

Sixty-seventh SAGE meeting on Covid-19, 12th November 2020

Held via Video Teleconference

Summary

1. The latest estimate of R for the UK is 1.0 to 1.2 and for England is 1.1 to 1.2. Estimates from SPI-M suggest that there are between 55,000 and 81,000 new infections per day in England. These estimates rely on lagged data so will not fully reflect recent changes resulting from the national restrictions introduced in England on 5th November.
2. SARS-CoV-2 infections in mink have led to mutations in the virus. There is no evidence that the infection caused by the transmission of the mutated virus to humans is more severe, but the mutations could have some impact on the ability of antibodies to protect against infection (low confidence).
3. The human to mink transmission, and subsequent mutations within minks, raise concerns over how SARS-CoV-2 evolves in animal populations and how the virus could mutate in the future. There is a need for greater surveillance of animal populations and research into how SARS-CoV-2 mutations could affect humans. The risk is highest in intensively reared animals susceptible to SARS-CoV-2.
4. It is almost certain that prevalence will remain high in some parts of the country at the end of the current national restrictions. When policymakers plan transitions either from national measures to a localised tiered approach, or between tiers, consideration will need to be given to both prevalence and growth rates of new infections. It will also be important to consider a range of restrictions that are more stringent than those in the current baseline package of measures in tier 3 for potential use in some areas where tier 3 measures are not able to reduce prevalence.
5. SAGE reiterated that interventions should seek to prevent areas of low prevalence from becoming areas of high prevalence, as well as reducing prevalence where it is high. Evidence shows that the earlier and more rapidly interventions are put in place, and the more stringent they are, the faster the reduction in incidence and prevalence, and the less likelihood for the need for further national measures. Test and trace systems also work best at low levels of prevalence.
6. Any change to the duration of quarantine is most likely to increase adherence if accompanied by a comprehensive package of support and a communications campaign which clearly explains the rationale for changes. SAGE will consider whether transmission can be reduced by changing the length of isolation for contacts of an index case. It will also consider the effects of regular testing of contacts as an alternative to their isolation.

Situation Update

7. As previously noted, R and growth rate estimates rely on lagged data, mask wide regional variation in the number of new infections and cannot fully reflect recent changes in transmission that might have occurred in the past two to three weeks. This includes the national restrictions introduced in England on 5th November and recent changes in the devolved administrations. They should therefore be treated as an indication of the general trend. Given the increasingly varied approach in managing the epidemic, UK level estimates are less meaningful than previously.
8. The latest estimate of R for the UK is 1.0 to 1.2, while the daily growth rate estimate for new infections is +1% to +3%. The latest estimate of R for England is 1.1 to 1.2, while the daily growth rate estimate is +1% to +4%. This suggests a doubling time for new infections of 28 to 63 days in the UK, and 22 to 43 days in England, but there may be

variations across regions and age groups, specifically rates in older people which may be stabilising less quickly than rates in young adults.

9. Estimates of R for Scotland and Wales span 1 (0.8-1.1 and 0.9-1.2 respectively), and the estimate for Northern Ireland has decreased slightly (0.8-1.0).
10. While there is some evidence that the rate of growth of the epidemic is slowing in some areas of England, R remains above 1 in England, suggesting the epidemic has continued to grow. The consensus estimate of R in the North West of England spans 1 (0.9-1.1), while the lower bound of the estimated R range for London and the North East of England and Yorkshire is 1.
11. Estimates of R remain generally highest in regions of England where prevalence is lower. The prevalence in the North West, North East and Yorkshire remains very high and significant pressures on the healthcare system, and increasing mortality, will persist until R is brought below 1 and prevalence falls.
12. Changing patterns in testing continue to make it hard to interpret changes in confirmed case numbers. As testing becomes more locally-led, the application of Pillar 2 testing is varying more from place to place. As a result, it is very difficult to interpret changes in pillar 2 testing data in different parts of the country.
13. Estimates from SPI-M suggest that there are between 55,000 and 81,000 new infections per day in England.
14. The ONS infection survey estimates that from 31st October to 6th November an average of 654,000 people had COVID-19 in the community in England, with 47,700 new infections per day in England, which is a slight increase on the previous estimate. The data do not include people in care homes, hospitals, or university halls of residence.
15. SAGE noted progress on wastewater testing for SARs-CoV-2, which can be used to detect traces of the virus in sewage and therefore potentially provide an early warning of a local outbreak. Testing has been rolled out across several wastewater treatment sites in the UK, covering approximately 22 per cent of the population in England. SAGE will consider this further at a future meeting.
16. Current unpublished evidence suggests the Pfizer vaccine will have 90% efficacy based on a study of symptomatic cases (this will need confirmation when full data are available). JCVI has published interim guidance on vaccine prioritisation and will update after reviewing the latest evidence. SAGE noted the need for very effective pharmacovigilance, for both safety and efficacy. This could be linked to the NHS App and have direct input from individuals.

