Seventy-third SAGE meeting on COVID-19, 17th December 2020
Held via Video Teleconference

Summary

1. A new variant of SARS-CoV-2 has been identified in the South-East of England, with an N501Y and other mutations. There are indications that this variant may be spreading more quickly than others but the extent of any increase in transmissibility is not yet known. There is no evidence to suggest any difference in severity of disease in infected people, or any difference in Ct values. Work is underway to better understand this variant and implications for transmission, immunity and testing.
2. R and growth rate estimates have increased in all areas of the UK. The latest estimate of R for the UK is 1.1 to 1.2 and 1.1 to 1.3 for England. Estimates of R for Scotland and Northern Ireland are both 0.9 – 1.1, and for Wales is 1.0 – 1.3. This will be an underestimate for Wales as there was a delay in reporting around 11,000 positive tests which are therefore not reflected in the estimate.
3. It is concerning that case rates are continuing to rise in areas that have been in Tier 3 since the relaxation of national measures. Additional interventions may need to be considered (or there needs to be an increase in adherence to existing measures) in such places in order to keep R below 1.
4. Nosocomial infection across England has steadily increased throughout October and November, which is a significant concern. This will lead to onward transmission within the community and will worsen overall mortality.
5. There is a risk that changes in behaviour will offset the benefits of vaccination, particularly in the early months of vaccine rollout. In the absence of relevant evidence on the impact of the vaccine roll-out on protective behaviours of those vaccinated and those not vaccinated, the nature and scale of any impact is unknown. Mitigating actions for any decline in adherence related to vaccine roll-out should include: a culturally tailored communication strategy; monitoring of vaccine status and vaccine-related beliefs and behaviours alongside existing monitoring of adherence; and developing a system of rapid alerts to allow timely intervention if adherence starts to fall. Plans for intervention should be worked up in advance of need.
6. There is significant risk that vaccine uptake for COVID-19 will be lower among minority ethnic groups, mainly related to trust in vaccine safety and efficacy. Interventions need to be tailored to the differing needs of different population groups. Vaccine offers and endorsements from trusted sources and involvement of local health professionals (including addressing vaccine hesitancy in some health professionals), are likely to support trust and vaccine engagement. Practical support may also be necessary.
7. Evidence is consistent with transmission occurring amongst school children when schools are open, particularly in those of secondary school age (high confidence). Data sources indicate that half-term led to a reduction in transmission in children and that transmission rates picked up again in many places when schools reopened following half-term (medium confidence). Analysis of ONS data to 2 December still indicates a higher role of those aged 12-16 in introducing infection into households than those 17 and over (medium confidence). Data for school staff shows no evidence of difference in the rates of teachers/education workers testing positive for SARS-CoV-2 compared to key workers and other professions (medium confidence).

Situation Update

8. SAGE received a verbal update from NERVTAG on the new variant which has been identified in the South-East of England, with the N501Y and other mutations including

deletions in the spike protein at positions 69-70. There are indications that this variant may be spreading more quickly than others, with it making up an increasing proportion of cases in the Lighthouse Lab at Milton Keynes, but the extent of any increase in transmissibility is not yet known. A variant in Wales with the N501Y mutation, but which differs in other ways, does not currently seem to be spreading more quickly than other variants. There is no evidence to suggest any major difference in severity of disease in infected people, or any difference in Ct values. Work is underway to determine whether test sensitivity (e.g. for antigen testing) differs for this variant (certainly some PCR primers will miss it), and to better understand the duration of viral shedding. It is not yet known if there is any impact on antibody recognition.

