Eighty-seventh SAGE meeting on COVID-19, 22 April 2021

Held via Video Teleconference

Summary

1. Variants other than B.1.1.7 currently make up around 2% of sequenced genomes in the UK where the variant can be determined. Many of these other variants have been identified through post-travel testing. The B.1.617.1 variant which is widespread in India and other parts of South Asia has been designated a Variant under Investigation by PHE.
2. SAGE noted again that, aside from the significant human and social costs, ongoing transmission in other countries continues to pose a threat to UK health, even when the epidemic is under control in this country and a high proportion of the population is vaccinated.
3. The most likely reasons for the competitive advantage of B.1.1.7 over older virus variants are a lower average infectious dose required to initiate infection (low confidence), and increased shedding of infectious virus, inferred from lower Ct values (low confidence).
4. There have been persistent differences in prevalence in different areas in England throughout the pandemic. The particular mix of risk factors in areas of enduring prevalence is complex, inconsistent across geographical areas, and difficult to disentangle. Workplaces and types of work may play some role and there is some association with areas with above average deprivation.
5. Ongoing baseline measures and sustained long-term behavioural change will be required to control a resurgence in infections. There are three main ways in which baseline measures can reduce transmission (from most to least effective):
    a. Reducing the likelihood that people who are infectious mix with others.
    b. For those potentially infectious people who are not isolated, reducing the likelihood that they enter higher risk settings or situations.
    c. Decreasing the transmission risk from a potentially infectious person in any given environment.
6. The most effective baseline measures, if adherence is good, are likely to be those which address the first of these objectives e.g., isolation of symptomatic people and those with a positive test (high confidence). There are some measures where there appears to be scope to have significantly more impact on transmission than is currently being achieved. For example, practical and financial support and enhanced communication around symptoms and when to take a test could improve rates of self-isolation.
7. As there is a move from rules to guidance and individual decision making, sustained behaviour change will also be required for measures to be most effective. Evidence from previous large behaviour change programmes (such as the UK's tobacco control strategy) suggests that sustained adoption of behaviours requires structural changes to the physical and social environment that results in changes in the approach taken by all sectors of society (high confidence).

Situation Update

8. R in England is between 0.8 and 1.0. For Scotland, Wales, and Northern Ireland, R is estimated to be between 0.7 and 0.9, 0.7 and 1.0, and 0.7 and 1.1 respectively.

These estimates will not yet reflect the impact of recent changes, such as those made in England on the 12th April.

9. There are currently estimated to be between 2,000 and 9,000 new infections per day in England. For the most recent week of the study (10th to 16th April), the ONS community infection study estimates that an average of 90,000 people had COVID-19 in the community in England (credible interval 75,900 to 105,700). These numbers are consistent with the previous modelling of scenarios for easing restrictions.
10. In London and the East of England, hospital admission figures are no longer clearly falling. The reasons for this are not clear, but there may be a link to nosocomial outbreaks. Mitigation measures in hospitals remain important. At relatively low levels of infections, the trends will be less consistent and will vary from week to week.
11. Lateral flow test positivity in schools in England increased over the period before Easter when schools were open (there may be differences in test usage and reporting between different groups). There was also a modest increase in positivity in school-aged children in the ONS's Community Infection Survey. This suggests that there was transmission in schools, which highlights the continued importance of mitigation measures.
12. The proportion of tests which are S-gene positive has recently been rising in some areas, notably in London. S-gene positivity is now an indication of infection with a variant other than B.1.1.7 (though cannot alone determine which variant) so monitoring changes in this proportion may offer early indications of transmission of potential new variants.
13. CO-CIN analysis shows that of those people who have been hospitalised and tested positive for COVID-19 after being vaccinated, the majority of these developed symptoms before immunity would be expected to have developed, with few developing symptoms more than 3 weeks post-vaccination (with at least a first dose). The data reflect both the benefits of vaccination and the reduction in exposure risk since January as prevalence has fallen. It will be important that people are encouraged to receive second doses to reduce the risk further.
14. Study of the immune response in vaccinated people who become infected with variants, and sequencing of testing samples would provide valuable information.

ACTION: Calum Semple to update the paper to reflect comments and consider the best way to communicate the complexity of the analysis to the public, and to follow up with NHSE, NHSTT and CMO on linking admissions, vaccination status and sequencing.

Update on variants including B.1.617

15. Variants other than B.1.1.7 currently make up around 2% of sequenced genomes in the UK where the variant can be determined. Many of these other variants have been identified through post-travel testing.
16. There are three clades in the lineage B.1.617. The B.1.617.1 variant which is widespread in India and other parts of South Asia has been designated a Variant under Investigation by PHE. There are currently 119 cases in the UK, all but 3 of which have been linked to travel.
17. B.1.617.1 has the L452R mutation which in other variants has been associated with an increase in transmissibility. In some places B.1.617.1 appears to compete effectively with B.1.1.7. This supports the hypothesis that it is more transmissible than wild-type variants (as B.1.1.7 is known to be more transmissible and has become dominant in other situations where other variants are present). There is a

theoretical risk of some degree of antigenic escape with B.1.617 based on some of the mutations present (low confidence). PHE is continuing to monitor this and other variants. B.1.617.2 seems to be growing in number as identified from travellers to the UK and this variant has lost the change at 484.

