Coronavirus (COVID-19): modelling the epidemic in Scotland (Issue No. 81)

Background

This is a report on the Scottish Government modelling of the spread and level of Covid-19 in Scotland. This updates the previous publication on modelling of Covid-19 in Scotland published on 2nd December 2021. The estimates in this document help the Scottish Government, the health service and the wider public sector plan and put into place what is needed to keep us safe and treat people who have the virus.

This edition of the research findings focuses on the epidemic as a whole, looking at estimates of R, growth rate and incidence as well as local measures of change in the epidemic. It is divided into three sections: one looking at recent periods, where the Delta variant makes up the majority of cases in Scotland; the second section looks at the Omicron variant and how this might impact on Scotland; and the third section covers other modelling for which the methodology is not affected by which variant makes up the majority of cases in Scotland. We will update on a weekly basis as we know more about the Omicron variant.

Key Points

Based on the Delta variant being the majority of cases

- The reproduction rate R in Scotland is currently estimated as being between 0.9 and 1.1, as of 23rd November. The lower estimate has increased since last week.
- The number of new daily infections for Scotland is estimated as being between 104 and 142 as at 23rd November, per 100,000 people.
- The growth rate for Scotland is currently estimated as between -3% and 0% as at 23rd November. The upper limit has decreased since last week.

- Hospital and ICU occupancy have fallen slightly. There continues to be uncertainty over hospital occupancy and intensive care in the next two weeks.
- Modelled rates of positive tests per 100K using data to 6th December indicate that, for the week commencing 19th December 2021, 30 of the 32 local authorities are expected to exceed 50 cases per 100K with at least 75% probability. The exceptions are Orkney Islands and Shetland Islands.
- 29 local authorities are expected to exceed 100 cases per 100K with this probability. The exceptions are Na h-Eileanan Siar, Orkney Islands and Shetland Islands.
- Three local authorities are expected to exceed 300 cases per 100K with at least 75% probability. These are East Ayrshire, East Dunbartonshire and Falkirk.
- There are no local authorities which are expected to exceed 500 cases per 100K with at least 75% probability.
- Modelling of long Covid estimates that on 26th December 2021 between 1.5% and 3.1% of the population are projected to self-classify with long Covid for 12 weeks or more after their first suspected Covid infection in Scotland. The lower and upper limits of the estimate of the proportion of the population with long Covid are unchanged from last week.

Based on the Omicron variant

- Using data to 6th December, we can estimate a doubling time for Scotland of between 2.18 - 2.66 days using S-gene target failure as a proxy for Omicron cases.
- Based on projections given the doubling time above, Omicron is likely to make up the majority of cases in Scotland, and this could occur between mid-December and early January 2022.

Other modelling

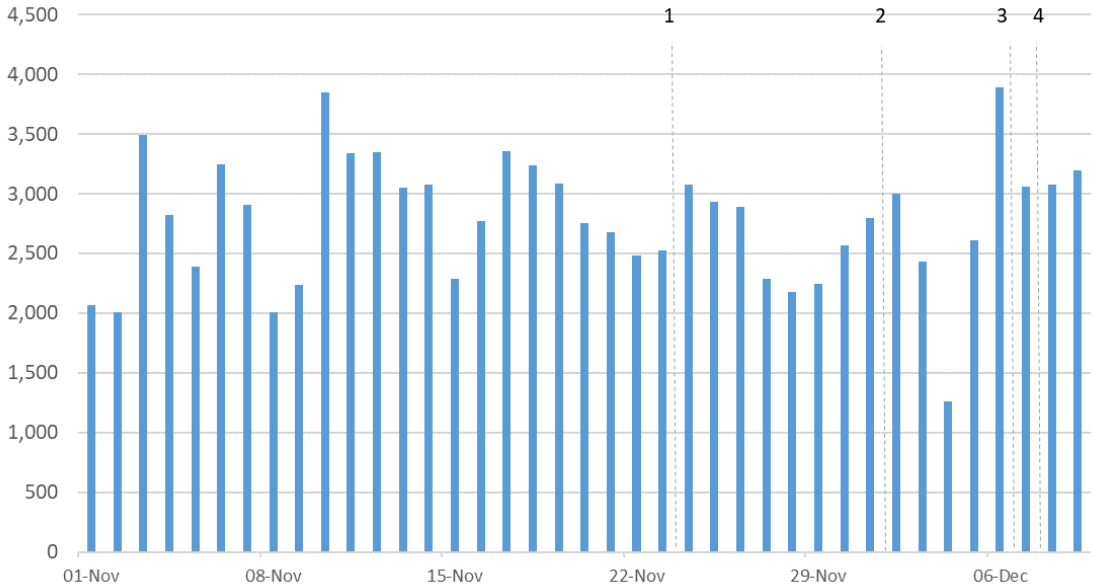
- Average contacts from the most recent Panel A cohort of the Scottish Contact Survey (week ending 1st December) indicate an average of 4.8 contacts.
- Mean contacts within the home have increased by 7% whereas work contacts have decreased by 8% in the last two weeks. Contacts within the other setting (contacts outside home, school and work) have remained at a similar level over the same period.
- Contacts for those in the 18-29 age group have almost doubled with a current level of 6.6 mean contacts.

- The biggest increase interactions is seen between the those under 18 with individuals within the 18-29 age group, with contacts at least three times higher between these age groups.
- The biggest changes in the proportion of participants visiting different locations is seen in those visiting shops. Visits to a non-essential shop increased from approximately 42% to 46% and visits to essential shops increased from 86% to 89% in the last two weeks.
- The number of people wearing a face covering where they have at least one contact outside of the home has increased in the last two weeks from 83% to 85%.
- Nationwide, wastewater Covid-19 levels have remained static, with the week ending on 7th December seeing levels of around 81 million gene copies per person per day (Mgc/p/d), about the same as the 78 Mgc/p/d seen the previous week.

Recent cases

Figure 1 shows the number of Covid-19 cases reported in Scotland between November and December 2021. The vertical dashed lines indicate the cut off points for each of the modelling inputs; after these dates, the number of cases is not incorporated into the outputs.

Figure 1: Cases reported in Scotland to 9th December 2021

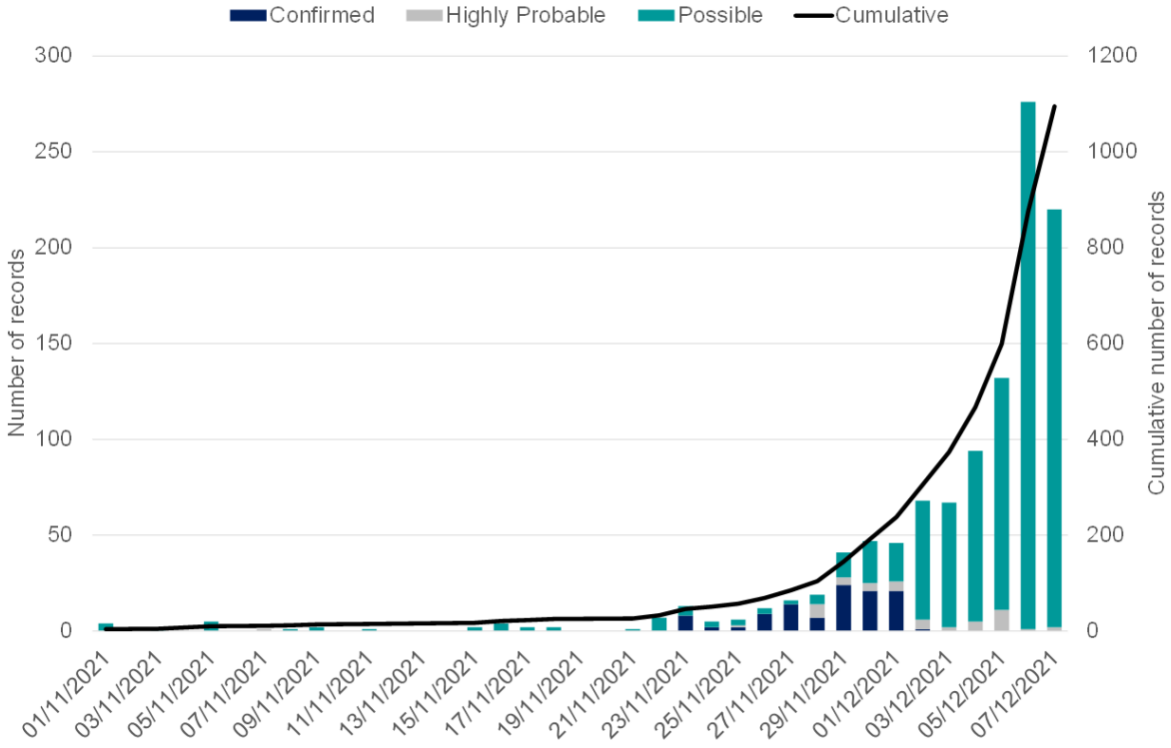


R, growth rate and incidence are as of 23rd November (dashed line 1). The Scottish Contact Survey uses data to 1st December (dashed line 2). The Scottish Government modelling of infections, hospitalisations and ICU beds, the long Covid analysis, the medium term projections and the modelled rates of positive tests per 100K use data to 6th December

(dashed line 3). Wastewater analysis used data to 7th December (dashed line 4).

Figure 2 shows the number of confirmed Omicron cases and those cases that are under investigation.

Figure 2: Confirmed Omicron variants and cases under investigation in Scotland, data to 7th December by specimen date[1]



Source: Scottish Government Covid-19 Evidence Report, published 10th December 2021

Overview of Scottish Government Modelling

Modelling outputs are provided here on the current epidemic in Scotland as a whole, based on a range of methods. Because it takes a little over three weeks on average for a person who catches Covid-19 to show symptoms, become sick, and either die or recover, there is a time lag in what our model can tell us about any change in the epidemic, e.g. any impact of the Omicron variant. Therefore a new section has been included covering what we know of this new variant.

[1] The modelling in this report uses S-gene test data to 6th December only.

The first section of this report covers a range of modelling where Delta makes up the majority of cases:

- The UK Health Security Agency (UKHSA) consensus is shown, which uses a range of data in its estimates of R and the growth rate.
- The logistical model utilises results from the epidemiological modelling, principally the number of new infections. The results are split down by age group, and the model is used to give a projection of the number of people that will go to hospital, and potentially to ICU.
- We also provide the SPI-M projection of infections and deaths, and the local modelling outputs for estimated cases per local authority in two weeks' time. These assume that Delta remains the majority of cases.

