



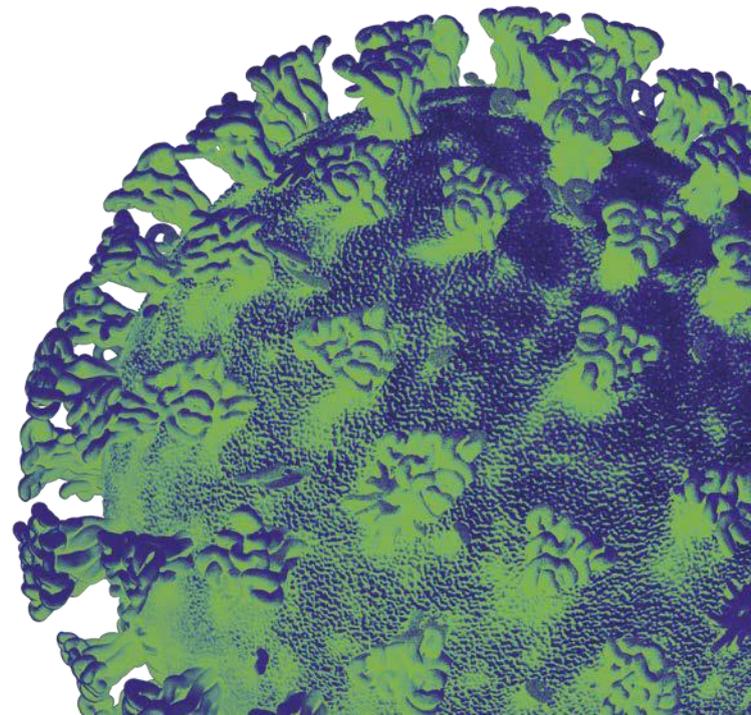
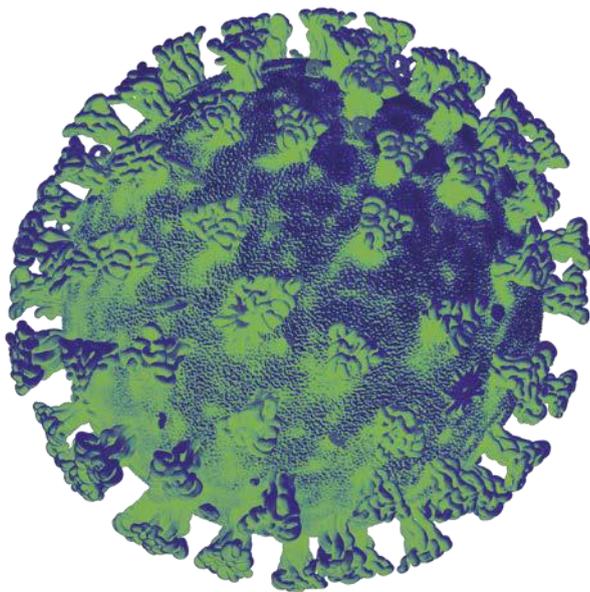
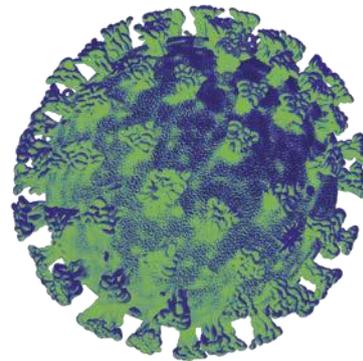
Llywodraeth Cymru
Welsh Government

Technical Advisory Group

Advice for 22nd April

Restriction Review

16 April 2021



Advice from the Technical Advisory Group and the Chief Scientific Advisor for Health - 16 April 2021

This report provides advice on the proposed relaxations considered as part of the 22 April review, covering:

- Outdoor attractions (including funfairs, theme parks and swimming pools)
- Outdoor hospitality
- Organised outdoor activities (up to 30 people)
- Weddings receptions outdoors (limited to 30 people)
- Gyms, leisure centres and fitness facilities (individual or one-to-one training)
- Extended households (another household that is not your support bubble).

This advice was informed by an 'Initial Evidence Scan' on indoor/outdoor transmission from the [Wales COVID-19 Evidence Centre](#).

Further requests were made to consider bringing forward advice on:

- Children's indoor activities
- Organised indoor activities (up to 15 people, including exercise classes)
- Community centres

And to either:

- Extend the definition of the rule of six to match the rule in England, OR
- Extend the rule of six outdoors to include up to six people from six households (not including children under 12).

1. Summary of Advice

- The advice from TAG should be read in conjunction with the most recent [TAG Behavioural Summary Advice](#), and considered in the context of the current epidemiological situation. The risk assessments made are based on an implicit expectation of good adherence to regulations and population public health interventions.
- Continuing relaxations according to the [Coronavirus Control Plan](#), with the acceleration that has been announced, is likely to result in manageable levels of COVID-19 in Wales (medium confidence). There is uncertainty as to whether further acceleration will increase epidemic growth beyond manageable levels. The relationship between vaccination and harm is not yet effectively quantified.
- Lessons from Europe and South America, where third waves have occurred, emphasise that caution during this period will allow greater freedoms in the long run.
- The decreases in cases since January are predominantly driven by public health protection measures rather than the vaccination programme, which to date has focused largely on those most at risk of poor outcomes but who typically have a smaller impact on population-wide transmission. This will change as a greater proportion of the Welsh population are vaccinated, although there will still be gaps in coverage.
- Recent modelling by SPI-M and Swansea University suggest a third wave is highly likely, although the timing, scale and shape of this wave is not certain. Overall modelled scenarios suggest it is likely cases, hospitalisations and deaths will increase in the second half of 2021 as restrictions are eased, although at a reduced level to previous waves.

The main issues that could cause a significant resurgence of covid harms are widespread transmission of a vaccine escape and/or immune escape variant; a breakdown in social distancing behaviour; or to a lesser extent, a change in vaccine supply or significant drop in vaccine uptake.

- There is evidence that transmission risk is generally lower outdoors than indoors due to increased ventilation, effect of sunlight and increased ability to socially distance in outdoor spaces. However, personal protective behaviours such as face coverings and hand hygiene will remain important in settings where it is not possible to socially distance at a minimum of 2m, particularly for extended durations.
- The relative risk of transmission in the settings discussed in the review amendments will vary depending on the likelihood of transmission in that

environment and the frequency and duration of people visiting that setting. Settings with more risk factors that are visited frequently by many people for long periods, including those outdoors, may have a greater impact on population level transmission than other less frequently visited settings. The role of 'wrap-around' activities such as transport and enter/exit points should be considered as well as the setting itself.

- In terms of exercise facilities, individual training coupled with protective behaviours (including regular cleaning of surfaces) represents a lower risk than fitness classes, which have been linked to a number of super spreading events internationally.
- On the 'Rule of 6' TAG would be supportive of maintaining the current exemption of children under 11 years of age from any cap in numbers, particularly as the mitigation would be that those children would have to be from one of the households of the 6 people.
- Organised indoor activities are likely to represent a higher risk of transmission, especially where those activities include exercise, singing, loud speaking etc. and this increases with duration and proximity. Large numbers of people attending from different households also has the potential to create wide network clusters should transmission take place, although this risk is closely related to community prevalence. As a result indoor activities should be substituted or moved outdoors where possible during the summer period.

2. Situation summary

The latest COVID-19 Situation Summary for Wales is available [here](#). The latest summary of advice from the Technical Advisory Cell is available [here](#) and supplements this situational summary.

It should be noted that the full impact of amendments made on 12 April (notably including changes for Schools, Further Education and Higher Education) will not yet be fully represented in the transmission data, as it takes at least three weeks to observe this. Caution should therefore be taken when considering the current rates of transmission based on existing measures.