18. SAGE noted again that, aside from the significant human and social costs, ongoing transmission in other countries continues to pose a threat to UK health even when the epidemic is under control in this country and a high proportion of the population is vaccinated.

B.1.1.7 biology update

19. It is almost certain that the epidemiological growth rate of B.1.1.7 is higher than older variants in circulation. NERVTAG's assessment is that it is highly likely that this is a function of an increased risk of transmission per contact (increased infectiousness or transmissibility) rather than a decrease in the interval between successive cases in a chain of transmission (reduced serial interval).
20. Data suggest that the environmental survival of B.1.1.7 is not meaningfully different from other variants (moderate confidence).
21. The most likely reasons for the competitive advantage of B.1.1.7 over older virus variants are a lower average infectious dose required to initiate infection (low confidence), and increased shedding of infectious virus, inferred from lower Ct values (low confidence).
22. If a lower infectious dose is required to infect people, this could increase the importance of some mitigation measures, particularly mitigations against airborne transmission.

Common characteristics between areas of persistent transmission

23. There have been persistent differences in prevalence between areas in England throughout the pandemic. The particular mix of risk factors in areas of enduring prevalence is complex, inconsistent across geographical areas and difficult to disentangle. However, they are generally areas with higher deprivation than the England average (high confidence).
24. Some settings (e.g., the workplace) may serve to coalesce risk factors which can extend transmission networks to additional settings or communities (medium confidence). A focus on workplace interventions to support Covid-safer practices may be valuable. This could include pilot studies to test the impact of different financial support packages (medium confidence).
25. Further detailed work including continued engagement with Directors of Public Health may provide additional insights. It would be valuable to consider differences between areas where prevalence has been heterogenous and those where it has been more homogeneous, and to consider areas where prevalence has not been high despite risk factors.
26. In some areas there has been a much longer-term association with poorer health outcomes which have persisted despite changes in the populations in these areas. It would be valuable to understand better the factors underlying this both for the COVID-19 response and for public health more broadly.
27. PHE and HSE will continue to lead work on the reasons for differences between different areas, and link this to operational decision making where required.

ACTION: **SAGE Secretariat** to discuss, with the British Academy and Academy of Medical Sciences, the possibility of a piece of work to consider geographical factors associated with historically poorer health outcomes.

ACTION: **PHE** and **HSE** to form an operational group to continue to consider practical and implementation issues around identifying and addressing areas of persistent transmission.

Gathering sizes

28. Analysis of social contact survey data shows that large gatherings have a relatively small epidemiological impact overall and that small and medium sized groups between 10 and 50 people have a much larger impact on an epidemic. This is because people attend smaller gatherings more frequently than large ones. A significant proportion of transmission happens in relatively small groups in close contact (e.g., gatherings with family and friends).
29. This analysis was unable to account for the impact of some other risk factors associated with gatherings, particularly whether they are indoor or outdoor. Many large events are typically clusters of smaller gatherings coming together, and have other activities around them (e.g., travel, often using shared transportation) which increases the risk. It also does not account for the risk of importations of new variants into an area. This may mean that the risk associated with large events is not as low as suggested by this analysis.
30. These results demonstrate that as restrictions are removed, it is important to maintain focus on the safety of smaller gatherings which happen frequently, and not just on the comparatively infrequent meetings of very large numbers of people. It is particularly important to focus on the risk of gatherings indoors.

ACTION: SPI-M to consider whether data on indoor and outdoor contacts could be collected which would strengthen the analysis on gathering sizes, and to amend paper to clarify points raised.

Implementing long-term baseline NPIs and achieving long-term behaviour change

31. Ongoing baseline measures and sustained long-term behavioural change will be required to control a resurgence in infections. Another wave of infections would be expected to occur even if these reduce transmission by as much as 25% (high confidence). However, resurgence would be much higher without such baseline measures and behaviour change (high confidence).
32. Lifting restrictions may recreate the conditions for 'superspreader' events, both person-driven (one highly infectious, but possibly asymptomatic, person going to multiple places) and setting-driven (e.g., transmission at an indoor event with crowding and poor ventilation). Restrictions over the past year have limited the number of settings where superspreader events might occur. However, as greater numbers of people mix, the probability of superspreader events (infector being present) and their size (number of people who are available to be infected) will increase.
33. There are three main ways in which baseline measures can reduce transmission (from most to least effective):
    a. Reducing the likelihood that people who are infectious mix with others.
    b. For those potentially infectious people who are not isolated, reducing the likelihood that they enter higher risk settings or situations.

c. Decreasing the transmission risk from a potentially infectious person in any given environment.

