Seventy-second SAGE meeting on COVID-19, 10th December 2020
Held via Video Teleconference

Summary

1. R and growth rate estimates have increased for Wales and Northern Ireland, decreased in Scotland and remained constant for England compared to last week. The latest estimate of R for the UK is 0.9 to 1.0 and 0.8 to 1.0 for England, while the daily growth rate for new infections in the UK and England is -2% to 0%. Estimates of R for Scotland, Wales and Northern Ireland are 0.7 to 0.9, 0.9 to 1.2 and 0.8 to 1.1, respectively. SPI-M is not confident that R is less than 1 in Wales, or in some regions of England.
2. There is a marked increase in the rate of infection for those aged 12-16 in London. SAGE reiterated the importance of acting early where infection rates are increasing in order to manage the overall epidemic. As previously noted, evidence shows that the earlier and more rapidly interventions are put in place, and the more stringent they are, the faster the observed reduction in incidence and prevalence.
3. The outcome of relaxed measures over the festive period remains highly uncertain but there is likely to be an increase in transmission. Levels of transmission up until the period of relaxed measures are also highly uncertain. As noted at SAGE 71, modelling suggests there could be changes in the age distribution of infections over the festive period, specifically a slight shift towards a higher proportion of cases in older groups, which could lead to an increase in hospitalisations. Individual behaviours and the extent of household mixing over this period will have an overall impact on the transmission of SARS-CoV-2.
4. Whilst emerging data show that vaccines can offer good protection against disease, the degree of protection conferred against infection remains unknown. People who are vaccinated may still be able to become infected and to infect other people, though vaccination may reduce the risk. The impact of vaccination on the potential infectiousness of vaccinated people if they were to become infected is also currently unknown.
5. Initial modelling suggests it is critical to get extremely high vaccine coverage in the most vulnerable groups before non-pharmaceutical interventions (NPIs) are eased (or adherence to them drops) in order to limit the number of hospitalisations and deaths.
6. Different types of certificates (to show an individual is virus-free, has natural immunity or has been vaccinated) could lead to different behavioural responses. Pilot studies should be conducted to consider this, alongside ethical concerns, before the introduction of certification.

Situation Update

7. The R and growth rate estimates rely on lagged data and mask wide regional variation in the number of new infections. Latest estimates are based on data available up to 7th December and do not reflect the impact of the end of national restrictions in England or of the new tiers implemented from 2nd December.
8. R and growth rate estimates have increased for Wales and Northern Ireland, decreased in Scotland and remained constant for England compared to last week. The latest estimate of R for the UK is 0.9 to 1.0 and 0.8 to 1.0 for England, while the daily growth rate for new infections in the UK and England is -2% to 0%. Estimates of R for Scotland, Wales and Northern Ireland are 0.7 to 0.9, 0.9 to 1.2 and 0.8 to 1.1, respectively. SPI-M is not confident that R is less than 1 in Wales, or in some regions of England.
9. There have been small increases in R in some NHS England regions, including East of England, Midlands and the South West. Only R estimates for the North West of England

and the North East and Yorkshire are securely below 1. London, the East of England, and South East of England have upper bound R estimates above 1 (all 1.1). SPI-M is not confident that R is below 1 in these regions, and more recent data are consistent with epidemic growth.