The second section of this report covers Omicron:

- Looking at estimates of the doubling time of this variant, using the data available for Scotland.
- It also projects this forward into the future to estimate the proportion of Omicron cases in the coming weeks.

We also include in this report other modelling which will not be affected by Omicron:

- The Scottish Contact Survey (SCS) is used to inform a modelling technique based on the number of contacts between people. Over time, a greater proportion of the population will be vaccinated. This is likely to impact contact patterns and will become a greater part of the analysis going forwards.
- We also report on levels of Covid-19 RNA in wastewater around Scotland and compare it to the 7-day average daily new cases.

What the modelling tells us about the epidemic based on Delta being the majority of cases

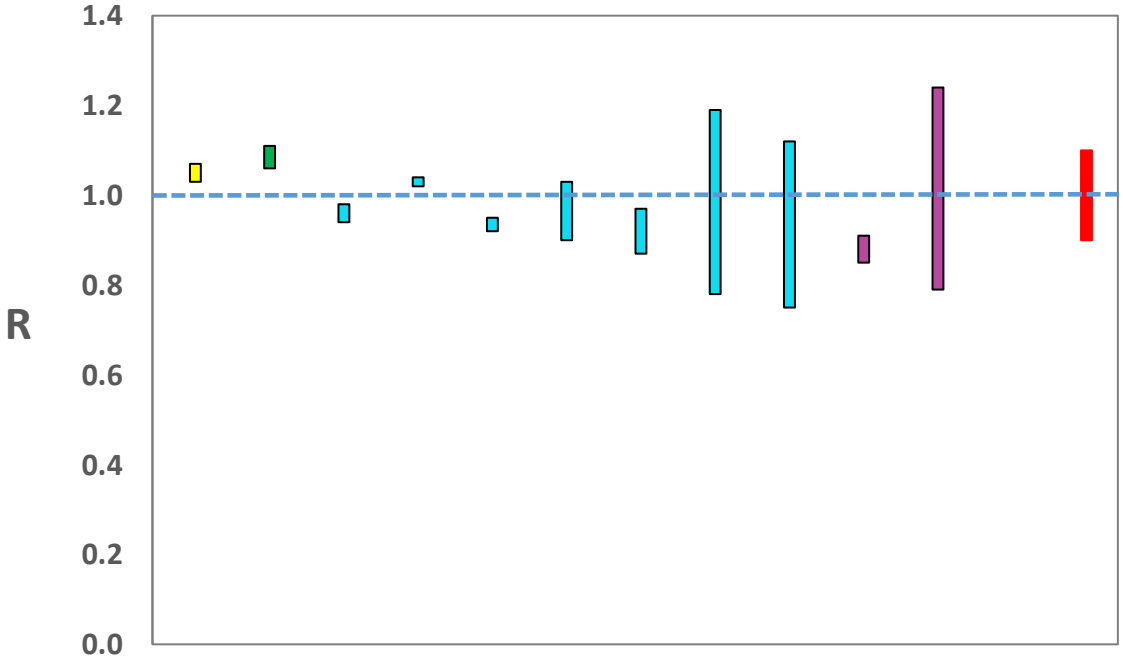
The R value and growth rates are estimated by several independent modelling groups based in universities and the UKHSA. Estimates are considered, discussed and combined at the Epidemiology Modelling Review Group (EMRG), which sits within the UKHSA. These are based on data to 23rd November, a week in which over 99% of reported cases in Scotland were estimated to be of the Delta variant.

UKHSA's consensus view across these methods, was that the value of R as at 23rd November[2] in Scotland was between 0.9 and 1.1 (see Figure 3)[3].

R is an indicator that lags by two to three weeks and therefore should not be expected to reflect recent fluctuations.

This week the Scottish Government presented two outputs to EMRG. The first uses confirmed cases, as published by Public Health Scotland (PHS), and deaths from National Records Scotland (NRS). The second uses instead wastewater data to estimate the number of cases, and deaths from NRS. Both outputs are shown in Figures 3 and 4.

Figure 3. Estimates of R_t for Scotland, as of 23rd November, including 90% confidence intervals, produced by EMRG[4].



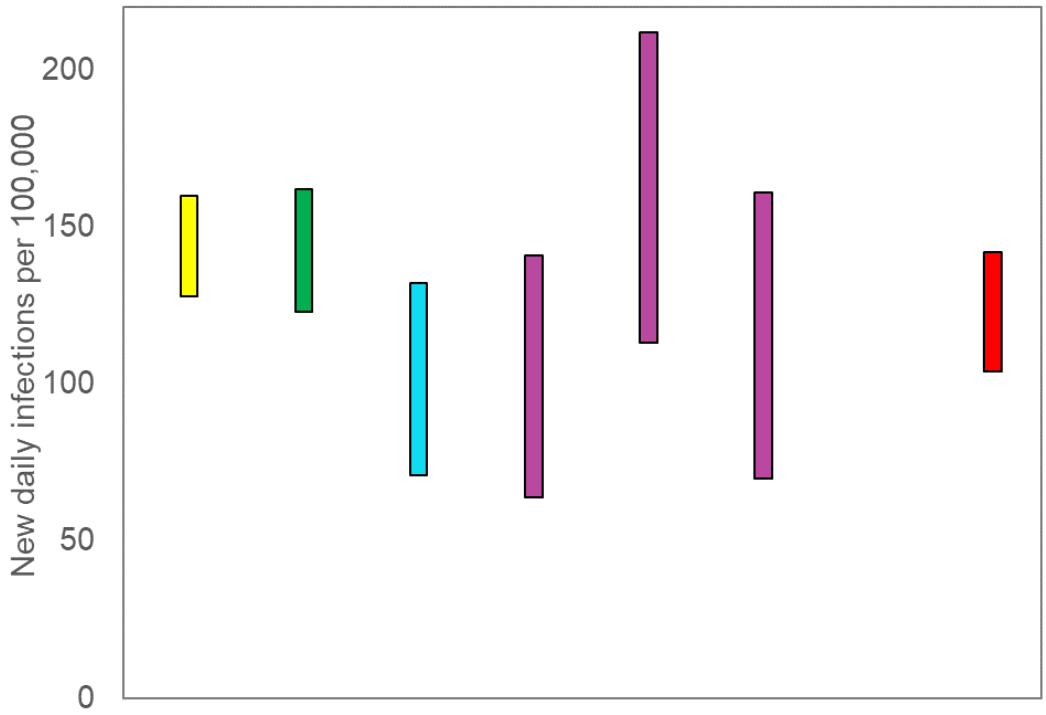
Source: EMRG

The various groups which report to the EMRG use different sources of data in their models to produce estimates of incidence (Figure 4). UKHSA's consensus view across these methods, as at 23rd November,

[2] Using data to 6th December 2021.
[3] Particular care should be taken when interpreting this estimate as it is based on low numbers of cases, hospitalisations, or deaths and / or dominated by clustered outbreaks. It should not be treated as robust enough to inform policy decisions alone.
[4] The cyan bars use Covid-19 test data and purple bars use multiple sources of data. The estimates produced by the Scottish Government are the two on the left. (Yellow uses confirmed cases from PHS and deaths from NRS; green uses wastewater data).The UKHSA consensus range is the right-most (red). Data to 6th December. R, incidence and growth rate as of 23rd November.

was that the incidence of new daily infections in Scotland was between 104 and 142 new infections per 100,000. This equates to between 5,700 and 7,800 people becoming infected each day in Scotland.

Figure 4. Estimates of incidence for Scotland, as at 23rd November, including 90% confidence intervals, produced by EMRG[4].



Source: EMRG

The consensus from UKHSA for this week is that the growth rate in Scotland is between -3% and 0% per day as at 23rd November. The upper limit has decreased since last week.

What the modelling tells us about estimated infections as well as Hospital and ICU bed demand for Delta

The Scottish Government assesses the impact of Covid-19 on the NHS in the next few weeks in terms of estimated number of infections. Figure 5 shows three projections over the two weeks to 20th December, rather than a longer period due to the uncertainty around both the Omicron variant and the potential impact of Christmas.

'Central' assumes that infections will plateau. 'Worse' assumes a rise in transmission from the current level. 'Better' assumes a drop in transmission[5]. As it is too soon to take account of the potential impact of

[5] All scenarios are based on current vaccine roll-out plans and efficacy assumptions. Data to 6th December.

the Omicron variant on hospitals and ICU etc, all three scenarios are based on the Delta variant. **Therefore depending on the current number of Omicron cases and its characteristics, the actual number of infections, hospital occupancy and ICU occupancy over the next few weeks could be higher than projected here.**

Figure 5. Medium term projections of modelled total new daily infections, adjusting positive tests[6] to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 6th December[7].

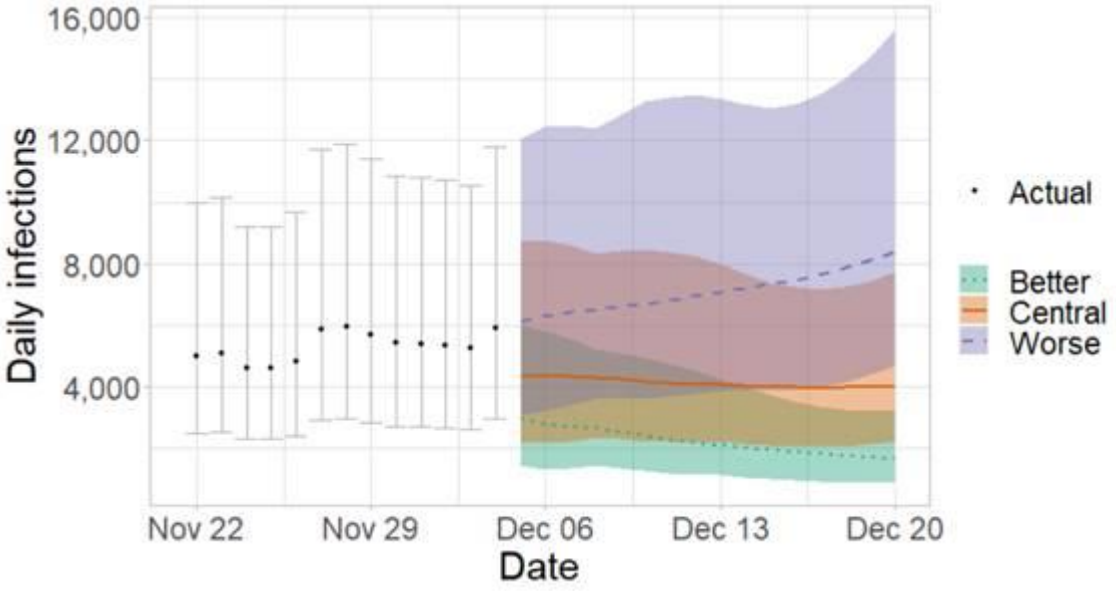


Figure 6 shows the impact of the projections on the number of people in hospital. The modelling includes all hospital stays, whereas the actuals only include stays up to 28 days duration that are linked to Covid-19.