34. There are several potential baseline measures available which can reduce transmission in each of these ways. The most effective, if adherence is good, are likely to be those which address the first of these objectives e.g., isolation of symptomatic people and those with a positive test (high confidence). There are also measures which could address the second objective (e.g., use of certification or "test to enter", partial home working), and the third objective (e.g., ventilation, face coverings).
35. There are some measures where there appears to be scope to have significantly more impact on transmission than is currently being achieved. For example, practical and financial support and enhanced communication around symptoms and when to take a test could improve rates of self-isolation.
36. A combination of all these approaches is likely to be needed, though implementation of some of them may vary by setting. Risk assessments which use the hierarchy of control approach are important in all settings for determining the most effective and practical approaches, but particularly in settings that are higher risk because of the environment and activities (such as nightclubs) and/or because of the vulnerability of the people within the setting (such as care homes).
37. It is important to recognise that risk factors do not have a simple additive effect because they interact, and that risks at the population level may be very different to those at an individual level. As such, neither risks nor mitigation measures can be considered in isolation.
38. It is difficult, if not impossible, to determine precisely which set of baseline measures and behaviour changes would result in the levels of transmission previously modelled (for example, which would create a 25% overall reduction in transmission). This is because the impact of different measures results from a complex interaction between physical, biological and behavioural factors.
39. As there is a move from rules to guidance and individual decision making, sustained behaviour change will also be required for measures to be most effective. Evidence from previous large behaviour change programmes (such as the UK's tobacco control strategy) suggests that sustained adoption of behaviours requires structural changes to the physical and social environment that results in changes in the approach taken by all sectors of society (high confidence).
40. Measures to promote behaviour change should adhere to some overarching principles, including ensuring that there is sustained investment, that interventions are flexible and can respond effectively to changes in level of risk, that interventions foster resilience at multiple levels (including individual, organisational, community and system level), and that measures reduce existing inequalities while not generating new inequalities.
41. Trials and other research methods should be used to gather evidence on baseline measures and behaviour change. This could include examining the effectiveness of individual measures or packages of measures, testing alternative versions of measures, looking at combinations of measures, and trialling different approaches to communications and messaging. Survey and other data on contacts and case transmission may also provide data on effectiveness after implementation. Mechanisms for monitoring, evaluation and research should be embedded within any framework of measures.

ACTION: SAGE Secretariat, subgroup chairs and **SPI-B** to review the papers on baseline NPIs and behaviour change, including risk and confidence assessments, before sharing with

Cabinet Office; **SAGE Secretariat** to consider most appropriate way to disseminate findings including to DAs.

ACTION: SPI-B to consider whether there are questions that would be valuable to add to ONS surveys.

List of actions

Calum Semple to update the paper to reflect comments and consider the best way to communicate the complexity of the analysis to the public, and to follow up with NHSE, NHSTT and CMO on linking admissions, vaccination status and sequencing.

SAGE Secretariat to discuss, with the British Academy and Academy of Medical Sciences, the possibility of a piece of work to consider geographical factors associated with historically poorer health outcomes.

PHE and **HSE** to form an operational group to continue to consider practical and implementation issues around identifying and addressing areas of persistent transmission.

SPI-M to consider whether data on indoor and outdoor contacts could be collected which would strengthen the analysis on gathering sizes, and to amend paper to clarify points raised.

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Attendees

Scientific experts (36): *Patrick Vallance (GCSA), Chris Whitty (CMO), Andrew Curran (HSE CSA), Angela McLean (MoD CSA), Calum Semple (Liverpool), Catherine Noakes (Leeds), Charlotte Deane (UKRI), Charlotte Watts (FCDO CSA), Christopher Dye (Royal Society), Fliss Bennee (Technical Advisory Cell, Wales), Graham Medley (LSHTM), Harry Rutter (Bath), Ian Boyd (St Andrews), Ian Diamond (ONS), Ian Hall (Manchester), Ian Young (NI CSA), James Rubin (KCL), Jeanelle de Gruchy (ADPH), Jeremy Farrar (Wellcome), Julia Gog (Cambridge), Kamlesh Khunti (Leicester), Maria Zambon (PHE), Mark Walport, Mark Wilcox (NHS), Meera Chand (PHE), Michael Parker (Oxford), Peter Horby (Oxford), Rob Orford (Health CSA Wales), Sharon Peacock (PHE), Sheila Rowan (CSA Scotland), Stephen Powis (NHS England), Susan Hopkins (PHE/NHST&T), Susan Michie (UCL), Wei Shen Lim (Nottingham), Wendy Barclay (Imperial), and Yvonne Doyle (PHE).*

Observers and government officials (27): *Alan Penn (MHCLG CSA), Andrew Morris (HDRUK),* [redacted] *Ben Warner (No.10), Catherine Huntley (DHSC), Christopher Williams (PHW), Daniel Kleinberg (Scottish Government),* [redacted]*, Gideon Henderson (Defra CSA), Giri Shankar (PHW), James Benford (HMT), Jennifer Rubin (HO CSA), Jim McMenamin (Health Protection Scotland), Julian Fletcher (CO),* [redacted]*, Liz Lalley (Welsh Government),* [redacted] *Matthew Sexton (JBC), Osama Rahman (DfE CSA), Paul Monks (BEIS CSA),* [redacted] *Phil Blythe (DfT CSA)* [redacted] *Rob Harrison (CO), Thomas Waite (JBC), Tom Rodden (DCMS CSA),* [redacted]

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

Total: 81