9. R and growth rate estimates rely on lagged data and mask wide regional variation in the number of new infections. These estimates are based on the latest data available up to 14th December. R and growth rate estimates have increased in all areas of the UK, compared to last week. The latest estimate of R for the UK is 1.1 to 1.2 and 1.1 to 1.3 for England. Estimates of R for Scotland and Northern Ireland are both 0.9 – 1.1, and for Wales is 1.0 – 1.3. This will be an underestimate for Wales as there was a delay in reporting around 11,000 positive tests which are therefore not reflected in the estimate.
10. The epidemic is growing in much of England and the East of England, London, and the South East now have R estimates well above 1. Spatial analysis of patterns of epidemic spread identifies a unique geographical cluster in the South East around Kent. While it is not yet possible to determine the extent to which the newly identified variant is a contributing factor to this, the rate of transmission in this area is a cause for concern. All other regions have R estimates above or spanning 1.
11. It is still too early to see the full impact of the new tiers system in England in these estimates, implemented from 2 December, and it will take longer for these impacts to flow into hospitalisation and death data. Nonetheless, the models are indicating increased transmission in England since the changes on the 2 December 2020. The marked increase in R following these changes may indicate that the November restrictions did not interrupt transmission chains to the same extent as measures taken in the first wave. This is the case for Tier 2 measures.
12. It is concerning that case rates are continuing to rise in areas that have been in Tier 3 since the relaxation of national measures. Additional interventions may need to be considered in such places in order to keep R below 1 as per previous SAGE advice.
13. Scenario modelling for the weeks either side of the festive period show great uncertainty in the medium-term trajectory of the epidemic. The full effect of the festive period will not be apparent until January. Even a short period of epidemic growth could lead to the number of new hospital admissions in early January 2021 exceeding the peak of the first wave.
14. Data considered by SPI-M shows that nosocomial infection across England has steadily increased throughout October and November. This is supported by CO-CIN analysis. This will lead to onward transmission within the community and will worsen overall mortality. Measures to limit aerosol transmission should be considered as part of infection prevention and control. It will be important to understand the epidemiology of spread amongst healthcare workers.
15. Vaccinations are now being delivered within hospital settings. Continued nosocomial infection may affect the interpretation of vaccine efficacy in patients and staff. Care should be taken when using hospital settings for vaccination.
16. CO-CIN analysis shows in-hospital mortality rates plateauing after having reduced for several months, when modelled across all patients. However, when considering only those patients with an outcome (i.e. death or discharge), there is a recent increase in the rate. The patients needing the highest level of care have not seen the same

reduction in mortality rate over time. It was also noted that mortality is increasing for the most severe cases across Wales.

17. COG-UK provided a paper on the University of Cambridge genomic analysis of early SARS-CoV-2 infections amongst students during the first five weeks of term, starting in October 2020. It identified limited transmission between university students and the local community. Outbreaks were largely restricted to individual colleges, where cessation of onwards transmission suggests successful intervention. It is unclear how generalisable the findings are to the wider UK student population, due to the atypical nature of the university.

ACTION: NERVTAG to review latest evidence on new variant of SARS-CoV-2 on 18 December, and to report back to GCSA and CMO to agree next steps.

ACTION: Cath Noakes to discuss with Hospital Onset COVID-19 infection working group potential approaches to identifying and limiting airborne transmission in hospitals and provide advice to the NHS through that group as required.

ACTION: Mark Wilcox and **Angela McLean** to identify what work is underway to identify and monitor transmission in healthcare workers and assess whether there are any research gaps which need to be addressed.

ACTION: SAGE secretariat to arrange a small group meeting on 21 December to consider what further NPIs may need to be considered if Tier 3 measures prove insufficient; Fliss Bennee to circulate relevant paper from Wales.