There continues to be uncertainty over hospital occupancy and intensive care in the next two weeks.

[6] The actual positive tests are adjusted to coincide with the estimated day of infection

[7] Actual infections are uncertain, with the range displayed representing between a 25% (higher infections) and 100% (lower infections) ascertainment rate for positive tests. This uncertainty is not reflected in the projected range, which is based on a 50% ascertainment rate.

Figure 6. Medium term projections of modelled hospital bed demand, from Scottish Government modelling, based on positive test data reported up to 6th December.

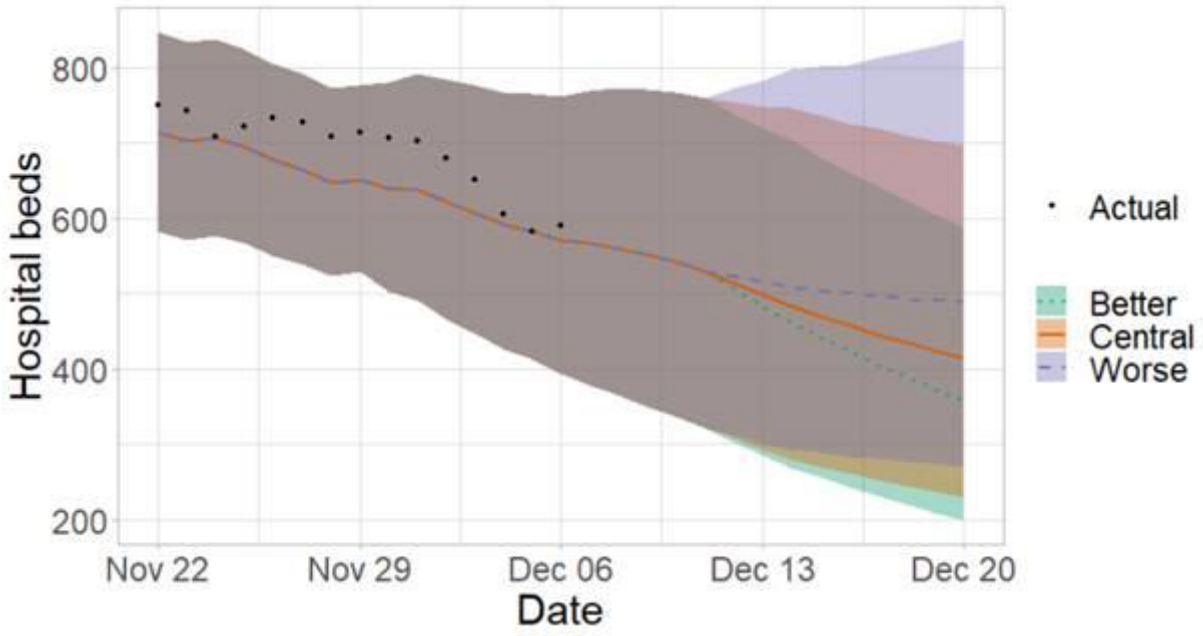
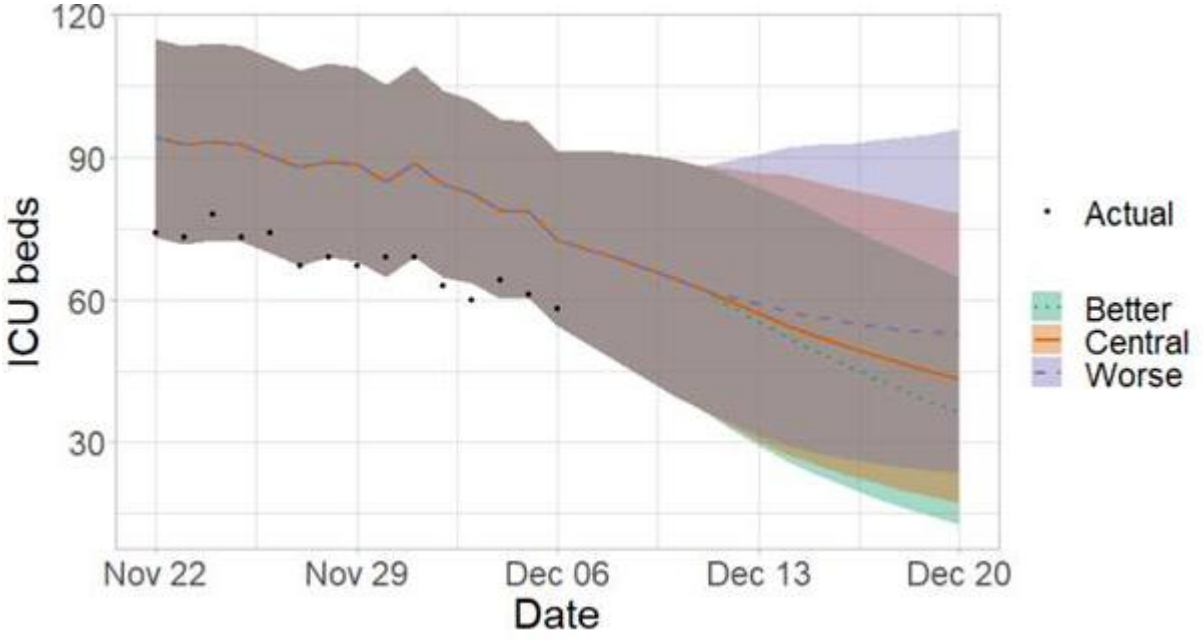


Figure 7 shows the impact of the projection on ICU bed demand.

Figure 7. Medium term projections of modelled ICU bed demand, from Scottish Government modelling[8], based on positive test data reported up to 6th December.



[8] Actual data does not include full numbers of CPAP. ICU bed actuals include all ICU patients being treated for Covid-19 including those over 28 days.

The methodology for estimating projections is included in the Technical Annex. Also included is a comparison of the actual data against historical projections.

What the modelling tells us about projections of hospitalisations and deaths in the medium term

SPI-M produces projections of the epidemic[9] (Figures 8 and 9), combining estimates from several independent models (including the Scottish Government's logistics modelling, as shown in Figures 5 to 7). These projections are not forecasts or predictions. They represent a scenario in which the trajectory of the epidemic continues to follow the trends that were seen in the data up to 6th December and **do not include the effects of any future increase in the Omicron variant, or future policy or behavioural changes**.

The delay between infection, developing symptoms, the need for hospital care, and death means they cannot fully reflect the impact of behaviour changes in the two to three weeks prior to 6th December. Projecting forwards is difficult when the numbers of admissions and deaths fall to very low levels, which can result in wider credible intervals reflecting greater uncertainty. The interquartile range should be used, with judgement, as the projection from which estimates may be derived until 21st December.

These projections include the potential impact of vaccinations over the next few weeks. Modelling groups have used their expert judgement and evidence from UKHSA, Scottish Universities & Public Health Scotland, and other published efficacy studies when making assumptions about vaccine effectiveness.

[9] Two week projections are provided here.

Figure 8. SPI-M medium-term projection of daily hospitalisations in Scotland, at 50% and 90% credible intervals.

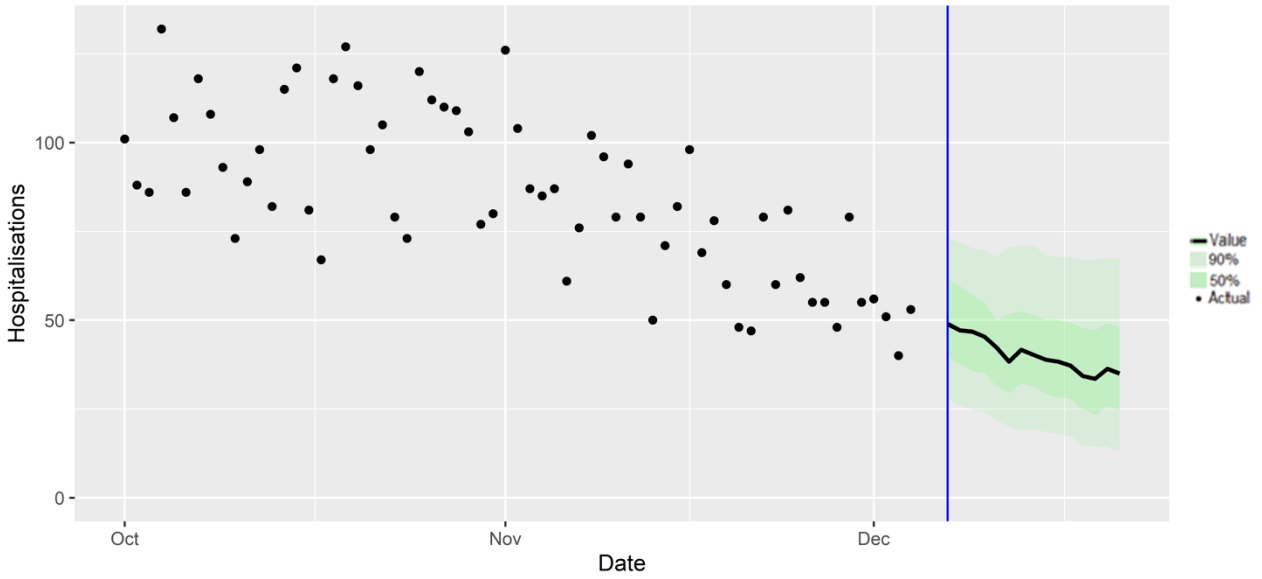
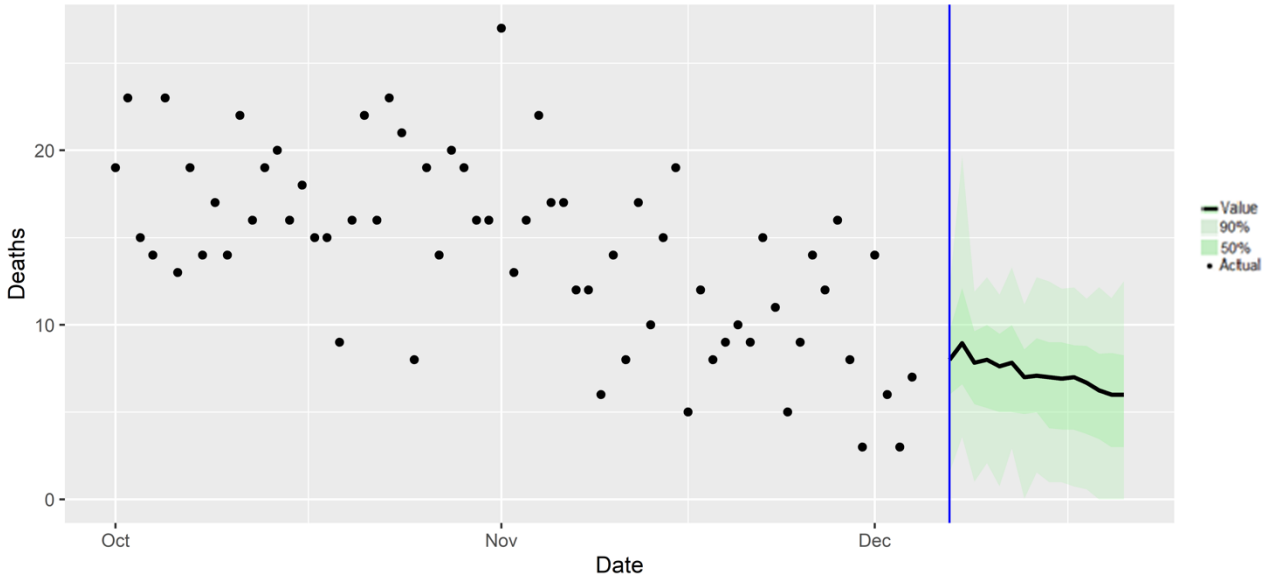


