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

Date: 15th December 2021

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

Summary

1. SPI-M-O groups now estimate a growth rate of around 0.4 per day for the omicron variant of SARS-CoV-2, which is consistent with a doubling time of around two days. Areas with higher incidence of omicron cases, for example London and Greater Manchester, are starting to see increases in hospital admissions, however, much of this will still be associated with delta. The hospital impact of omicron cases is yet to be seen.
2. SPI-M-O has considered an updated range of scenarios from two academic groups who have modelled the impact of omicron transmission on trajectories of infections, hospitalisations, and deaths. These groups suggest it is almost certain that there will be a very substantial peak of infections (much larger than occurred during January 2021). There are highly likely to be between 1,000 and 2,000 hospital admissions per day in England by the end of the year. Many of these hospitalisations are already "in the system" due to the lags between infection, symptom onset, and the subsequent need for health care. The recently announced expanded and expedited booster vaccination programme will not affect transmission and severe and mild disease in time to mitigate these hospitalisations for the rest of 2021.
3. Scenarios that assume no further restrictions beyond Plan B generally lead to trajectories in daily hospital admissions in England that have a minimum of 3,000 hospital admissions per day at their peaks, with some scenarios having significantly worse outcomes during the first few months of 2022. To prevent such a wave of hospitalisations, more stringent measures would need to be implemented before 2022.
4. Behaviour change (spontaneous, recommended, or mandated) could significantly affect the peak of infections and hospitalisations. Current modelling assumes no change in behaviours beyond those previously seen on imposition of equivalent measures in the past. Non-mandated behaviour change, however, has the potential to make a big difference in either direction – changes in mixing over the festive period, between generations and within different networks, could increase transmission, but rapidly doubling cases may lead to a spontaneous precautionary reduction in mixing patterns. As omicron is doubling so quickly, it is highly likely that, if behaviour changed or measures were implemented only after noticeable increases in hospital admissions, it would be too late to materially decrease peak hospitalisations.
5. It is not only hospitalisations that will increase substantially, but the number of infections and cases will likely lead to significant levels of milder disease that may have implications for workforce and school absences.

6. As with previous large waves of infection, different settings, such as hospitals, care homes, and prisons, will experience omicron outbreaks. Healthcare setting-associated (nosocomial) infections, in particular, have already been seen and are widely expected, with the subsequent impacts of high staff absence.

7. Extensive uncertainties in these scenarios remain. The current estimated growth rate of omicron, the speed and coverage of the booster roll out, and level of protection through vaccine effectiveness estimates (particularly against severe disease) and cross-protection due to previous infection will all impact these trajectories. There currently remains no strong evidence that omicron infections are either more or less severe than delta infections.

Omicron variant and possible future scenarios

8. SPI-M-O groups' central estimate for omicron's growth rate is around 0.4 per day. This is consistent with doubling times of S-gene target failure (SGTF) data of around two days. Areas with higher incidence of omicron cases, for example London and Greater Manchester, are starting to see increases in hospital admissions, however, much of this will still be associated with delta. The hospital impact of omicron cases is yet to be seen. These estimates are commensurate with other estimates.

9. Given known data issues due to reporting over multiple bank holidays, combined with unpredictable changes in behaviour around the festive period, and potential for different test-seeking behaviours, it is highly likely that the scale of cases over this period will be very difficult to track at a critical time for the epidemic. Data on hospitalisations is highly likely to be delayed. Additionally, as cases and hospitalisations rise, data delays and completeness are highly likely to reduce significantly if testing and reporting systems struggle to meet demand.

10. SPI-M-O has considered updated scenarios from two academic groups[1] who have modelled the impact of omicron transmission on trajectories of infections, hospitalisations, and deaths. These include an updated booster vaccination programme roll out (assuming an average of three to six million booster doses per week) and the latest available estimates of vaccine effectiveness[2] against symptomatic infection. As with previous preliminary results, the modelled scenarios between groups are qualitatively similar.

11. It is almost certain that, without any further mitigations beyond Plan B[3] as currently implemented, there will be a very substantial peak of infections, much larger than occurred during January 2021. There are highly likely to be between 1,000 to 2,000 hospital admissions per day by the end of the year. It is almost certain that there are now hundreds of thousands of new omicron infections per day as of 15th December 2021. Many hospitalisations are therefore already "in the system" due to the lags between infection,

[1] *Barnard, R. C, Davies, N. et al.* (2021) Modelling the potential consequences of the Omicron SARS-CoV-2 variant in England; University of Warwick – Early Omicron results; SAGE 99 13th December 2021
[2] *Andrews et al.* (2021) Effectiveness of COVID-19 vaccines against the Omicron (B.1.1.529) variant of concern
[3] COVID-19 Response: Autumn and Winter Plan 2021; 9th November 2021

symptom onset, and the subsequent need for health care. The recently announced expanded and expedited booster vaccination programme will not dampen transmission or disease progression in time to mitigate these hospital admissions for the rest of 2021.

