

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

Date: 29th July 2020

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

Summary

1. SPI-M-O's best estimate for **R in England is between 0.8 and 1.0**. However, estimates of R always rely on lagged data. Models that use pillar 2 testing data, a likely leading indicator for changes in transmission, suggest higher values for R in England and several of its regions than those models using more lagged indicators, such as the number of deaths. The increasing proportion of pillar 2 tests returning a positive result over the past two weeks also supports this. As a result, **SPI-M-O do not have confidence that R is currently below 1 in England**.
2. SPI-M-O's best estimate for **the UK is that R is between 0.8 and 0.9**. 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.
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 -4% and -1% per day**. Care should be taken when interpreting R and growth rate estimates for the UK. This figure masks wide variation in the number of cases and pattern of how this is changing in different parts of the country, and as with the estimate for England, is lagged behind current transmission.
4. **Care should also be taken when interpreting the R and growth rate estimates for Scotland, Wales, Northern Ireland, East of England, London, North East and Yorkshire, North West 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. 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.

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 is between 0.8 and 0.9**. The previous three consensus estimates of R have been included to show the trend in the estimates.
8. SPI-M-O **do not have confidence that R is *currently* below 1 in England**. Models that use pillar 2 testing data, a likely leading indicator for changes in transmission, suggest higher values for R in England and several of its regions than those models that use more lagged indicators, such as deaths. The increasing proportion of pillar 2 tests returning a positive result over the past two weeks also supports this.
9. **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 that underpin SPI-M-O models and therefore nor in SPI-M-O's consensus estimates of R.**

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 the growth rate per day in the UK is between **-4% to -1% per day**. SPI-M-O's agreed national estimates of growth rate are summarised in **Table 1**.
12. Rounding and differences between the models used in the combinations account for differences between estimates of R and growth rates. Such variation highlights the importance of applying judgement when using on these metrics rather than relying solely on their values.

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 λ at small values of t .

Regional variation

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

15. 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.
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, East of England, London, North East and Yorkshire, North West, and South West**. This is because these estimates are based on low case numbers and / or clustered outbreaks. SPI-M-O does not have confidence that these regional R estimates are sufficiently robust to inform regional policy decisions.
17. Care should also be taken when interpreting the R and growth rate estimates for the UK. This figure masks wide variation in the number of cases and pattern of how this is changing in different parts of the country.

Incidence

18. Combined estimates from four SPI-M models give a 90% confidence interval of **1,000 – 3,000 new infections per day** in England.
19. Data from the ONS swabbing survey for the most recent week of the study (20th to 26th July) estimates that an average of **35,700 people** were positive for SARS-CoV-2 in the community in England (confidence interval 23,700 to 53,200). The study also estimates that during the same week, there were **4,200 new infections per day, with a confidence interval of 2,200 to 8,100**. Although the ONS survey can directly estimate incidence, it is based on a very small number of positive tests.

Annex: PHIA framework of language for discussing probabilities

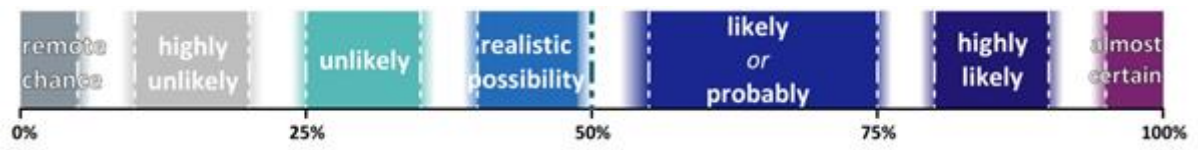


Table 1: Combined estimate of R and the growth rate in the UK, four nations and English NHS regions (90% confidence interval)

Nation	R	Growth rate per day
England	0.8 – 1.0	-4% to -1%
Scotland*	0.6 – 0.9	-11% to -3%
Wales*	0.7 – 0.9	-8% to -1%
Northern Ireland*	0.4 – 1.2	-13% to -3%
UK†	0.8 – 0.9	-4% to -1%