Figure 9. SPI-M medium-term projection of daily deaths in Scotland, at 50% and 90% credible intervals.



What we know about which local authorities are likely to experience high levels of Covid-19 in two weeks' time

We continue to use modelling based on Covid-19 cases and deaths using data to 6th December from several academic groups to give us an indication of whether a local authority is likely to experience high levels of Covid-19 in the future. This has been compiled via UKHSA into a consensus. In this an area is defined as a hotspot if the two week prediction of cases (positive tests) per 100K population is predicted to exceed a threshold, e.g. 500 cases.

There is uncertainty in regions with smaller populations, and hence lower test counts, in particular in regions such as Na h-Eileanan Siar, Orkney Islands and Shetland Islands.

Modelled rates of positive tests per 100K using data to 6th December (Figure 10) indicate that, for the week commencing 19th December 2021, 30 of the 32 local authorities are expected to exceed 50 cases per 100K with at least 75% probability. The exceptions are Orkney Islands and Shetland Islands.

29 local authorities are expected to exceed 100 cases per 100K with this probability. The exceptions are Na h-Eileanan Siar, Orkney Islands and Shetland Islands.

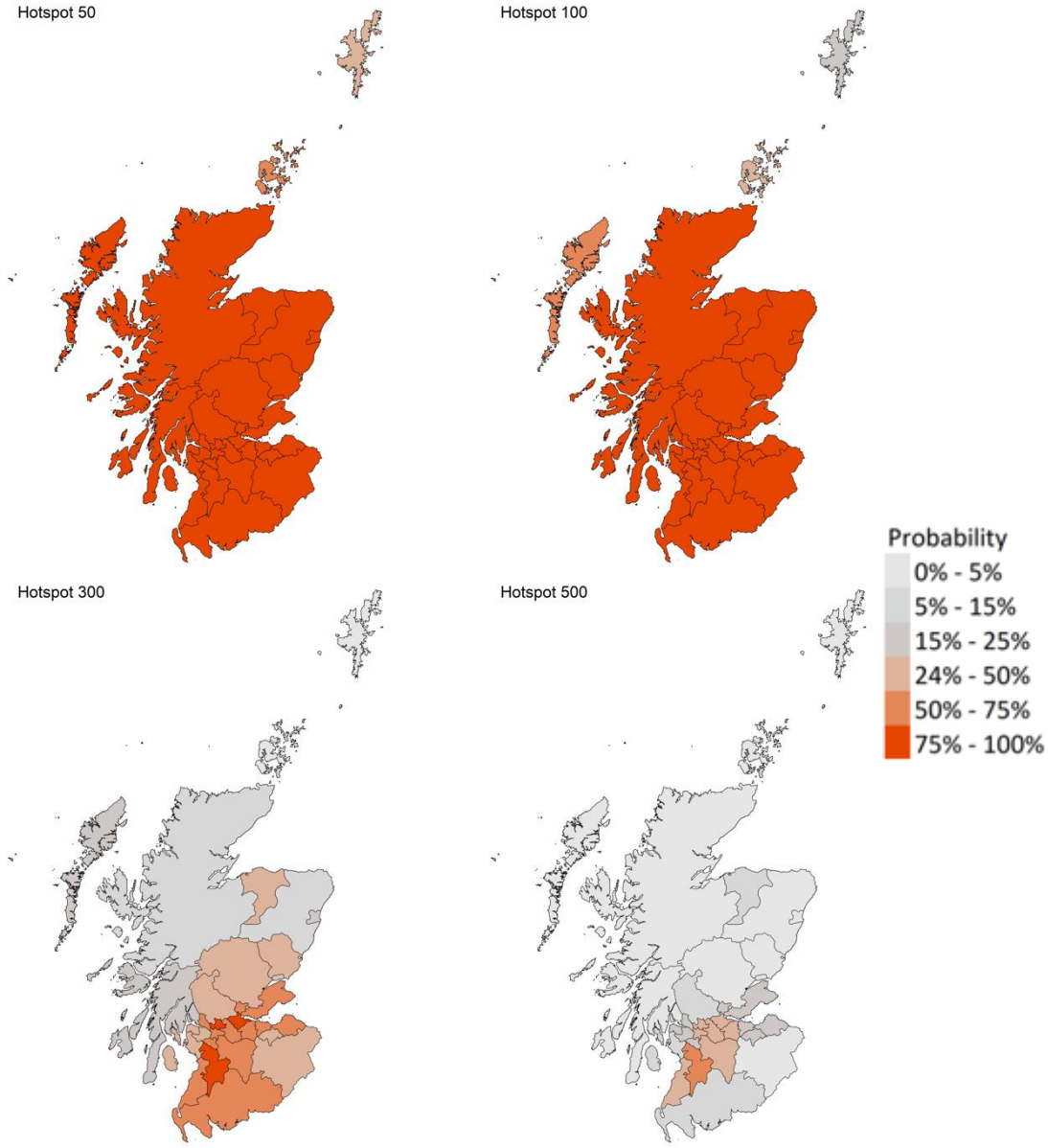
Three local authorities are expected to exceed 300 cases per 100K with at least 75% probability. These are East Ayrshire, East Dunbartonshire and Falkirk.

There are no local authorities which are expected to exceed 500 cases per 100K with at least 75% probability[10].

These models are based on a projection where the Delta variant makes up the majority of cases.

[10] Values are included in Table 1 in the Technical Annex.

Figure 10. Probability of local authority areas exceeding thresholds of cases per 100K (19th to 25th December 2021), data to 6th December.



What estimates do we have of the number of people experiencing long Covid symptoms?

The Scottish Government is modelling the number of people likely to experience long Covid symptoms. This gives a projection of estimated self-reported long Covid rates in the future, based on Scottish Government medium term projection modelling, as set out in Figure 11.

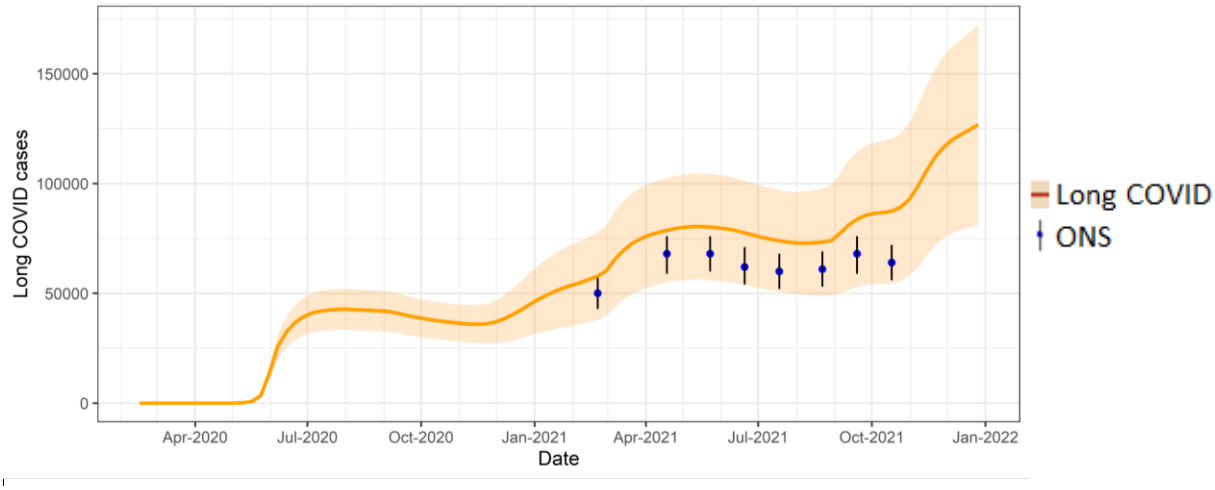
This modelling estimates that at 26th December 2021 between 81,000 (1.5% of the population) and 172,000 (3.1%) people are projected to self-

classify with long Covid for 12 weeks or more after their first suspected Covid infection in Scotland.

The lower and upper limits of the estimate of the proportion of the population with long Covid are unchanged from last week.

