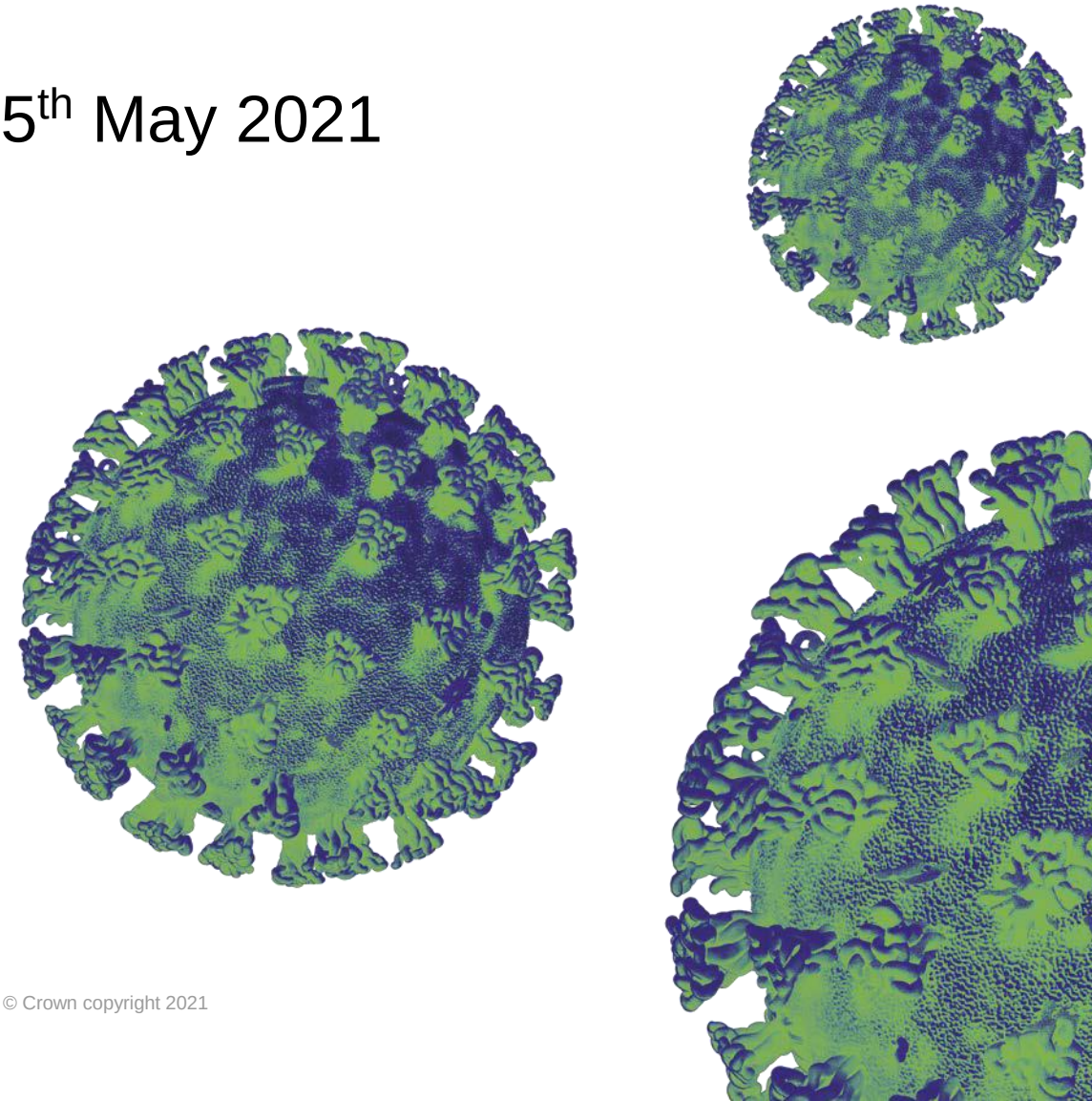
Llywodraeth Cymru
Welsh Government

Technical Advisory Group

Policy modelling update

5th May 2021



Policy modelling update 5th May 2021

Welsh Government COVID-19 TAG Policy Modelling Subgroup

1. Summary

- This paper explores the results of policy modelling carried out by Swansea University to understand possible futures around the coronavirus pandemic in Wales.
- The epidemiological models have produced estimates of infections and direct COVID-related harms 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.
- 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.
- Evidence is emerging suggesting that vaccines are preventing onward transmission which means the number of cases, based on current variants in circulation in Wales, is likely to be smaller than previously experienced. However, there is still uncertainty about duration of effectiveness of available vaccines and plans for booster vaccinations.
- It is likely that future outbreaks will occur in children and young people who have more contacts and have not been vaccinated, so in future it may be useful to consider what level of virus transmission is acceptable if vaccinations are keeping hospitalisations and deaths low.
- Key uncertainties are: the level of adherence to social distancing and other restrictions; the impact of vaccines on transmission; the impact of new variants; and, the possibility of waning immunity.
- This paper shows how the dominant B117 variant would have produced a much worse peak had it been the dominant variant in the first wave (Appendix 2).
- The current modelled scenarios do not include the impact of antigenic drift or waning immunity; so are likely to be robust for the next few months, but further evidence is likely to be established in advance of Winter 2021/22.
- 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. New

variants also need to be monitored for differential impacts, for instance on children.

- As the 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, supply, uptake and 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.

2. 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").

3. 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 case rates, and pressure on the NHS.[1] Over 57% of the population of Wales have now received one dose of a vaccine. This includes over 95% of over 80 year olds and more than 85% of 50-54 year olds, the final group in the top nine priority groups Welsh Government targeted, and achieved, 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 case rate as of 22nd April 2021 for Wales is 12.2 confirmed cases per 100k (7 day rolling), and positivity has also fallen below 1.4% after peaking at over 25%. In addition, prevalence is 0.11% (as measured by the ONS COVID Infection Survey in the week to 10th April 2021) and antibody prevalence was 61.0% in the week to 11th April 2021 (as measured by the COVID Infection Survey), indicating that a high proportion of people have antibodies present either following natural infection or vaccination.

4. Evidence Summary

The latest information about the COVID-19 situation in Wales can be found on the Welsh Government website.[2]

5. Updated modelling scenarios from Swansea University

Swansea University produced a range of modelled scenarios (72 in total) for the time period up to end of March 2022. The methods have been described previously.[3]

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.[4] Wales has been in Level 4 restrictions since 20 December 2020,

[1] Written Statement: Alert level four restrictions
[2] Technical advisory Cell: summary of advice 2 April 2021
[3] https://gov.wales/sites/default/files/publications/2021-03/technical-advisory-cell-modelling-update-12-february-2021.pdf
[4] Coronavirus Control Plan: Alert levels in Wales (14 December 2020).

although restrictions have been slowly easing to move Wales from Level 4 to Level 3 by 3rd May 2021, subject to public health conditions remaining favourable[5]. 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
- From 28 June = move to alert level one

In all scenarios it was assumed that a complete return to normal contact behaviour would not occur over the time period. Instead, it was assumed that a level of contact behaviour half-way between level 1 and completely normal (level 0.5) was set from 1st August 2020 until the end of the simulations.

Effectiveness of vaccines

The scenarios modelled in this paper all set out a range of possibilities for how effective vaccine is against infection and clinical events: either 65%, 80%, 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. This range of vaccine efficacy levels was chosen to reflect general 'low', 'medium' and 'high' efficacy scenarios based on current knowledge. There remains considerable uncertainty on the vaccine efficacy in the population across different events (infection, transmission, hospitalisation, deaths), how these change between first and second doses, and on age-specific vaccine efficacies. Our efficacies are chosen to represent averages across these parameters, using the first dose roll out as the time point of vaccination, plus a two week delay before the

[5] Further coronavirus restriction relaxations brought forward (22 April 2021)

vaccine effects occur. Evidence is emerging on these parameter values, and the model will be updated to include more detailed vaccine effects when they are clear.

The policy modelling has been updated to reflect the differing uptake rates across age bands:

- 95% for over 65s (observed)
- 85% for 50-64 (observed)
- 70% for 40-49 (assumed)
- 60% for 30-39 (assumed)
- 50% for under 30 (assumed)

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)
- '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 low adherence is more like the number of contacts seen in December 2020.