Vaccines

18. There is limited evidence relating to possible changes of behaviour associated with vaccine rollout. Surveys conducted during the pandemic and evidence from previous vaccination campaigns suggest that, in the absence of mitigation policies, some of those vaccinated show a reduction in personal protective behaviours (medium confidence).
19. There is a risk that changes in behaviour could offset the benefits of vaccination, particularly in the early months of vaccine rollout. In the absence of relevant evidence on the impact of the vaccine roll-out on protective behaviours of those vaccinated and those not vaccinated, the nature and scale of any impact is unknown.
20. Evidence shows there are different levels of adherence to rules and guidance by different sectors of society, and that strategies aimed at influencing behaviour are more effective when co-produced and targeted (medium confidence).
21. Mitigating actions for any decline in adherence related to vaccine roll-out should include: a culturally tailored communication strategy; monitoring of vaccine status and vaccine-related beliefs and behaviours alongside existing monitoring of adherence; and developing a system of rapid alerts to allow timely intervention if adherence starts to fall (interventions should be planned in advance of need). Vaccination appointments may be an important point at which to deliver messages about the importance of continuing to adhere to guidance and rules.
22. There is a significant risk that vaccine uptake for COVID-19 will be lower among minority ethnic groups. Barriers to uptake must be understood and addressed within the COVID-19 vaccination programme (high confidence).
23. Primary care data analysed by QResearch indicates that, for several vaccines, Black African and Black Caribbean groups are less likely to be vaccinated (50%) compared to White groups (70%). Recent UK Household Longitudinal study data (collected 3 weeks ago) shows overall high levels of willingness (82%) to take up the COVID-19 vaccine. However, marked differences existed by ethnicity, with Black ethnic groups the most

likely to be COVID-19 vaccine hesitant (28% reporting intention to vaccinate), followed by the Pakistani/Bangladeshi group. Other White ethnic groups (which include Eastern European communities) also had higher levels of COVID-19 vaccine hesitancy than White UK/White Irish ethnicity (high confidence).

24. The main barrier to vaccine uptake among minority ethnic groups presented relates to trust and confidence in vaccine safety and efficacy, with historical issues of unethical health research particularly affecting Black communities. Additional cited barriers include lower perceived risk, access barriers and inconvenience, sociodemographic context and lack of endorsement by trusted providers and community leaders.
25. Interventions need to be tailored to the differing needs of different population groups. Meaningful community engagement is necessary, and there is need for multilingual, non-stigmatising communication, which addresses religious and cultural concerns, and involves key decision-makers within groups. Vaccine offers and endorsements from trusted sources and involvement of local health professionals (including addressing vaccine hesitancy in some health professionals), is likely to support trust and vaccine engagement. Practical support may also be necessary.
26. Monitoring and evaluation systems should be developed and implemented to inform interventions, with the ability to access real-time data on uptake so interventions can be adapted accordingly.

ACTION: SAGE secretariat, CO and **DHSC** to identify the appropriate audience for a teach-in on behaviours and communication around vaccines, behaviours and NPIs; SPI-B and the ethnicity subgroup to deliver this teach-in.

ACTION: Vaccine Science Coordination Group to discuss how to develop and embed monitoring systems and provide advice to DHSC and NHS as required.

Direct and Indirect Impacts of COVID-19 on Excess Deaths and Morbidity – addition of counterfactual scenario

27. An updated paper looking at the Direct and Indirect Impacts of COVID-19 was presented which includes a comparison against a counterfactual scenario, following an action from SAGE 69. The paper also contains updated estimates relating to elective care, alongside more recent OBR forecasts to support the analysis of economic harms.
28. The counterfactual, provided by SPI-M, considers one possible scenario where there is little or no government intervention. Whilst epidemiologically possible, this counterfactual does not represent a plausible future scenario as no intervention is not government policy. The counterfactual is one of many possible scenarios.
29. The health impacts of the counterfactual are compared with a plausible Winter Scenario contained in the paper over a 3-month period between the end of December 2020 and the end of March 2021. As would be expected the comparison shows that mortality from direct health impacts of contracting COVID-19 and impact of insufficient critical care capacity over the period are significantly higher in the counterfactual scenario of little or no intervention. Over the same period wider population harms are not estimated due to the uncertainty in quantifying the behavioural response (particularly understanding the degree of voluntary social distancing which might occur). If the time period over which the two scenarios are compared were longer, it is likely direct COVID-19 harms would be greater than the estimates presented.
30. There is a high degree of uncertainty around many of the point estimates. Whilst there are challenges in making comparisons to the counterfactual over a longer time period, and in quantifying wider population impacts of the counterfactual through a QALY

framework, it was agreed that there would also be benefit in addressing these issues qualitatively in the paper where possible.