These are preliminary results, further data on rates of long Covid and associated syndromes will be added as research emerges, eg around the Omicron variant.

Figure 11. Estimates of self-classified long Covid prevalence at 12 weeks from 16th February 2020 to 26th December 2021 (showing 90% confidence interval). ONS estimates of self-reported long Covid with range also shown.



See the Technical Annex in issue 73 for information about the methodology.

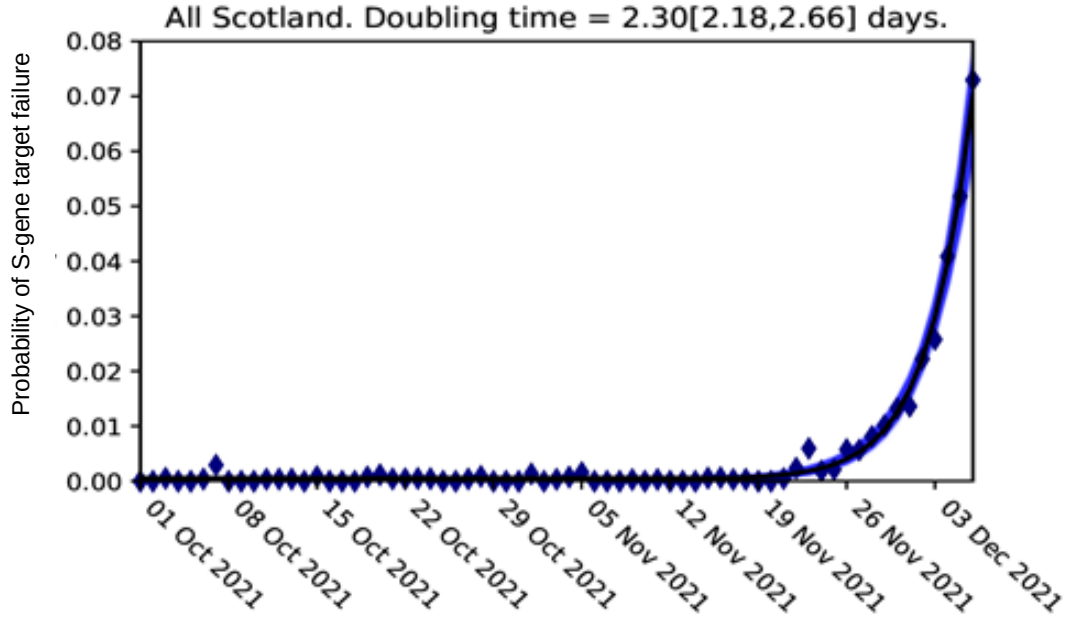
What we already know about the Omicron variant

Latest data shows there have been 109 confirmed, 48 highly probable, and 938 possible Omicron variant cases reported in Scotland, for a total of 1,095 confirmed or possible cases. This is based on specimens collected to 7 December 2021 and reported up to 9 December 2021[11].

Based on data to 6th December, we can estimate a doubling time for Scotland of between 2.18 - 2.66 days using S-gene target failure as a proxy for Omicron cases. We will continue to monitor the doubling times which may fluctuate or change over future days.

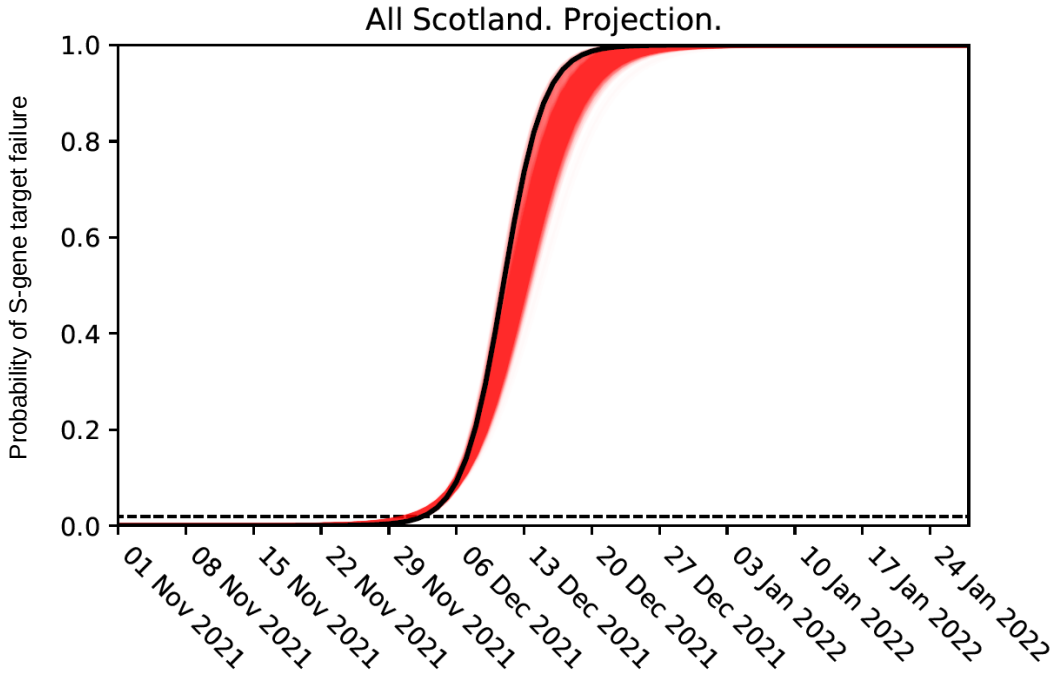
[11] Scottish Government Covid-19 Evidence Report, published 10th December 2021.

Figure 12: Estimated proportion of Omicron cases in Scotland based on S-gene target failure, data to 6th December



This curve is projected into the future to see the likely evolution of cases in Scotland. Based on projections given the doubling time above, Omicron is likely to make up the majority of cases in Scotland, and this could occur between mid-December and early January 2022.

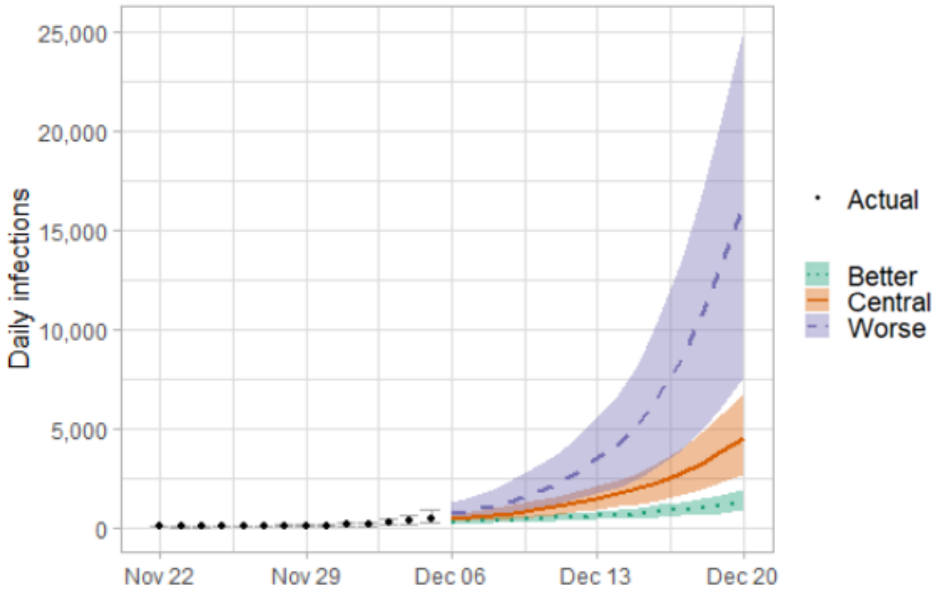
Figure 13: Estimate of the proportion of Omicron cases in Scotland in the coming weeks



Will Omicron lead to more infections?

Although we are still learning about how many hospitalisations might result from Omicron, given the doubling rate shown above (Figure 14), we can start to estimate the number of infections which might result from this variant in Scotland. Figure 14 sets out our current understanding of the possible number of infections over the next two weeks. We will continue to revise this as more data becomes available.

Figure 14: Medium term projections of modelled total new daily Omicron infections, adjusting SGTF positive tests to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 6th December[12]



It is likely that a proportion of these infections will result in hospitalisation. To avoid the NHS being put under severe pressure Omicron would need to be substantially less severe than Delta (either because of the characteristics of Omicron or the effectiveness of vaccination against severe disease) given the very substantial number of infections projected in Figure 12.

[12] Coronavirus (COVID-19): modelling the epidemic - gov.scot (www.gov.scot)

Other modelling

This section covers some modelling outputs for which the methodology is not affected by which variant is dominant.

What we know about how people's contact patterns have changed

Average contacts from the most recent Panel A cohort of the Scottish Contact Survey (week ending 1st December) indicate an average of 4.8 contacts. This has remained at a similar level compared to the previous Panel A of the survey (week ending 17th November), as seen in Figure 15.

Mean contacts within the home have increased by 7% whereas work contacts have decreased by 8% in the last two weeks. Contacts within the other setting (contacts outside home, school and work) have remained at a similar level over the same period.

Figure 15: Mean Adult Contacts (truncated at 100) from SCS.