Impact of Variants

The main outputs centre on the B117 variant (termed NV_0.6 and shown in green in the figures). This variant arose in November 2020 and quickly became dominant across the UK. B117 was estimated to add approximately 0.6 to R_t, as compared to a baseline $R_t = 1.3$. (Note that the magnitude of the additive effect changes with the transmission dynamics and control measures in place over time, and is equivalent to an approximate R_0 of 4.3). For comparison, the 'old variant', representing the virus transmission dynamics prior to December 2020, is shown (blue lines), illustrating the considerable increase in impact of the B117 variant. An intermediate variant, NV_0.4

is also shown (red lines) for comparison, for which the variant adds 0.4 to the R_t number as observed in November (compared, again, to baseline $R_t = 1.3$).

Current analysis from England still suggests that the dominant Kent B.117 variant may add around 0.4 to 0.7 to the R_t number compared with the wild type variants, 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 considered 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 is has quickly become dominant around the world.[6,7] Other variants of concern may have increased infectivity or be more likely to escape vaccines.

6. Results Summary

All model scenarios predict an increase in cases in the second half of 2021. For B117 the models predict a peak between May 2021 and September 2021. If the 'new variant' effect contributes only 0.4 to the R_t number, then the models predict a small rise in cases from November 2021. All scenarios with the wild type variant indicate that subsequent peaks are unlikely (at least under the assumption that there is no waning immunity over the period).

These scenarios suggest that levels of adherence to restrictions and the transmissibility of the Variant of Concern (VOC) have 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 to restrictions falls, then there may be a larger resurgence of the virus around May-June time, especially under the B117 scenario. 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 large, and even the most pessimistic scenarios do not see as many deaths as have happened over the winter period.

Figures 2A, 2B and 2C compare the model-estimated deaths with the current Reasonable Worst Case (RWC), Most Likely Scenario (MLS), and actual deaths reported by ONS and PHW. Figures 3A, 3B and 3C compare the model-estimated

[6] https://www.reuters.com/article/us-health-coronavirus-germany-variants-idUSKBN2AX0RV

[7] https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---13-april-2021

admissions with the current RWC, MLS, and actual admissions reported by PHW. From these charts, it is clear that none of the models are likely to follow the current RWC and all estimate significantly lower deaths than the MLS assuming “good” adherence up to end of June 2021. The current RWC predicts a peak around May/June 2021. The reason for the differences include:

- Previous RWC included some more pessimistic vaccine efficacy assumptions
- Current vaccine roll out has outpaced assumptions (rate of first dose roll out has not decreased alongside second dose delivery)
- Previous RWC included potential Low adherence scenarios over February and March, which are now considered unlikely

Consequently, the most recent policy modelling scenarios estimate a peak around July/August 2021 and of lower magnitude than the current RWC. We therefore recommend updating the current RWC and MLS.

Tables 1A, 2A and 3A show the total symptomatic cases (in future labelled as “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, 2B and 3B show the daily peaks of COVID-19 cases, deaths, admissions and ICU admissions between the 1st April 2021 and 30th June 2021 predicted for each scenario. For all scenarios, the maximum number of cases and deaths reduce as vaccine efficacy increases or adherence to restrictions improves.

The total number of COVID-19 cases and deaths was lowest under the delayed approach.

Interpretation – new Reasonable Worst Case and Most Likely Scenario

These model results do not include waning immunity or antigenic drift, so should be interpreted with caution over a longer time horizon. It may be that we see some resurgence of the virus in Winter 2021-22 due to waning immunity, due to virus mutations or recombination, or due to low uptake of the vaccine in younger age groups combined with increased contacts.

The current reasonable worst case (RWC) has a peak that may happen in May 2021, which is very unlikely with the low incidence we are seeing now. The RWC still exists as a planning scenario that is meant to be pessimistic but plausible, not what we think will happen. We therefore propose the RWC scenario to be the most pessimistic of these scenarios: vaccine 65% effective, “low” adherence, accelerated release of restrictions, and B117 variant R_t number.

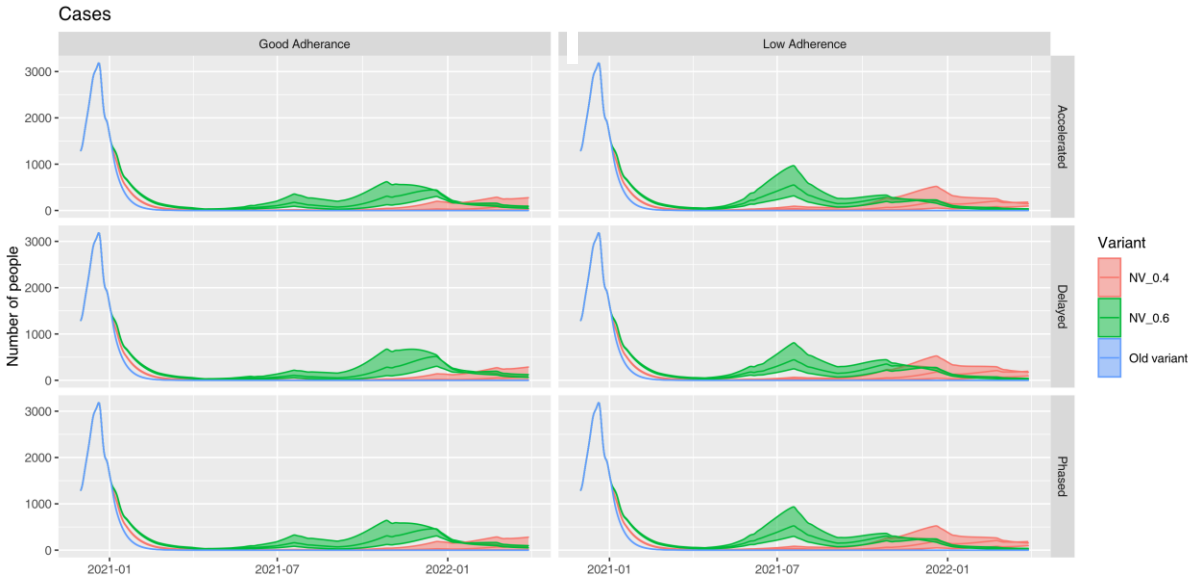
At the same time, we can update the Most Likely Scenario (MLS) with more recent data. We consider that the new MLS is likely to be the following: “good” adherence of

existing restrictions, vaccine 80% effective, accelerated release of restrictions, and B117 R_t; but this will be monitored over time as to whether it fits the relevant data.

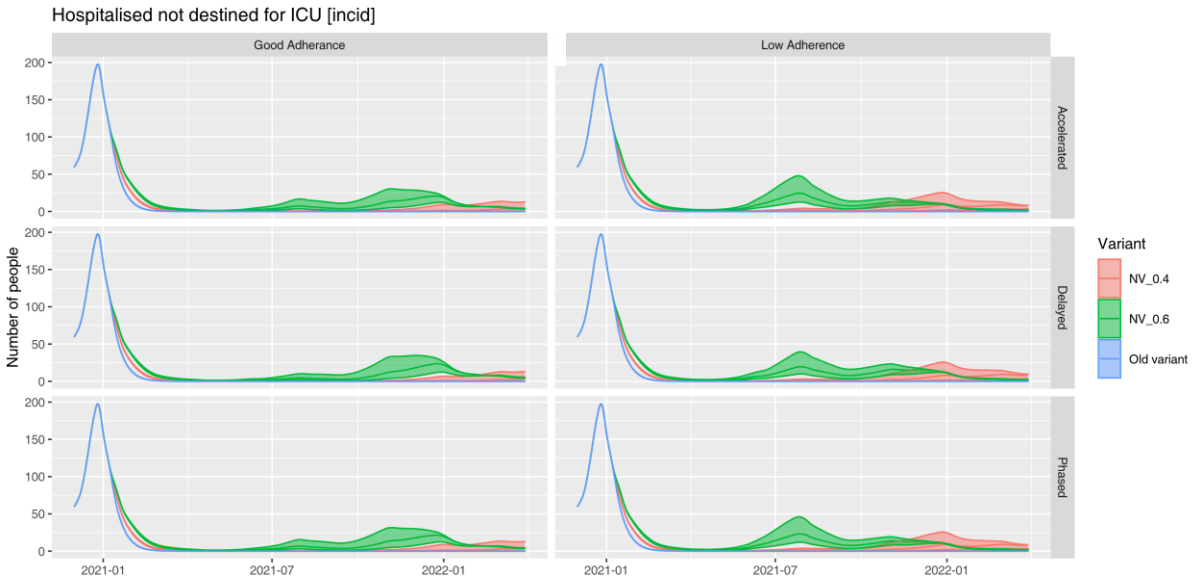
Figure 4 showing the new proposed MLS and RWC scenarios are included in the appendix. The charts also include the current February 2021 MLS and February 2021 RWC for comparison.

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).

