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Coronavirus (COVID-19): Analysis

Coronavirus (COVID-19): modelling the epidemic in Scotland (Issue No. 76)

Background

This is a report on the Scottish Government modelling of the spread and level of Covid-19. This updates the previous publication on modelling of Covid-19 in Scotland published on 28th October 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.

In Scotland, the modelled estimate for R is between 0.9 and 1.1, with the growth rate between -3% and 1%.

Key Points

- The reproduction rate R in Scotland is currently estimated as being between 0.9 and 1.1, as of 19th October. The lower and upper limits have increased since last week.
- The number of new daily infections for Scotland is estimated as being between 63 and 96, per 100,000 people.
- The growth rate for Scotland is currently estimated as between -3% and 1%. The upper limit has increased since last week.
- Average contacts have decreased by 13% in the last two weeks (comparing surveys pertaining to 7th October - 13th October and 21st October - 27th October) with a current level of 4.1 daily contacts.
- Mean contacts within the work and other setting (contacts outside home, school and work) have decreased in the last two weeks by 20%

and 17% respectively. Contacts within the home have remained at a similar level over the same period.

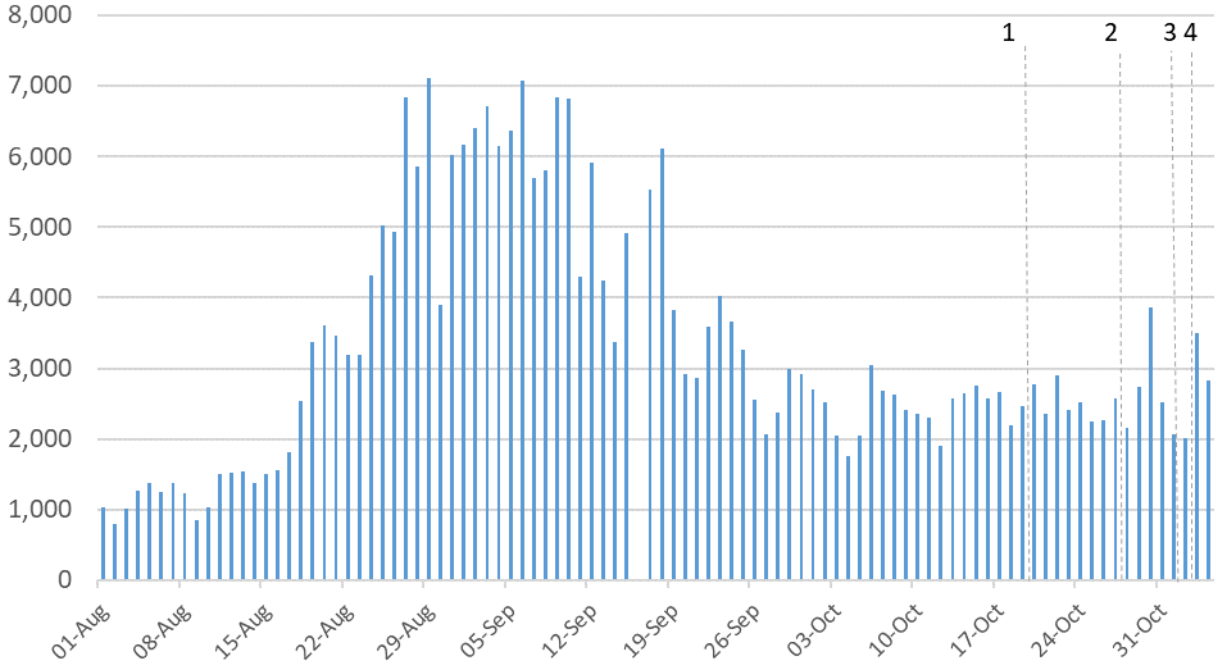
- Those aged between 30-39 and 50-59 reported an increase in overall contacts whereas all remaining age groups reported a decrease. Changes across the age groups are driven by contacts within the work place with the exception of the 18-29 age group, with their decrease driven by a reduction in contacts within the other setting.
- Those aged between 18-29 have reported the biggest decrease in interactions with those aged under 18 in the last two weeks. The highest interactions remain between the 18-29 age group with each other.
- The proportion of individuals using public transport increased from approximately 23% to 28% while individuals visiting another's home rose from 44% to 48% in the last two weeks.
- The proportion of contacts reported to have been indoors only has increased in the last two weeks from 66% to 69%.
- 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 80% to 84%.
- New research from the EAVE II group indicates that for August to October 2021 most hospitalisations are among older double vaccinated individuals.
- This study also shows that from August to October 2021 most hospitalisations are among double vaccinated individuals with multiple comorbid clinical conditions, though a substantial number are still unvaccinated individuals with no clinical conditions.
- Hospital and ICU occupancies are in a plateau. There continues to be uncertainty over hospital occupancy and intensive care in the next three weeks.
- Modelled rates of positive tests per 100K using data to 1st November indicate that, for the week commencing 14th November 2021, 31 local authorities are expected to exceed 50 cases per 100K with at least 75% probability. The only exception to this is the Shetland Islands.
- 29 local authorities are also expected to exceed 100 cases per 100K with at least 75% probability. The only exceptions are Na h-Eileanan Siar, Orkney Islands and Shetland Islands.
- Clackmannanshire is the only local authority which is expected to exceed 300 cases per 100K with at least 75% probability.
- Nationwide, Covid-19 levels in wastewater (WW) have shown an increase since last week (20th to 26th October), increasing by approximately 20%.
- Modelling of long Covid estimates that on 21st November 2021 between 1.4% and 2.9% of the population are projected to self-classify

with long Covid for 12 weeks or more after their first suspected Covid-19 infection in Scotland. The upper and lower limits of the estimate are higher than last week.

Recent cases

Figure 1 shows the number of Covid-19 cases reported in Scotland between July and November 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 4th November 2021[1]



R, growth rate and incidence are as of 19th October (dashed line 1). The Scottish Contact Survey uses data to 27th October (dashed line 2). The Scottish Government modelling of infections, hospitalisations and ICU beds, the long Covid analysis, the medium term projections and modelled rates of positive tests per 100K use data to 1st November (dashed line 3). Wastewater analysis uses data to 2nd November (dashed line 4).

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

[1] On 16 September 2021, daily data on new cases and tests were not refreshed due to a technical issue affecting the availability of the data.

symptoms, become sick, and either die or recover, there is a time lag in what our model can tell us about any re-emergence of the epidemic and where in Scotland this might occur.

However modelling of Covid-19 deaths is an important measure of where Scotland lies in its epidemic as a whole. In addition, the modelling groups that feed into the UK Health Security Agency (UKHSA) consensus use a range of other data along with deaths in their estimates of R and the growth rate. These outputs are provided in this research findings. The type of data used in each model to estimate R is highlighted in Figure 2.

We use the Scottish Contact Survey (SCS) 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.

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. This will continue to be based on both what we know about how different age groups are affected by the disease and the vaccination rate for those groups to estimate the proportion of cases that will require hospital, and the length of time people that people will stay there.

What the modelling tells us about the epidemic as a whole

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.

UKHSA's consensus view across these methods, was that the value of R as at 19th October[2] in Scotland was between 0.9 and 1.1 (see Figure 2)[3].

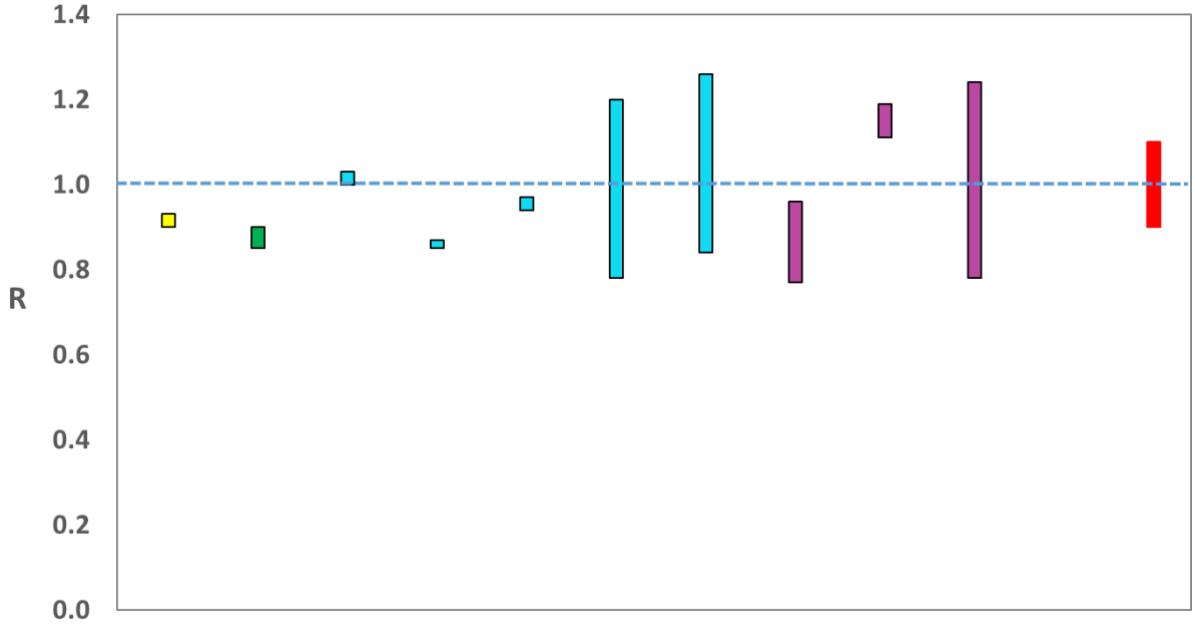
R is an indicator that lags by two to three weeks and therefore should not be expected to reflect recent fluctuations.