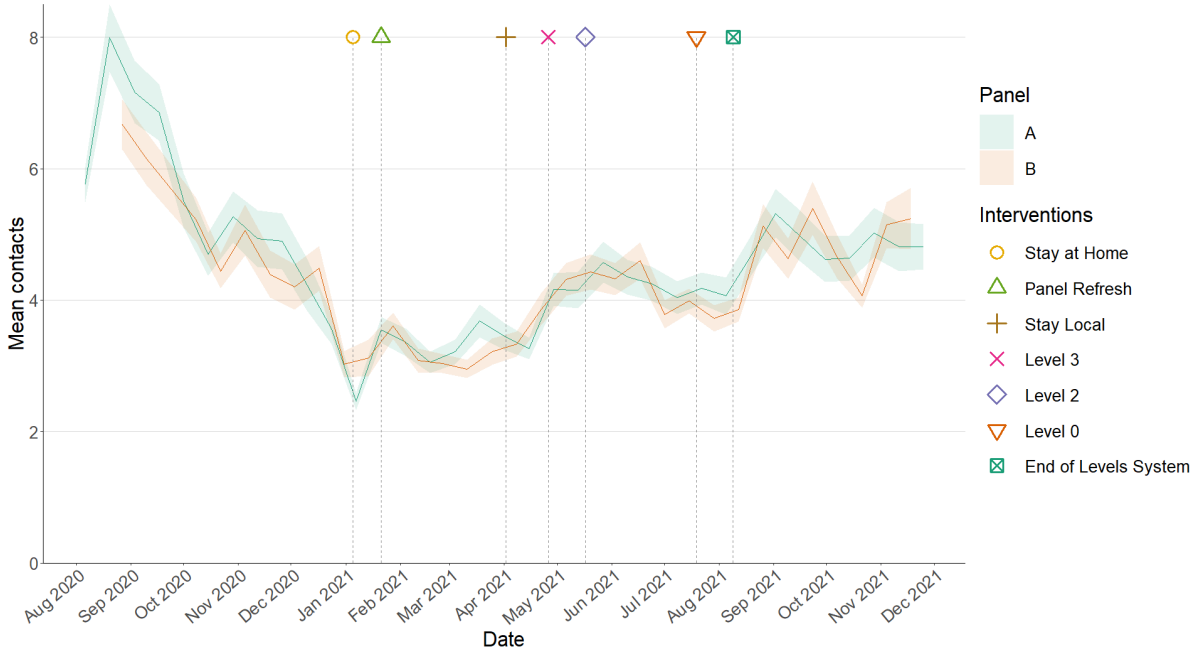
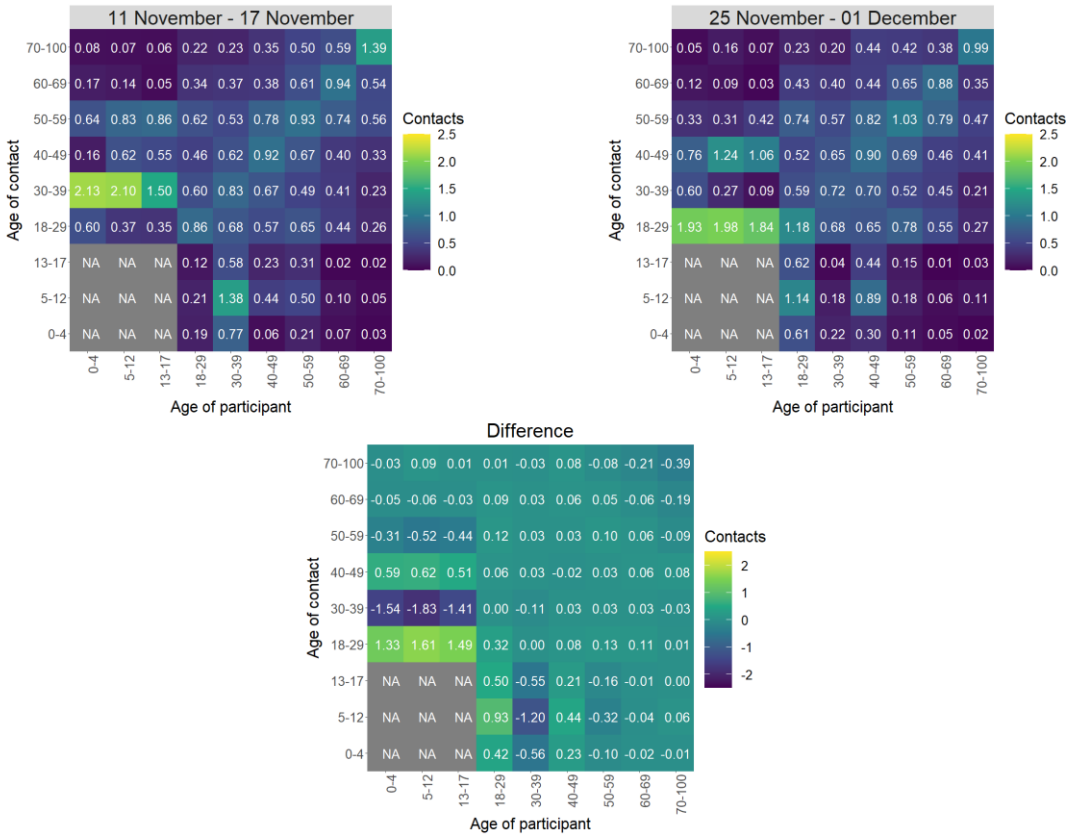


Figure 16 shows how contacts change across age group and setting. Although overall contacts have remained at similar levels compared to two weeks prior, contacts for those in the 18-29 age group have almost doubled with a current level of 6.6 mean contacts. This increase is largely driven by a rise in contacts within the work and other settings.

Figure 16: Average (mean) contacts for each panel per day by setting for adults in Scotland, truncated to 100 contacts per participant (from SCS).

The heatmaps in Figure 17 show the mean overall contacts between age groups for the weeks relating to 11th November - 17th November and 25th November - 1st December and the difference between these periods. The biggest increase interactions is seen between the those under 18 with individuals within the 18-29 age group, with contacts at least three times higher between these age groups.

Figure 17: Overall mean contacts by age group before for the weeks relating to 11th November - 17th November and 25th November - 1st December.



As shown in Figure 18, the biggest changes in the proportion of participants visiting different locations, though slight, is seen in those visiting a shop. Visits to a non-essential shop increased from approximately 42% to 46% and visits to essential shops increased from 86% to 89% in the last two weeks.

Figure 18: Locations visited by participants at least once for panel A and B (from SCS).

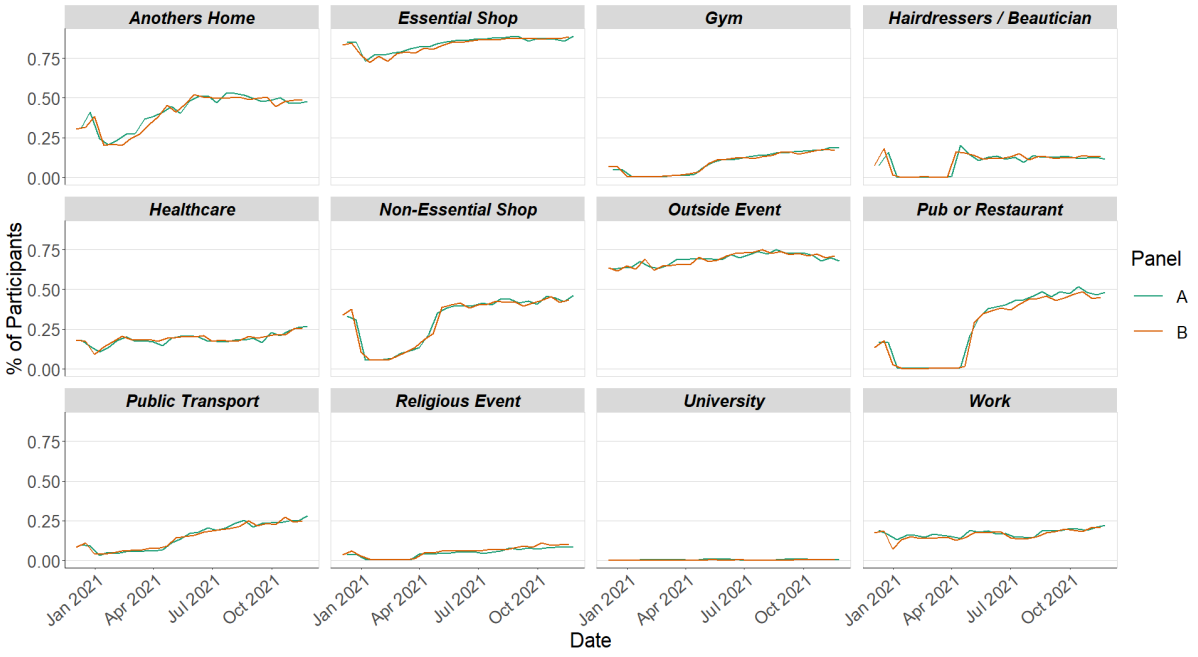
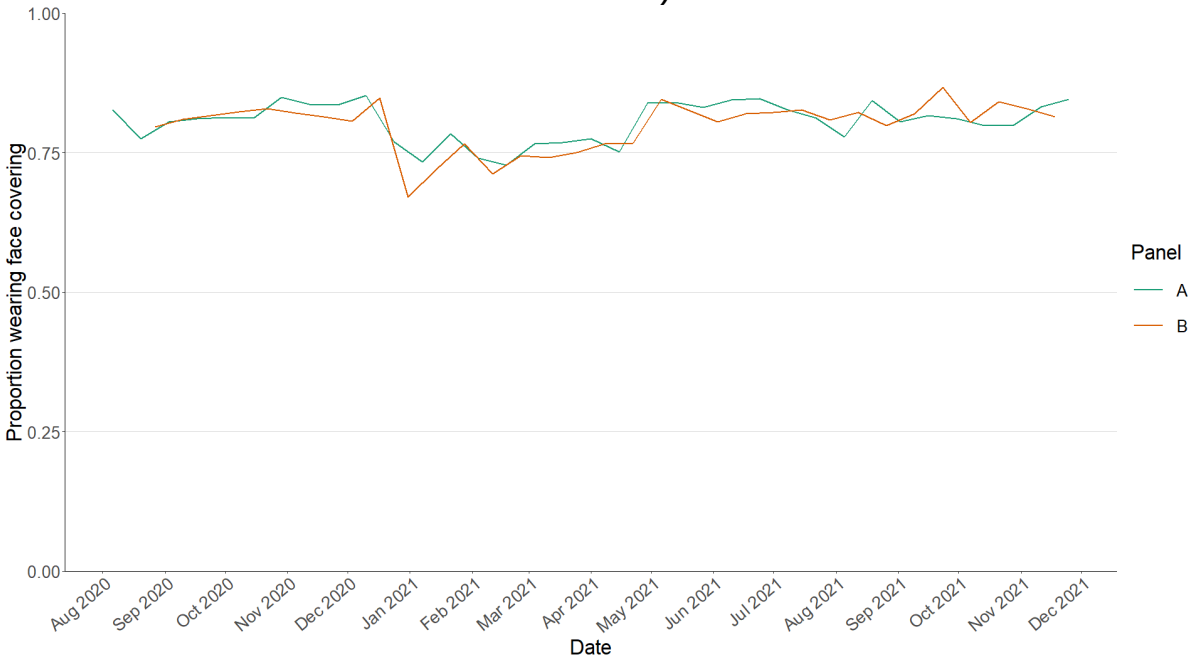


Figure 19 shows the number of people wearing a face covering where they have at least one contact outside of the home. This has increased in the last two weeks from 83% to 85%.