Since the impact of previous relaxations cannot yet be reliably estimated, it follows that it is not possible to robustly quantify the further increase in risk that would be associated with additional easements (High confidence).

Further relaxations that lead to more population level mixing are likely to lead to more cases and exponential growth (High confidence). It is important to remember that as more settings reopen and activities resume, there will be network multiplier

effects that increase transmission further, so settings and activities cannot be considered in isolation.

The decrease in cases since January is predominantly driven by population public health control measures (High confidence). This is largely because, although the vaccine programme has been effective in progressing through the JCVI priority groups, older people have relatively fewer contacts compared to the rest of the population and therefore a smaller impact on population-wide transmission. As control measures are eased and people mix, infection rates will increase (High confidence). As more people are vaccinated the dependency on population control measures to reduce harms related to COVID-19 decreases over time. As prevalence decreases, the likelihood of coming into contact with an infectious individual decreases (high confidence)

The new relationship between COVID-19 cases, hospitalisations and deaths and vaccination has not yet been quantified. As the vaccination programme continues the proportion of cases that lead to severe illnesses and deaths should continue to decrease (High confidence). However, a large proportion of the population currently remains susceptible to infection even though the majority of those most vulnerable to serious infections have now been vaccinated.

The potential impact of 'Long Covid' and post COVID-19 conditions remains important to consider when planning the easing of restrictions. Over the four-week period ending 6 March 2021, the COVID-19 infection survey estimated that 56,000 people in private households Wales were experiencing self-reported Long Covid. Of study participants who tested positive for COVID-19, symptom prevalence at 12 weeks post-infection was higher for female participants (14.7%) than male participants (12.7%) and was highest among those aged 25 to 34 years (18.2%)¹.

3. Policy modelling update

Updated modelling from SPI-M (which considers components specific to the English roadmap, but which are also relevant to Wales), continues to suggest that a third wave is highly likely. There is uncertainty about the timing, scale and shape of this wave because there will be people in vulnerable groups who do not have direct protection (either because they have not been vaccinated, or because vaccination does not fully prevent infection or illness), and there is not sufficient indirect protection from wider population immunity (medium-high confidence).

¹ [ONS. Prevalence of ongoing symptoms following coronavirus \(COVID-19\) infection in the UK: 1 April 2021](#)

Updated Swansea University Modelling (full paper in Appendix A)

An updated set of policy modelling scenarios from the Swansea University model are included below to understand possible futures around the coronavirus pandemic in Wales. Following the announcement of school and further education policy decisions, the models have been updated to reflect the real life scenario of all pupils having returned to school. This model has produced estimates until the end of March 2022.

Overall the modelled scenarios suggest that it is likely cases, hospitalisations and deaths will increase in the second half of 2021 as restrictions are eased.

The model does not contain a factor for waning immunity. The results should be viewed with this in mind, and caution should be taken not to mistake the model for a prediction.

So far in 2021, it is likely that restrictions and public responses have had an impact in reducing transmission of the virus and reducing hospital admissions and deaths. As we move into the next phase, the vaccination programme will have to do more of the 'heavy lifting' in preventing COVID-19 harms.

It is likely that future outbreaks will occur in children and young people who have more contacts and have not yet been vaccinated. In future it may be useful to set out what level of virus transmission is acceptable if vaccinations are keeping hospitalisations and deaths low.

Key uncertainties are around the level of adherence to social distancing and other precautions, the impact of vaccines on transmission, and the impact of new variants.

The main issues that could cause a significant resurgence of COVID-19 harms are widespread transmission of a vaccine escape and/or immune escape variant; a breakdown in social distancing behaviour; or to a lesser extent, a change in vaccine supply or significant drop in vaccine uptake.

As vaccine roll out continues, the horizon looks more positive in terms of expecting lower numbers of COVID-19 deaths than were observed in November 2020 – February 2021.

Continued surveillance of infections in schools, effectiveness of vaccines, and impact and spread of variants is crucial in helping to understand what trajectory Wales is following in terms of the pandemic and in fine-tuning future policy formulations to deal with the pandemic while reducing other health, educational and socioeconomic harms and inequalities.

Further work is currently underway looking at the dynamics of vaccinations in the model. We think this will impact hospital admissions and deaths, and therefore the

estimates presented in this paper are likely to represent pessimistic scenarios in terms of the ratio of cases to harms.

4. Alignment across the UK nations

Recognition of 'alert fatigue' associated with the volume and complexity of regulations and guidance in place is important. Consistent messaging and transparency regarding any uncertainty is essential with clear rationales given for decision making. Where possible alignment across UK nations is preferable².

5. General risk of indoor vs. outdoor activities

It has been well-documented that, generally, transmission risk is lower outdoors when compared to indoors. This is due to increased ventilation, reduced virus stability from solar radiation and increased ability to socially distance³. Because maintaining a 2m radius is logically easier in outdoor spaces, there is a reduced relative risk of transmission in uncrowded outdoor spaces compared to indoor spaces. This has been quantified in a preprint study suggesting that the odds that a primary case transmitted COVID-19 in a closed environment was 18.7 times greater compared to an open-air environment (95% confidence interval [CI]: 6.0, 57.9)⁴.

Evidence indicates that in outdoor environments personal protective behaviours will need to continue including: social distancing with a minimum of 2m, wearing face coverings where this is not possible or where it is crowded, improved hand hygiene (washing hands) and trying not to touch one's face or other surfaces^{5 6}.

The risk of outdoor transmission increases when social distancing behaviours are interrupted, and gathering density, circulation (mingling) and population size increases, particularly for an extended duration (over 15 minutes)⁷. There is an increasing body of evidence showing airborne transmission of the virus over longer distances in some situations (e.g. transmission between rooms in

² [Technical Advisory Group: statement on priority considerations relating to personal protective behaviours to inform decisions on easing of restrictions in Spring 2021, 8 April 2021](#)

³ [SAGE EMG/SPI-B: Mitigating risks of SARS-CoV-2 transmission associated with household social interactions, 26 November 2020](#)

[SAGE TWEG: Evidence of wider environmental transmission of SARS-CoV-2, 12 June 2020](#)

⁴ [MedRxiv, Closed environments facilitate secondary transmission of coronavirus disease 2019 \(COVID-19\), April 2020](#)

⁵ [EMG: Environmental influence on transmission of COVID-19, 28 April 2020](#)

⁶ [EMG: Application of physical distancing and fabric face coverings in mitigating the B117 variant SARS-CoV-2 virus in public, workplace and community, 13 January 2021](#)

⁷ [MedRxiv, Rapid Scoping Review of Evidence of Outdoor Transmission of COVID-19, September 2020](#)

quarantine hotels has been recorded⁸). This type of transmission is often hard to identify, making its contribution to overall transmission difficult to quantify.

The importance of transmission associated with different settings on the epidemic will depend on the likelihood of transmission occurring within a particular environment and the frequency with which people visit that setting. Those that are associated with higher risk factors and are visited frequently by many people are likely to have a much bigger impact than those that may have a higher risk but are visited infrequently by smaller numbers of people (high confidence)⁹.

Transmission risk then depends on several factors, including the concentration of viable virus deposited and its viability on a specific surface for a given time period. Evidence suggests that the virus persists much longer on smooth, nonporous surfaces compared to porous surfaces (wood, paper, cloth) and that there may be a concern for viral persistence on outdoor surfaces in cooler weather, although more data is required¹⁰.

Recent studies discussed at SAGE do not indicate a difference in the ability of different variants to survive in the environment. The studies considered survival of B.1.1.7 and B.1.351 on surfaces, and B.1.1.7 in air.¹¹

6. Outdoor attractions (including funfairs and theme parks)

Settings with more risk factors which are visited frequently by many people, are likely to have a much bigger impact on population level transmission than those visited less frequently, or by fewer people (high confidence). Outdoor attractions/fun fairs/theme parks tend to attract a larger number of visitors.

