SPI-M-O: Consensus Statement on COVID-19

Date: 8th December 2021

All probability statements are in line with the framework given in the Annex.

Summary

1. The situation with the omicron variant of SARS-CoV-2 is moving extremely rapidly in the UK. SPI-M-O groups estimate a central projection for omicron growth rate of 0.2 to 0.4 per day – the data are consistent with two to three day doubling times of S-gene target failure (SGTF). It is highly likely that this growth advantage is driven by both a level of increased transmissibility and some immune evasion.

2. These current estimated growth rates depend on SGTF data that are, however, subject to a range of potential biases or confounding effects, which should be taken into consideration, such as heterogeneous spatial coverage of different testing platforms.

3. SPI-M-O has considered a range of scenarios from three academic groups who modelled the impact of omicron transmission on trajectories of infections, hospitalisations, and deaths. Despite making different assumptions about the trade-off between immune escape and transmissibility, the modelled scenarios have qualitatively similar results. All groups suggest there is the potential for a very substantial peak of infections (much larger than occurred during January 2021) with hospital admissions potentially in the scale of 1,000 per day by the end of the year.

4. For the forthcoming wave to remain around or below 1,000 to 2,000 total hospital admissions per day without intervention, low immune escape and very high protection from boosters are required to be consistent with the estimated omicron growth rate. Unmitigated scenarios with assumptions that lie close to the centre of the parameter space explored by modelling groups, and in line with current estimates for omicron growth advantage, generally have a minimum of 5,000 hospital admissions per day at the peak with many scenarios significantly worse during the first few months of 2022.

5. To prevent a wave of hospitalisations similar to those seen in Spring 2020 and January 2021, without the need to slow growth with interventions, the severity of omicron would need to be between 10% and 30% that of delta. Given these unmitigated modelled scenarios, it is highly likely that very stringent measures would be required to control growth and keep R close to or below 1. The scale of hospitalisations in these scenarios would almost certainly lead to unsustainable pressure on health and care settings.

6. Modelling groups have considered a reintroduction of control measures. In almost all scenarios consistent with estimated omicron growth, a significant reduction in transmission

(similar in scale to the national lockdown implemented in January 2021 and the "pingdemic" in July 2021) is required to keep hospitalisations below the height of previous peaks. Earlier intervention also reduces the wave of hospitalisations. This is particularly the case with short infection doubling times such as those currently observed.

Omicron variant

7. The situation with the omicron variant of SARS-CoV-2 is moving extremely rapidly with initial data from the UK that is consistent with the course of the epidemic already seen in South Africa. SPI-M-O groups estimate a central projection for omicron growth rate of 0.2 to 0.4 per day. This is consistent with doubling times of S-gene target failure (SGTF) data of two to three days and suggests a significant growth advantage in the UK with the fastest growth ever of SARS-CoV-2 seen in the UK since its emergence in early 2020.
8. It is highly likely that this growth advantage is driven by both a level of increased transmissibility and some immune evasion but deconvoluting the relative contributions will take at least three weeks.
9. These current estimated growth rates depend on SGTF data, which is fast becoming a good proxy indicator for omicron in the UK. They are, however, subject to a range of potential biases or confounding effects which should be taken into consideration. Coverage across the UK is not complete with, for example, known reporting delays in the North East and Yorkshire and low coverage in much of the South West and parts of South East England. Low SGTF coverage of pillar 1 laboratories (i.e. tests in clinical settings) may also cause delay or reduce estimation of the scale of omicron cases. Without improved data coverage in these areas, as well as data reporting in Wales and Northern Ireland, it will be very difficult to be able to fully identify omicron cases as it spreads.
10. These data are subject to the same reporting delays after symptom onset as other community testing data. As analyses are being conducted at pace, it is possible that fluctuations in the most recent data may skew subsequent trajectories for scenarios, particularly at a sub-nation or lower tier local authority (LTLA) level, where there may be substantial spatial heterogeneity. Suspected cases of omicron are also currently being prioritised operationally towards laboratories that are able to conduct SGTF assays, which may also bias these data.
11. Despite these flaws in the SGTF data, the rapid rate of increasing cases means that it is highly likely there are currently thousands of new omicron infections per day in the UK. These are almost certainly no longer dominated by infections associated with travel from other countries, but instead reflect community transmission.
12. Given the known data issues around the festive period and potential for different test-seeking behaviours, it is possible the scale of cases and hospitalisations over this period will be very difficult to track at a critical time for the epidemic.