[2] Using data to 1st November 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.

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 2 and 3.

Figure 2. Estimates of R_t for Scotland, as of 19th October, including 90% confidence intervals, produced by EMRG[4].

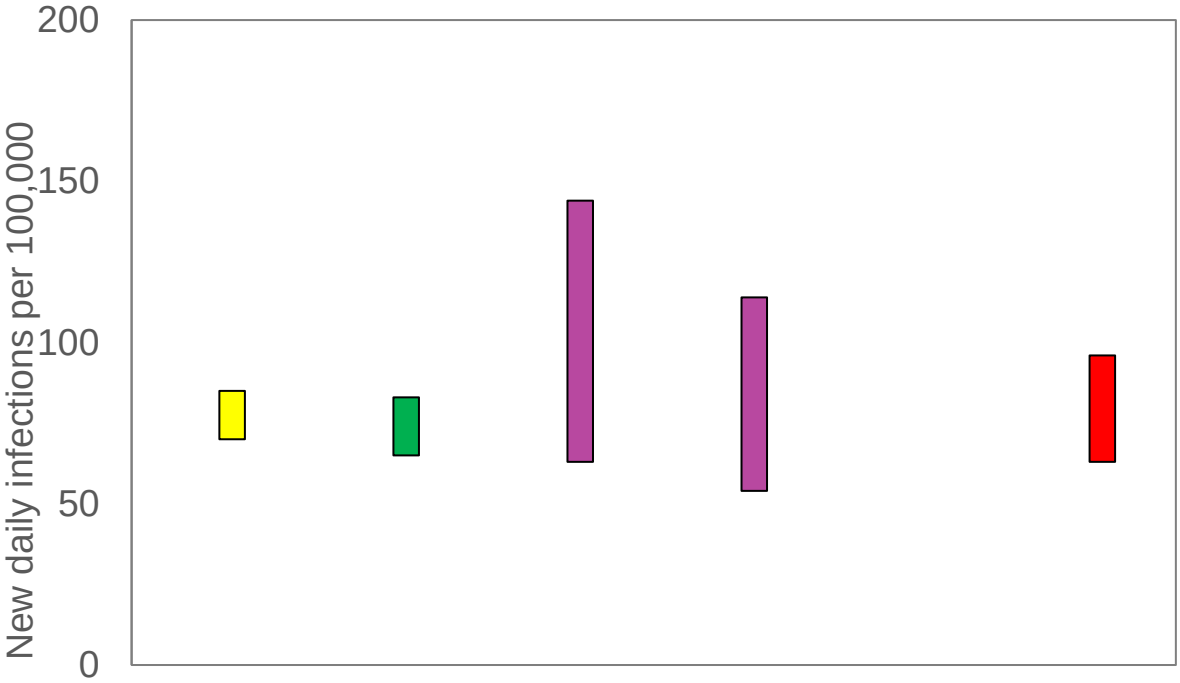


Source: EMRG

The various groups which report to the EMRG use different sources of data in their models to produce estimates of incidence (Figure 3). UKHSA's consensus view across these methods, as at 19th October, was that the incidence of new daily infections in Scotland was between 63 and 96 new infections per 100,000. This equates to between 3,400 and 5,200 people becoming infected each day in Scotland. The lower and upper limits have decreased since last week.

[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 1st November. R, incidence and growth rate as of 19th October.

Figure 3. Estimates of incidence for Scotland, as at 19th October, 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 1% per day as at 19th October. The upper limit has increased since last week.

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

Average contacts have decreased by 13% in the last two weeks (comparing surveys pertaining to 7th October - 13th October and 21st October - 27th October) with a current level of 4.1 daily contacts as seen in Figure 4. Mean contacts within the work and other setting (contacts outside home, school and work) have decreased in the last two weeks by 20% and 17% respectively. Contacts within the home have remained at a similar level over the same period.

Figure 4: Mean Adult Contacts (truncated at 100) from SCS.

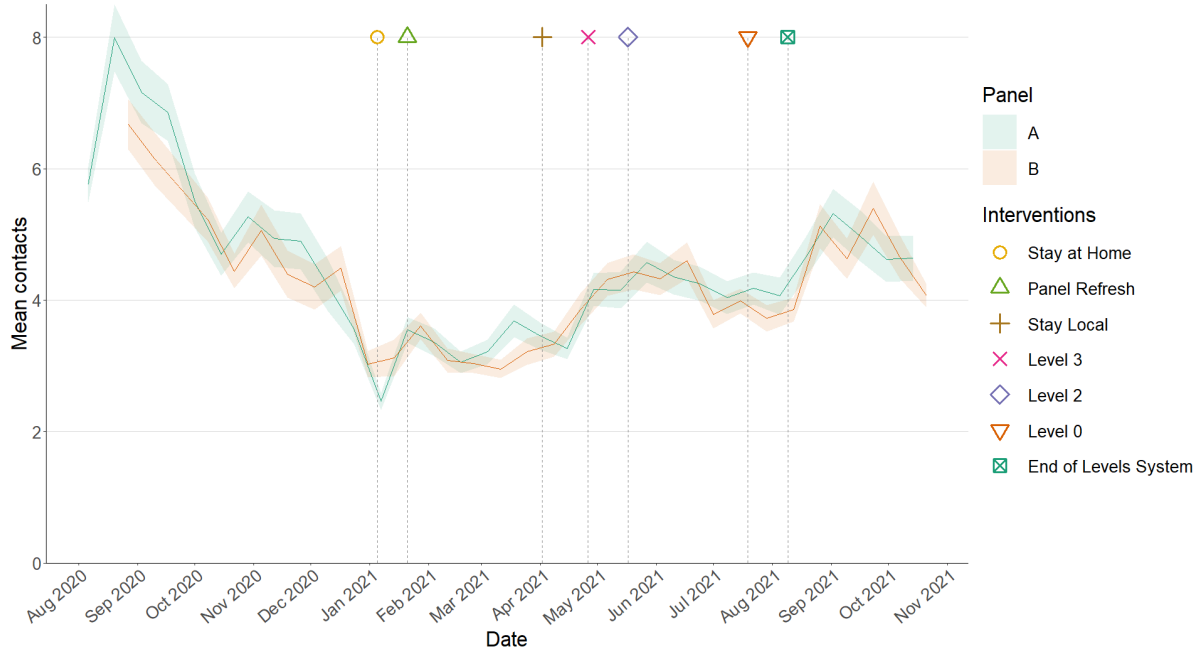
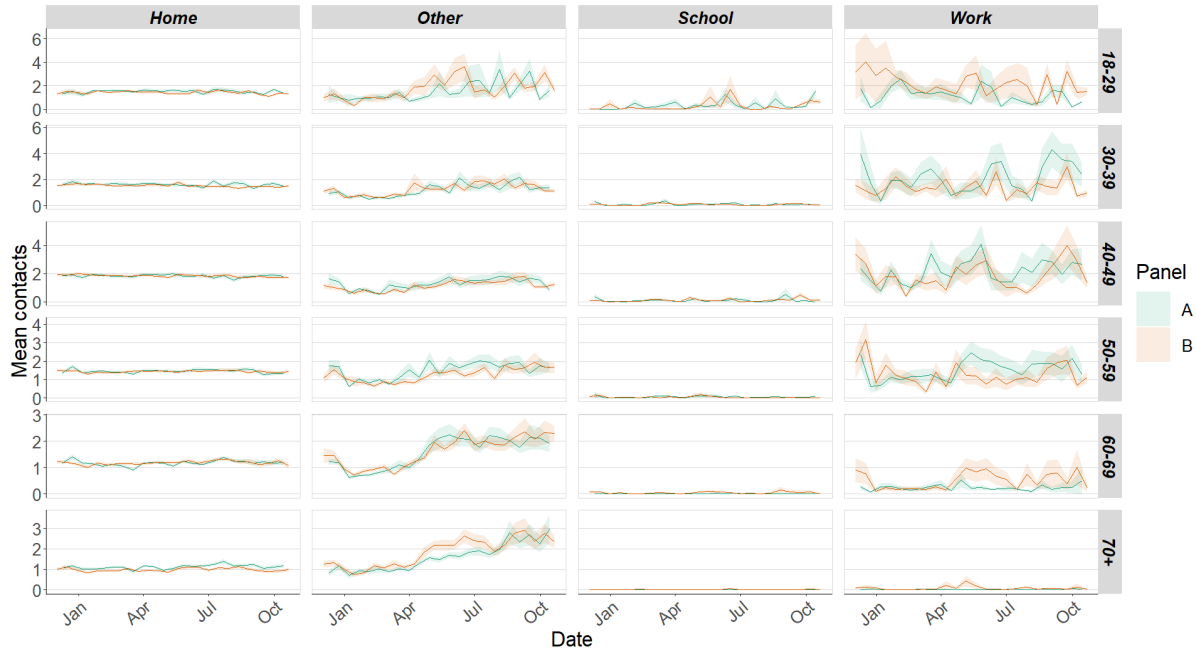


Figure 5 shows how contacts change across age group and setting. Those aged between 30-39 and 50-59 reported an increase in overall contacts whereas all remaining age groups reported a decrease. Changes across the age groups are driven by contacts within the work place with the exception of the 18-29 age group, with their decrease driven by a reduction in contacts within the other setting.