Common factors associated with transmission was mass gatherings (1000 people or more) or arriving in the same transport¹². The lack of ability to socially distance and interplay with 'surrounding' activities such as travel are important. Whilst the event/venue itself may have tight control measures, surrounding activities add to the overall risk of transmission.

Activities surrounding events involving many people (like outdoor attractions) include things that like: travel (sharing cars¹³), 'wrap around' activities such as

⁸ [CDC, Transmission of Severe Acute Respiratory Syndrome Coronavirus 2 during Border Quarantine and Air Travel, New Zealand, May 2021](#)

⁹ [PHE: Factors contributing to risk of SARS-CoV2 transmission in various settings, 26 November 2020](#)

¹⁰ [National Collaborating Centre for Environmental Health, COVID-19 and outdoor safety: Considerations for use of outdoor recreational spaces, April 2020](#)

¹¹ [SAGE 85 minutes: Coronavirus \(COVID-19\) response, 31 March 2021](#)

¹² [Journal of Infectious Diseases, Outdoor Transmission of SARS-CoV-2 and Other Respiratory Viruses: A Systematic Review, February 2021](#)

¹³ [Science Advances, Airflows inside passenger cars and implications for airborne disease transmission, January 2021](#)

meeting beforehand indoors, travel in same transport, visiting other places, visiting toilets¹⁴ etc. Each of these activities carry their own individual risks.

Fun fairs and theme parks are likely to have a high number of contact points, particularly on attractions with high throughput or where equipment is reused (balls, toys, grabbers etc.). Given evidence suggesting that the virus can remain viable and detectable on plastic and steel for four days, on glass for two days, and on wood for one day¹⁵, there is potential for contamination of surfaces and therefore appropriate cleaning regimens are essential.

Fun fair and theme park staff may need to get closer to visitors for short periods of time to undertake functions such as checking tickets and reviewing safety measures etc., so they may be at increased risk of exposure. Protection of staff in these high contact settings is important and should be considered carefully in relevant guidance for employers¹⁶.

7. Transmission risk at outdoor events (including weddings and organised outdoor activities)

It is recognised that most viral transmission occurs due to prolonged, close interaction with friends and relatives in a familiar and relaxed environment (i.e. in places and situations we perceive to be safe). This may lead to an 'intimacy paradox' whereby a place we think is safe carries a higher risk and so transmission risks are highest when people spend extended periods of time in close proximity to infected individuals. The risk is greater with larger events and those which are inter-generational (high confidence)¹⁷.

Social interactions indoors increase the risk of infection. Outdoor events represent a much lower risk due to the natural ventilation. However this is dependent upon the activity, proximity and duration. If activities are taking place in close proximity (i.e. less than 2m) then there is still a risk of transmission through aerosol droplets and direct transmission.

Increased transmission is likely to result from more social mixing during celebrations, often involving gatherings beyond habitual networks and across regions, and in larger groups (high confidence). There is also evidence that activities associated with social gatherings and celebrations increase risk, including shared dining and events such as weddings and parties⁷. Whilst this research is likely to be indoors, it is the activity and proximity that raises the risk and the behaviours of those in attendance that enhances the risk of transmission.

¹⁴ [Technical Advisory Group: SARS-CoV-2 transmission risk in public toilets, March 2021](#)

¹⁵ [The Lancet, Stability of SARS-CoV-2 in different environmental conditions, April 2020](#)

¹⁶ [SPI-B: Managing infection risk in high contact occupations - 15 June 2020](#)

¹⁷ [Technical Advisory Group: current evidence relating to weddings, February 2021](#)

The highest risks of transmission, including those from super-spreading events, are associated with poorly ventilated and crowded indoor settings with increased likelihood of aerosol emission (such as loud singing/speech, laughing, aerobic activity^{18,19}) and when no face coverings are worn such as bars, nightclubs, parties/family gatherings, indoor dining, gyms and exercise classes, choirs and churches (high confidence). Whilst the risks are likely to be reduced outdoors (High confidence), personal protective behaviours and other responsible mitigations should be encouraged to reduce the risk of transmission.

As with the other settings, a major part of the risk is associated with activities surrounding the main activity. Whilst weddings may be outside, there may be activities around the event that increase the risk such as toilets, bars, rooms, and other indoor empty space where people may unintentionally congregate. The weather may play an impact upon the true ability to host a wedding outside. There is evidence to support the view that outdoors is safer than indoors, however what is not fully understood at the moment is the risk in semi-enclosed spaces i.e. marquees etc.

8. Outdoor hospitality

Generally outdoor hospitality will be less risky than indoor hospitality; however there are risks associated with hospitality in general as described in recent papers discussed at SAGE²⁰, outlined below. As above, behaviours and wrap around activities make important contributions to overall risk of transmission.

It is difficult to reliably assess the level of past transmission associated with the hospitality, leisure and retail sectors as they have been operating under different levels of restrictions for the past year. This also makes it difficult to estimate the potential risk associated with reopening. Though there are limitations in the evidence base, the sources of evidence available have broadly consistent findings. Overall, data suggest that the hospitality sector is associated with greater risk of transmission than the leisure and retail sectors.

The contribution of a setting to population infection rates will depend on both the likelihood of transmission occurring within that environment, and the frequency with which people visit that setting. The likelihood of transmission increases with the duration spent in the setting.

Settings with more risk factors which are visited frequently by many people, are likely to have a much bigger impact on population level transmission than those visited less frequently, or by fewer people (high confidence). The fraction of cases

¹⁸ [PHE/EMG: Aerosol and droplet generation from singing, wind instruments and performance activities, 13 August 2020](#)

¹⁹ [CDC. Epidemiologic Evidence for Airborne Transmission of SARS-CoV-2 during Church Singing, Australia, 2020, 2021](#)

²⁰ SAGE, Insights on transmission of COVID-19 with a focus on the hospitality, retail and leisure sector, April 2021 (SAGE 86, not published at time of writing, [link](#))

in a population that can be attributed to any individual sector or activity is relatively low, as transmission happens in many settings and during many activities (high confidence).

It is difficult to ascertain the individual contribution of these sectors to the overall transmission rates as they are closely linked to other activities and occupations, such as those associated with warehouses, delivery work, food production, and transport. Once hospitality and retail services are open, it leads to greater mixing and mobility across the population (medium confidence).

Studies that rely on the reporting of contacts (e.g. contact tracing data) may be less likely to identify transmission from asymptomatic people or transmission through long-range aerosols, which may lead to some underreporting of risk. Staff working in these sectors are shown to be at significantly higher risk of infection than customers, consistently demonstrated in all studies. Close contact service staff, in particular those working in restaurants, bars, and pubs, had the highest risk observed (high confidence).

There are several factors which may contribute to this risk, including frequent and multiple contacts at work, long working hours, working in settings where adherence to mask use or social distancing may be challenging, sharing transport or using public transport, or being more likely to live in large or multiple occupancy households (high confidence).

Staff attending the workplace while unwell (which may be more likely if not provided with paid sick leave or financial compensation) increases the risk of transmission in the environment, which increases risk for customers and other staff members (high confidence) - this a major modifiable risk.

As settings reopen, prevention measures will be important, e.g., limiting building occupancy, improving ventilation, prioritising outdoor seating, use of face coverings, physical distancing, adherence to quarantine, and encouraging vaccination ²².

9. Swimming pools

As with all sectors, people should not attend swimming pools (or any other setting) if they suspect they might have COVID-19.