ACTION: SPI-M to update severity parameters, with input from ONS, NERVTAG and CO-CIN.

ACTION: Jonathan Van Tam/Vaccines Taskforce to provide OBR and HMT with an estimate of the rate at which vaccinations can take place to inform their forecasting.

Mink SARS-CoV-2 mutations

17. SAGE endorsed the NERVTAG paper '*SARS-CoV-2 variants that have been selected in mink*', Human Animal Infections and Risk Surveillance (HAIRS) group paper '*Qualitative assessment of the risk that SARS-CoV-2 infection in UK captive Mustelinae populations presents to the UK human population*', and Defra paper '*UK animal health response*'.

18. There have been outbreaks of SARS-CoV-2 in mink farms in Europe (Denmark, Netherlands and Spain) and in the USA. Countries with better surveillance are more likely to detect these outbreaks.
19. Evidence suggests that SARS-CoV-2 entered the mink population from humans (high confidence). The risk of such events is highest in intensively reared animals susceptible to SARS-CoV-2.
20. As the virus passes through farms, where mink are densely housed, mutations that enhance spread in mink can be selected. Mutations selected for in mink have passed back into humans as a result of human contact with infected mink. In Denmark there has been human to human transmission of the mutated virus.
21. There is no evidence that disease in humans caused by mink-adapted virus is more severe (moderate confidence).
22. Single mutations that confer mink adaptation do not increase transmission of the virus in humans, but viruses with combinations of mutations that have arisen during replication in mink has resulted in sustained community transmission in Denmark (moderate confidence).
23. The mutations of most concern are those in the spike protein of the mink-adapted SARS-CoV-2 isolates, which is the protein on the surface of the virus by which the virus attaches to its target cells' surface protein, ACE2. Antibodies that neutralise SARS-CoV-2 infectivity often target the interface between ACE2 and the spike, therefore there is concern that these mutations might affect the efficacy of antibodies to inhibit the virus.
24. Some viral mink mutations in spike protein are associated with decreased antibody neutralisation by human convalescent sera (low confidence). For spike variants where decreased neutralisation is observed, there is a possibility that the mutations might allow the virus to replicate and spread in people who have antibodies following a first infection or vaccination, or impact the effectiveness of therapeutic monoclonal antibodies. This could eventually lead to a requirement for vaccine update, as seen for influenza viruses (low confidence).
25. Testing of neutralisation is not yet standardised and tests have shown different mutations with different spike proteins and variations in neutralisation testing has led to uncertainty in the evidence.
26. SAGE noted that the transmission to mink and subsequent mutations could be a model of how the virus could mutate in the future. It could also show that animal populations can act as reservoirs for infection. Greater surveillance of animal populations and studies into the susceptibility of other species, as well as considering potential implications on vaccine targeting, is critical.
27. There are no mink farms in the UK and wild mink populations have little contact with humans so are considered low risk.
28. The mutations observed in virus isolates from mink have also been observed in virus from ferrets. Preliminary evidence suggests ferrets could pose a risk to those most vulnerable, but low risk otherwise and are normally not kept in high-intensity farms. Defra is currently assessing the risk to people in the UK and developing messaging for ferret owners.
29. Coordination is needed across academic groups, AHPA, DEFRA, PHE and other relevant bodies on the risks of human-animal transmission and the intensive rearing of animals. International collaboration in this area is also important.

ACTION: Vaccine Taskforce to note potential implications for vaccine targeting of variants including mink adapted variants.

ACTION: UKRI, PHE and Academic Consortium to consider proposals for relevant studies on different variants including mink adapted variants and ensure that the work is conducted and funded.