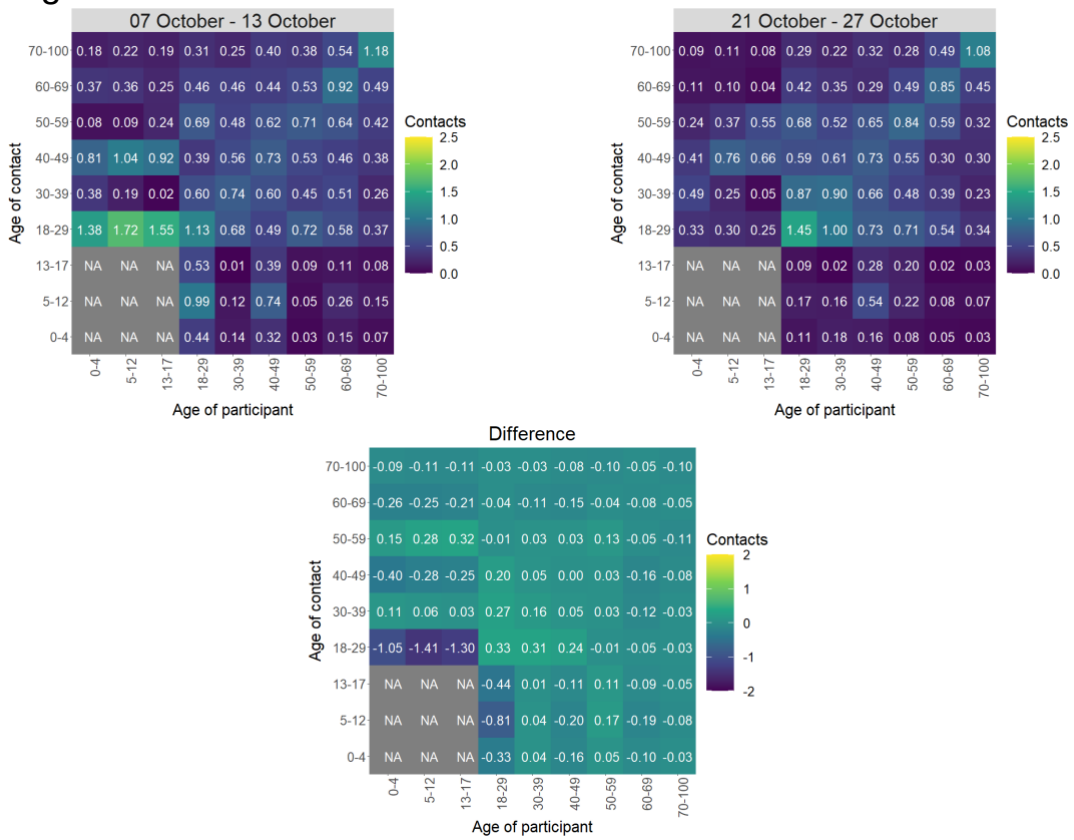
Figure 5: Average (mean) contacts for each panel per day by setting for adults in Scotland, truncated to 100 contacts per participant (from SCS).



The heatmaps in Figure 6 show the mean overall contacts between age groups for the weeks relating to 7th October - 13th October and

21st October - 27th October and the difference between these periods. Those aged between 18-29 have reported the biggest decrease in interactions with those aged under 18 in the last two weeks. The highest interactions remain between the 18-29 age group with each other.

Figure 6: Overall mean contacts by age group before for the weeks relating to 7th October - 13th October and 21st October - 27th October.



As shown in Figure 7, the biggest differences are seen with those using public transport and also individuals visiting another's home. The proportion of individuals using public transport increased from approximately 23% to 28% while individuals visiting another's home rose from 44% to 48% in the last two weeks.

Figure 7: Locations visited by participants at least once for panel A and B (from SCS).

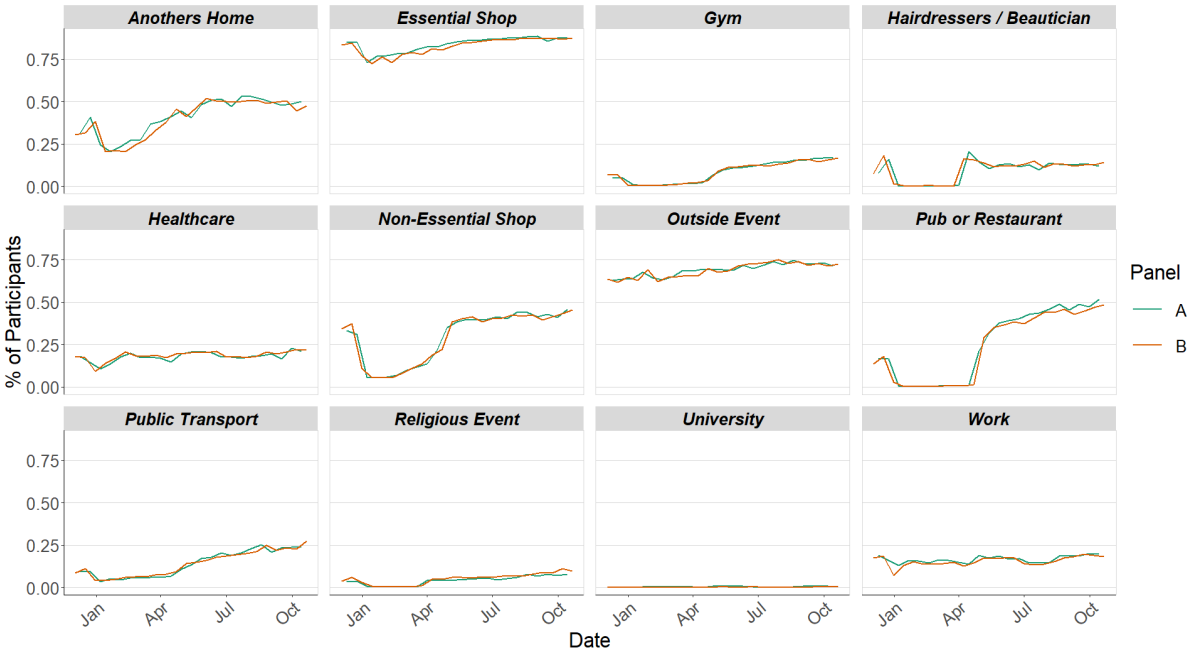


Figure 8 shows the proportion of participants that reported contacts had indoors and outdoors for contacts individually reported for panel B. A contact can also be recorded as both indoor and outdoor. The proportion of contacts reported to have been indoors only has increased in the last two weeks from 66% to 69%.

Figure 8: Proportion of participants reported indoors and outdoors for contacts individually reported for panel B.