The extent of transmission of SARS-CoV-2 in swimming activities compared to other settings is unclear, and there is limited data to draw on. However there is evidence that SARS-CoV-2 is considered more unstable in water and is susceptible to oxidants such as chlorine.²¹ The limited evidence available

²¹ [Coronavirus in water environments: Occurrence, persistence and concentration methods – a scoping review, July 2020, Water Research](#)

suggests that that swimming activities may be of lower risk when compared to exposure to SARS-CoV-2 in other settings (e.g. household contacts, healthcare settings), but not completely risk-free^{22,23}.

Outside of controlled laboratory conditions, it is very difficult to identify exactly where an individual is infected. Moreover, the risks associated with activities and environments surrounding the swimming activity also need careful consideration.

As highlighted in the section above, transmission risk is generally lower in outdoor environments when compared to indoor environments and therefore, it is likely that outdoor swimming pools are likely to be lower risk than indoor swimming pools.

Mitigations to reduce risks in these settings have been set-out previously and include advice on disinfection and social distancing²⁴.

10. Gyms, fitness classes, leisure centres and fitness facilities (individual or one-to-one training)

The risks identified in the TAG indoor exercise paper²⁵ highlighted several different risks, however the biggest risk was super spreading events.

It was noted in the paper that not all facilities where physical exercise takes place is the same. There are vast differences to the size, layouts, equipment, functions etc.

Currently (e.g. whilst there is circulating SARS-CoV2 in the community) outdoor exercise is safer than indoor exercise for reasons covered above.

Individual training coupled with preventative mitigations such as social distancing, effective ventilation, regular cleaning of surfaces etc. represents a lower risk than fitness classes where there are multiple people in close proximity and may possibly be sharing equipment (high confidence). International case data supports the view many of the cases are related to fitness classes.

However, with individual exercise, these mitigations are likely to depend upon type of facility, behaviours of individual members, and the way in which individual indoor exercise facilities encourage adherence to guidelines.

²² [MedRxiv, SARS-CoV-2 prevalence and transmission in swimming activities: results from a retrospective cohort study, March 2021](#)

²³ [Transmission of COVID-19 in 282 clusters in Catalonia, Spain: a cohort study, the Lancet, February 2021](#)

²⁴ <https://www.pwtag.org/technical-notes/>

²⁵ [Technical Advisory Group: SARS-CoV-2 infection risks at indoor exercise facilities, January 2021](#)

11. Extended households (another household that is not your support bubble)

As noted in previously published TAG advice, households are an important but not inevitable setting for transmission²⁶. The protective behaviours that people adopt and the characteristics of each extended household will vary and therefore the level of risk associated with each extended household will vary. For example, a larger extended household including people working in high-contact occupations will be more risky than a smaller extended household including people in low contact occupations.

This TAG advice summarises work by SAGE sub-groups that reinforces the importance of transmission within (and between) households and how to mitigate this²⁷, consistent with more recent advice relating specifically to VOC-202012/01³. For example, whole population communications can help to increase awareness of the necessity, feasibility and effectiveness of implementing household measures to reduce transmission, alongside information and support accessible by people in a range of household circumstances. It is suggested within-household transmission could be reduced by 25% if such measures are followed.

12. Rule of Six

The current rule in Wales provides for up to 6 people (not including children under 11 years of age or carers) from a maximum of 2 households to meet outdoors. In England the rules are:

- 6 people from any number of households (children of all ages count towards the maximum number of 6); or
- Any number of people from a maximum of two households can meet outdoors.
- For the purposes of the two households, an extended household (i.e. a household and a support bubble) would count as a single household, thus potentially a total of 4 households.

If the intention is to align with England for the purpose of harmonising the rules and for consistency of communication – as many consider the rules in England to be those that should/do apply in Wales; then we are comfortable that whilst this does present a risk we should align with the approach taken in England and therefore include children of all ages. There is evidence to demonstrate that children are both able to contract and transmit the virus whilst (high confidence) with reduced or minimal severity of symptoms.

²⁶ [Technical Advisory Group: using behavioural science to inform policy and practice, February 2021](#)

²⁷ [EMG/SPI-B/SPI-M: Reducing within- and between-household transmission in light of new variant SARS-CoV-2, January 2021](#)

It must also be noted that any extension beyond the current rule in Wales and if considered, that in England, must be considered in light of the current reduced infection numbers being a result of a natural firebreak presented by schools being closed or the last two weeks. With schools now fully reopen the number of infections amongst children may well rise now that they have returned to school and that schools have been reopened across the board.

Based on evidence outlined at SAGE²⁸, TAC would be supportive of maintaining the current exemption of children under 11 years of age from any cap in numbers. Particularly as the mitigation would be that those under 11 years of age would have to be from one of the households of the 6 people.

There is no new evidence to suggest that Wales' approach to children should change in terms of excluding under 12s from NPI restrictions- the precise age cut off of 11 /12 is administratively convenient, using junior school circumstances rather than a precise age cut off, but is reasonable, achievable and easily understood.

The key NPIs have always been to reduce overall contacts (using network theory to illustrate exponential spread risk with increasing numbers of contacts outside the household) as well as reduce droplet and aerosol spread (by social distancing, ventilation and face coverings) and reduce spread by personal or fomite contact (SD, hand and surface hygiene)

Increased outdoor mixing given low background rates could be seen as a behaviourally sound offer as it increases some freedom, aligned with clear rules about still maintaining social distancing between adults outdoors and maintaining a strict prohibition on increased indoor mixing at this time.

Further data on effects will be gained by regular data monitoring (rates, secondary infection rates, and test positivity rates, in the weeks after any relaxations. It is likely that any rise in rates will then be followed by some rise in hospital admission and then deaths – but the successful vaccination programme should offer protection against this.

There is limited info from modelling data as it does not clearly differentiate between indoor and outdoor mixing, it's clear that increasing indoor mixing would increase infection rates (and etc. as inevitable consequences) but less clear what increased outdoor mixing would do. Local IMT reports of the Ogmores Beach incident some months back showed no evidence of spread of cases from this one event of young people gathering. However this is local intelligence rather than published evidence and cannot be relied on as a single persuasive fact.

There remain potential risks: increasing household mixing and potential for disregarding of social distancing and other NPI rules. These should be set against

²⁸ [SAGE Children's Task and Finish Group: update to 17th December 2020 paper on children, schools and transmission](#)

potential benefits: response to reduced background rates and restoration of some freedoms; opportunity to emphasise the remaining indoor limitations to be strictly observed; prospect of encouraging outdoor exercise and increasing fitness.

Any decision should also take into account the potential additional risks and benefits for younger children being able to see unmasked faces outside is a huge advantage which has been denied to many children; families with more children (often Black or minority ethnic) can gather; disabled children in bubbles can have more social contact. There are risks of unclear communication about maintaining NPIs but these can be addressed with clear consistent communication strategies.

13. Children's indoor activities

As discussed previously by the Technical Advisory Group²⁹, there is now considerable evidence that children can be susceptible to COVID-19 and transmit infection, although their susceptibility appears to be less than adults (High confidence). There is also evidence that older children (over 11) are closer to adults in terms of transmission risk and that children have a similar viral load to adults³⁰ whether symptomatic or asymptomatic³¹.

Children also have around twice the average number of close contacts per day compared to adults, according to the CoMix social contact survey³², although this is closely correlated to school activity and reduces during holiday periods. As mentioned above, indoor environments generally pose a greater relative risk of transmission than outdoor environments. As a result, measures to mitigate risk should consider a hierarchy of controls approach, recognising that measures that eliminate or substitute higher risk interactions, i.e. by moving the activity outside, are more effective than controls that rely on conscious personal protective behaviours. The duration, activity and proximity of contact is likely to alter the transmission risk. Children at the activity are also likely to be accompanied by an adult(s) and there will likely be associated wrap-around activities such as pick-up, collection and for those parents observing the activity for the duration. The same risks to children would be enhanced towards the adults, as it is the behaviour that is perhaps the biggest factor, alongside duration spent there, especially if adherence to mitigations such as social distancing, face covering etc. were to diminish.