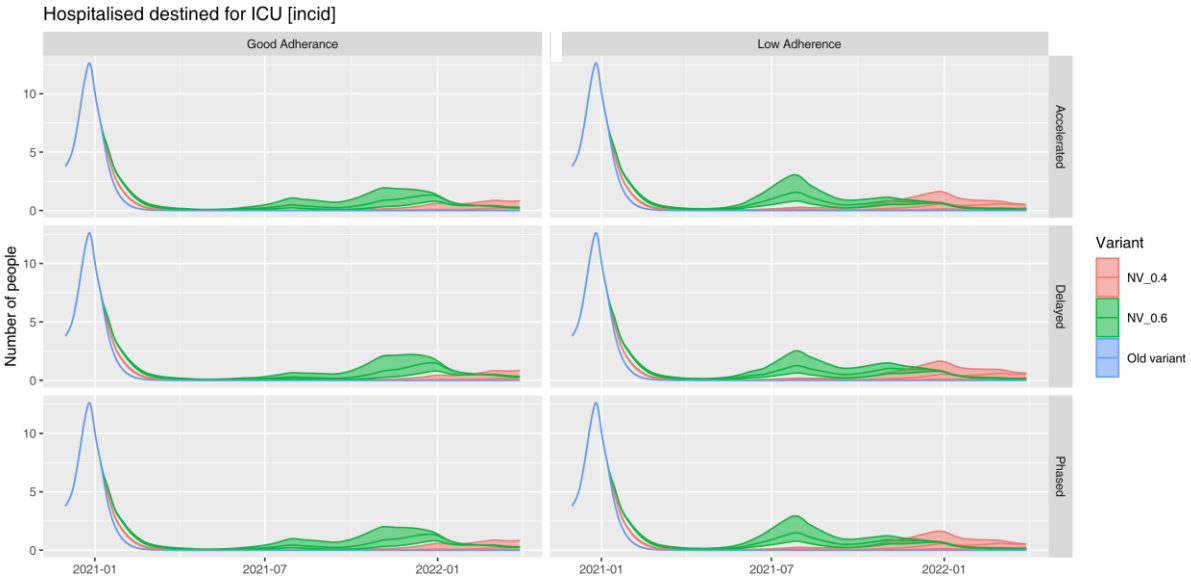
1A. Daily cases



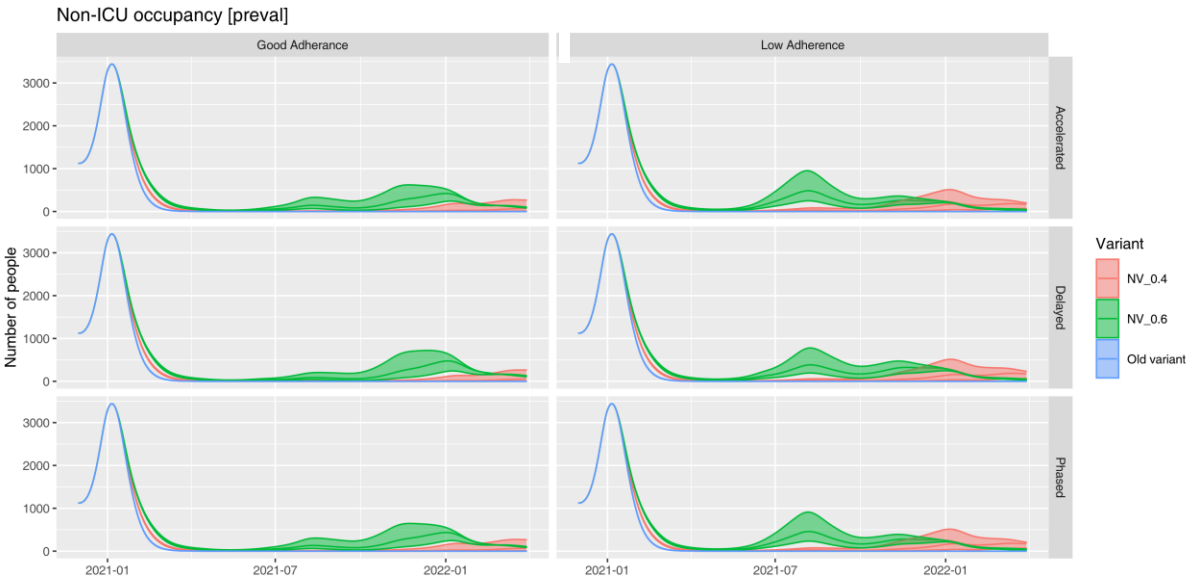
1B. Hospital admissions not destined for ICU (COVID-19 positive cases).



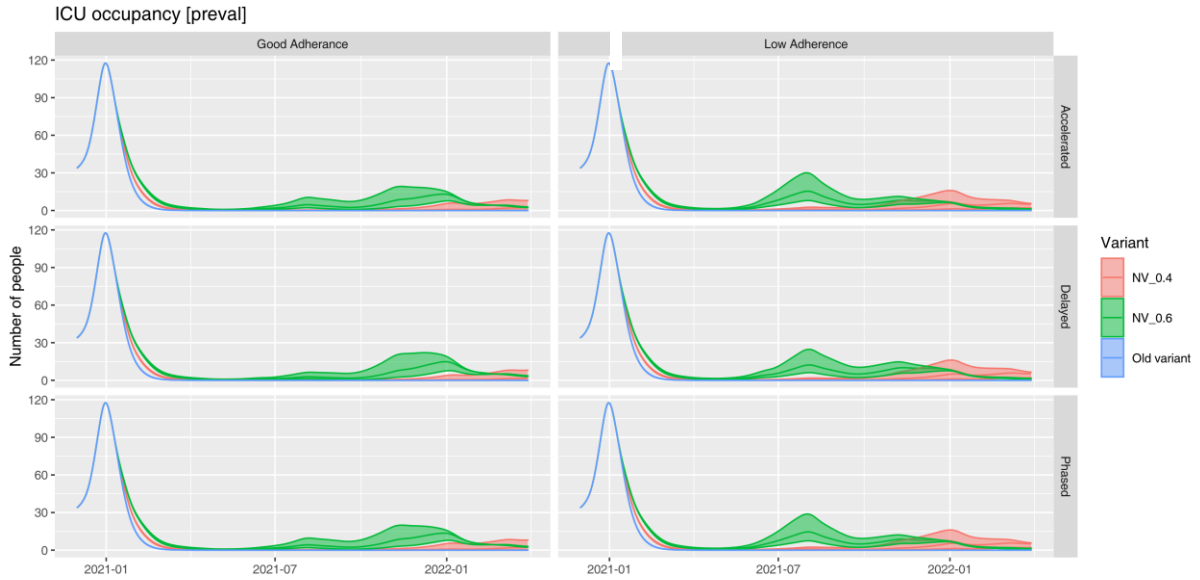
1C. Hospital ICU admissions (COVID-19 positive cases).



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



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



1F. Deaths.