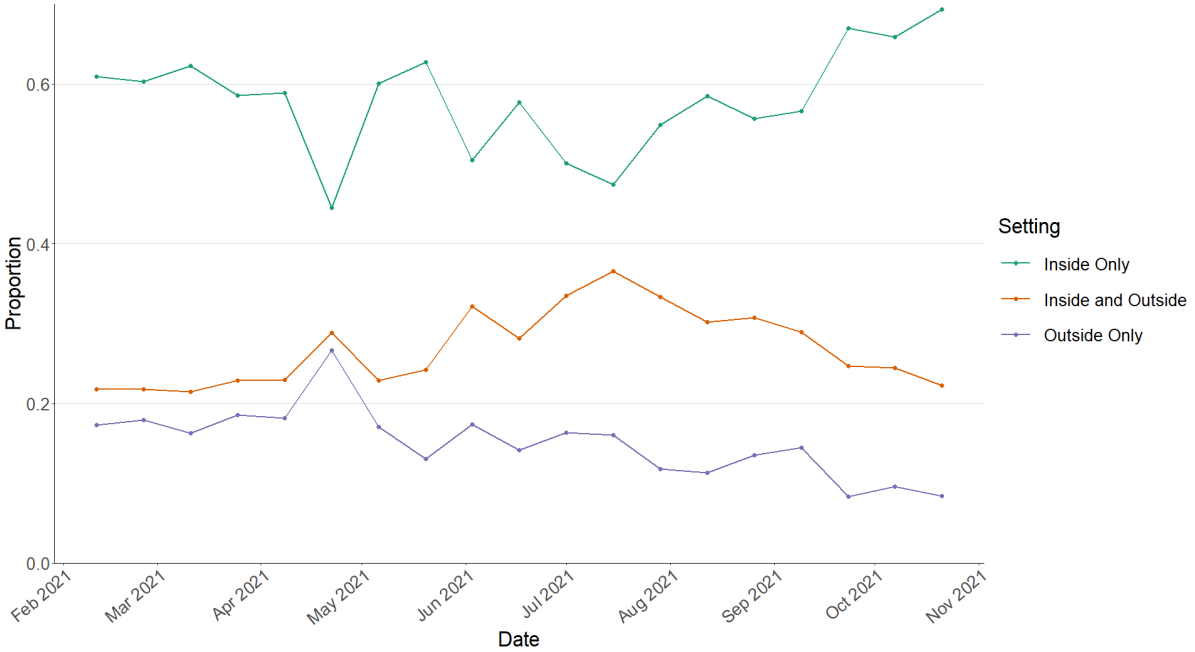
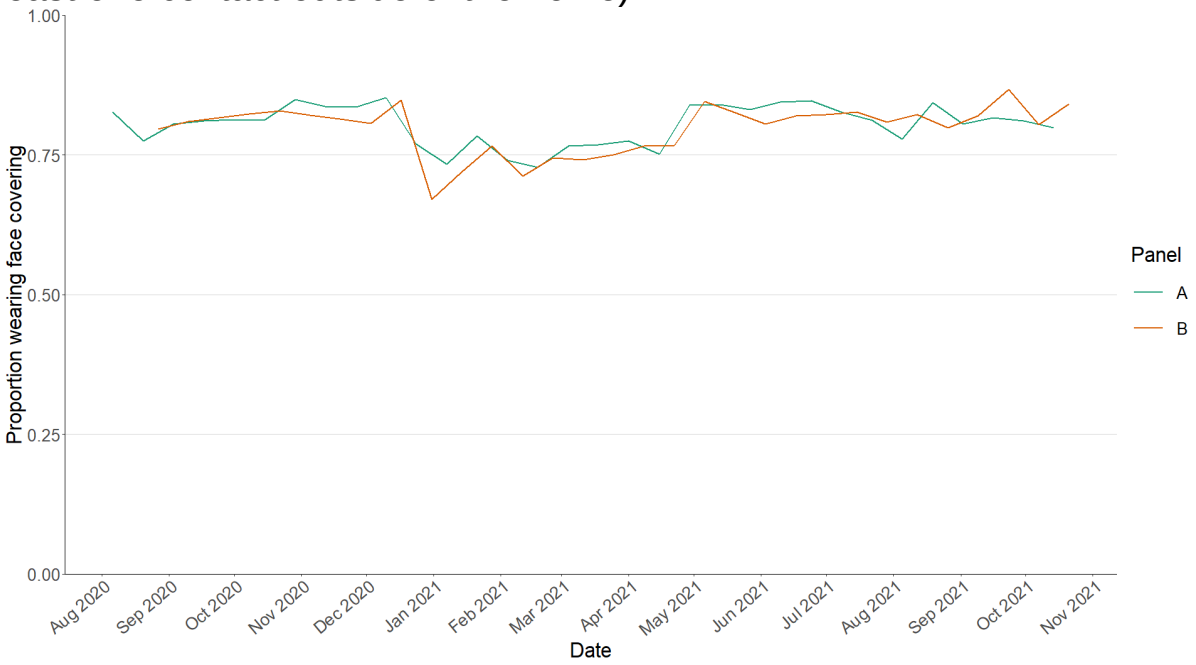


Figure 9 shows the number of people wearing a face covering where they have at least one contact outside of the home. This has increased in the last two weeks to 84% from 80%.

Figure 9: Proportion of adults wearing a face coverings over time (with at least one contact outside of the home).



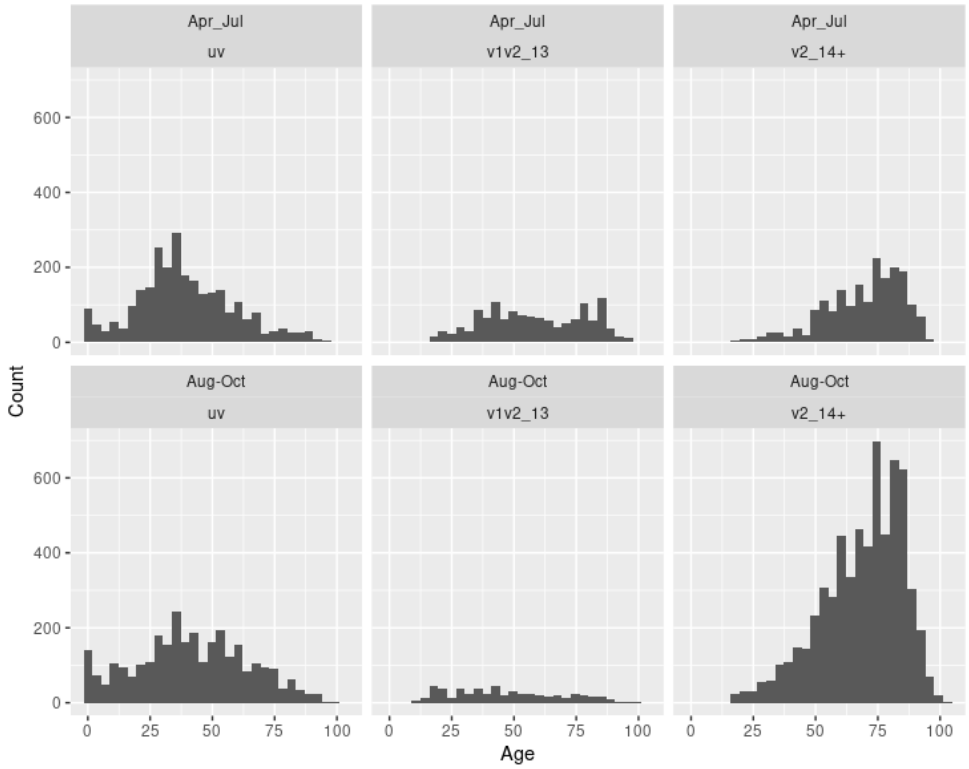
What we know about who is being admitted to hospital

The Early Pandemic Evaluation and Enhanced Surveillance of Covid-19 (EAVE 2) Study Group[5] has updated the pattern of demographics, deprivation, vaccine status and clinical risk groups over time for those who were admitted to hospital in Scotland (for further information see the Technical Annex in Issues 23 and 24 of these Research Findings). This update covers the demographics of emergency Covid-19 admissions to hospital in Scotland from 1st April 2021 to 25th October 2021.

[5] Based at Edinburgh University, Strathclyde University, Aberdeen University and Public Health Scotland.

As shown in Figure 10, in the earliest period (1st April to 31st July 2021) the majority of admissions to hospital following a positive Covid-19 test were among unvaccinated younger people, although a substantial number were elderly and double vaccinated. In the latest period (1st August to 25th October 2021) most hospitalisations are among older double vaccinated individuals. This may reflect a number of factors, e.g. waning vaccine protection, now that most of the adult population are now double vaccinated.

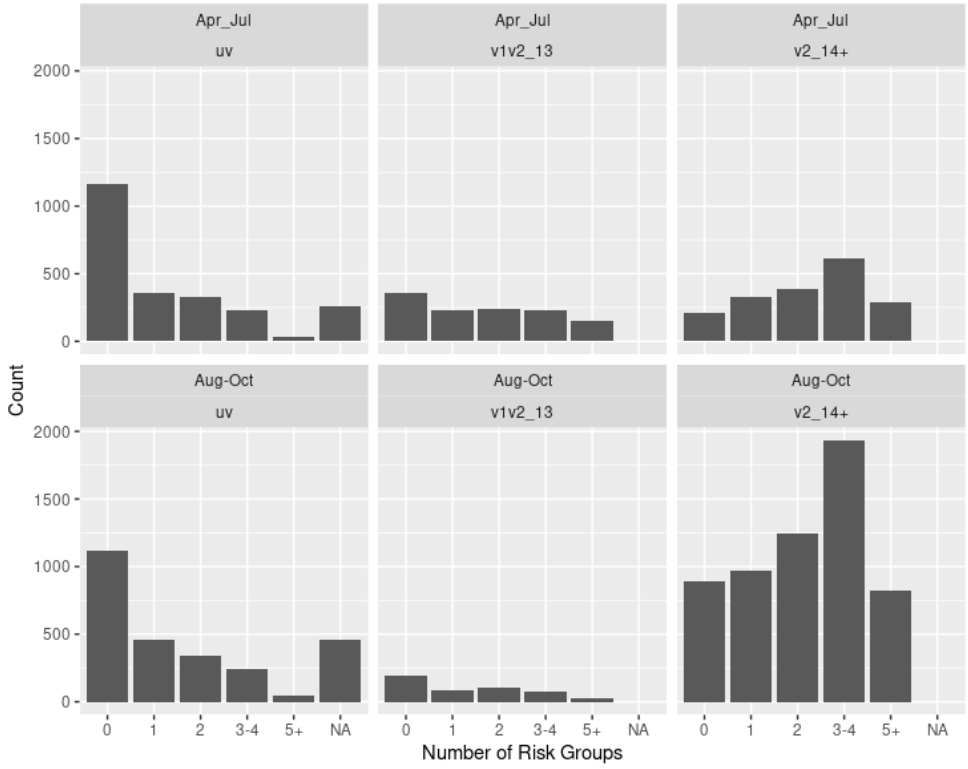
Figure 10. Number of Covid-19 admissions to hospital by age and vaccination status in two periods.