ACTION: ONS, with input from **John Aston,** to update the paper to better reflect uncertainties, and provide a qualitative description of health and longer-term impacts relating to the counterfactual. **ONS** to develop a short narrative summary of the paper.

Impact of children and schools on transmission

31. Subject to changes agreed at the meeting, SAGE endorsed the update from the Children's Task and Finish Group to previous advice on children, schools and transmission discussed at SAGE 65 and SAGE 72.
32. Overall, evidence is consistent with transmission occurring amongst school children when schools are open, particularly in those of secondary school age (high confidence). Multiple data sources indicate that half-term led to a reduction in transmission in children and that transmission rates picked up again in many places when schools reopened following half-term (medium confidence); there is uncertainty about the size of this effect. Analysis of DfE attendance data indicates that reported cases in students increased across all tiers during the first two weeks of national restrictions, particularly in secondary schools (medium confidence). It remains difficult to quantify the level of transmission taking place specifically within schools compared to other settings.
33. ONS COVID-19 Infection Survey (CIS) data to 12 Dec 2020 show the rates of those testing positive for SARS-CoV-2 continue to be highest in secondary school age (11/12 to 15/16 years) children in England; REACT-1 data between 13 Nov – 3 Dec also show the highest prevalence in children aged 13-17 years. Recent ONS CIS data show a marked increase in the positivity rate in secondary school aged children in London, rising to over 4% over the fortnight to 12 December 2020 (high confidence).
34. Analysis of ONS data to 2 December still indicates a higher role of those aged 12-16 in introducing infection into households than those 17 and over (medium confidence).
35. Analysis of ONS CIS data from 2 Sept-16 Oct combining different categories of school staff shows no evidence of difference in the rates of teachers/education workers testing positive for SARS-CoV-2 compared to key workers and other professions (medium confidence).
36. Early results from the School Infection Study (SIS) show that, even with testing, there are low levels of infection in staff and pupils attending school, suggesting that mitigation measures in schools are having an effect. As those included in the SIS study are in school, these figures will reflect the levels of infection without clear symptoms only (as symptomatic individuals should not be attending).
37. Preliminary SIS data shows varied implementation of different mitigations in schools. Further analysis of the link between different practices and infection levels needs to be undertaken.
38. Further work and modelling should be undertaken looking at the potential impact of further mitigations in schools for use over a longer period, as well as the contribution of children and teachers to wider transmission, and options/uncertainties in the longer-term.

ACTION: Children's Task and Finish Group, ONS and **SPI-M** to make the evidence on transmission related to schools being open clear, and to agree and continue work on testing, mitigation options, and modelling potential impacts of these.

ACTION: Osama Rahman and **NHSTT** to determine whether data collected by schools including on bubble closures is collected centrally and used.

ACTION: JCVI to outline modelling requirements on immunisation in schools for SPI-M.[1]

Use of household survey to measure infectiousness

39. Cycle threshold (Ct) values broadly categorise the concentration of viral genetic material in a patient sample following testing by RT-PCR (with higher Ct values corresponding to lower concentrations). Initial analysis from ONS Covid-19 Infection Survey (CIS) data up to 7 December showed that positive tests with high Ct values (>25) do not cluster with other positive tests (with either high or low Ct values).
40. This suggests that they are not associated with transmission-type patterns meaning these people may be less infectious to others than those whose tests have a low Ct value. Some caution is required with this finding, as higher Ct values were observed during the summer when other factors may have reduced within household transmission. However, it would be in line with expert opinion which suggests a Ct value of below 25 seems to be associated with viable transmission.
41. This also supports the hypothesis that lateral flow testing (which is more likely to identify cases which have a low PCR test Ct value) is better at identifying more infectious individuals than it is at identifying infected but less infectious people.