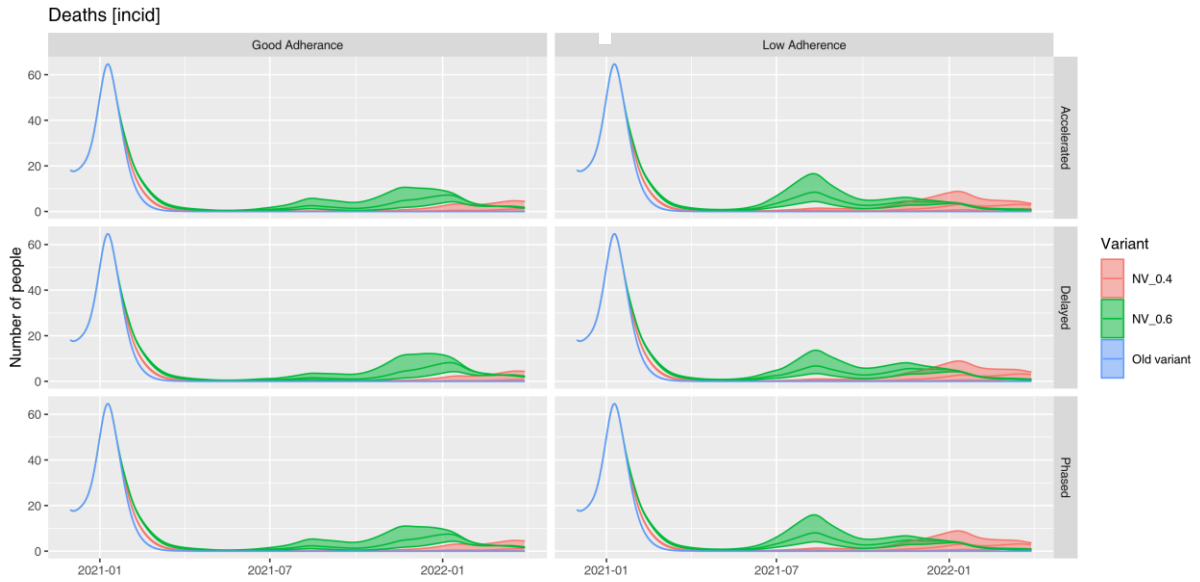
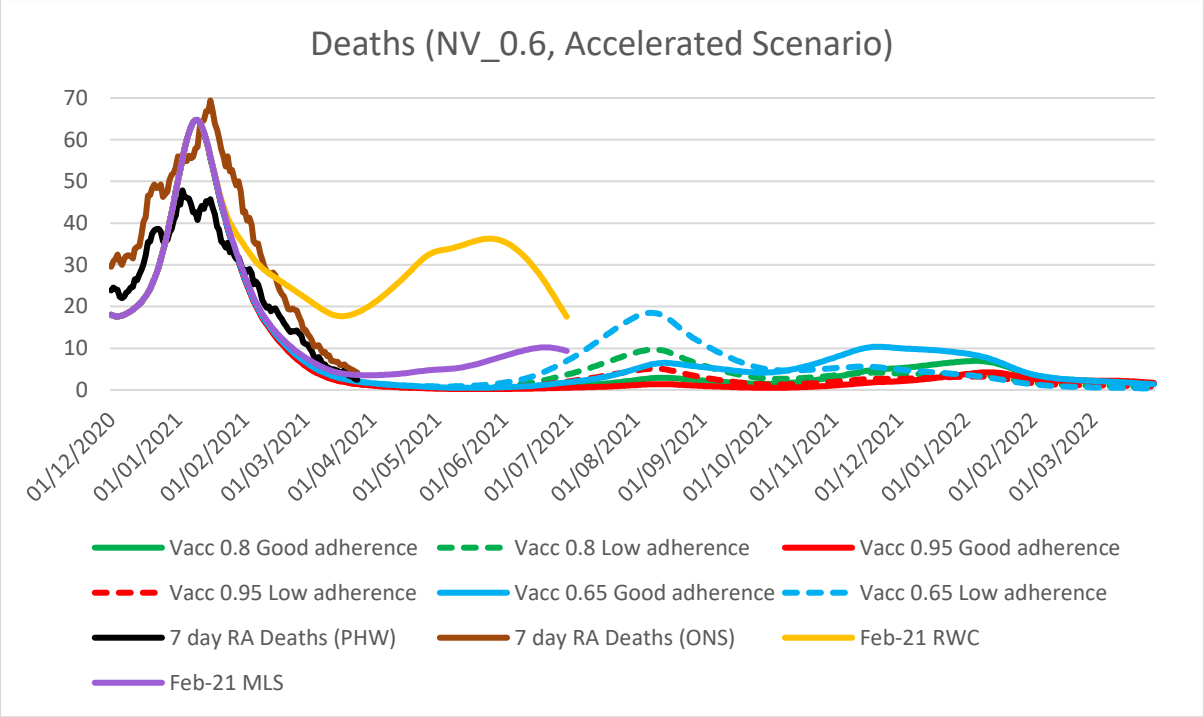
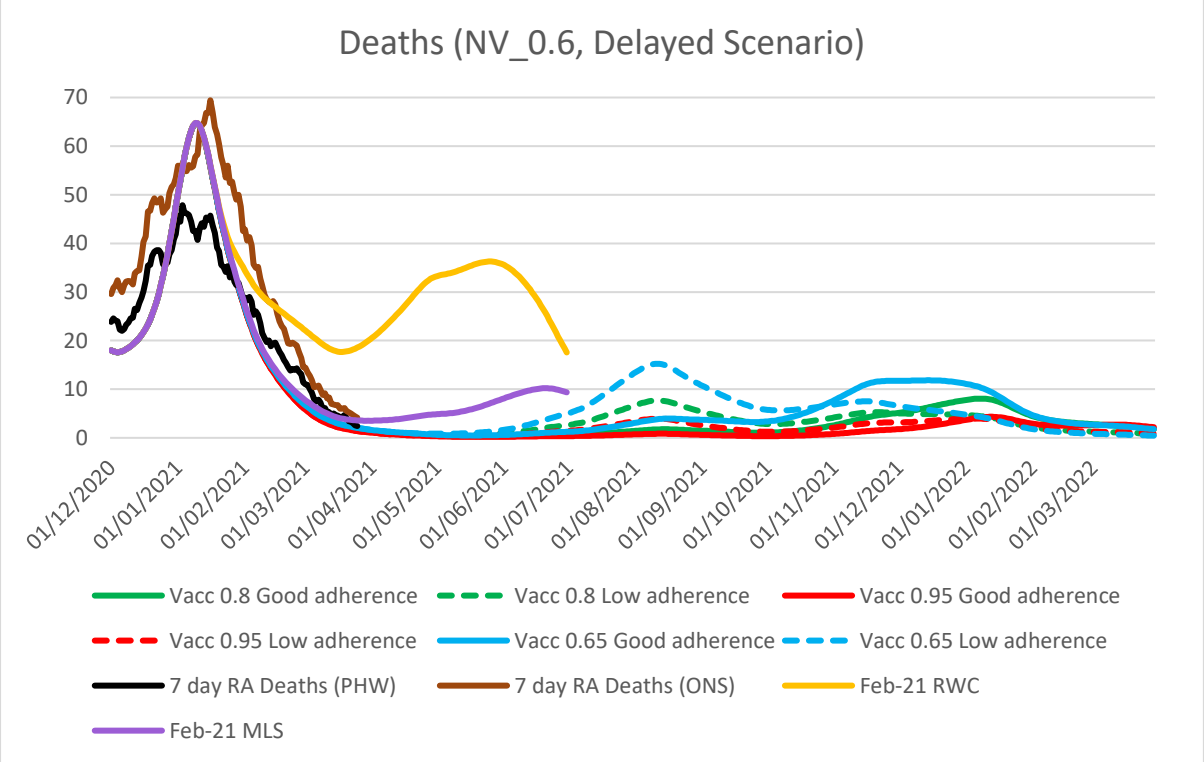


Figure 2. Model-estimated COVID-19 deaths along with the current RWC (RWC_0221) and MLS (MLS_0221), compared to the actual deaths reported by ONS and PHW, for the three scenarios: “Accelerated approach”, “Delayed approach” and “Phased approach”.