13. The relative severity of omicron compared to delta remains unknown. Changes in the level of hospitalisations will broadly scale linearly with changes in severity, assuming no change in hospital capacity as admissions increase, and even a marked decrease in severity is unlikely to offset the impact of a larger susceptible pool (a consequence of immune escape) or increased transmissibility; it would be easier to halve the number of infections than the infection hospitalisation rate (IHR).

14. The burden of disease for any wave of omicron infection will depend on the size of the pool of people susceptible to infection, which in turn depends on the numbers of people vaccinated, boosted, or recovered from natural infection and the level of protection each of these affords. Depending on omicron's immune escape mechanisms, it is likely that the pool of people susceptible to infection with omicron is much larger than those who could catch delta. If this is true, then transmission will increase substantially.

15. The mechanisms that are driving omicron's growth advantage will affect which populations are most impacted: if omicron has higher transmissibility, this will be susceptible individuals; if omicron has lower vaccine and booster effectiveness, this will be those in older age groups; and if omicron lowers cross-reactivity against natural immunity, this will be those who have been infected and subsequently recovered. If omicron's immune escape reduces vaccine effectiveness against hospitalisation from, say, 96% to 92%, that would effectively *double* the number of vaccinated individuals who are **not** protected from hospitalisation.

16. The interaction between the two main SARS-CoV-2 variants in the UK population, delta and omicron, will also be important. There is the possibility that they may coexist with delta and omicron circulating in different populations. This could happen in theory if, for example, there is poor cross-immunity for delta after omicron infection. SPI-M-O's consensus, however, is that omicron's growth advantage will likely lead to it outcompeting delta.

Overview of possible omicron scenarios

17. SPI-M-O has considered a range of scenarios from three academic groups who modelled the impact of omicron transmission on trajectories of infections, hospitalisations, and deaths. Despite making different assumptions about the trade-off between immune escape and transmissibility, the modelled scenarios have qualitatively similar results.

18. Any wave of significant infection, almost irrespective of immune escape, will spill over into hospitalisations, and ultimately deaths. All groups suggest that, without any mitigations, there is the potential for a very substantial peak of infections much larger than occurred during the winter wave of January 2021. The rapid rate of increase of omicron cases currently observed suggests that hospital admissions could be of the order of 1,000 per day by the end of 2021.

19. Even assuming the lower end of estimates of omicron's observed growth rate, many scenarios see hospitalisations close to or above previous peak levels, if there is no reduction in transmission. The situations in which the estimated peak of the epidemic is around or below 1,000 to 2,000 total hospital admissions per day without intervention require low immune escape and very high protection from boosters to be consistent with estimated growth. Unmitigated scenarios with assumptions that lie closer to the centre parameter space explored by modelling groups, and in line with current estimates for omicron growth advantage, generally have a minimum of 5,000 hospital admissions per day at the peak, with many scenarios significantly larger during the first few months of 2022.

20. One group estimates that, to prevent waves of hospitalisations of a similar scale to those seen in Spring 2020 and January 2021 without the need to slow growth, the severity of omicron would need to be between 10% and 30% of delta. There currently remains no strong evidence that omicron infections are either more or less severe than delta infections. It will take several weeks (four to six, subject to any disruption to data streams over the festive period) for this evidence to accrue.

21. These expected large waves of hospitalisations do include the impact of booster vaccinations and their roll out to the whole adult population. In the absence of any other mitigations, omicron spreads so fast through the population that individuals are infected before boosters can be offered to and elicit an immune response in all adults (assuming an average roll out of three to three and a half million booster doses per week).

22. Another SPI-M-O group has used a simpler modelling approach to consider similar parameters that focus on increased transmission compared to delta, decreased protection from vaccination and onward transmission relative to delta, and the impact of waning and boosting of such protection. This analysis provides information on the size of the epidemic rather than the dynamic trajectory. It confirms that the R value and total admissions and deaths increase as assumptions about the degree of immune escape and transmissibility for omicron increase. This concurs with the dynamic modelling in concluding that, without very substantial reductions in mixing, a large wave of omicron infections is to be expected with its associated hospitalisations and deaths.

Impact of restrictions on possible scenarios

23. Given these unmitigated modelled scenarios, it is highly likely that very stringent measures would be required to control growth and keep R close to or below 1. The scale of hospitalisations in unmitigated scenarios would almost certainly lead to unsustainable pressure on health and care settings. Reducing the total number of infections and delaying any wave would allow more time for boosters to be rolled out and for vaccinations and

therapeutics to be modified to combat omicron, as well as preventing such pressure on health services.