10. Data show differing levels of nosocomial infection across the country, with increases particularly in the East of England. It remains important to implement infection control measures and to monitor levels of infection in healthcare workers.
11. There is a marked increase in the rate of infection for those aged 12-16 in London. SAGE reiterated the importance of acting early where infection rates are increasing in order to manage the overall epidemic. As previously noted, evidence shows that the earlier and more rapidly interventions are put in place, and the more stringent they are, the faster the observed reduction in incidence and prevalence.
12. Estimates from SPI-M using data up to 8th December suggest that there are between 34,000 and 50,000 new infections per day in England.
13. The ONS infection survey estimates that from 29th to 5th December an average of 481,500 people had COVID-19 in the community in England. The data do not include people in care homes, hospitals, or university halls of residence which SPI-M estimates do include.
14. SAGE considered medium-term projections covering a 3-week period rather than the usual 6-week period. This is because they are unlikely to be meaningful over the festive period, where there is a high degree of uncertainty about the trajectory of the epidemic. These projections are not forecasts or predictions. They represent a scenario in which the trajectory of the epidemic continues to follow the trends that were seen in the data up to the 7th December and reflect data collected while England was under national restrictions (5th November to 2nd December). It is likely the end of the national measures in England will have changed the trajectory.
15. The outcome of relaxed measures over the festive period remains highly uncertain but there is likely to be an increase in transmission. Levels of transmission up until the period of relaxed measures are also highly uncertain. As noted at SAGE 71, modelling suggests there could be changes in the age distribution of infections over the festive period, specifically a slight shift towards a higher proportion of cases in older groups, which could lead to an increase in hospitalisations. Individual behaviours and the extent of household mixing over this period will have an overall impact on the transmission of SARS-CoV-2.
16. SAGE considered preliminary findings from the Liverpool mass asymptomatic serial testing pilot. From 6th November to 9th December, 25% of the Liverpool population were tested. Evaluations of the pilot, including test sensitivity, logistics and communication were outlined in the paper. Cycle threshold (Ct) values broadly categorise the concentration of viral genetic material in a patient sample following testing by RT PCR. Although lateral flow testing is not as sensitive as PCR, detecting around 40% of PCR positive cases, for samples with a lower PCR Ct value (<25) the lateral flow tests were positive in around two-thirds of samples. This may mean that lateral flow testing can identify around two-thirds of the most infectious individuals. Several important lessons on operationalisation and other areas have been learnt from the Liverpool experience.
17. SAGE received a verbal update from ONS on the use of the household infection survey to measure infectiousness. A paper will be circulated in due course.

ACTION: SPI-B (Brooke Rogers) to review survey data on intentions over the festive period to understand if there are variations between demographic groups.

ACTION: ONS to circulate paper on use of household survey to measure infectiousness, ahead of discussion at SAGE next week.

ACTION: Susan Hopkins to provide an update on the establishment of the evaluation group for mass testing.

Potential Impacts of vaccines

18. SAGE considered a paper on early insights from vaccination modelling, and the impact of immunisation on the epidemic. There remains a high degree of uncertainty about this impact for a number of reasons.
19. Whilst emerging data show that vaccines can offer good protection against disease, the degree of protection conferred against infection remains unknown. People who are vaccinated may still be able to become infected and to infect other people, though vaccination may reduce the risk. The impact of vaccination on the potential infectiousness of vaccinated people if they were to become infected is also currently unknown. The extent to which a vaccine may reduce risk of infection, disease or onward transmission is likely to vary between vaccines and between different groups of people.
20. Other factors that will determine the overall impact of vaccines on the epidemic include: the choice of and adherence to non-pharmaceutical interventions (NPIs); behavioural factors around the vaccines (in both vaccinated and unvaccinated people); vaccine coverage; speed of rollout; and duration of protection. There remains uncertainty around all of these factors.
21. Initial modelling of some scenarios demonstrates that it is critical to get extremely high vaccine coverage in the most vulnerable groups before non-pharmaceutical interventions (NPIs) are eased (or adherence to them drops) in order to limit the number of hospitalisations and deaths.
22. To reach population level immunity from vaccination, coverage of the adult population would need to be very high and vaccines would need to be highly efficacious against infection and also transmission. Vaccine-induced immunity would need to either be long-lasting, or would require re-vaccination to maintain this population level immunity. If vaccines are not highly effective against infection and transmission then the epidemic would continue to spread in the absence of NPIs.
23. Relaxation of NPIs are policy decisions which need to balance different harms. Once the vaccine has been rolled out to the most vulnerable people, there will be some scope for partial relaxation of NPIs (or lower adherence to them) with less of an increase in direct COVID-19 health harms, but the extent of this is highly dependent upon the impact of vaccines on viral transmission. It should be reiterated that the epidemic will still spread by the time the most vulnerable are protected.
24. Vaccines will prevent more COVID-19 deaths if prevalence is kept low until a late stage of the vaccine rollout through maintenance of and adherence to NPIs (high confidence).