2A. Accelerated approach



2B. Delayed approach



2C. Phased approach

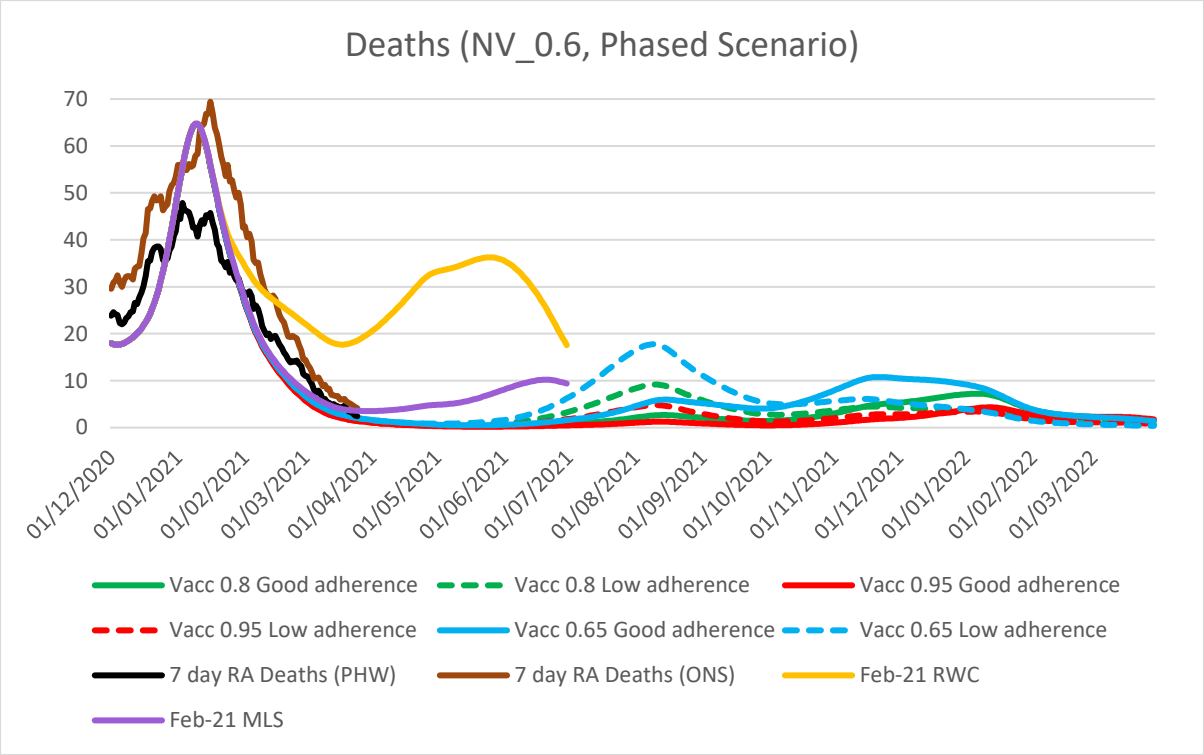
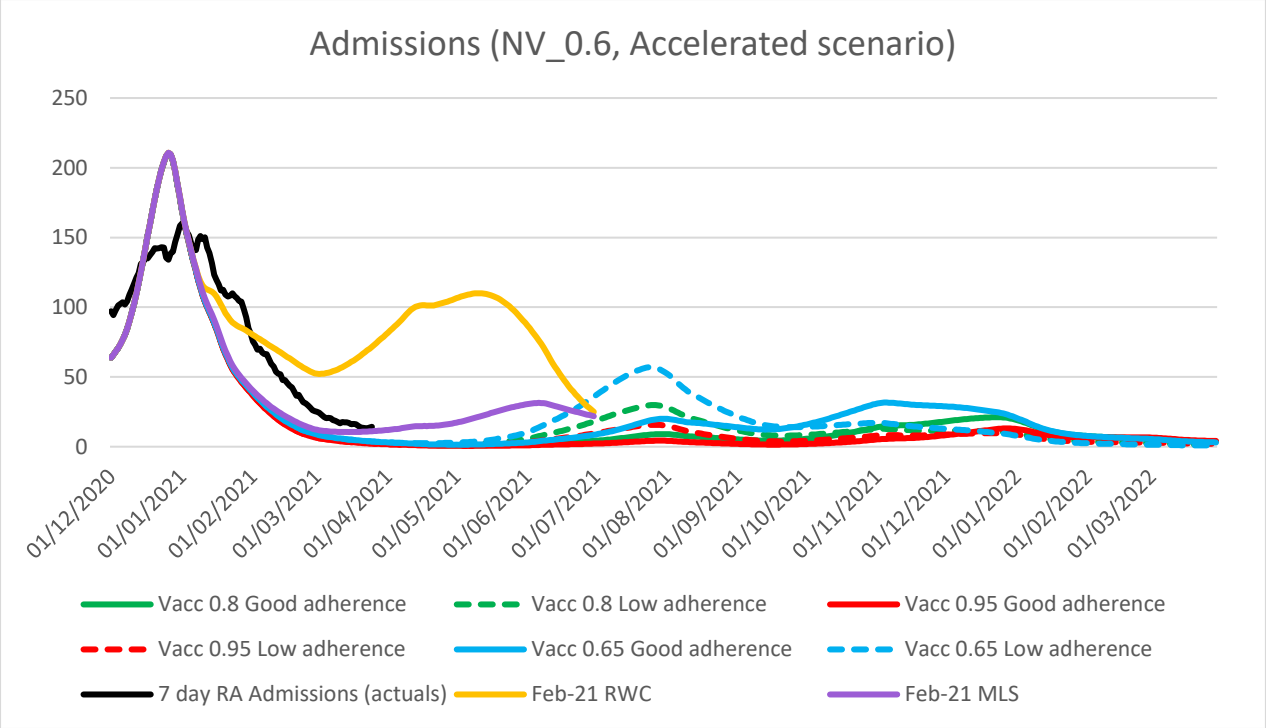
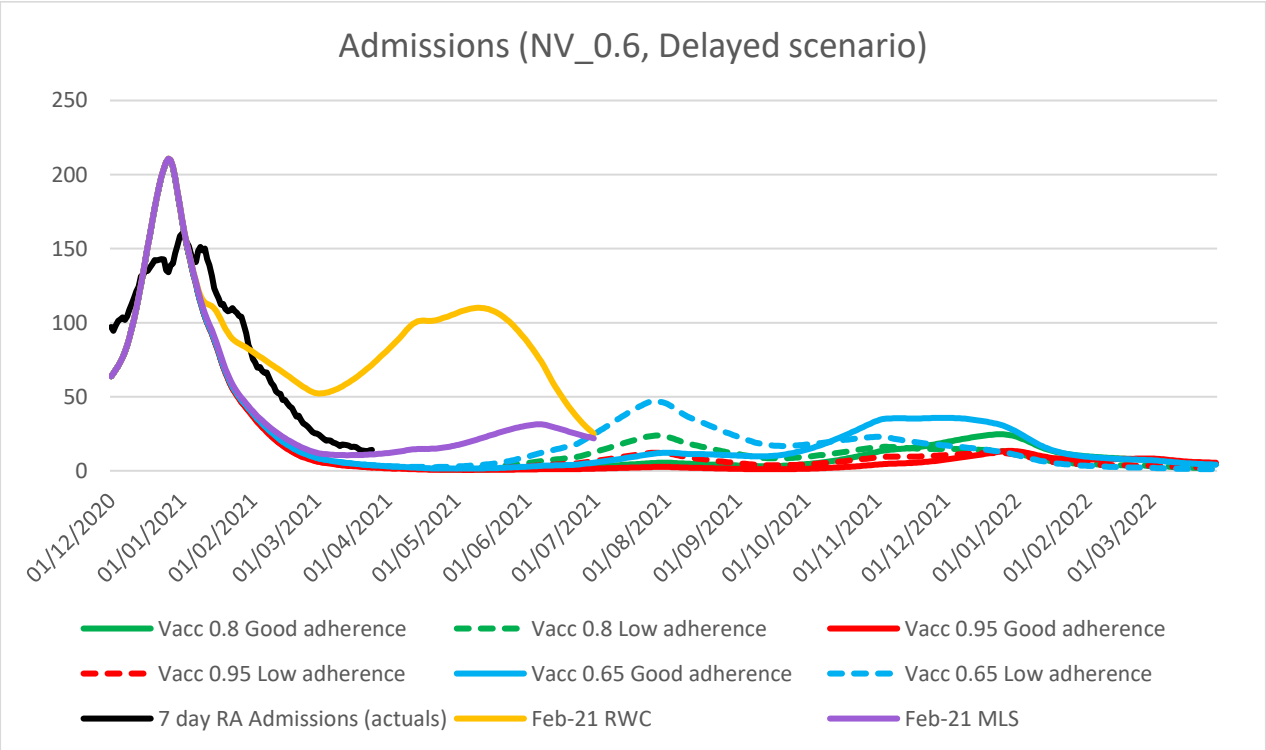


Figure 3. Model-estimated COVID-19 admissions along with the current RWC (RWC_0221) and MLS (MPS_0221), compared to the actual confirmed admissions reported by PHW, for the “Accelerated approach”, “Delayed approach” and “Phased approach”.