Figure 19: Proportion of adults wearing a face coverings over time (with at least one contact outside of the home).



What can analysis of wastewater samples tell us about local outbreaks of Covid-19 infection?

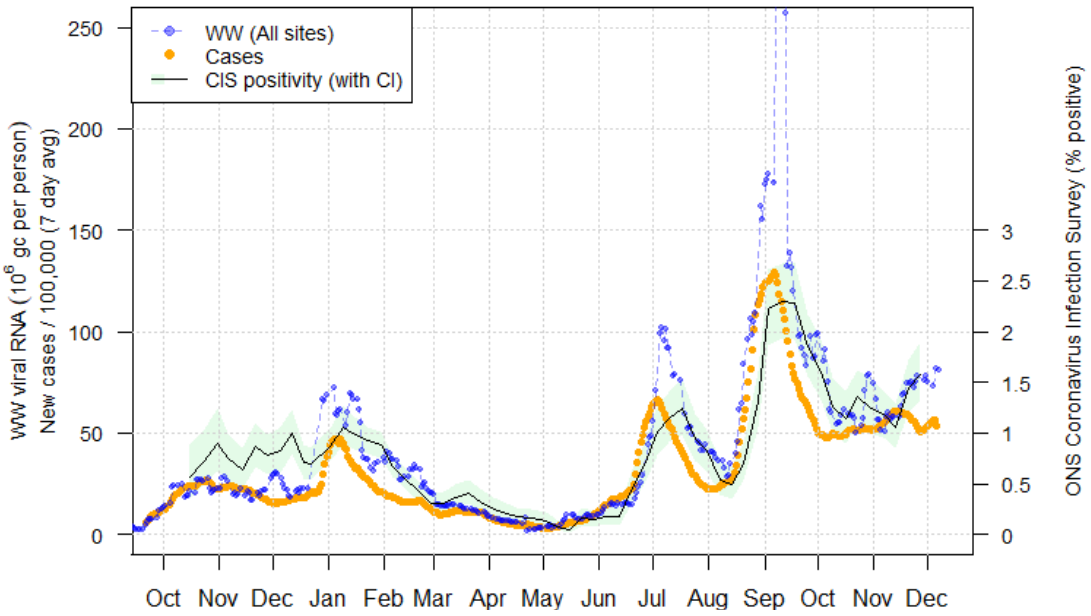
Levels of Covid-19 RNA in wastewater (WW) collected at a number of sites around Scotland are adjusted for population and local changes in intake flow rate (or ammonia levels where flow is not available) and compared to 7-day average daily new case rates derived from Local Authority and Neighbourhood (Intermediate Zone) level aggregate data. See Technical Annex in Issue 34 of these Research Findings for the methodology.

Nationwide, wastewater Covid-19 levels remains at a similar high level as last week, with the week ending on 7th December seeing levels of around 81 million gene copies per person per day (Mgc/p/d), about the same as the 78 Mgc/p/d seen the previous week (week ending 30th November). Recent changes in WW Covid-19 match trends seen in the Office of National Statistics' Coronavirus Infection Survey (ONS CIS) but maintains the relatively high recent level of the WW to new case rate ratio.

Figure 20 shows the national running average trend (over a 7-day period) for the full set of sampled sites, with a small number of unrealistically large outliers excluded. We also consider data from the ONS CIS, with positivity estimates up to 27th November. From this, we see that while both WW viral levels and new case rates do not change greatly this week, this is after a substantial increase in WW Covid-19 and decrease in new case rates the previous week. However, the most recent CIS positivity estimate shows a similar pattern to WW Covid-19 with the estimate levelling off at around 50% higher than two weeks ago[13].

[13] Note that the sample analysis capacity this past week has been reduced to under 100 samples (half that of normal) due to unforeseen technical difficulties at SEPA facilities. While these issues have now been fixed, there has resulted in reduced data coverage, implying the detailed WW outputs for less populated regions of Scotland (as presented in Table 2) should be considered less reliable this week.

Figure 20. National running average trends in wastewater Covid-19 and daily new case rates (7 day moving average) as of 7th December[14].



What next?

Modelling will be provided for both the Delta and Omicron variants where possible. As more information on Omicron becomes available this will be incorporated in the different models as and when it is appropriate to do so.

[14] Anomalously high values, one in Seafield (Edinburgh) in mid-February (see Issue 40), one in Dunblane in mid-June, and two in Daldowie in January, were removed. For this graph, a wastewater RNA average using the last 7 days of data is computed at every sampling date. Information from the ONS Coronavirus Infection Survey is overlaid, with a scale chosen to approximately match the displayed peak of the survey percentage to the recent peaks in cases.

Technical Annex

Epidemiology is the study of how diseases spread within populations. One way we do this is using our best understanding of the way the infection is passed on and how it affects people who catch it to create mathematical simulations. Because people who catch Covid-19 have a relatively long period in which they can pass it on to others before they begin to have symptoms, and the majority of people infected with the virus will experience mild symptoms, this “epidemiological modelling” provides insights into the epidemic that cannot easily be measured through testing e.g. of those with symptoms, as it estimates the total number of new daily infections and infectious people, including those who are asymptomatic or have mild symptoms.

Modelling also allows us to make short-term forecasts of what may happen with a degree of uncertainty. These can be used in health care and other planning. The modelling in this research findings is undertaken using different types of data which going forward aims to both model the progress of the epidemic in Scotland and provide early indications of where any changes are taking place.

The delivery of the vaccination programme will offer protection against severe disease and death. The modelling includes assumptions about compliance with restrictions and vaccine take-up. Work is still ongoing to understand how many vaccinated people might still spread the virus if infected. As Covid-19 is a new disease there remain uncertainties associated with vaccine effectiveness. Furthermore, there is a risk that new variants emerge for which immunisation is less effective.

How the modelling compares to the real data as it emerges

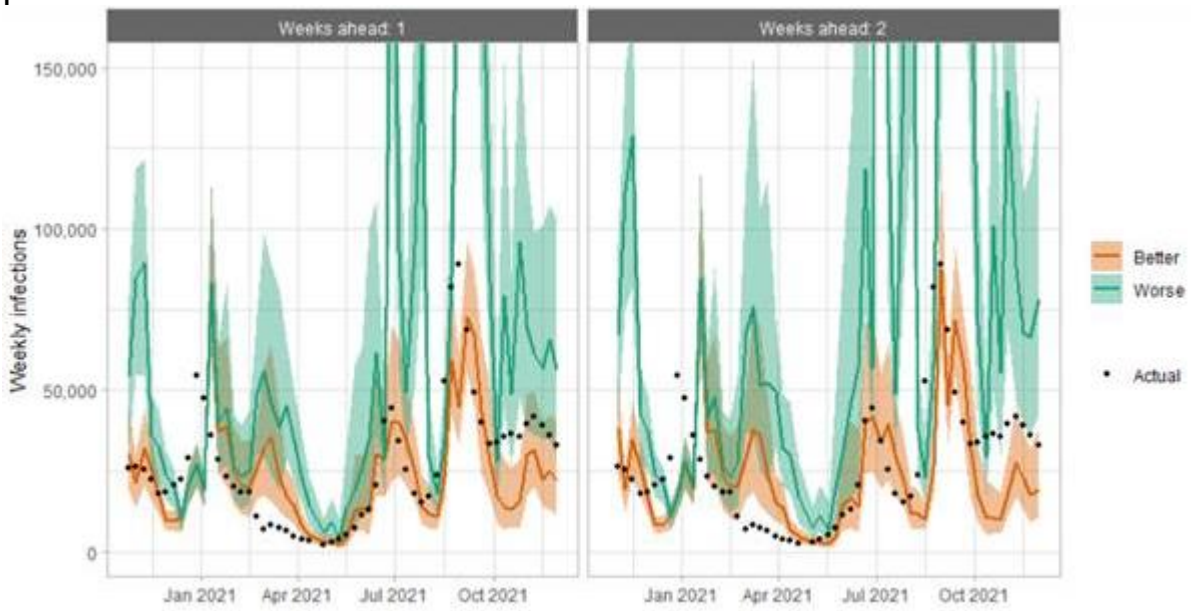
The method of producing the medium term projections (figures 5 - 7) uses the published actual numbers of infections, hospital admissions and ICU admissions directly, rather than modelling them from the beginning of the epidemic. This means the projections begin from the point the published data ends.

There is no prediction interval around the actual infections in Figure 5 because there is no longer any uncertainty from simulating infections during this period. There is still uncertainty in the ascertainment rate, which is represented by the whiskers around the actual infections.

The prediction intervals around the actual hospital and ICU occupancy in Figures 6 and 7 now represent uncertainty in the assumptions for the hospitalisation rate and hospital length of stay, rather than uncertainty in the number of infections. These confidence intervals are created by applying sensitivity analysis to the assumptions.