12. The modelled scenarios from the two groups are summarised in Table 1. Those scenarios that assume no further restrictions beyond Plan B generally lead to trajectories in daily hospitalisations in England with a minimum peak of 3,000 hospital admissions per day. Many sensitivities considered have significantly worse trajectories during the first few months of 2022 without further intervention, which are several times higher than those seen in January 2021. The scale of these hospital admissions would almost certainly lead to unsustainable pressure on health and care settings. These scenarios also have huge waves of infections that would have significant associated mild disease and morbidity, with consequent workforce and school absences.

13. To significantly reduce the peak of such a wave, more stringent restrictions than the current Plan B measures would be required. To illustrate more stringent measures, groups have modelled impacts comparable to Step 2 or Step 1[4] of the Roadmap for England. These scenarios suggest that, if sufficiently stringent and enacted early enough, measures and/or behaviour change would not need to be in place for more than a few weeks to substantially reduce the potential peak in hospital admissions and infections compared with Plan B alone. The timing of such measures is crucial; if implemented late, it is less likely that these would prevent considerable pressure on health and care settings.

14. Reducing the total number of infections and delaying any wave in the very short term would allow more time for the accelerated booster roll out to take effect. This would also allow many hospitalisations to be *prevented* as a result, not just delayed.

15. The current pace of exponential growth is faster than that seen in March 2020, and this, combined with current infection levels, drives much of the timing for the coming waves.

16. Behaviour change (spontaneous, recommended or mandated) could significantly affect the peak of infections and hospitalisations. Current modelling assumes no change in behaviours beyond those previously seen upon imposition of equivalent measures in the past. Non-mandated behaviour change, however, has the potential to make a big difference in either direction. If cases increase to high levels very rapidly, there may be a spontaneous precautionary reduction in mixing patterns, thus slowing transmission. The festive period, however, may see changes in mixing between households and generations, joining up networks, that could lead to increased transmission.

17. Hospital admissions have been between 500 and 1,000 per day in England since mid-July 2021, likely due to spontaneous behaviour changes. It is possible that similar behavioural changes could result in a long, extended period of high hospitalisations, rather than a single sharp peak.

[4] COVID-19 Response - Spring 2021 (Roadmap); 22nd February 2021

Table 1: High level scenarios for potential omicron epidemic trajectories in England based on modelling to date. This is a summary across modelling considered by SPI-M-O, from different groups. These groups make different precise assumptions about omicron's characteristics and impact, such as: its growth advantage, vaccine effectiveness against infection and symptomatic and severe disease for omicron, the exact impact on transmission as a result of measures implemented including behavioural responses, etc. This is a collation of this information and is imprecise; estimates do not relate to any one scenario but are an overall assessment informed by the range of modelled scenarios and other epidemiological considerations.

Please note: these are *NOT* government policy options or proposals, but a summary informed by scenarios modelled by multiple groups to consider their possible impact of omicron on transmission. These are not forecasts or predictions.

Scenario for measures against omicron	Infections*	Hospitalisations	Deaths	Uncertainties / assumptions that are driving the shape and timing of wave and peak height
A: Plan B taken forward for several weeks	Peak: 600,000 to 2 million per day Timing: Late December 2021 to January 2022	Peak: 3,000 to 10,000 admissions per day Timing: January to February 2022 Shape: increase over December / January to peak, declining over March / April 2022	Peak: 600 to 6,000 deaths per day Timing: Mid-January to mid-March 2022	Estimated growth advantage of omicron Severity and vaccine effectiveness assumptions (both against infection and severe disease) Protection from previous infection Booster uptake and roll out speed
B: Action equivalent to Step 2 of Roadmap	Peak: 400,000 to 1.5 million per day Higher the later stringent measures are implemented. Timing: Late December 2021 to early February 2022	Peak: 3,000 to 7,000 admissions per day Timing: January to March 2022	Peak: 500 to 3,000 deaths per day Timing: Late January to late March 2022	As Scenario A (Plan B) Timing of implementation (during December 2021 versus January 2022) If measures equivalent to Step 2 are lifted in mid-January at the end of the booster roll out, immunity build up means there is the potential to avoid an exit wave of infections, hospitalisations, and deaths on release of measures.
C: Action equivalent to Step 1 of Roadmap	Peak: 200,000 to 1 million per day Higher the later stringent measures are implemented. Timing: Late December 2021 to late February 2022	Peak: 1,500 to 5,000 admissions per day during interventions Timing: January to March 2022; or if lifted in mid-January: increases over January, followed by larger wave on release of measures.	Peak: 200 to 2,000 deaths per day during interventions Timing: January to March 2022; or if lifted in mid-January: increases over January, followed by larger wave on release of measures.	As Scenario A (Plan B) Timing of implementation (during December 2021 versus January 2022) If measures equivalent to Step 1 are fully lifted in mid-January, this may lead to an exit wave of infections, hospitalisations, and deaths on release of measures as mixing returns *before* reaching herd immunity.