3A. Accelerated approach



3B. Delayed approach



3C. Phased approach

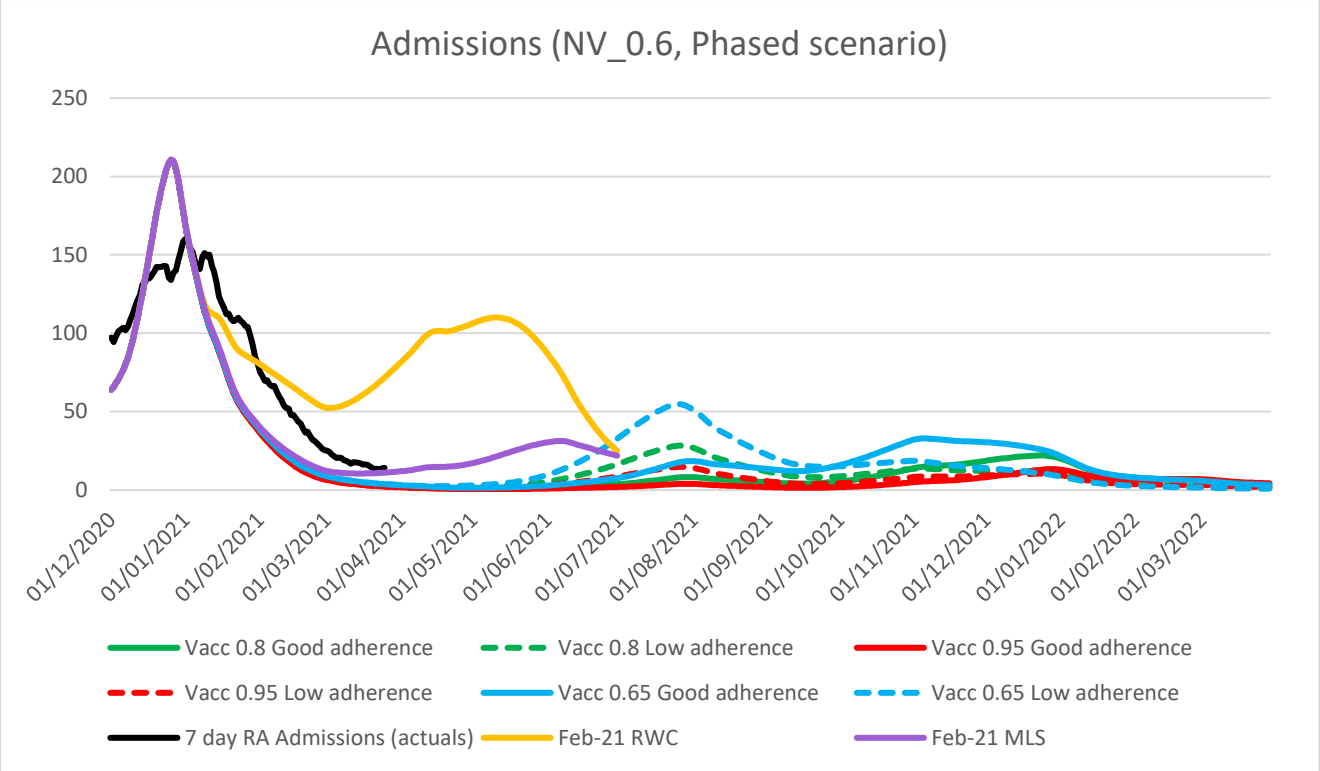


Table 1. Accelerated approach

1A. Totals (Between 1st April 2021 and 30th June 2021)

Accelerated Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 ICU Admissions
Vacc 0.8 Gd Adh	4,746	54	167	10
Vacc 0.8 Low Adh	15,260	108	495	30
Vacc 0.95 Gd Adh	3,019	36	101	6
Vacc 0.95 Lw Adh	9,433	68	282	17
Vacc 0.65 Gd Adh	7,854	82	292	18
Vacc 0.65 Low Adh	25,691	181	907	54
RWC_Feb2021	139,451	2,739	7,772	466
MLS_Feb2021	47,424	595	2,003	120

1B. Daily Peaks (Between 1st April 2021 and 30th June 2021)

Accelerated Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 Bed Occupancy	COVID-19 ICU Bed Occupancy
Vacc 0.8 Gd Adh	124	1	4	71	2
Vacc 0.8 Low Adh	500	4	18	258	9
Vacc 0.95 Gd Adh	69	1	2	57	1
Vacc 0.95 Lw Adh	290	2	9	139	5
Vacc 0.65 Gd Adh	233	2	9	125	4
Vacc 0.65 Low Adh	890	7	36	499	18
RWC_Feb2021	2,205	36	110	2,199	66
MLS_Feb2021	718	10	31	608	19

1C. Totals by quarter for NV_0.6, vaccine efficacy of 0.8 and good adherence (MLS)

Accelerated Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 ICU Admissions
01/04/2021 – 30/06/2021	4,746	54	167	10
01/07/2021 – 30/09/2021	11,782	183	572	34
01/10/2021 – 31/12/2021	29,706	380	1,384	83
01/01/2022 – 29/03/2022	10,503	311	685	41

1D. Daily peaks by quarter for NV_0.6, vaccine efficacy of 0.8 and good adherence (MLS)

Accelerated Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 Bed Occupancy	COVID-19 ICU Bed Occupancy
01/04/2021 – 30/06/2021	124	1	4	71	2
01/07/2021 – 30/09/2021	201	3	9	171	5
01/10/2021 – 31/12/2021	426	7	21	418	13
01/01/2022 – 29/03/2022	260	7	19	418	12

Table 2. Delayed approach

2A. Totals (Between 1st April 2021 and 30th June 2021)

Delayed Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 ICU Admissions
Vacc 0.8 Gd Adh	3,787	50	139	8
Vacc 0.8 Low Adh	11,992	98	396	24
Vacc 0.95 Gd Adh	2,460	35	86	5
Vacc 0.95 Lw Adh	7,496	62	229	14
Vacc 0.65 Gd Adh	6,121	76	237	14
Vacc 0.65 Low Adh	20,007	162	714	43
RWC_Feb2021	139,451	2,739	7,772	466
MLS_Feb2021	47,424	595	2,003	120

2B. Daily Peaks (Between 1st April 2021 and 30th June 2021)

Delayed Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 Bed Occupancy	COVID-19 ICU Bed Occupancy
Vacc 0.8 Gd Adh	83	1	3	71	2
Vacc 0.8 Low Adh	361	3	12	180	6
Vacc 0.95 Gd Adh	47	1	2	57	1
Vacc 0.95 Lw Adh	208	1	7	97	3
Vacc 0.65 Gd Adh	155	2	5	90	3
Vacc 0.65 Low Adh	651	5	25	347	12
RWC_Feb2021	2,205	36	110	2,199	66
MLS_Feb2021	718	10	31	608	19

2C. Totals by quarter for NV_0.6, vaccine efficacy of 0.8 and good adherence

Delayed Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 ICU Admissions
01/04/2021 – 30/06/2021	3,787	50	139	8
01/07/2021 – 30/09/2021	7,966	118	375	23
01/10/2021 – 31/12/2021	31,253	369	1,421	85
01/01/2022 – 29/03/2022	13,416	379	854	51

2D. Daily peaks by quarter for NV_0.6, vaccine efficacy of 0.8 and good adherence

Delayed Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 Bed Occupancy	COVID-19 ICU Bed Occupancy
01/04/2021 – 30/06/2021	83	1	3	71	2
01/07/2021 – 30/09/2021	122	2	5	104	3
01/10/2021 – 31/12/2021	503	8	25	481	15
01/01/2022 – 29/03/2022	319	8	23	482	15

Table 3. Phased approach

3A. Totals (Between 1st April 2021 and 30th June 2021)

Phased Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 ICU Admissions
Vacc 0.8 Gd Adh	4,375	52	156	9
Vacc 0.8 Low Adh	14,080	103	457	27
Vacc 0.95 Gd Adh	2,799	35	95	6
Vacc 0.95 Lw Adh	8,719	65	262	16
Vacc 0.65 Gd Adh	7,196	79	270	16
Vacc 0.65 Low Adh	23,690	170	834	50
RWC_Feb2021	139,451	2,739	7,772	466
MLS_Feb2021	47,424	595	2,003	120

3B. Daily Peaks (Between 1st April 2021 and 30th June 2021)

Phased Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 Bed Occupancy	COVID-19 ICU Bed Occupancy
Vacc 0.8 Gd Adh	111	1	4	71	2
Vacc 0.8 Low Adh	462	3	16	232	8
Vacc 0.95 Gd Adh	63	1	2	57	1
Vacc 0.95 Lw Adh	266	2	9	125	4
Vacc 0.65 Gd Adh	210	2	8	111	4
Vacc 0.65 Low Adh	827	6	33	449	16
RWC_Feb2021	2,205	36	110	2,199	66
MLS_Feb2021	718	10	31	608	19