²⁹ [Technical Advisory Group: Evidence review on Children and Young People Under 18 in Preschool, School or College following the Firebreak, 09 November 2020](#)

³⁰ [MedRxiv, An analysis of SARS-CoV-2 viral load by patient age, June 2020](#)

³¹ [Han, M.S., Seong, M.W., Kim, N., Shin, S., Cho, S.I., Park, H., Kim, T.S., Park, S.S. and Choi, E.H., 2020. Viral RNA load in mildly symptomatic and asymptomatic children with COVID-19, Seoul, South Korea. *Emerging Infectious Diseases*, 26\(10\), pp.2497-2499.](#)

[MedRxiv An analysis of SARS-CoV-2 viral load by patient age, June 2020](#)

³² [Comix Survey, Social contacts in the UK from the CoMix social contact survey Week 53, April 2021](#)

14. Organised Indoor activities (up to 15 people, including exercise classes)

Organised indoor activities are likely to represent a higher risk (high confidence), especially where there are activities including exercise, singing, loud speaking etc. and are increased with duration and proximity³³. The number of people attending from different households also has the ability to create a wider network cluster should any transmission take place and so the increase in risk in super-spreading event³⁴. However the probability of coming into contact with an infectious person is reduced the lower the prevalence rate is. Like the above, groups should be encouraged to consider the hierarchy of risks and substitute outdoor spaces for individual and group activities where possible.

15. Community Centres

All of the above should be taken into account for advice around the transmission risk of indoor activities in community centres. Welsh Government has published [guidance](#) on the reopening and safe use of community centres and similar venues and this should be shared with those responsible for the centre.

16. International Update

The recent steep rises in many European countries, especially those in Eastern Europe, have been arrested (i.e. stabilised at high levels) or have been reversed (i.e. with daily rates of infection falling from high peaks). This is not a universal picture, however, and some countries are struggling still to arrest their increases, i.e. Lithuania and Sweden. Hitherto, Germany has managed its pandemic quite effectively but even here, the arrival of the new more transmissible variants is causing great difficulties in preventing rises in daily infection numbers.

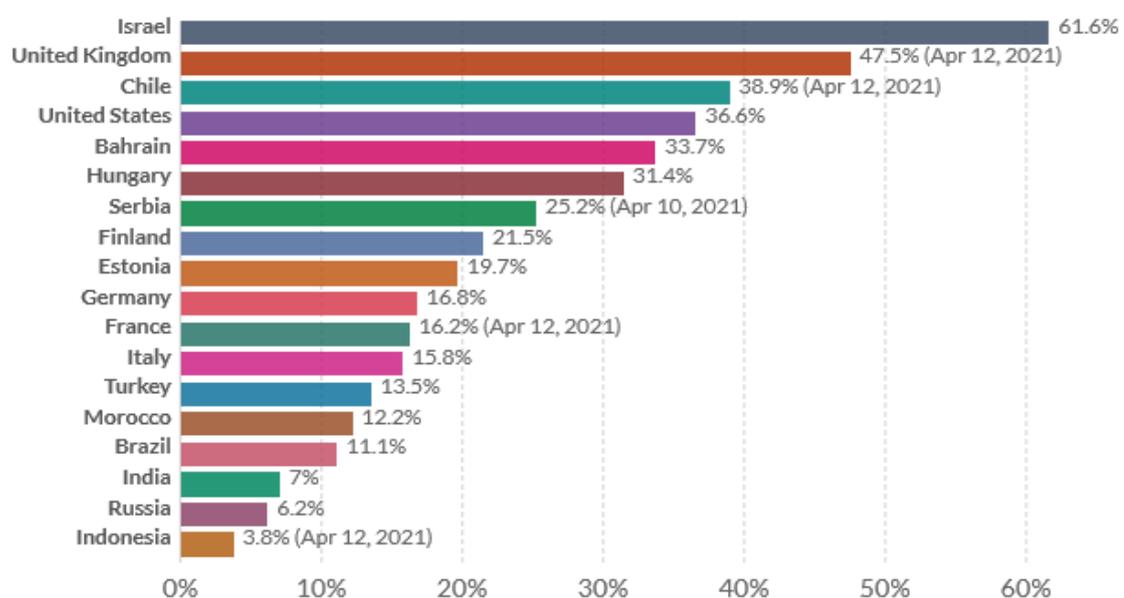
Across Europe, the vaccination programmes rollout have been slow compared to the UK although in the last week or so there has been an acceleration. However, the typical values for many European countries are still at the 15% to 20% of the population who have received at least one dose, compared to the UK of about 48% (see chart below) and there have been temporary interruptions and restrictions in the use of the Oxford AstraZeneca vaccine because of the blood clotting issue.

³³ [Technical Advisory Group: COVID-19 evidence associated with transmission and potential risks associated with religious activities and places of worship, April 2021](#)

³⁴ [EMG/ NERV TAG: SARS-COV-2: Transmission Routes and Environments, 22 October 2020](#)

Elsewhere, Israel is a good example of what can be expected when a significant proportion of the population has been vaccinated (approximately 62% of the population has received at least one dose, see chart below) as number of new infections has fallen to very low levels. Early evidence shows that the vaccination of a major part of the population does reduce the incidence of infection to very low levels but it will not eliminate it entirely, partly because there will always be a proportion who refuse to be vaccinated and partly because vaccination does not prevent infection entirely. The new, more infectious variants are still present in the Israeli population with predominantly the UK variant within the non-vaccinated part of the population and this and the South Africa variant still present in the vaccinated population. The presence of the UK and especially the South African variant in the vaccinated population, albeit in very small numbers, is due to its partial resistance to the vaccine and there remains a concern that this will impart selection pressure which will drive the evolution of more vaccine-evasive variants; however, the evidence shows that vaccination has reduced massively the likelihood of severe disease and death even for the partially resistant variants so there is every benefit to be gained from a comprehensive vaccine rollout³⁵.

Figure: Percentage of people who have received at least one dose of vaccine³⁶.



South America is experiencing a rapid resurgence of the pandemic, especially Argentina, Brazil, Chile, Paraguay and Uruguay and this is thought to be due to two main reasons – the new P1 Brazil variant and the relaxation and lack of adherence to NPI controls. Chile has undertaken a very rapid rollout of its

³⁵ [MedRxiv, Evidence for increased breakthrough rates of SARS-CoV-2 variants of concern in BNT162b2 mRNA vaccinated individuals, April 2021](#)

³⁶ <https://ourworldindata.org/covid-vaccinations>

vaccination programme and has achieved approximately 37% of its population having received at least one dose. However, this has not prevented the resurgence of their pandemic, mainly because of widespread relaxations of NPI controls as a sense of complacency set in with the rapid vaccine deployment but also because their main vaccine (approximately 90% of administered doses are the Sinovac vaccine from China) is much less effective at preventing infection, severe disease and death, i.e. it is thought to be only about 50% effective³⁷ rather than the 70% to 90% effectiveness of other vaccines.

India and Bangladesh are experiencing extremely rapid rises with both countries having recorded a 6-fold increase in daily infection rates in the last three weeks, although in India the very rapid rise is confined to only a few regions (as yet). The rise in India (see 7-day rolling average graph below³⁸) is thought to be mainly due to people's behaviours but there are worries over the emergence of a new 'double mutant' virus and the spread of the UK variant³⁹ ⁴⁰. Similarly Turkey, Iran and Iraq are experiencing very rapid rises in a similar manner to those experienced by the UK and European countries earlier this year, again thought to be due partly to the new variants.