ACTION: SPI-M to amend paper 'Insights from early vaccination modelling' to respond to SAGE comments.

ACTION: SAGE Secretariat to arrange an initial meeting of the Vaccine Science Coordination Group as soon as possible and to organise a teach-in session if required.

Immunity, reinfection and certification

25. SAGE considered papers from NERVTAG and SPI-B on the biology of immunity in the context of potential certification, and the behavioural considerations of different use cases for certification.

26. Most people develop antibodies following SARS-CoV-2 infection. Following natural infection with SARS-CoV-2, current evidence indicates that short lived protection against further symptomatic infection is high, estimated at 99%; (93-100% 95% CI; high confidence). Protection against symptomatic infection typically lasts at least 3 months (high confidence) and possibly up to 6 months (moderate confidence). Protection against further asymptomatic infection is moderate, estimated at 57% (49-69% 95% CI; high confidence); i.e. asymptomatic reinfection can occur in a meaningful proportion of people. Protection against infectiousness (when reinfected) is uncertain; there is not currently enough evidence to address this.
27. Whilst certification from protection from disease for a period of 3 months or longer following RT-PCR confirmed SARS-CoV-2 infection may be possible, it should be recognised that a small proportion of people will not develop immunity, and certificates should not replace other measures to protect high-risk individuals (e.g. use of PPE or testing regimens) (high confidence). Individuals may still be infectious to others even if protected themselves from severe disease. Certificates based on a single lateral flow test or a single antibody test are not currently recommended due to the uncertainties around performance and interpretation of these tests.
28. Current evidence indicates there is protection from disease following vaccination (high confidence), but efficacy may vary for each individual vaccine. Different vaccines cannot be assumed to be equal. Data on duration of protection or against reinfection is currently limited for all vaccines.
29. Further data and work are required to understand viral load/infectiousness in reinfections, standardisation of antibody assays, and any sterilising immunity for vaccines (including with data from industry).
30. Different types of certificates (to show an individual is virus-free, has natural immunity or has been vaccinated) could lead to different behavioural responses. Public responses to certification, including if they are used as an incentive to be tested, may depend on what these certificates enable. There may be some adverse effects of certification, such as incentivising individuals to expose themselves to infection or providing false reassurance to engage in activities which lead to greater risk of exposure. Potential inequalities in the impacts of certification were also noted.
31. Further clarity is required on potential use cases for certificates, e.g. use in care homes to manage visits, accessing individual events or to prevent unnecessary repeat isolation following infection. There will be several ethical considerations as part of any certification discussion, depending on the use case.
32. Communication to the public on any certification policy will be important, with regards to what a test means in practice, particularly on individual safety and potential effect on others. Attitudes towards certificates can also vary between different groups. Certificates also should not imply that an individual has no risk, rather they have a reduced risk.
33. Given the limited evidence around the outcomes if certification is to be introduced, pilot studies should be conducted including consideration of ethical concerns.

ACTION: Cabinet Office and DHSC to work with SAGE secretariat to confirm policy questions requiring science advice on potential certification, including potential use cases to assess.