3C. Totals by quarter for NV_0.6, vaccine efficacy of 0.8 and good adherence

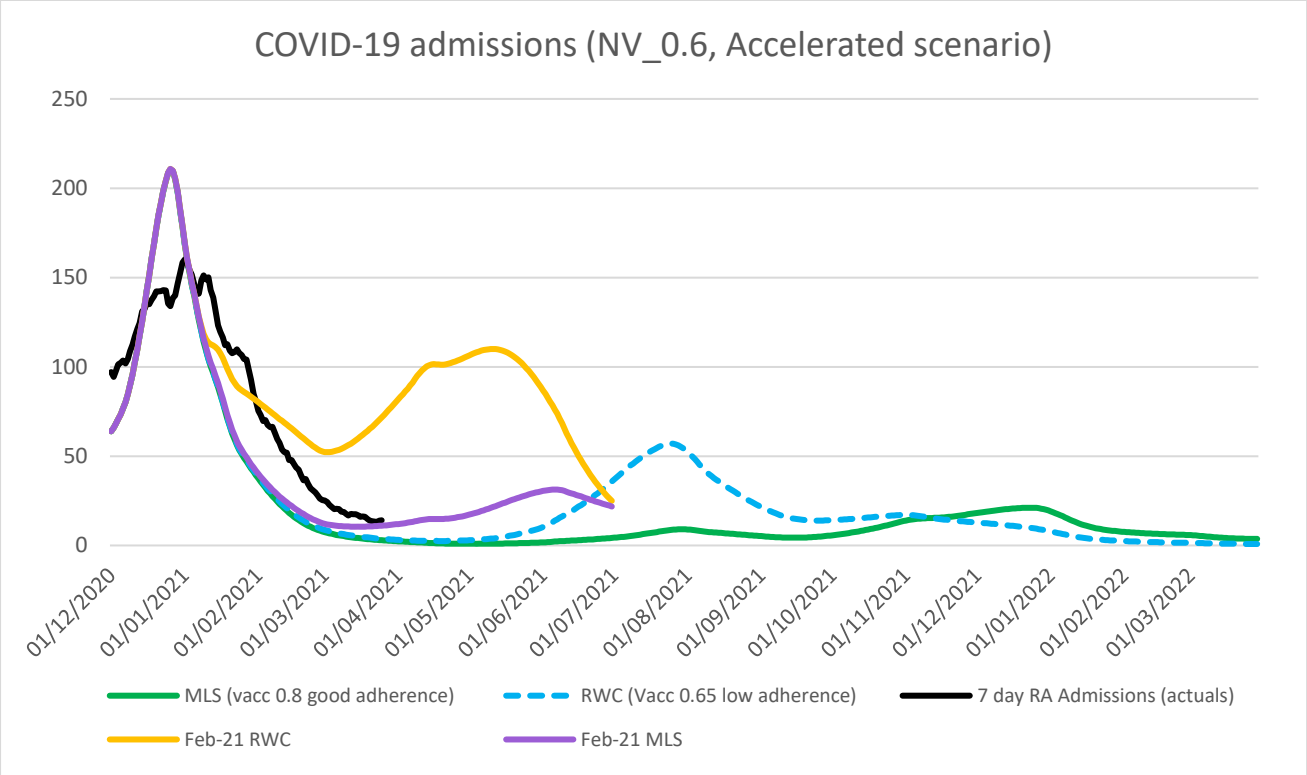
Phased Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 ICU Admissions
01/04/2021 – 30/06/2021	4,375	52	156	9
01/07/2021 – 30/09/2021	11,006	168	530	32
01/10/2021 – 31/12/2021	30,435	384	1,413	85
01/01/2022 – 29/03/2022	11,021	325	717	43

3D. Daily peaks by quarter for NV_0.6, vaccine efficacy of 0.8 and good adherence

Phased Scenario	COVID-19 Cases	Covid-19 Deaths	COVID-19 Admissions	COVID-19 Bed Occupancy	COVID-19 ICU Bed Occupancy
01/04/2021 – 30/06/2021	111	1	4	71	2
01/07/2021 – 30/09/2021	184	3	8	157	5
01/10/2021 – 31/12/2021	444	7	22	435	13
01/01/2022 – 29/03/2022	272	7	20	435	13

Appendix 1. RWC

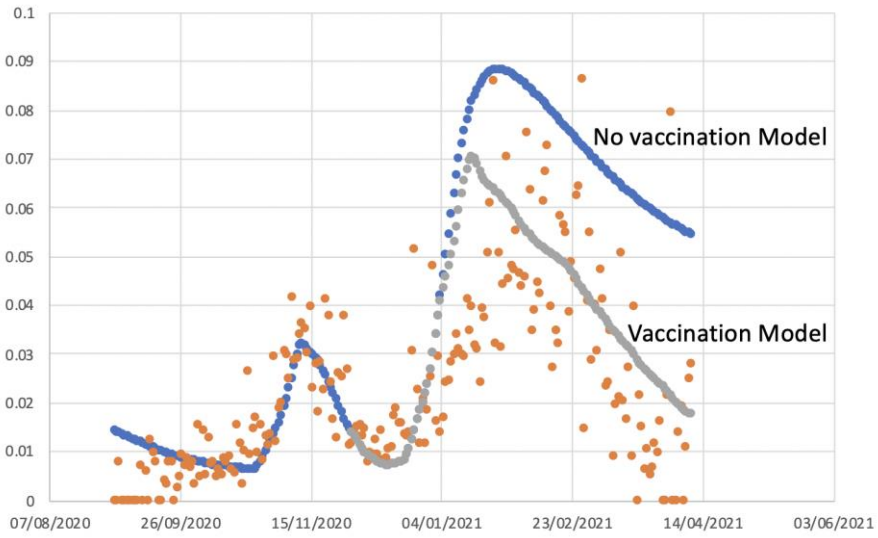
Figure 4. COVID-19 current and proposed most likely scenarios (MLS) and reasonable worst case (RWC)



Appendix 2. Consideration of age-specific effects

To illustrate the age-specific effects of vaccination, the model was fitted to recent case incidence data up until the beginning of April, using the model with / without vaccination. The output of the model case fatality rate was then compared to the observed data. (Note figure 5 is not a direct model fit, the fit was obtained solely from case data, and the predictions plotted against the observations). The vaccination model illustrates the significant change in the case fatality ratio, due to early roll-out of the vaccine in the older population, in which the great majority of severe cases are experienced.

Fig 5. Impact of vaccination on the ratio of death / cases. Case incidence fitted with a model with no vaccination (blue) and with vaccination (grey).



Appendix 3. Illustration of the effect of B117 at the start of the pandemic

To illustrate the potential impact of the dominant B117 variant, the model was run with emergence of this variant in the UK, during the first wave in early 2020. The scenario assumption is the emergence in January, soon after the importantion of the first cases, and spread to reaching 50% by 22nd February and complete dominance by 8th March.

The key result of the scenario is that the increase in the rate of transmission through the new variant may have been very difficult to detect at this point of the UK epidemic. At this stage, in the absence of widespread testing, hospitalisations and death incidence were the key indicators of transmission, and these measures lag infection incidence by 1 to 3 weeks. The model suggests the epidemic curve for death incidence may not have deviated significantly from that of the original variant until very close to, or past the decision point for the 23rd March lockdown. This

suggests that the more rapid spread of the variant may not have been evident, and timing of lockdown may have remained unchanged. However during early March, B117 would have caused considerably more infections, with the consequence that the post lockdown peak in clinical events may have been up to four-fold higher, with associated much greater ICU demand.

Figure 6A. Modelled deaths in first wave with original variant (blue) and with hypothetical early UK emergence and spread of B117 variant (red).