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

*Care should be taken when interpreting these estimates as they are based on low incidence 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 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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UK

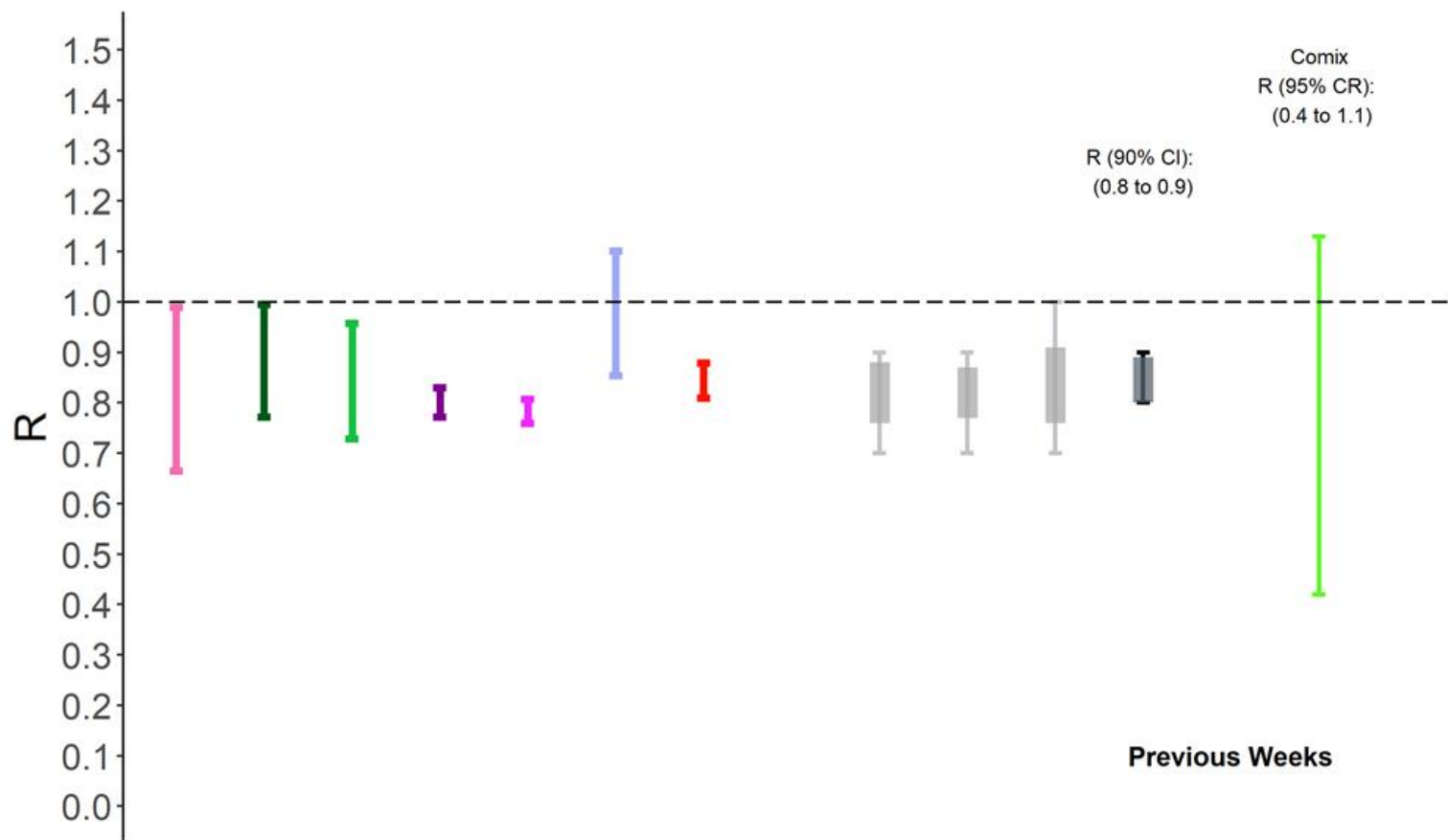


Figure 2: SPI-M groups estimates of median R in the four nations of the UK, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

