Rapid response to:

Notes to accompany the report from the impact of interventions Task and Finish Group of SAGE: The UK's 4 nations' autumn interventions (update 26th Nov).

Summary

There are two inconsistencies in this report:

- The assumption that SAGE/ SPI-M's R estimates are a key indicator is misguided (see below)
- The assumption that R is not available at a local authority level is wrong

Recommendations

These inconsistencies speak to two recommendations

- The **scientific consensus** that undergirds epidemiological estimates **should be widened**
- Movements among tiers should be based upon **prospective estimates** of morbidity and demands upon the NHS – not **retrospective estimates** of the R-number

The status of SAGE/ SPI-M's R estimates

"When considering COVID risk to a region, the key indicators considered are rate of growth (as measured by SAGE/ SPI-M's R estimates) and the prevalence (as measured by the ONS infection survey)."

The SAGE/ SPI-M's R consensus estimates are based upon retrospective data and are weeks out of date, rendering them unfit for purpose when making time-sensitive decisions. This is clearly evident in the current report: when the prevalence of infection peaks, its rate of change is zero. At this point in time, the R number is exactly 1.

"South East The latest ONS infection survey data shows that prevalence peaked in the South East at 0.91%, (central estimate) on the 10th November."

"South West The latest ONS infection survey data shows that prevalence peaked in the South East at 0.76%, (central estimate) on the 7th November."

Therefore, in the South-East and West, the **R number was less than one on 13 November**. The **consensus estimates from SAGE/SPI-M were substantially greater than one**.

"Date South East South West

13th Nov 1.2-1.4 1.2-1.4"

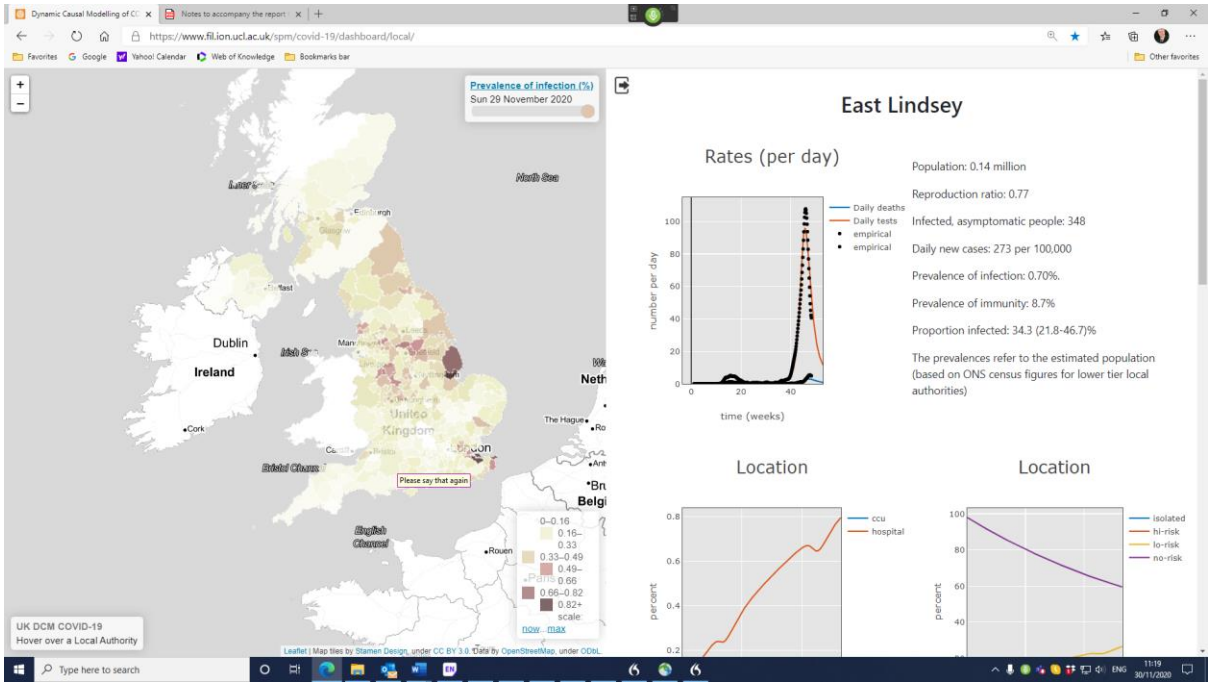
It is worrying that this has not been noted by SAGE/SPI-M.

Consensus estimates versus data assimilation

"The ONS and SAGE/SPI-M's estimate of R are used since they are considered highly robust indicators and are both available on a regional level and are preferred to e.g. KCL/ZOE data which is self-reported and not adjusted for demographics.

R and prevalence are not available on a sub-regional level so case rates by local authority, and by age band are used as a proxy, although numbers may be affected by changes in the number of tests performed."

SAGE/SPI-M's estimate of R are clearly not robust. Furthermore, robust estimators are available (using state-of-the-art variational procedures) that **assimilates both ONS data and KCL/ZOE** data to provide demographic adjusted estimates of R the level of local authorities. See example below (from the following dashboard):



Recommendations (1): widening the consensus of epidemiological estimates

- Prof Graham Medley, the chair of the SPI-M, should be asked to comment on the inconsistencies between ONS prevalence data and SPI-M consensus estimates. In particular, the validity of the estimates should be evaluated retrospectively (i.e., compare the estimates issued on a particular date with *post hoc* estimates based upon subsequent prevalence data).

"Each of the models in the SPI-M SAGE subgroup is produced each week using different approaches… which is the best way of ensuring they are tested and examined before a consensus is reached.

They are receptive for feedback and challenge on the methodologies they use – that is a nature of academia – and will, I am sure, take into account proposals. Discover places and absolute premium on making sure that it has access to a diverse range of the most up-to-date scientific views."

Letter from the Prime Minister to (28th of November 2020) to The Right Honourable Mark Harper MP and Mr Steve Baker MP.

- To underwrite the above commitment, Prof Graham Medley might want to engage other academics (for example Prof Tim Spector and Prof Karl Friston), whose estimates of the reproduction number differ markedly from the modelling groups that comprise SPI-M. There is no mechanism for feedback or challenge to the SPI-M at the current time.
- Alternatively, Prof Mike Cates (chair of the Royal Society's RAMP initiative) could be asked to evaluate the composition of the SPI-M.
- The implications of the failures of SPI-M consensus estimates of the reproduction number—for the impact of the tier system and national lockdowns—needs urgent review under an extended academic consensus.

Recommendations (2): movements among tiers should be based upon prospective estimates of morbidity and demands upon the NHS – not retrospective estimates of the R-number

- Quantitative criteria should be based upon **metrics that matter** for the consequences of tier restrictions (i.e., prevalence of infection in the over 60s, hospital admissions, et cetera), not retrospective summary statistics of past interventions (i.e., the R-number).
- These quantitative criteria could be made **available to the public** the form of a dashboard to underwrite engagement and transparency. These projections will ensure behavioural modification and preclude 'uncorking the champagne' reactions to various announcements.
- The dashboard (and associated press briefings) could be **updated on a regular basis, much like a weather forecast**, explaining how pre-emptive transitions are motivated. The five criteria should be available at the level of local authorities or NHS Trusts, where the data allow for accurate predictions several weeks into the future.