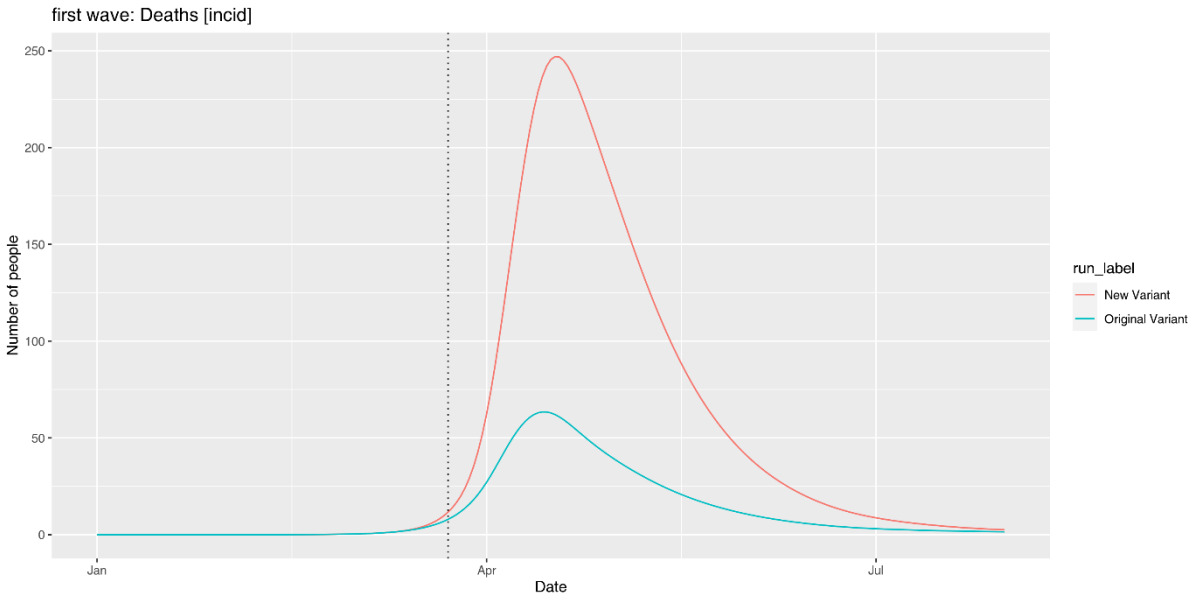
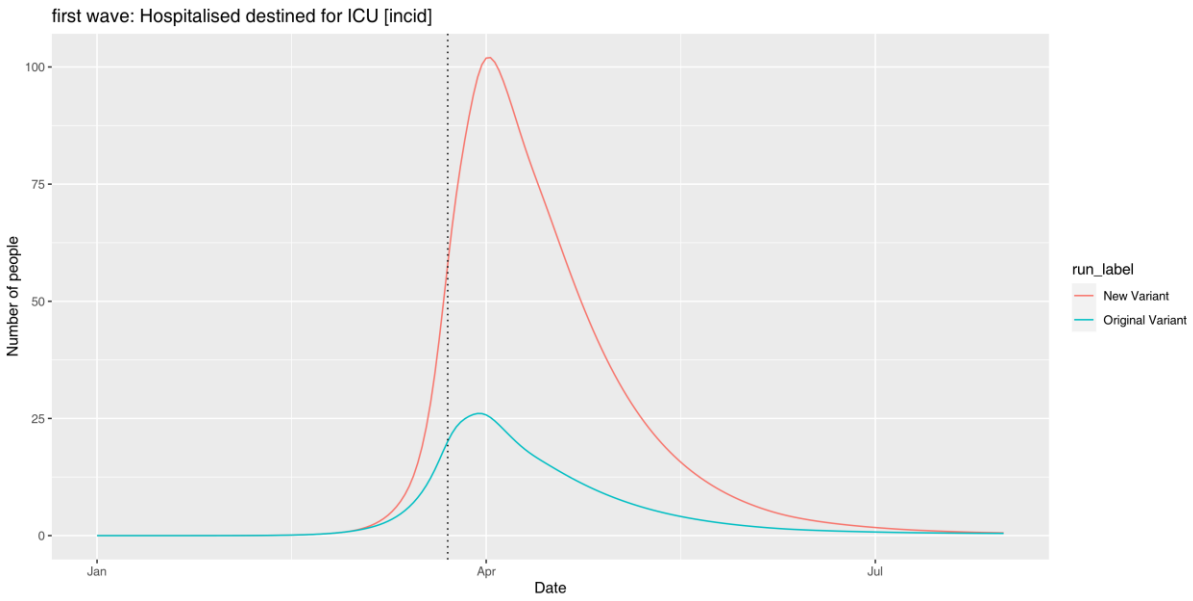


Figure 6B. Modelled ICU occupancy in first wave with original variant (blue) and with hypothetical early UK emergence and spread of B117 variant (red).

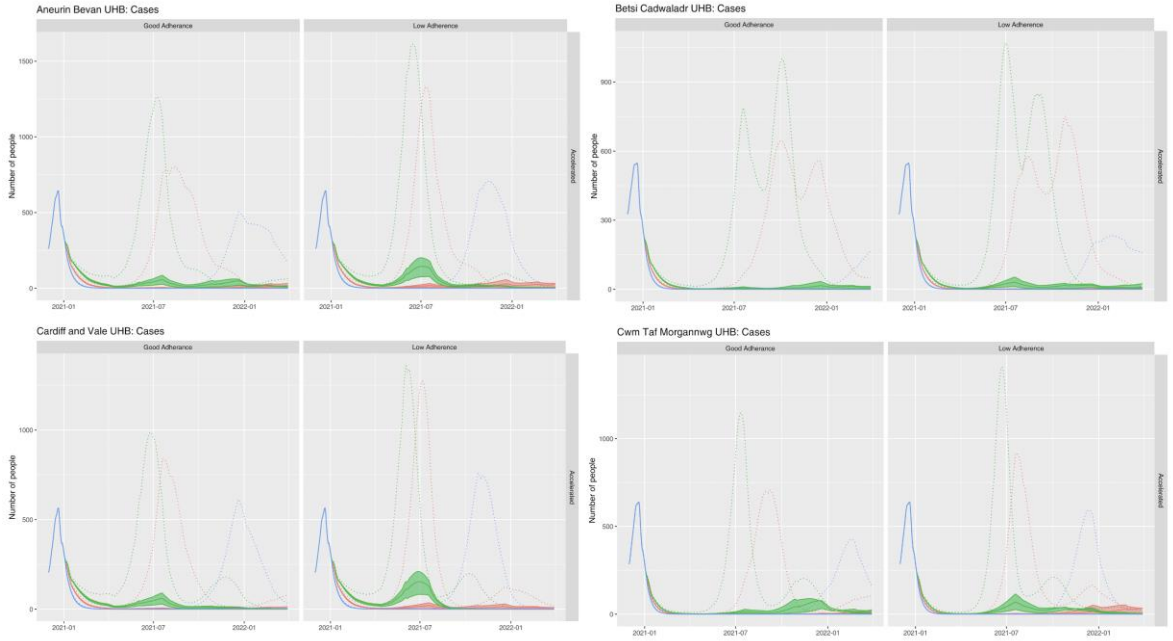


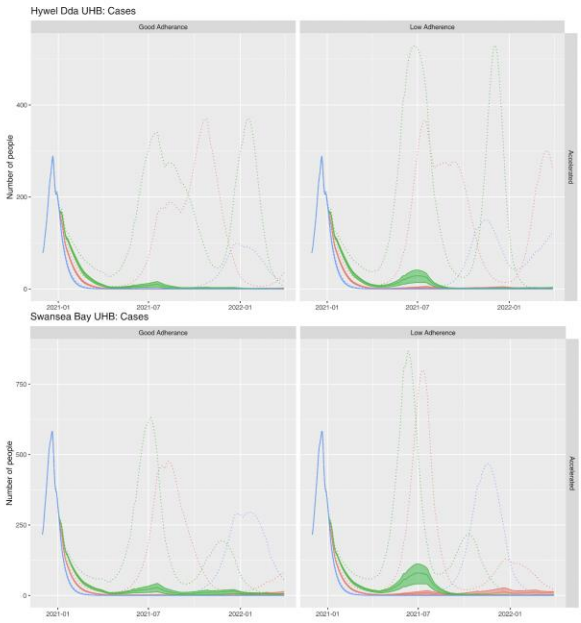
Appendix 4. Introduction of Health Board Level Modelling

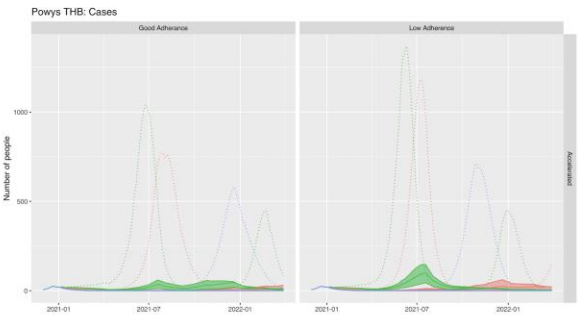
For model fitting, case incidence, hospital incidence, ICU incidence, death incidence, hospital prevalence and ICU prevalence are used at the all-Wales level. Hence a single model is used at the all-Wales level for scenarios, and Health Board level metrics simply on a per capita basis. The models have now been updated on a Health Board level, which aims to capture more local effects of R_t and timing of interventions. This allows future scenarios to include more realistic previous exposure (and Health Board specific vaccination roll out).

It is hoped that the Health Board level scenarios will replace the all-Wales model for scenarios going forward, however at this stage it requires additional testing. The all-Wales model has the advantage of larger data sample sizes, and has been tested on many occasions over the time period. Preliminary outputs from the Health Board level model, using the same scenarios as above, are shown in Figure 6.

Figure 7. Preliminary Health Board level scenario models. Scenarios from figure 1, with previous history fitted at the Health Board level instead of all-Wales. Case predictions only shown for illustration. Dotted lines so expected trajectory in absence of vaccine roll-out.




Hywel Dda UHB: Cases
Good Adherance
Low Adherance
Number of people
Accelerated
2021-01
2021-07
2022-01


Powys THB: Cases
Good Adherance
Low Adherance
Number of people
Accelerated
2021-01
2021-07
2022-01

Swansea Bay UHB: Cases
Good Adherance
Low Adherance
Number of people
Accelerated
2021-01
2021-07
2022-01