* Note on infections – no data to fit to so academic groups estimates vary widely. Not available for some scenarios.

18. As omicron is doubling so quickly, it is highly likely that, if behaviour changed or measures were implemented only after noticeable increases in admissions, it would be too late to significantly reduce the subsequent peak in mild and severe disease.

19. Extensive uncertainties in these scenarios remain. The current estimated growth rate of omicron, the speed and coverage of the booster roll out, and level of protection through vaccine effectiveness estimates (particularly against severe disease) and cross-protection due to previous infection will all impact these trajectories. Currently modelling groups are using preliminary estimates of these parameters, and, over time, these estimates will become more certain.

20. In June to July 2021, the "pingdemic" and significant behaviour change coincided with (and may have caused) a sharp reversal of epidemic growth; at the time, the R value for England was slightly above 1 (approximately 1.2 to 1.4 over this period, with a growth rate of approximately +3% to +6% per day). It is unlikely that such an "intervention" would have such a significant impact now due to the significant growth of omicron (estimated percentage growth rate of around 50% per day[5]). If, however, many people were isolating as a result of being a COVID-19 case or potential contact of one, then this reduction in network transmission would reduce omicron cases.

21. There currently remains no strong evidence that omicron infections are either more or less intrinsically severe than delta infections. It will still take several weeks (four to six, subject to any disruption to data streams over the festive period) for this evidence to accrue. Other signals about the impact of omicron on, for example, reinfection likelihood are emerging. As yet, however, there are no indications of reduced severity with omicron infection[6].

22. Even a marked reduction in any aspect of severity is unlikely to offset the impact of a larger susceptible pool (a consequence of immune escape) or increased transmissibility without further measures, as is implied by omicron's evident growth advantage. The severity of a disease, however, is multi-layered and includes: whether people require hospital treatment if infected (infection hospitalisation risk [IHR]); how long they spend in hospital when they get there (length of stay); and whether they need to be transferred, for example, to intensive care. Omicron may appear to have lower severity as a result of protection due to prior infection or vaccination – this *apparent* decreased severity may not correspond to an intrinsically lower severity of this variant. This may also be affected by the demographics of individuals infected with omicron and their immune status. Pressure on health and care settings, particularly hospital bed occupancy, will depend on all aspects of severity and how these interact. It may be that a changed average length of stay affects how hospitals are able to manage their admissions.

23. Previous epidemic waves have seen the hospital fatality risk increase, together with substantial changes in length of stay. The coming wave of admissions and increased

[5] Please note that for small values, the growth rate of a disease will roughly approximate the percentage growth in the number of cases per day but this is no longer the case for a growth rate of 0.4, as estimated for omicron. An explanation of this can be found at Plus magazine.

[6] *UKHSA SARS-CoV-2 variants of concern and variants under investigation in England – Technical Briefings*

pressure in hospitals is likely to see similar observations, although these will be modified by changes in treatment options and clinical requirements of patients.

24. There are early indications for shorter lengths of stay in South Africa, however, it is unknown whether such observations would be seen in the UK, given differences in population demographics, COVID-19 epidemic timing and variant composition to date, vaccination types and programmes, health care systems, etc. It is too early to make an assessment of what the UK's average length of stay would be for hospitalisations due to omicron infection.

Omicron in specific settings

25. As with previously large waves of infection, different settings will experience omicron outbreaks. A large number of healthcare setting-associated (nosocomial) infections, in particular, are to be expected, with the subsequent impacts of high staff absence and consequences of patient infection. In previous waves, such nosocomial outbreaks have led to extended epidemics.

26. Depending on policies to protect the vulnerable, similar outbreaks might occur in care homes, although current data suggests rates of cases have plateaued. Other closed settings, such as prisons, are also vulnerable to large outbreaks, with spill over into and from the community through the staff. These will likely reflect wider workforce absences as a result of the likely magnitude of the wave of infections.

27. Many of the populations and communities in such closed or semi-closed settings may have particularly vulnerable individuals. They may, for example, have been vaccinated with AstraZeneca and not yet boosted – given early vaccine effectiveness and antibody neutralisation studies against omicron[2], they may have lower levels of protection.

Other areas of continued uncertainty

28. 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.

29. 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. Current analyses assume omicron has the same generation time as delta, but this remains unknown.

Annex: PHIA framework of language for discussing probabilities