What is obvious is that maintenance of NPIs is still the most effective means of controlling the pandemic, even in countries which are well down the road of rolling out their vaccine programmes and it is still too early to decide what mix of vaccination and NPI controls will be most effective in the future as new variants continue to emerge. Confidence remains high that when a very large majority of the population has been fully vaccinated, the disease incidence will fall to very low

³⁷ <https://www.bbc.co.uk/news/world-asia-china-56713663> and <https://www.ft.com/content/c54b02d6-00a0-4b7d-9160-a9353800efd3>

³⁸ <https://ourworldindata.org/covid-cases>

³⁹ <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1707177>

⁴⁰ <https://www.bbc.co.uk/news/world-asia-india-56517495>

levels, but the potential for new variants will mean that global vigilance will be required for some time to come.

17. Disclaimer

- It is important to note that due to limited evidence relevant to specific environments, it has been necessary to refer to a smaller numbers of studies conducted outside of the UK and under varying levels of restrictions. Therefore the studies may not be directly comparable to each other, or generalisable to Wales.
- Some of these studies are also published 'preprints' from sites such as MedrXiv and therefore have not been subject to the same level of independent peer-review as evidence published in scientific journals. These preprints are identified in the text.
- Moreover, outside of controlled laboratory or experimental conditions, it is very difficult to identify exactly how, where and when an individual has been infected and therefore these studies should be treated with caution. However, due to the dynamic nature of the pandemic and timelines involved evidence is often emerging and is revisited as more substantive peer reviewed scientific papers and studies are published.

Appendix A: Policy Modelling Contribution, 15 April 2021 - Welsh Government COVID-19 TAG Policy Modelling Subgroup

Summary

- This paper explores the results of policy modelling carried out by Swansea University to understand possible futures around the coronavirus pandemic in Wales. Following the announcement of school and further education policy decisions, the models have been updated to reflect the real life scenario of all pupils having returned to school. This model has produced estimates until the end of March 2022.
- Overall the modelled scenarios suggest that it is likely cases, hospitalisations and deaths will increase in the second half of 2021 as restrictions are eased.
- The model does not contain a factor for waning immunity. The results should be viewed with this in mind, and caution should be taken not to mistake the model for a prediction.
- So far in 2021, it is likely that restrictions and public responses have had an impact in reducing transmission of the virus and reducing hospital admissions and deaths. As we move into the next phase, the vaccination programme will have to do more of the 'heavy lifting' in preventing COVID-19 harms.
- It is likely that future outbreaks will occur in children and young people who have more contacts and have not yet been vaccinated, so in future it may be useful to set out what level of virus transmission is acceptable if vaccinations are keeping hospitalisations and deaths low.
- Key uncertainties are around the level of adherence to social distancing and other precautions, the impact of vaccines on transmission, and the impact of new variants.
- The main issues that could cause a significant resurgence of COVID-19 harms are widespread transmission of a vaccine escape and/or immune escape variant; a breakdown in social distancing behaviour; or to a lesser extent, a change in vaccine supply or significant drop in vaccine uptake.
- As vaccine roll out continues, the horizon looks more positive in terms of expecting lower numbers of COVID-19 deaths than were observed in November 2020 – February 2021.
- Continued surveillance of infections in schools, effectiveness of vaccines, and impact and spread of variants is crucial in helping to understand what trajectory Wales is following in terms of the pandemic and in fine-tuning future policy

formulations to deal with the pandemic while reducing other health, educational and socioeconomic harms and inequalities.

- Further work is currently underway looking at the dynamics of vaccinations in the model. We think this will impact hospital admissions and deaths, and therefore the estimates presented in this paper are likely to represent pessimistic scenarios in terms of the ratio of cases to harms.

Objective

The objective of this paper is to examine scenarios for COVID-19 in Wales from April 2021-March 2022, which include different assumptions around the impact of new variants, impacts of vaccine efficacies and individuals' ability to continue to follow restrictions and to continue to adopt protective behaviours (labelled in this paper as "adherence").

Background

Wales went into level 4 restrictions on 20th December 2020 following the identification of the new Variant of Concern 202012/01, increasing rates of confirmed COVID-19 case rates, and pressure on the NHS.⁴¹ Over 50% of the population of Wales have now received one dose of a vaccine, including over 95% of over 80 year olds and over 83% of 50-54 year olds, the final group in the top nine priority groups Welsh Government have targeted to offer a first dose of the vaccine to by 15th April 2021. This is expected to lead to a reduction in hospitalisations and deaths in vaccinated groups.

The current case rate as of 15th April 2021 for Wales is below 20 confirmed cases per 100k (7 day rolling), and positivity has also fallen below 2% after peaking at over 25%. In addition, prevalence is 0.12% (as measured by the ONS COVID Infection Survey) and antibody prevalence was 49.1% in the week to 28th March 2021 (as measured by the COVID Infection Survey), indicating that a higher percentage of people have antibodies present either following natural infection or vaccination.

Evidence Summary

The latest information about the COVID-19 situation in Wales can be found on the Welsh Government website.⁴²

⁴¹ [Written Statement: Alert level four restrictions](#)

⁴² [Technical advisory Cell: summary of advice 2 April 2021](#)

Updated modelling scenarios from Swansea University

Swansea University produced a range of modelled scenarios (864 in total) for the time period up to end of March 2022. The methods have been described previously.⁴³

Level of restrictions in place across Wales

The Welsh Government has set out four alert levels for public response to threat levels, that require measures designed to control the spread of the virus and protect people's health.⁴⁴ Wales has been in Level 4 restrictions since 20 December 2020, although restrictions have been slowly easing to move Wales from Level 4 to Level 3 by 17th May 2021, subject to public health conditions remaining favourable⁴⁵. Three scenarios are modelled in this paper which assume the level of restrictions in place across Wales would be:

Scenario 1 (accelerated):

- From 12 April = schools return plus low risk bits of alert level three
- From 3 May = full move to alert level three
- From 24 May = move to alert level two
- From 28 June = move to alert level one

Scenario 2 (delayed):

- From 12 April = schools return plus low risk bits of alert level three
- From 10 May = move to alert level three
- From 14 June = move to alert level two
- From 19 July = move to alert level one

Scenario 3 (phased):

- From 12 April = schools return plus low risk bits of alert level three
- From 10 May = move to alert level three
- From 24 May = move to alert level 2.5 (in between three and two)
- From 31 May = move to alert level two

⁴³ <https://gov.wales/sites/default/files/publications/2021-03/technical-advisory-cell-modelling-update-12-february-2021.pdf>

⁴⁴ [Coronavirus Control Plan: Alert levels in Wales](#) (14 December 2020).

⁴⁵ [Moving Wales into Alert Level 3: First Minister sets out plans to further relax COVID restrictions](#) (31 March 2021)

- From 28 June = move to alert level one

Effectiveness of vaccines

The scenarios modelled in this paper all set out a range of possibilities for how effective vaccine is against clinical events and transmission: either 75%, 90%, or 95% effective. This is represented in each figure by a band representing the lower, central, and upper estimates for cases, hospitalisations, ICU occupancy and deaths in each model. Scenarios were previously produced for a vaccine efficacy of 60%, but since latest evidence indicates that the lower vaccine efficacy of 60% is unlikely, outputs from the model using 60% efficacy are not included in this paper.