Key
uv corresponds to unvaccinated at time of admission
v1v2_13 corresponds to either one dose of vaccine or 2 doses and admitted within 13 days of the second dose
v2_14+ corresponds to 2 vaccine doses and admitted 14 or more days after the second dose.

Figure 11 shows the number of Covid-19 admissions to hospital by number of clinical risk groups and vaccination status. Risk group status is the number of Q-Covid[6] risk groups to which a person belongs. In the earliest period shown (1st April to 31st July 2021) the majority of hospitalisations following a positive Covid-19 test were among unvaccinated individuals, with no clinical risk groups. In the latest period (1st August to 25th October 2021) most hospitalisations are among double vaccinated individuals with multiple comorbid clinical conditions, though a substantial number are still unvaccinated individuals with no clinical conditions.

Figure 11. Number of Covid-19 admissions to hospital by number of clinical risk groups and vaccination status[7] in two periods.



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

The Scottish Government assesses the impact of Covid-19 on the NHS in the next few weeks in terms of estimated number of infections.

[6] Coronavirus (COVID-19) risk assessment - NHS Digital

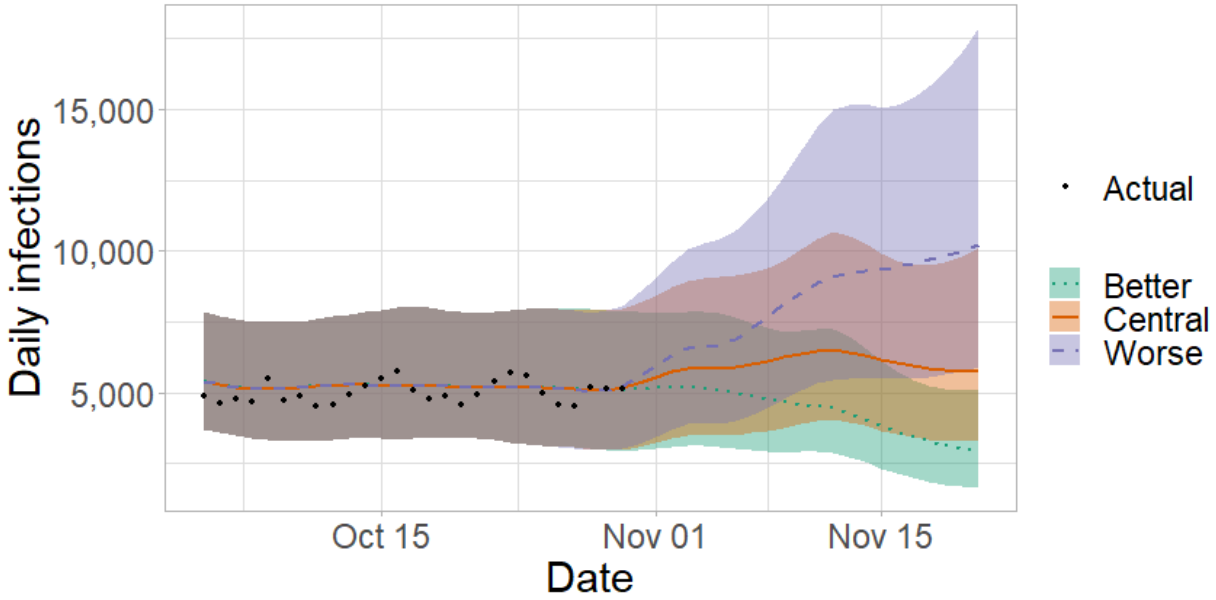
[7] uv – unvaccinated at time of admission ; v1v2_13 - one dose of vaccine or 2 doses and admitted within 13 days of the second dose; v2_14+ - 2 vaccine doses and admitted 14 or more days after the second dose. NA – unknown risk group information.

Figure 12 shows three projections over the three weeks to 21st November.

‘Central’ assumes that infections will rise or plateau at the current level, resulting from a small rise in transmission. ‘Worse’ assumes a larger rise in transmission from the current level. ‘Better’ assumes a small drop in transmission[8]. All three scenarios account for the end of the half-term periods and COP 26 in Glasgow. Due to this, there is a large amount of uncertainty as to the potential impact on infections.

Contacts tend to be lower during half term and holidays. The modelling accounts for a potential increase in transmission from schools reopening after half-term.

Figure 12. Medium term projections of modelled total new daily infections, adjusting positive tests[9] to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 1st November.



[8] All scenarios are based on current vaccine roll-out plans and efficacy assumptions. Data to 1st November.
[9] The actual positive tests are adjusted to coincide with the estimated day of infection.

Figure 13 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 three weeks.

Figure 13. Medium term projections of modelled hospital bed demand, from Scottish Government modelling, based on positive test data reported up to 1st November.

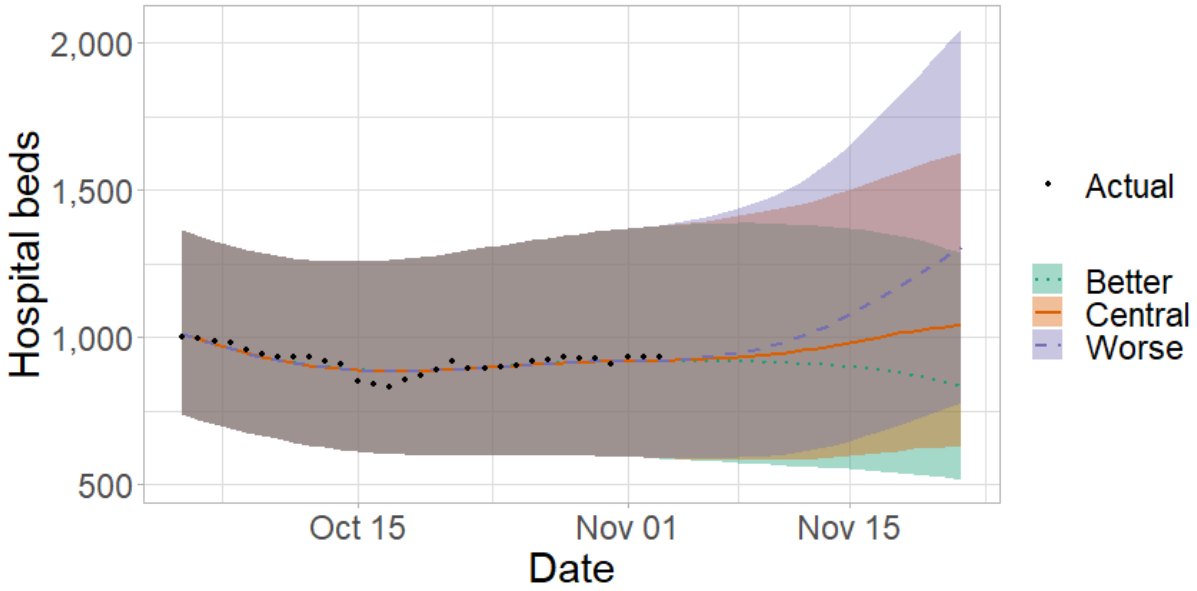
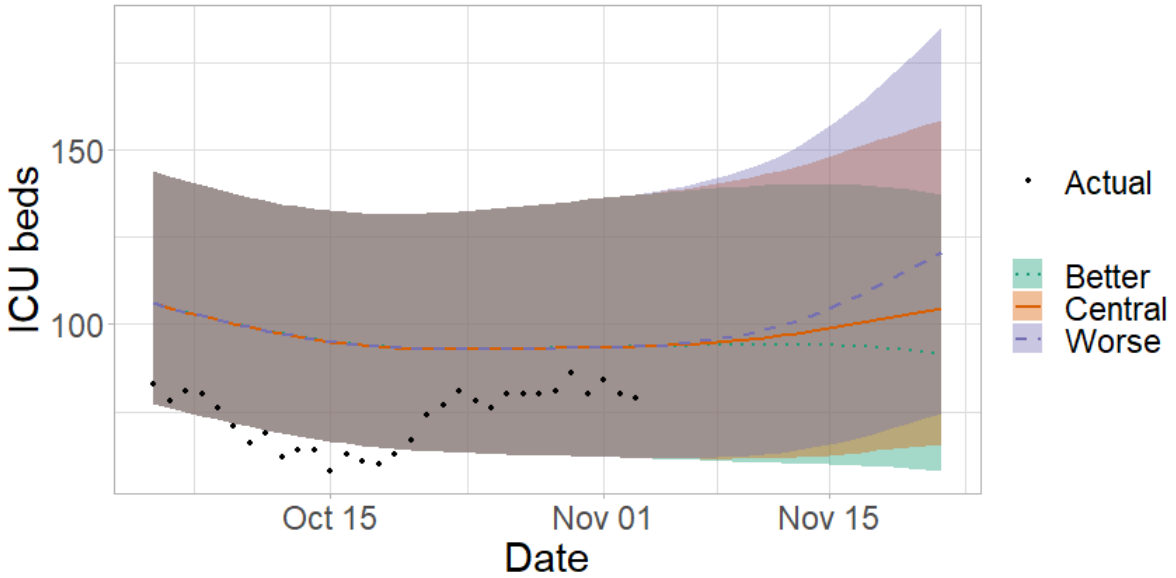