24. Modelling groups have considered a return to stringent measures, either implementation of Plan B[1], different phases previously seen in the Roadmap out of lockdown for England from earlier in 2021[2] (including a national lockdown), or other methods to reduce transmission. These modelled interventions assume that the impact on transmission is the same as when the measure in question was previously used and do not account for any changes in adherence that might occur on reimplementation.

25. In all cases consistent with the estimated omicron growth rate, a significant reduction in transmission is required to keep hospitalisations below the height of previous waves. In most scenarios, these levels of decrease are achieved by interventions similar to the national lockdown implemented in January 2021. Earlier interventions reduce the wave of hospitalisations more effectively. This is particularly the case when the doubling time for infections is so fast. Based on a doubling time of two and a half days, to avoid a peak of 5,000 hospitalisations would require this sort of stringent action to be implemented when, at that time, only around 150 to 200 hospitalisations had been recorded.

26. Less stringent interventions can also reduce the size of any peak, but, if used in isolation without more stringent interventions later, will have only relatively little effect.

27. Given the inherent delays in disease progression and data processing, growth in admissions and deaths would continue for several weeks even after severe curtailment of transmission. It is probable that, once hospitalisations begin to increase at a rate similar to that of cases, four doublings could already be "in the system" before interventions that slow infections are reflected in slower hospitalisations. With a doubling time of two to three days, any delay to implementation of measures would only compound this.

28. Slowing transmission as soon as possible will reduce the number of people who are infected with omicron before they are fully vaccinated / boosted. It will also slow the rate at which omicron overtakes delta and give more time to understand omicron's severity and its other properties.

Areas of continued uncertainty and generation time

29. There remains considerable uncertainty whilst the full range of biological parameters of the omicron variant remain poorly described. Information about omicron's transmissibility and immune escape compared to delta will be significantly improved over the next two weeks, although disentangling the difference between these two may take longer. The

[1] COVID-19 Response: Autumn and Winter Plan 2021; 9th November 2021
[2] COVID-19 Response: Spring 2021; 22nd February 2021

uncertainty over severity will take longer to resolve (four to six weeks, subject to any disruption to data streams over the festive period).

30. Other uncertainties also remain, such as how omicron infections will move through and affect different age groups, how differently omicron may evade natural and vaccine-acquired immunity and how this may hold for booster vaccinations, and the relative scale of reduction in vaccine effectiveness between infection and severe disease. The scenarios considered by SPI-M-O are still informed by assumptions for both vaccine effectiveness and cross protection from previous SARS-CoV-2 infections, and these will need to be considered as real-world data become available.

31. Current analyses assume omicron has the same generation time as delta, which is likely but unknown. For a fixed growth rate, such as that currently observed for omicron, the virus's generation time will affect the estimated R value. A shorter mean generation time will mean an R closer to 1, whereas a longer generation time will lead to a more extreme R that is further from 1, i.e. R will be higher when above 1. As omicron's doubling time appears to be so fast, this could imply a quicker generation time than delta.

32. For modelled forward projections or scenarios over time, the question of generation time essentially does not affect the results; the growth rate will still match to the data either explicitly or implicitly.

33. When evaluating the possible impact of future interventions, however, generation time could have an impact. Where interventions have a population level effect and a widespread reduction of transmission (for example, Roadmap steps, lockdown, etc.) the true R will be closer to 1 than estimated if the generation time is shorter than assumed. For a growing epidemic, therefore, interventions that reduce all transmission could be more effective than expected. For interventions that depend on the time course of an infection (for example, contact tracing, control by lateral flow tests where timing is crucial to detecting infection, etc.) then a true shorter generation time could render these less effective.

34. A changed generation time could also affect the relative importance of different transmission networks (for example, household contacts could be more or less important) or the use of potential treatments, if these rely on usage early in infection. This could also have effects on the longer-term dynamics (for example, a potentially lower peak incidence but with higher prevalence). A full evaluation of these impacts will need to consider the details, such as if the true generation time is shorter because of the virus's latent period or infectious period.

35. As a result of this continuing uncertainty, SPI-M-O groups have attempted to consider the very broad plausible parameter space that is consistent with the observations made as omicron has emerged in the UK. Omicron's emergence has been identified much earlier

in its trajectory than for other variants, such as alpha and delta. This means it is possible to respond more quickly but also entails greater uncertainty.

Annex: PHIA framework of language for discussing probabilities