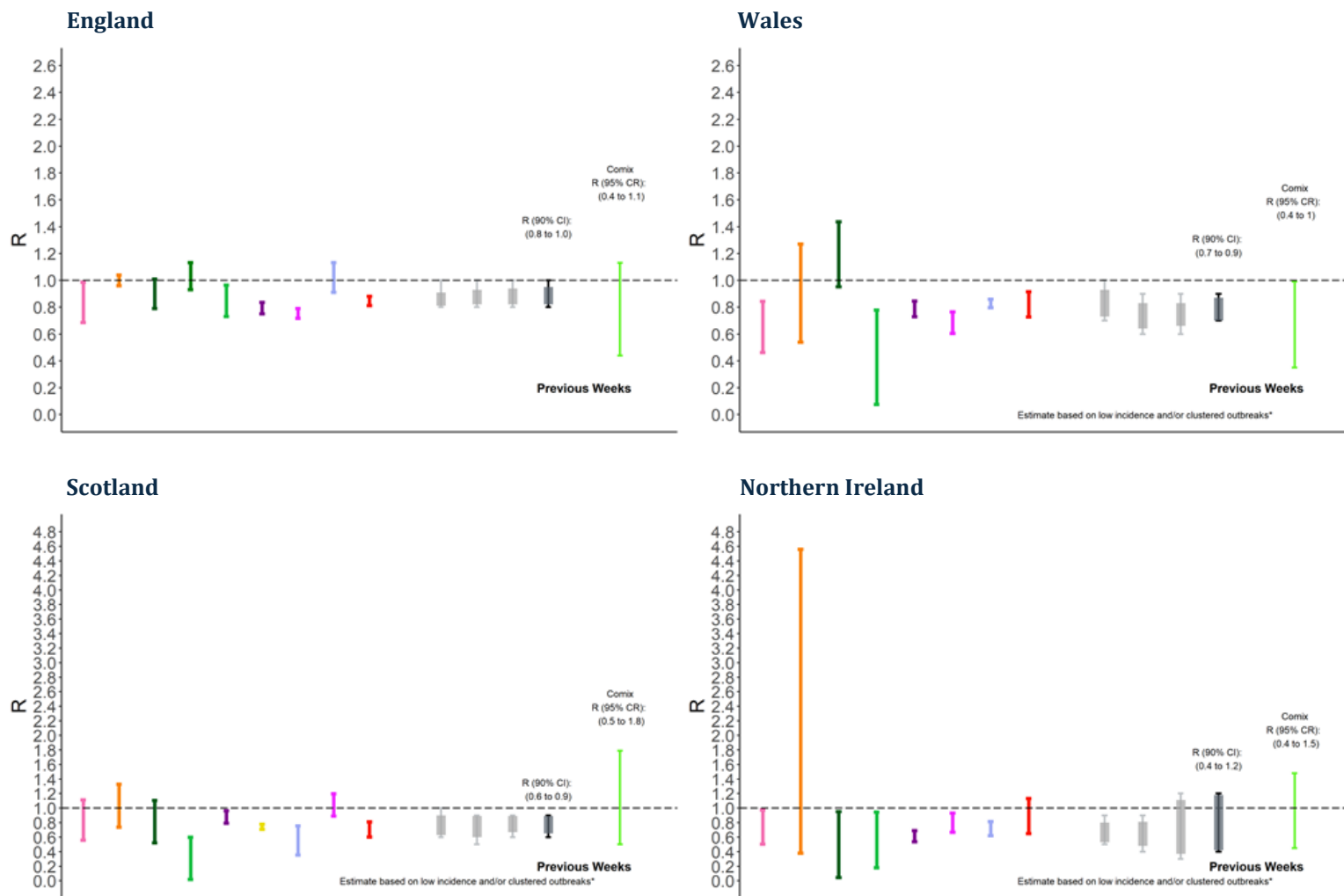


Figure 3: SPI-M groups estimates of the growth rate in NHS England regions, including 90% confidence intervals. Bars represent different modelling groups. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 2 decimal places.