Figure 14 shows the impact of the projection on ICU bed demand.

Figure 14. Medium term projections of modelled ICU bed demand, from Scottish Government modelling[10], based on positive test data reported up to 1st November.



A comparison of the actual data against historical projections is included in the Technical Annex.

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

SPI-M produces projections of the epidemic[11] (Figure 15), combining estimates from several independent models (including the Scottish Government's logistics modelling, as shown in Figures 12 to 14). 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 1st November and **do not include the effects of any future policy or behavioural changes**.

Due to an insufficient number of models, SPI-M has been unable to produce a consensus projection for deaths in Scotland this week. We hope to include a new set of projections in next week's publication.

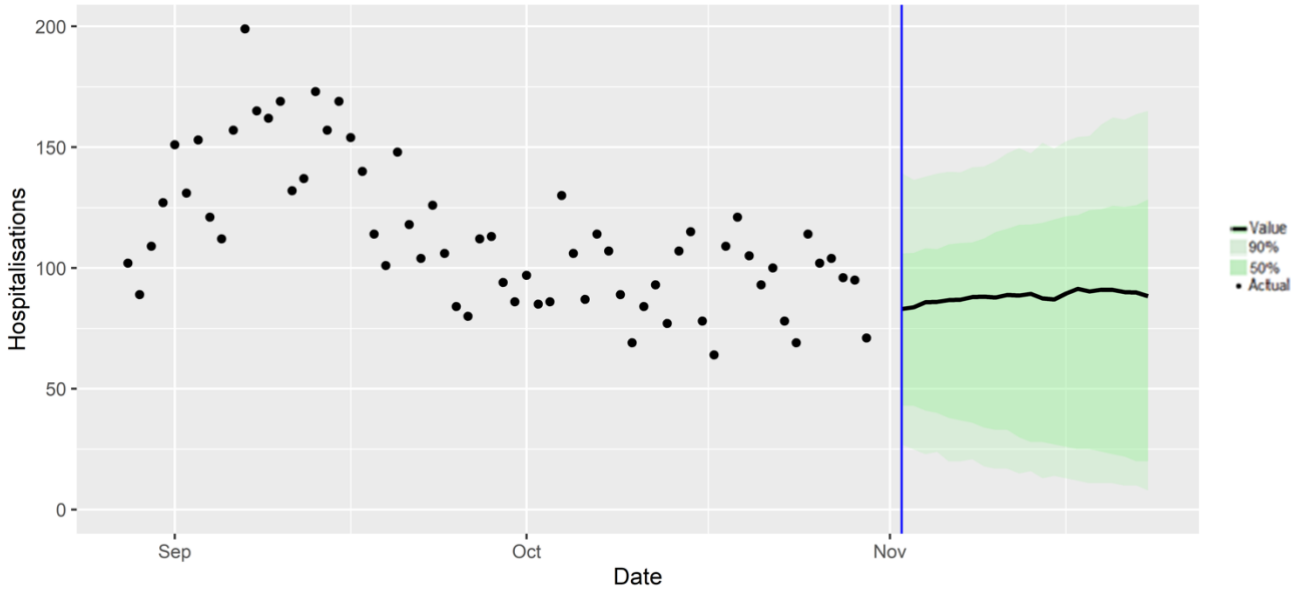
The delay between infection, developing symptoms, the need for hospital care, and death means they cannot fully reflect the impact of behaviour changes in the two to three weeks prior to 1st November. Projecting forwards is difficult when the numbers of admissions and deaths fall to very low levels, which can result in wider credible intervals reflecting

[10] 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.
[11] Three week projections are provided here: Scientific evidence supporting the government response to coronavirus (COVID-19) - GOV.UK (www.gov.uk)

greater uncertainty. The interquartile range should be used, with judgement, as the projection from which estimates may be derived until the 23rd November.

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.

Figure 15. SPI-M medium-term projection of daily hospitalisations 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 1st November 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.

This week, there remains increased uncertainty in estimates due to recent changes in case trends and the potential impact of half-term.

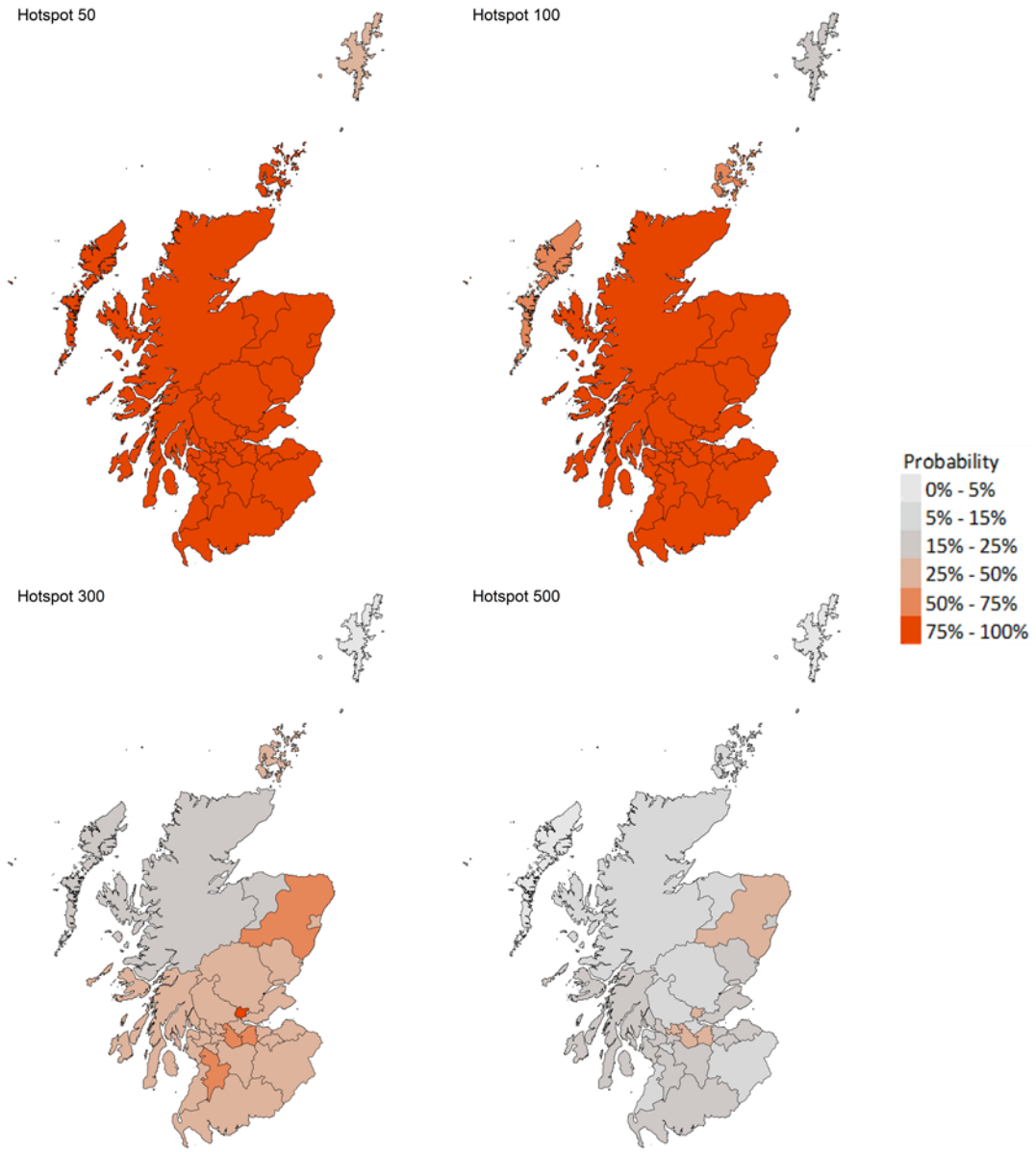
Modelled rates of positive tests per 100K using data to 1st November (Figure 16) indicate that, for the week commencing 14th November 2021,

31 local authorities are expected to exceed 50 cases per 100K with at least 75% probability. The only exception to this is the Shetland Islands.

