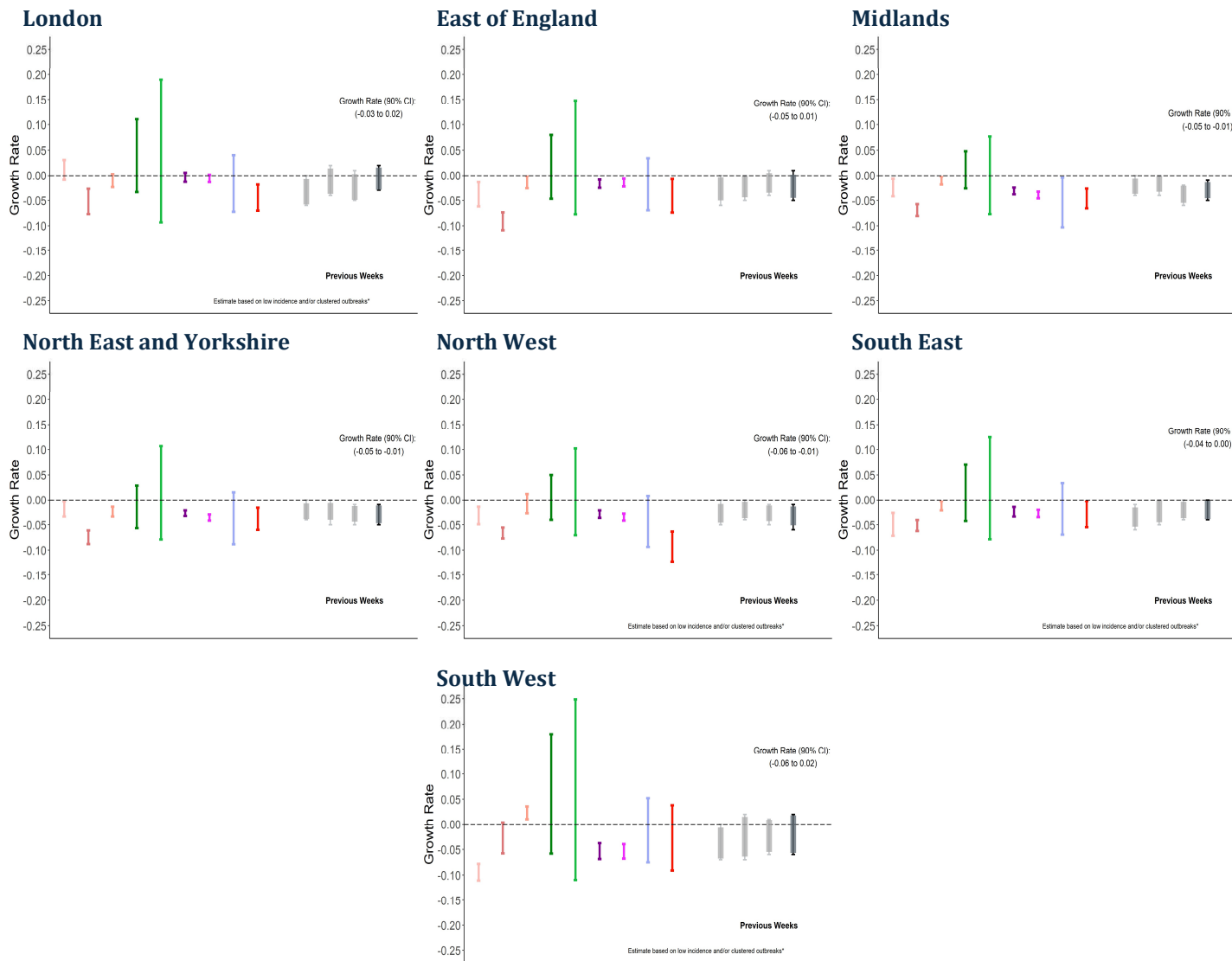
**Figure 4:** SPI-M groups estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.