ACTION: CVO and Defra to lead a wider piece of work to consider risks from other species in the longer-term.

Impacts of Tiers

30. SAGE considered analysis from SPI-M on how the introduction of local COVID alert levels (tiering) has impacted viral transmission across England since 12th October, noting that the impact of tiers will vary depending on the characteristics of different areas.
31. In analysing the impact of tiers, there are many confounding factors that cannot be fully accounted for, including but not limited to: application of higher tiers being related to the previous prevalence and growth rates in an area, which vary widely; areas having different histories of interventions; behavioural changes which may be linked to increases in prevalence irrespective of formal guidance; changing levels of population immunity; and changes in local testing strategies. These make analysis of the impact of tiers challenging, and means that there is considerable uncertainty inherent in any assessment of impact.
32. Overall, early analysis suggests that the tiers system in England had an impact on viral transmission during the period it was implemented, with higher tiers having a greater impact. Tier 1 measures alone are not enough to prevent the epidemic from growing rapidly.
33. Some models suggest a modest (approximately 10%) reduction in R when moving from tier 1 to tier 2. Under the right circumstances in some places, tier 2 could theoretically be enough to reduce R to below 1, however this has not yet been observed. This would only be the case if R in a given area were only slightly above 1 prior to implementation of tier 2 restrictions. This suggests that tier 2 is the minimum intervention required to maintain any degree of control on transmission, though this would not be the case in all places and there is significant uncertainty. In most cases moving from tier 1 to tier 2 would slow growth rather than reverse it.
34. The package of measures applied in tier 3 varied between places, with some areas applying more stringent restrictions than others. Evidence suggests that tier 3 restrictions reduced local transmission, particularly in the North West, and possibly North East and Yorkshire regions, however the scale of the reduction is currently hard to quantify. ONS analysis is consistent with the SPI-M analysis, though also with significant uncertainty. It is therefore unclear whether baseline tier 3 restrictions alone would be sufficient at a regional or national level to reduce R below 1.
35. It is almost certain that prevalence will remain high in some parts of the country at the end of the current national restrictions. When policymakers plan transitions from national measures to a localised approach, or between tiers in future, consideration will need to be given to both prevalence and growth rate of new infections.
36. Basing transitions on prevalence alone leads to an outcome where growth rates are highest in the lower prevalence areas and interventions sufficient to halt growth do not take place until prevalence is very high. This eventually leads to high prevalence across the whole country and the consequent need to implement national measures. SAGE has advised that interventions need to be introduced whilst prevalence is low in order to maintain low prevalence, and should be based on growth rate as well as prevalence. Test and trace systems work best at low levels of prevalence.

37. It will also be important to consider a range of restrictions that are more stringent than those in the current tier 3 that might be required for some areas to avoid the need for further national-level interventions. This will be particularly important in the run up to the winter festive period if relaxation of measures is under consideration.
38. The implementation of firebreaks in Wales and Northern Ireland, and the introduction of measures in Scotland appear to have led to decreases in estimates of R but further analysis is needed.
39. In Wales, the firebreak seems to have had a more significant national effect on the transmission of the virus in the population compared to local measures (high confidence), which would be expected to affect hospital admissions, ICU admissions and deaths. Initial findings suggest some waning of effectiveness and a return to growth within 3-4 weeks of the interventions being brought in. This may be due to several reasons including “pandemic fatigue” in the population, confusion where there are competing messages or where the rules are too complex, or uncertainty around how long measures will last.
40. SAGE will consider further analysis on the impact of local and national interventions in the Devolved Administrations at its next meeting.

ACTION: Angela McLean to lead a task & finish group to evaluate the impact of recent non-pharmaceutical interventions across the UK, with input from ONS and DAs.