29 local authorities are also expected to exceed 100 cases per 100K with at least 75% probability. The only exceptions are Na h-Eileanan Siar, Orkney Islands and Shetland Islands.

Clackmannanshire is the only local authority which is expected to exceed 300 cases per 100K with at least 75% probability[12].

Figure 16. Probability of local authority areas exceeding thresholds of cases per 100K (14th to 20th November 2021), data to 1st November.



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

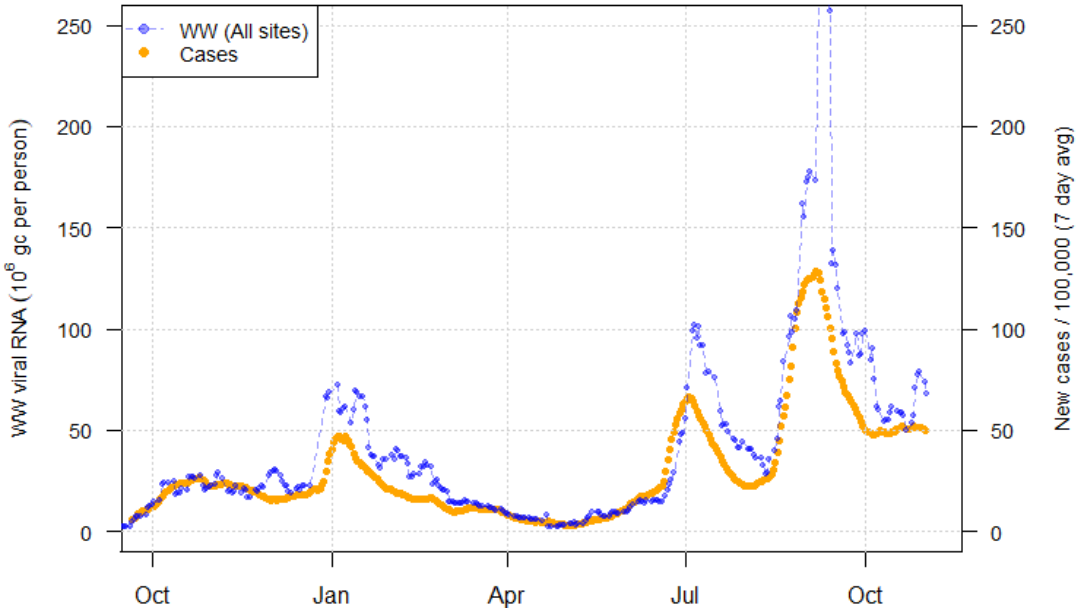
What can analysis of wastewater samples tell us about local outbreaks of Covid-19 infection?

Levels of Covid-19 RNA in wastewater collected at a number of sites around Scotland are adjusted for population and local changes in intake flow rate 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 (WW) Covid-19 levels have shown an initial increase followed by a downturn since last week (20th to 26th October), with a one-week average level ending on 2nd November of around 68 million gene copies per person per day (Mgc/p/d). This compares with 56 Mgc/p/d for the week ending 26th October, an increase of approximately 20%. Whilst the measured WW levels have fluctuated, case numbers remained steady at around 50 new cases per 100,000 population (7 day average), over the last month.

Figure 17 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. WW Covid-19 levels are still high, similar to those early in the year or shortly after the July peak.

Figure 17. National running average trends in wastewater Covid-19 and daily new case rates (7 day moving average) as of 2nd November[13]



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

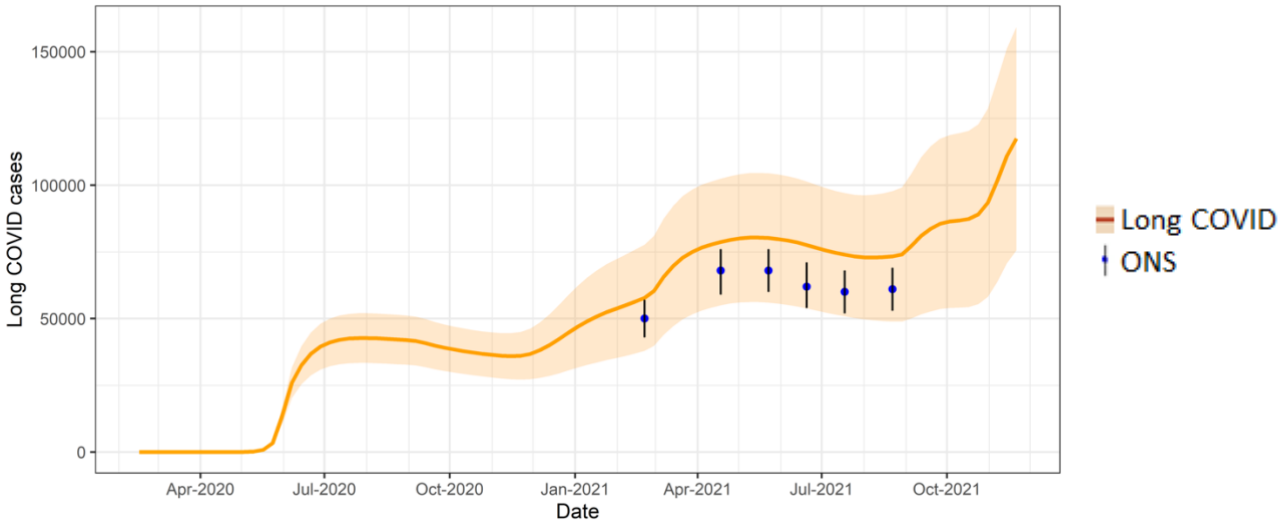
The Scottish Government is modelling the number of people likely to experience long Covid symptoms. This gives a projection of estimated self-reported long Covid rates in the future, based on Scottish Government medium term projection modelling, as set out in Figure 18.

This modelling estimates that at 21st November 2021 between 76,000 (1.4% of the population) and 159,000 (2.9%) people are projected to self-classify with long Covid for 12 weeks or more after their first suspected Covid-19 infection in Scotland. The upper and lower limits of the estimate are higher than last week.

These are preliminary results, further data on rates of long Covid and associated syndromes as research emerges are required.

[13] 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.

Figure 18. Estimates of self-classified long Covid prevalence at 12 weeks from 16th February 2020 to 21st November 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 next?

The modelled estimates of the numbers of new cases and infectious people will continue to be provided as measures of the epidemic as a whole, along with measures of the current point in the epidemic such as R_t and the growth rate.

We may report on exceedance in future weeks when the background levels of Covid-19 reduces so that it can be useful in identifying outbreaks.

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.

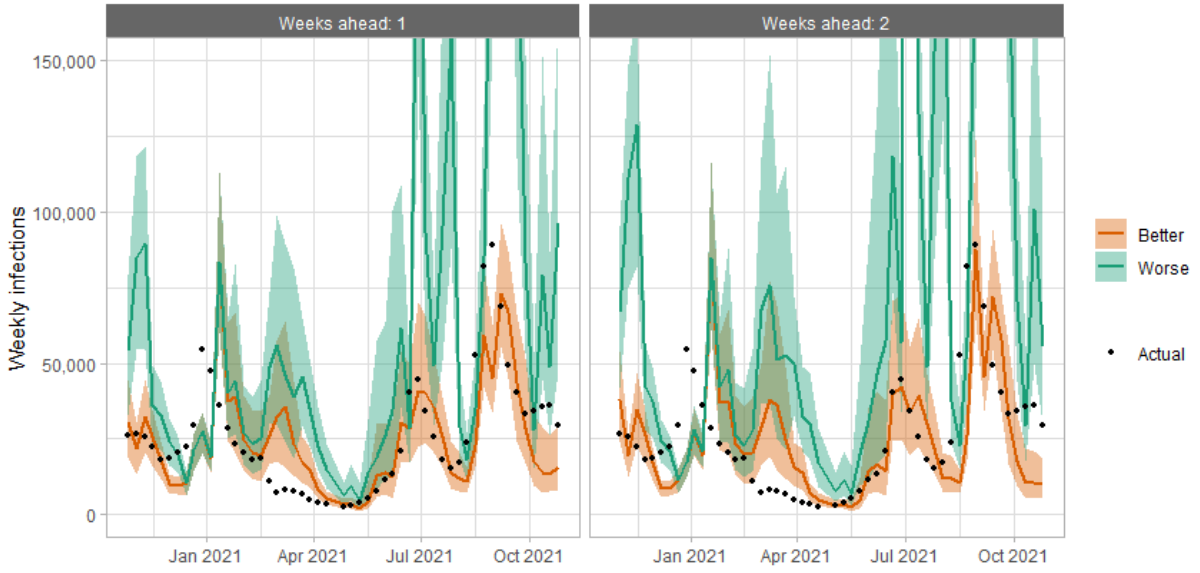
Modelling also allows us to make short-term forecasts of what may happen with a degree of uncertainty. These can be used in health care and other planning. The modelling in this research findings is undertaken using different types of data which going forward aims to both model the progress of the epidemic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