Levels of ‘adherence’

Each of the scenarios modelled in this paper is presented twice, side-by-side. The ‘adherence’ levels in these scenarios are modelled on the assumption of both:

- ‘Good adherence’ (where ‘adherence’ is at a level equivalent to what was seen during the autumn firebreak in Wales), including the level of financial and societal support and approval, as well as individual action that is required to achieve it.
- ‘Low adherence’ (where ‘adherence’ is at a level equivalent to what was seen during December 2020 in Wales). In this analysis, low or good adherence is in reference to individual’s numbers of contacts, which may change as a result of motivation to comply, but also depending on ability to comply, for instance if workplaces require them to return to working on-site. So it is not only about adherence with the rules, but also how many contacts people are having which may still be within the rules. We know that so far in the pandemic, adherence has been high and there has been a huge collective effort to reduce contacts, take precautions (such as meeting outside, wearing face covering, handwashing, etc) and control the virus. In these scenarios, good adherence is similar to the reduction in contacts seen in the October 2020 firebreak, while poor adherence is more like the number of contacts seen in December 2020.

Impact of Variants

Three levels of impact of new variants have been included; old variant, where the virus behaves as it did up until around November 2020, NV_0.4 where the new variant initially adds around 0.4 to the Rt number (but this will change over time based on transmission dynamics) and NV_0.6 where the new variant adds around 0.6 to the initial Rt number (similar to R_0 of 4.5). Current analysis from England

still suggests that the new variant may add around 0.4 to 0.7 to the R_t number, but this would be if the new variant was 100% of cases, and the background R_0 in Wales may be slightly lower than in England because Wales has more people in rural areas, so 0.6 is felt to be a sensible high value to use in the modelling. The increased R_0 of the B.117 variant is reflected in the fact that it has quickly become dominant around the world and has been associated with fast growth in many countries like Germany, some US states, and recently, Thailand.⁴⁶⁴⁷

Results Summary

All model scenarios predict an increase in cases in the second half of 2021. If the new variant effect initially contributes 0.6 to the R_t number, then the models predict a peak between May 2021 and September 2021. If the new variant effect initially contributes 0.4 to the R_t number, then the models predict a small rise in cases from November 2021.

These scenarios suggest that levels of adherence to restrictions has the greatest impact on the number of cases, hospitalisations and deaths, with a smaller contribution from vaccine effectiveness. This aligns with the previous model scenarios from which the current MLS and RWC were obtained, in which levels of adherence made the greatest impact to the number of transmissions.

If adherence with restrictions wanes, then there may be a larger resurgence of the virus around May-June time, especially if the new variant adds around an initial 0.6 to the R_t number. Given that the peaks in hospital cases and deaths for those scenarios with the least optimistic assumptions come at least 2 months after moving to Level 3, this would in a real-world scenario allow some opportunity to re-impose more stringent restrictions at an early stage if data indicated that cases were following such a trajectory. As such it indicates the importance of carefully monitoring key indicators and reacting swiftly if needed.

It is clear that the impact of new variants, vaccine efficacy and 'adherence' are great, and even the most pessimistic scenarios do not see as many deaths as have happened in recent months.

Tables 1A shows the total cases, deaths, admissions and ICU admissions between the 1st April 2021 and 30th June 2021 predicted for each scenario. For all scenarios, the number of cases and deaths reduce as vaccine efficacy increases or adherence to restrictions improves.

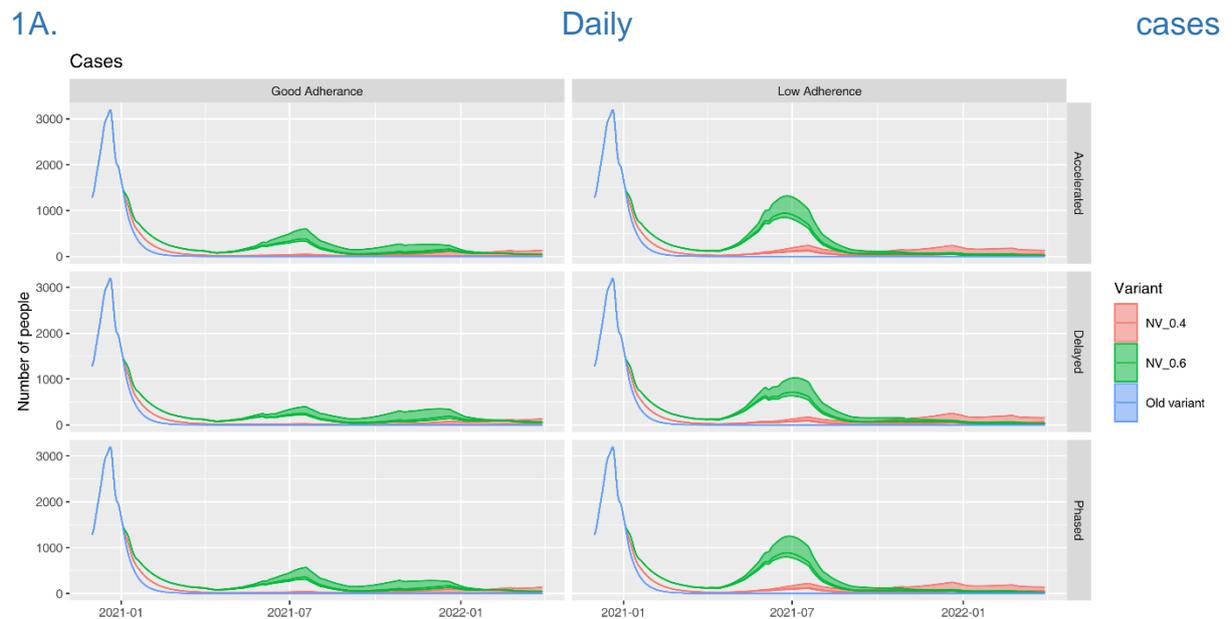
Tables 1B shows the daily peaks of cases, deaths, admissions and ICU admissions between the 1st April 2021 and 30th June 2021 predicted for each

⁴⁶ <https://www.reuters.com/article/us-health-coronavirus-germany-variants-idUSKBN2AX0RV>

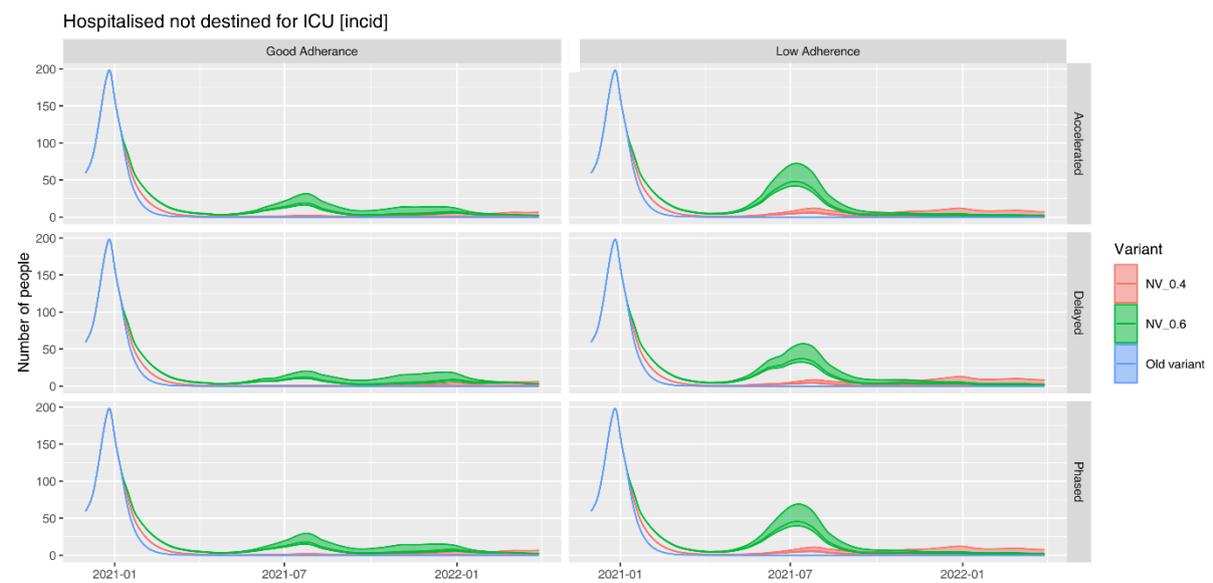
⁴⁷ <https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---13-april-2021>

scenario. For all scenarios, the maximum number of cases and deaths reduce as vaccine efficacy increases or adherence to restrictions improves.