List of Actions

NERVTAG to review latest evidence on new variant of SARS-CoV-2 on 18 December, and to report back to GCSA and CMO to agree next steps.

Cath Noakes to discuss with Hospital Onset COVID-19 infection working group potential approaches to identifying and limiting airborne transmission in hospitals and provide advice to the NHS through that group as required.

Mark Wilcox and **Angela McLean** to identify what work is underway to identify and monitor transmission in healthcare workers and assess whether there are any research gaps which need to be addressed.

SAGE secretariat to arrange a small group meeting on 21 December to consider what further NPIs may need to be considered if Tier 3 measures prove insufficient; Fliss Bennee to circulate paper from Wales on this subject.

SAGE secretariat, CO and **DHSC** to identify the appropriate audience for a teach-in on behaviours and communication, behaviours and NPIs; SPI-B and the ethnicity subgroup to deliver this teach-in.

Vaccine Science Coordination Group to discuss how to develop and embed monitoring systems and provide advice to DHSC and NHS as required.

ONS, with input from **John Aston,** to update the paper to better reflect uncertainties, and provide a qualitative description of health and longer-term impacts relating to the counterfactual. **ONS** to develop a short narrative summary of the paper.

Children's Task and Finish Group, ONS and **SPI-M** to make the evidence on transmission related to schools being open clear, and to agree and continue work on testing, mitigation options, and modelling potential impacts of these.

[1] Note added for clarification on 23rd December: JCVI requested support from SPI-M in modelling the hypothetical impact on transmission from immunisation of younger age groups, in the event that vaccines are shown to reduce transmission, as part of its work to consider prioritisation beyond the highest priority groups which it has already set out.

Osama Rahman and **NHSTT** to determine whether data collected by schools including on bubble closures is collected centrally and used.

JCVI to outline modelling requirements on immunisation in schools for SPI-M.[1]

Attendees:

Scientific Experts (41)*: Patrick Vallance (GCSA), Chris Whitty (CMO), Angela McLean (MoD CSA),Cath Noakes (Leeds), Charlotte Watts (FCDO CSA), Calum Semple (Liverpool), Fliss Bennee (Wales), Graham Medley (LSHTM), Ian Boyd (St Andrews), Ian Diamond (ONS), Iain Bell (ONS), Ian Young (NI), 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), Nicola Steedman (Scotland), Harry Rutter (Bath), Rob Orford (Wales, Health CSA), Sheila Rowan (Scotland CSA), Sharon Peacock (PHE), Susan Hopkins (PHE/NHST&T), Jeanelle de Gruchy (ADPH), Andrew Morris (HDR UK), Lucy Yardley (Bristol/Southampton), Russell Viner (RCPCH), Susan Michie (UCL), Wei Shen Lim (Nottingham), Vittal Katikireddi (Glasgow), Atiya Kamal (Birmingham),* [redacted] *Thomas House (Manchester)*

Observers and government officials (20)*: Paul Monks (BEIS CSA),* [redacted] *Julian Fletcher (CO), Phil Blythe (DfT CSA),* [redacted] *Dharmesh Nayee (HMT), John Aston (HO CSA), Jennifer Rubin (HO CSA), Rupert Shute (HO dCSA), Andrew Curran (HSE CSA), Alan Penn (MHCLG CSA), Daniel Kleinberg (Scotland), Gideon Henderson (DEFRA CSA),* [redacted] *Osama Rahman (DfE),* [redacted] *Robin Grimes (MoD Nuclear CSA),* [redacted]

Secretariat (all GO-Science) (22): *Stuart Wainwright, Simon Whitfield,* [redacted] *Crystal Moore,* [redacted]

Total: 83