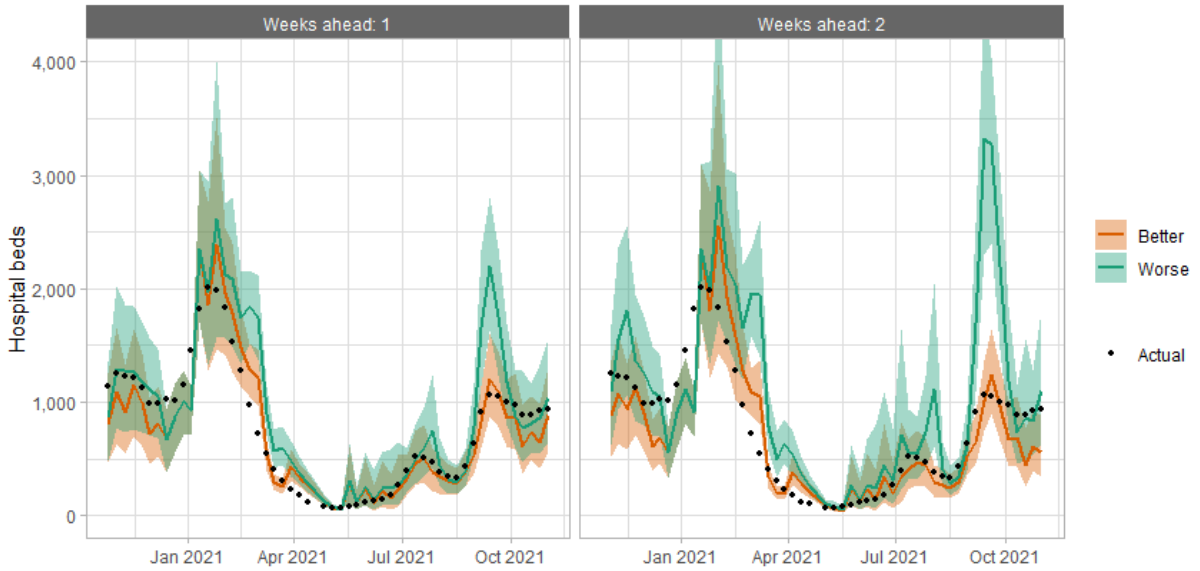
The following charts show the history of our modelling projections in comparison to estimates of the actual data. The infections projections were largely accurate during October to mid-December 2020 and from mid-January 2021 onwards. During mid-December 2020 to mid-January 2021, the projections underestimated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

Figure 19. 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 20. 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 21. ICU bed projections versus actuals, for historical projections published between one and two weeks before the actual data came in.

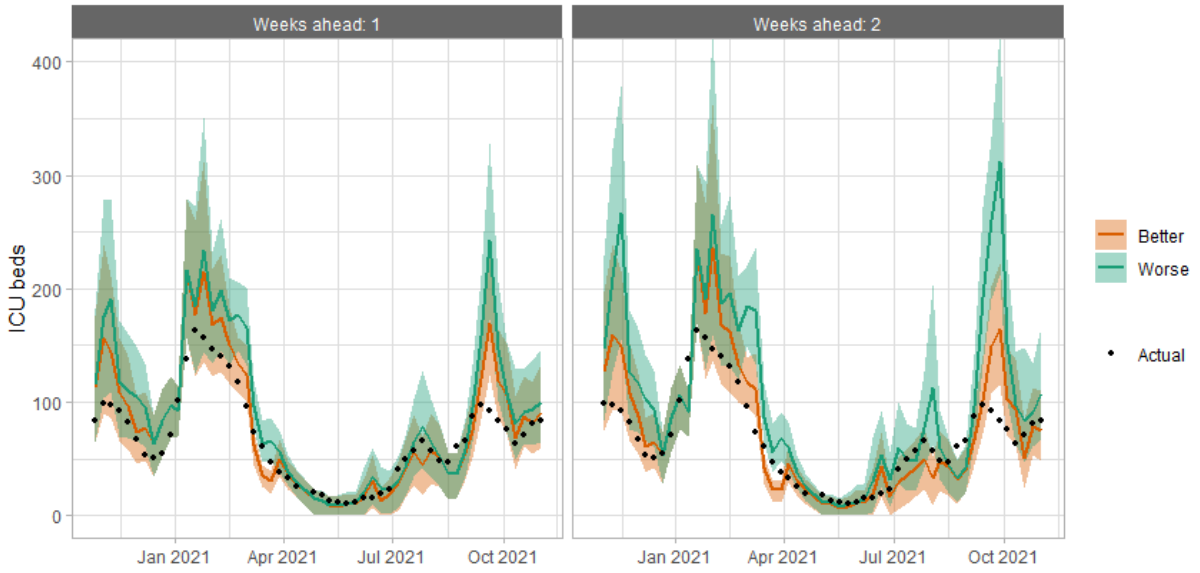


Table 1. Probability of local authority areas exceeding thresholds of cases per 100K (14th to 20th November 2021), data to 1st November.

	Probability of exceeding (cases per 100K)			
Local Authority (LA)	50	100	300	500
Aberdeen City	75-100%	75-100%	25-50%	15-25%
Aberdeenshire	75-100%	75-100%	50-75%	25-50%
Angus	75-100%	75-100%	25-50%	15-25%
Argyll and Bute	75-100%	75-100%	25-50%	15-25%
City of Edinburgh	75-100%	75-100%	25-50%	15-25%
Clackmannanshire	75-100%	75-100%	75-100%	25-50%
Dumfries & Galloway	75-100%	75-100%	25-50%	15-25%
Dundee City	75-100%	75-100%	25-50%	15-25%
East Ayrshire	75-100%	75-100%	50-75%	15-25%
East Dunbartonshire	75-100%	75-100%	25-50%	25-50%
East Lothian	75-100%	75-100%	25-50%	15-25%
East Renfrewshire	75-100%	75-100%	25-50%	5-15%
Falkirk	75-100%	75-100%	25-50%	5-15%
Fife	75-100%	75-100%	25-50%	15-25%
Glasgow City	75-100%	75-100%	25-50%	15-25%
Highland	75-100%	75-100%	15-25%	5-15%
Inverclyde	75-100%	75-100%	25-50%	5-15%
Midlothian	75-100%	75-100%	25-50%	15-25%
Moray	75-100%	75-100%	15-25%	5-15%
Na h-Eileanan Siar	75-100%	50-75%	15-25%	0-5%
North Ayrshire	75-100%	75-100%	25-50%	15-25%
North Lanarkshire	75-100%	75-100%	50-75%	25-50%
Orkney Islands	75-100%	50-75%	25-50%	5-15%
Perth and Kinross	75-100%	75-100%	25-50%	5-15%
Renfrewshire	75-100%	75-100%	25-50%	15-25%
Scottish Borders	75-100%	75-100%	25-50%	5-15%
Shetland Islands	25-50%	15-25%	0-5%	0-5%
South Ayrshire	75-100%	75-100%	25-50%	5-15%
South Lanarkshire	75-100%	75-100%	25-50%	15-25%
Stirling	75-100%	75-100%	25-50%	5-15%
West Dunbartonshire	75-100%	75-100%	25-50%	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 20th and 27th October 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[14].

Table 2. Average daily cases per 100k as given by WW data[15].

Local authority (LA)	w/b 20th October	w/b 27th October	Coverage
Aberdeen City	46	60	99%
Aberdeenshire	73	119	49%
Angus	63	77	68%
Argyll and Bute	–	–	3%
City of Edinburgh	39	59	98%
Clackmannanshire	116	204	92%
Dumfries & Galloway	64	90	36%
Dundee City	66	75	100%
East Ayrshire	34	73	72%
East Dunbartonshire	58	57	99%
East Lothian	39	60	56%
East Renfrewshire	62	41	95%
Falkirk	58	58	96%
Fife	57	93	84%
Glasgow City	66	50	75%
Highland	50	96	32%
Inverclyde	49	10	98%
Midlothian	39	66	88%
Moray	70	32	56%
Na h-Eileanan Siar	–	–	0%
North Ayrshire	26	41	93%
North Lanarkshire	67	61	91%
Orkney Islands	19	23	34%
Perth and Kinross	97	112	45%
Renfrewshire	39	26	97%
Scottish Borders	28	128	48%
Shetland Islands	0	–	0%
South Ayrshire	32	65	84%
South Lanarkshire	63	55	69%
Stirling	19	42	63%
West Dunbartonshire	54	60	98%
West Lothian	85	126	95%

[14] 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.
[15] Coverage as at the week beginning 27th October 2021.

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