Duration of isolation / test & release

41. SAGE has previously considered the length of the current isolation period and impacts on transmission (see SAGE 52) and the duration of the infectious period for individuals infected with SARS-CoV-2 (see SAGE 41). Further advice will be provided at a future meeting.
42. While there is an increasing availability of lateral flow devices, SAGE noted that the ability of these tests to detect infection at different points in the infection cycle is currently not well understood.
43. Contacts of known index cases are currently required to self-isolate for 14 days. A shorter isolation period might be preferable if it results in more people coming forward for testing and/or improves adherence to self-isolation. If individuals are much less infectious during the second week after infection, even a modest increase in adherence to test and self-isolation could more than compensate for any extra infections resulting from a shorter isolation period.
44. A shorter duration is likely to lead to a reduction in the perceived and actual negative consequences of quarantine. This is likely to make adherence to quarantine more acceptable and sustainable for some people, especially for repeated episodes (medium confidence), though it is unclear what the impact on actual levels of adherence would be. Reduction in perceived negative consequences of quarantine might increase willingness to take up testing (on multiple occasions if necessary) and possibly to report contacts (low confidence).
45. Reducing the length of quarantine could reduce perceptions of the risks of infection and the importance of quarantine in general, leading to lower adherence (low confidence). Reducing the length of quarantine could signal that there is no risk of spreading infection during the later period of infectivity, which could result in reduced adherence during this period and risky contacts with vulnerable people (low confidence).
46. The majority of reasons people give for non-adherence are unrelated to duration, therefore reducing duration without also providing improved support may not increase adherence or testing uptake but would mean that adherent people would be obliged to

resume risky behaviour sooner (such as attending work and education) (medium confidence).

47. Any change to the duration of quarantine is most likely to increase adherence if accompanied by a comprehensive package of support and a communications campaign which clearly explains the rationale for changes and the. SAGE will consider whether transmission can be reduced by changing the length of isolation for contacts of an index case. It will also consider the effects of regular testing of contacts as an alternative to their isolation.

ACTION: NERVTAG to review duration of infectiousness and likely impact of daily testing of contacts as an alternative to automatic self-isolation of contacts, with input from SPI-M and SPI-B.

ACTION: SPI-B to amend paper 'Behavioural effects if reducing duration of quarantine for contacts'.

ACTION: SAGE participants to contact Steve Powis for further details of NHS asymptomatic staff testing programme if required.

List of actions

SPI-M to update severity parameters, with input from ONS, NERVTAG and CO-CIN.

Jonathan Van Tam/Vaccines Taskforce to provide OBR and HMT with an estimate of the rate at which vaccinations can take place to inform their forecasting.

Vaccine Taskforce to note potential implications for vaccine targeting of variants including mink adapted variants.

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Attendees:

Scientific Experts (34): Patrick Vallance (GCSA), Chris Whitty (CMO), Ian Diamond (ONS), Susan Hopkins (PHE/NHST&T), Ian Young (Health, NI CSA), Graham Medley (LSHTM), John Edmunds (LSHTM), Catherine Noakes (Leeds), Calum Semple (Liverpool), Wendy Barclay (Imperial), Rob Orford (Health, Wales CSA), Mark Walport (UKRI), Mark Wilcox

(Leeds), Lucy Yardley (Bristol/Southampton), Charlotte Watts (DfID CSA), Yvonne Doyle (PHE), Peter Horby (Oxford), Fliss Bennee (Technical Advisory Cell, Wales), Angela McLean (MoD CSA), Nicola Steedman (dCMO Scotland), Steve Powis (NHS England), Michael Parker (Oxford), Kamlesh Khunti (Leicester), Sheila Rowan (CSA Scotland), Ian Boyd (St Andrews), James Rubin (KCL), Gideon Henderson (DEFRA CSA), Christine Middlemiss (DEFRA CVO), Jeremy Farrar (Wellcome), Wei Shen Lim (Nottingham), [REDACTED] Sharon Peacock (PHE), Andrew Rambaut (Edinburgh), Harry Rutter (Bath)

Observers and government officials (23): Carole Mundell (FCDO CSA), John Aston (HO CSA), Andrew Curran (HSE CSA), Alan Penn (MHCLG CSA), Paul Monks (BEIS CSA), Phil Blythe (DfT CSA), Robin Grimes (MoD Nuclear CSA), Christianne Glossop (Wales CVO), Shelia Voas (Scotland CVO), Robert Huey (NI CVO), [REDACTED] Julian Fletcher (CO), [REDACTED] James Benford (HMT), [REDACTED]

[REDACTED] Thomas Waite (JBC), [REDACTED] Jim McMenamin (Health Protection Scotland)

Secretariat (all GO-Science) (18): [REDACTED]

[REDACTED] Simon Whitfield, Stuart Wainwright,

[REDACTED] Laura Eden, [REDACTED]

Total: 75