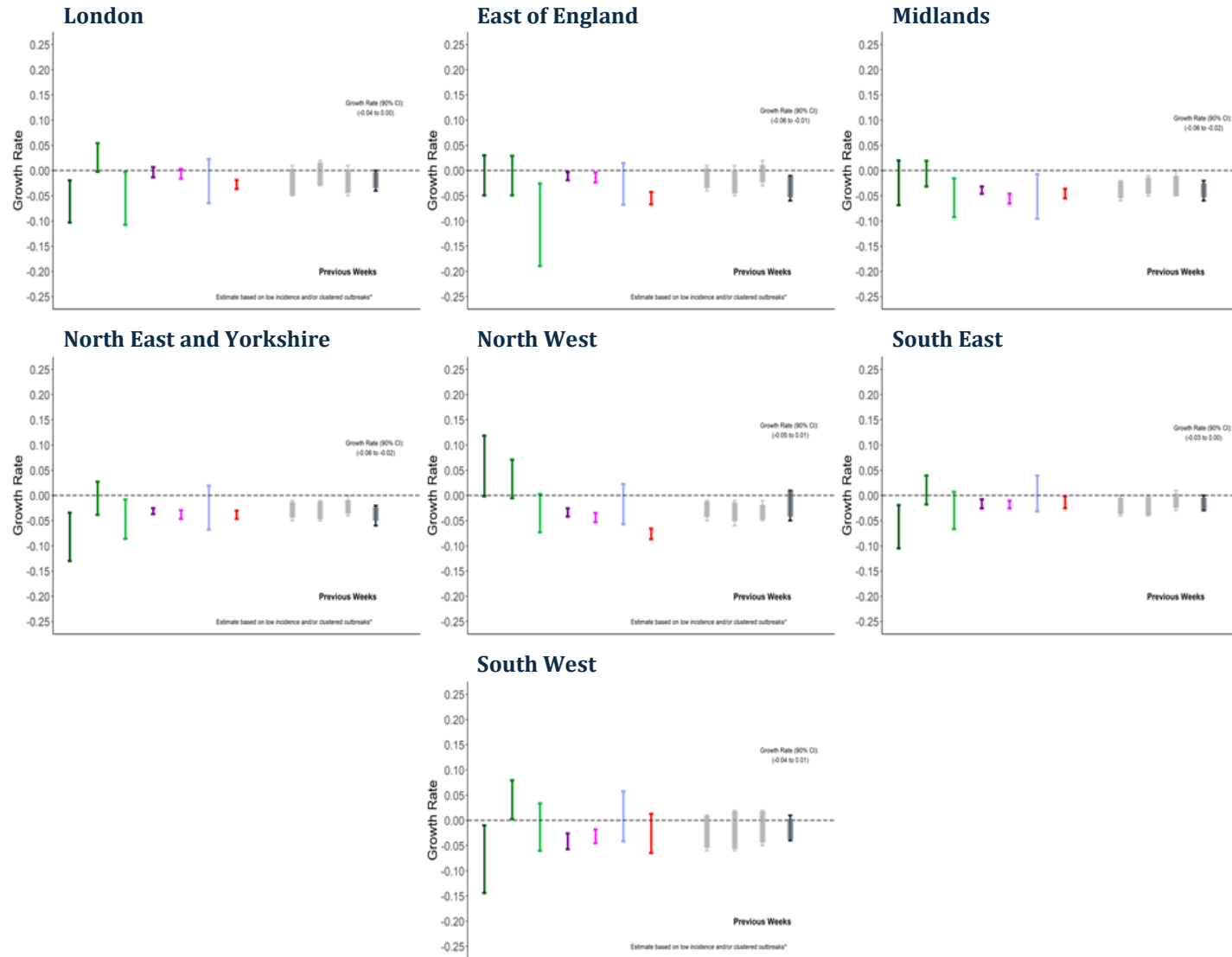


Figure 4: SPI-M groups estimates of median R in the NHS England regions, including 90% confidence intervals. Bars represent different independent estimates. The grey shaded areas represent the combined numerical range and the black bars are the combined range after rounding to 1 decimal place.