ACTION: SAGE Secretariat to coordinate a single updated paper addressing science questions on certification, with input from **NERVTAG, SPI-B** and **MEAG.**

Impact of children and schools on transmission

34. ONS provided an interim update on prevalence and transmission in children and schools, including data from the COVID-19 Infection Survey (CIS) and School Infection Survey (SIS).
35. Emerging SIS data and further ONS analysis continue to support the statement from SAGE 65 that "ONS data from 2 September to 16 October show no difference in the positivity rates of pre-school, primary and secondary school teachers and staff, relative to other workers of a similar age (medium confidence)".
36. While data show that children aged 12-16 continue to play a significantly higher role in introducing infection into households (i.e. being the index case) than those over 17, updated analysis suggests that their relative increased likelihood of this may have reduced. Preliminary analysis also suggests that while children are still more likely to be the first case in the household, they appear less likely to be infecting those aged 25 and over in the household.
37. These analyses and other emerging data will be considered in a consensus update to SAGE from the Children's Task and Finish group. This should consider any potential association between the prevalence in primary- or secondary-school teachers and children, as compared to the wider community, as well as any potential impact of measures such as bubbling or symptomatic isolation. Further analysis of the potential links between different infection control practices in schools and infection levels should be undertaken.

ACTION: Children's Task and Finish Group to review ONS and other data and provide an updated consensus view to SAGE on the 17th December.

List of Actions

SPI-B (Brooke Rogers) to review survey data on intentions over the festive period to understand if there are variations between demographic groups.

ONS to circulate paper on use of household survey to measure infectiousness, ahead of discussion at SAGE next week.

Susan Hopkins to provide an update on the establishment of the evaluation group for mass testing.

SPI-M to amend paper 'Insights from early vaccination modelling' to respond to SAGE comments.

SAGE Secretariat to arrange an initial meeting of the Vaccine Science Coordination Group as soon as possible and to organise a teach-in session if required.

Cabinet Office and DHSC to work with SAGE secretariat to confirm policy questions requiring science advice on potential certification, including potential use cases to assess.

SAGE Secretariat to coordinate a single updated paper addressing science questions on certification, with input from **NERVTAG, SPI-B and MEAG**.

Children's Task and Finish Group to review ONS and other data and provide an updated consensus view to SAGE on the 17th December.

Attendees:

Scientific Experts (36): *Patrick Vallance (GCSA), Chris Whitty (CMO), Andrew Morris (HDR UK), Angela McLean (MoD CSA), Brooke Rogers (KCL), Cath Noakes (Leeds), Charlotte Watts (FCDO CSA), Fliss Bennee (Technical Advisory Cell, Wales), Graham Medley (LSHTM), Ian Boyd (St Andrews), Ian Diamond (ONS), Iain Bell (ONS), Iain Buchan (Liverpool), Ian Young (NI, CSA for Health), James Rubin (KCL), Jenny Harries (dCMO), Jeremy Farrar (Wellcome), Jim McMenamin (Health Protection Scotland), John Edmunds (LSHTM), Julia Gog (Cambridge), Kamlesh Khunti (Leicester), Maria Zambon (PHE), Mark Walport (UKRI), Mark Wilcox (NHS), Michael Parker (Oxford), Peter Horby (Oxford), Stephen Powis (NHS England), Wendy Barclay (Imperial), Yvonne Doyle (PHE), Nicola Steedman (Scotland), Harry Rutter (Bath), Rob Orford (Wales, Health CSA), Sheila Rowan (Scotland CSA), Sharon Peacock (PHE), Susan Hopkins (PHE/NHST&T), Theresa Marteau (Cambridge)*

Observers and government officials (20): *Paul Monks (BEIS CSA),* [redacted] *Julian Fletcher (CO),* [redacted] *Phil Blythe (DfT CSA),* [redacted] *Carole Mundell (FCDO CSA), James Benford (HMT), John Aston (HO CSA), Rupert Shute (HO CSA), Andrew Curran (HSE CSA), Anna Seale (JBC), Alan Penn (MHCLG CSA), Ben Warner (No.10), Laura Gilbert (No.10),* [redacted]

Secretariat (all GO-Science) (18): *Stuart Wainwright, Simon Whitfield,* [redacted] *Crystal Moore,* [redacted]

Total: 74