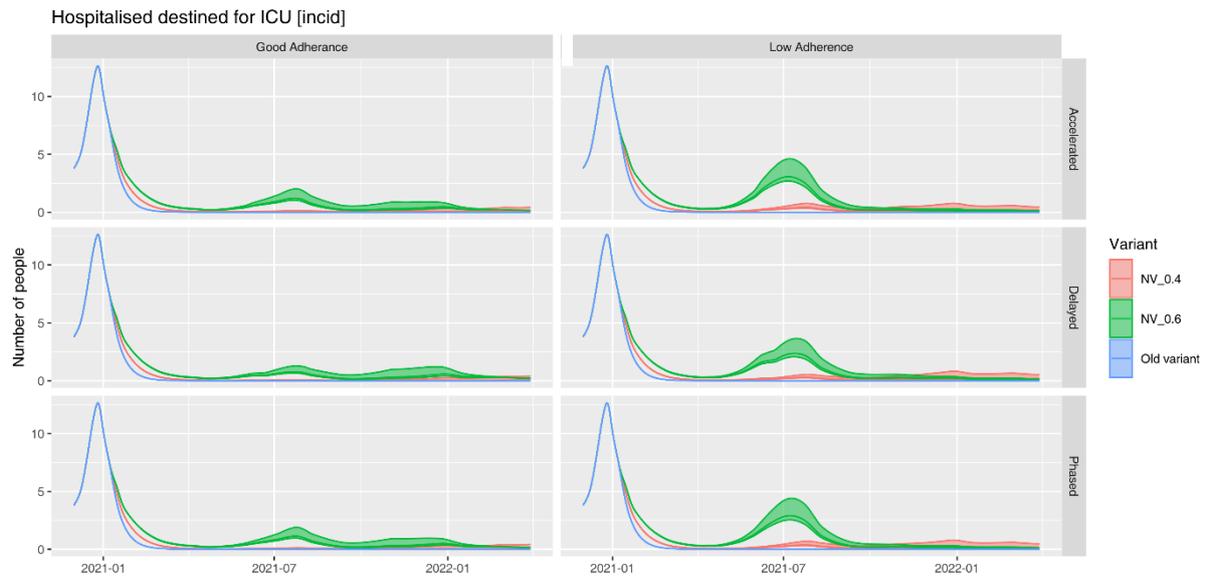
Figure 1. Trend in outcomes for an “Accelerated approach”, “Delayed approach” and “Phased approach”, with good/low adherence, varying effects of new variants (coloured curves), and different vaccine efficacy (areas around trend lines).



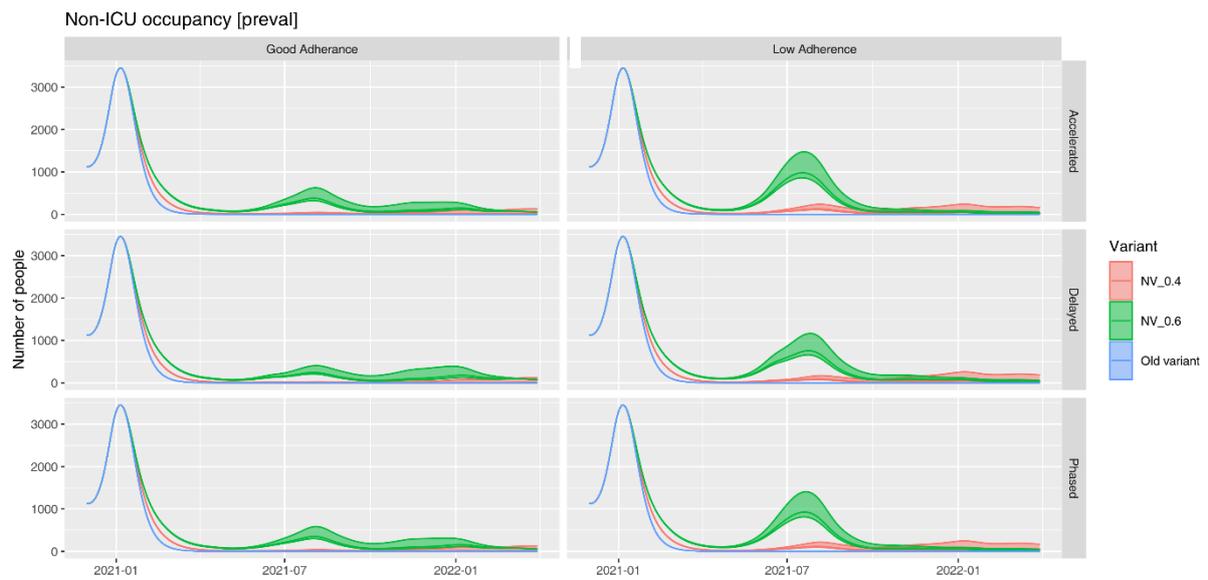
1B. Hospital admissions not destined for ICU (COVID-19 positive cases).



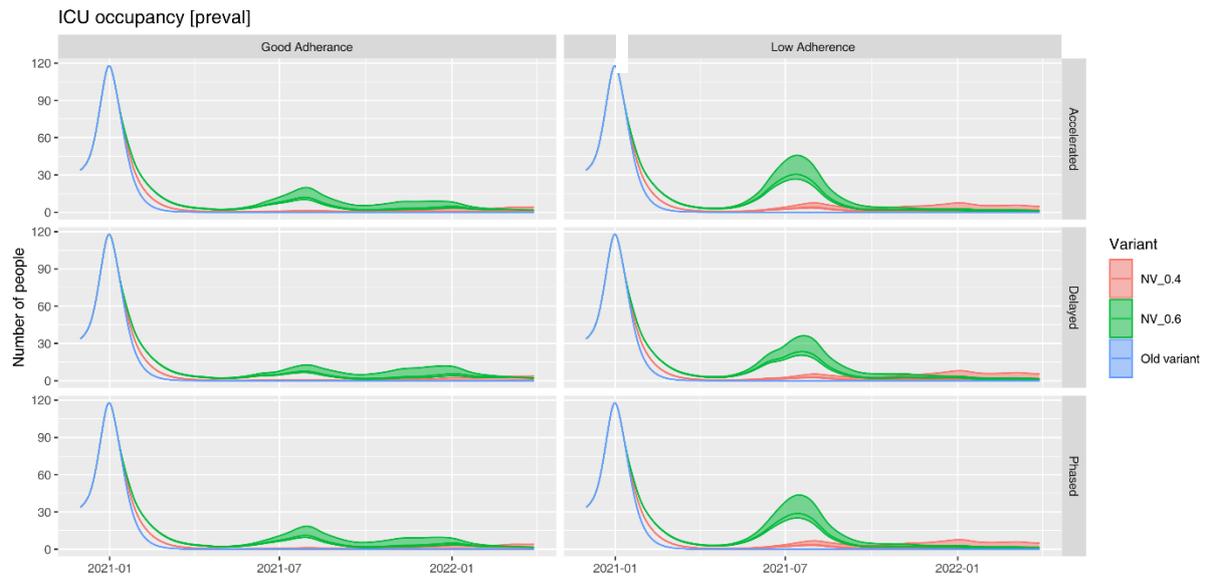
1C. Hospital ICU admissions (COVID-19 positive cases).



1D. Hospital non-ICU occupancy (COVID-19 positive cases).



1E. Hospital ICU occupancy (COVID-19 positive cases)



1F. Deaths.