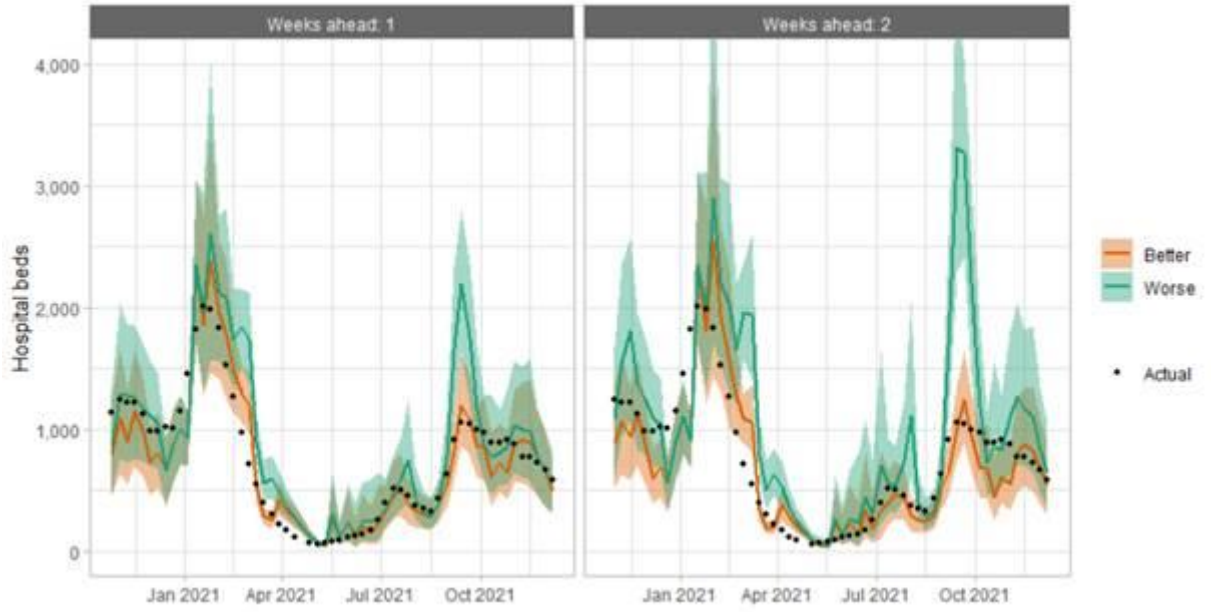
The following charts show the history of our modelling projections in comparison to estimates of the actual data. The infections projections were largely accurate during October to mid-December 2020 and from mid-January 2021 onwards. During mid-December 2020 to mid-January 2021, the projections underestimated the number of infections, due to the unforeseen effects of the new variant.

Figure 21. Infections projections versus actuals, for historical projections published between one and two weeks before the actual data came in.



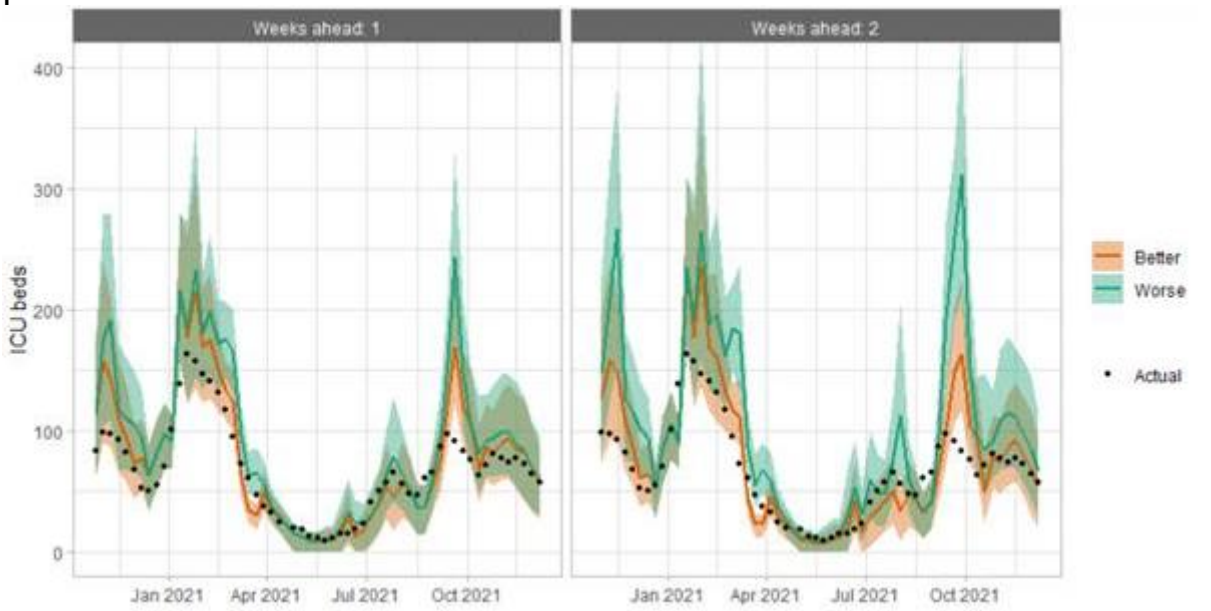
Hospital bed projections have generally been more precise than infections estimates due to being partially based on already known information about numbers of current infections, and number of people already in hospital. The projections are for number of people in hospital due to Covid-19, which is slightly different to the actuals, which are number of people in hospital within 28 days of a positive Covid-19 test.

Figure 22. Hospital bed projections versus actuals, for historical projections published between one and two weeks before the actual data came in.



As with hospital beds, ICU bed projections have generally been more precise than infections. The projections are for number of people in ICU due to Covid-19. The actuals are number of people in ICU within 28 days of a positive Covid-19 test up to 20 January 2021, after which they include people in ICU over the 28 day limit.

Figure 23. ICU bed projections versus actuals, for historical projections published between one and two weeks before the actual data came in.



How is the doubling time for the Omicron variant calculated

In a recent WHO report[15] it was confirmed that in PCR tests one of the three target genes of the SARS-CoV-2 virus is not detected (called S-gene target failure, SGTF). This test can therefore be used as an indicator for the Omicron variant.

The number of total S-gene tests and the proportion which test positive for SGTF in Scotland are provided daily by PHS. Based on a methodology developed by academics at the University of Manchester, a statistical model is based on some underlying parameters of the Omicron variant. This is fitted against the actual number of S-gene test and the proportion of these which are positive for SGTF using maximum likelihood. This allows for a best estimate of the underlying parameters, including the relative growth advantage of the Omicron variant, which leads to an estimate of the doubling time of the variant.

There remains significant unknowns about the Omicron variant, which makes it difficult to estimate projections with any degree of confidence. Key to this is any measure of severity, transmissibility and vaccine escape. This information will be incorporated into the various models as and when it becomes known.

[15] Classification of Omicron (B.1.1.529): SARS-CoV-2 Variant of Concern (who.int)

Which local authorities are likely to experience high levels of Covid-19 in two weeks' time

Table 1. Probability of local authority areas exceeding thresholds of cases per 100K (19th to 25th December). Data to 6th December. This is based on the Delta variant being the majority of cases.

	Probability of exceeding (cases per 100K)			
Local Authority (LA)	50	100	300	500
Aberdeen City	75-100%	75-100%	15-25%	0-5%
Aberdeenshire	75-100%	75-100%	5-15%	0-5%
Angus	75-100%	75-100%	25-50%	0-5%
Argyll and Bute	75-100%	75-100%	15-25%	0-5%
City of Edinburgh	75-100%	75-100%	50-75%	15-25%
Clackmannanshire	75-100%	75-100%	50-75%	15-25%
Dumfries & Galloway	75-100%	75-100%	50-75%	5-15%
Dundee City	75-100%	75-100%	15-25%	0-5%
East Ayrshire	75-100%	75-100%	75-100%	50-75%
East Dunbartonshire	75-100%	75-100%	75-100%	25-50%
East Lothian	75-100%	75-100%	50-75%	15-25%
East Renfrewshire	75-100%	75-100%	50-75%	15-25%
Falkirk	75-100%	75-100%	75-100%	25-50%
Fife	75-100%	75-100%	50-75%	15-25%
Glasgow City	75-100%	75-100%	50-75%	25-50%
Highland	75-100%	75-100%	5-15%	0-5%
Inverclyde	75-100%	75-100%	25-50%	15-25%
Midlothian	75-100%	75-100%	25-50%	15-25%
Moray	75-100%	75-100%	25-50%	5-15%
Na h-Eileanan Siar	75-100%	50-75%	15-25%	0-5%
North Ayrshire	75-100%	75-100%	25-50%	5-15%
North Lanarkshire	75-100%	75-100%	50-75%	25-50%
Orkney Islands	50-75%	25-50%	0-5%	0-5%
Perth and Kinross	75-100%	75-100%	25-50%	0-5%
Renfrewshire	75-100%	75-100%	25-50%	15-25%
Scottish Borders	75-100%	75-100%	25-50%	0-5%
Shetland Islands	25-50%	15-25%	0-5%	0-5%
South Ayrshire	75-100%	75-100%	50-75%	25-50%
South Lanarkshire	75-100%	75-100%	50-75%	25-50%
Stirling	75-100%	75-100%	25-50%	5-15%
West Dunbartonshire	75-100%	75-100%	50-75%	15-25%
West Lothian	75-100%	75-100%	50-75%	25-50%

What levels of Covid-19 are indicated by wastewater data?

Table 2 provides population weighted daily averages for normalised WW Covid-19 levels in the weeks beginning 24th November and 1st December 2021, with no estimate for error. This is given in Million gene copies per person, which approximately corresponds to new cases per 100,000 per day. Coverage is given as percentage of LA inhabitants covered by a wastewater Covid-19 sampling site delivering data during this period[16].

Table 2. Average daily cases per 100k as given by WW data[17].

Local authority (LA)	w/b 24th November	w/b 1st December	Coverage
Aberdeen City	99	53	80%
Aberdeenshire	76	58	29%
Angus	81	64	55%
Argyll and Bute	35	44	12%
City of Edinburgh	85	76	98%
Clackmannanshire	83	–	0%
Dumfries & Galloway	67	–	8%
Dundee City	89	64	100%
East Ayrshire	49	88	69%
East Dunbartonshire	94	102	99%
East Lothian	106	82	74%
East Renfrewshire	76	57	89%
Falkirk	91	133	69%
Fife	68	120	77%
Glasgow City	86	79	71%
Highland	72	60	48%
Inverclyde	57	53	98%
Midlothian	82	76	73%
Moray	115	89	14%
Na h-Eileanan Siar	4	–	0%
North Ayrshire	67	66	92%
North Lanarkshire	73	103	33%
Orkney Islands	26	18	34%
Perth and Kinross	76	86	38%
Renfrewshire	54	66	97%
Scottish Borders	84	40	27%
Shetland Islands	–	–	0%
South Ayrshire	54	94	88%
South Lanarkshire	66	61	58%
Stirling	54	35	53%
West Dunbartonshire	70	80	98%
West Lothian	89	136	95%

[16] Advancements in detection and interpretation practices allow us to identify when outlying results are anomalous rather than indicators of spikes in Covid-19 levels. Table 2 provides population weighted daily averages for normalised WW Covid-19 levels with the outliers removed. See Technical Annex in Issue 60 of these Research Findings for further details.

[17] Coverage as for week beginning 1st December 2021.

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The views expressed in this report are those of the researcher and do not necessarily represent those of the Scottish Government or Scottish Ministers.

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