

Coronavirus (COVID-19): Analysis

Coronavirus (COVID-19): modelling the epidemic in Scotland (Issue No. 68)

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 2nd September 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 1.2 and 1.5, with the growth rate between 3% and 7%.

Key Points

- The reproduction rate R in Scotland is currently estimated as being between 1.2 and 1.5, as of 24th August. This is a decrease in the lower and upper limits from last week.
- The number of new daily infections for Scotland is estimated as being between 118 and 214, per 100,000 people. This is an increase in the lower and upper limits since last week.
- The growth rate for Scotland is currently estimated as between 3% and 7% This is a decrease in the lower and upper limits since last week.
- Average contacts have increased by approximately 14% in the last two weeks (comparing surveys pertaining to 19th August - 25th August and 2nd September - 8th September) with a current level of 5.3 daily contacts.
- Mean contacts within the work setting have increased by 63% in the last two weeks whereas contacts within the home and other setting

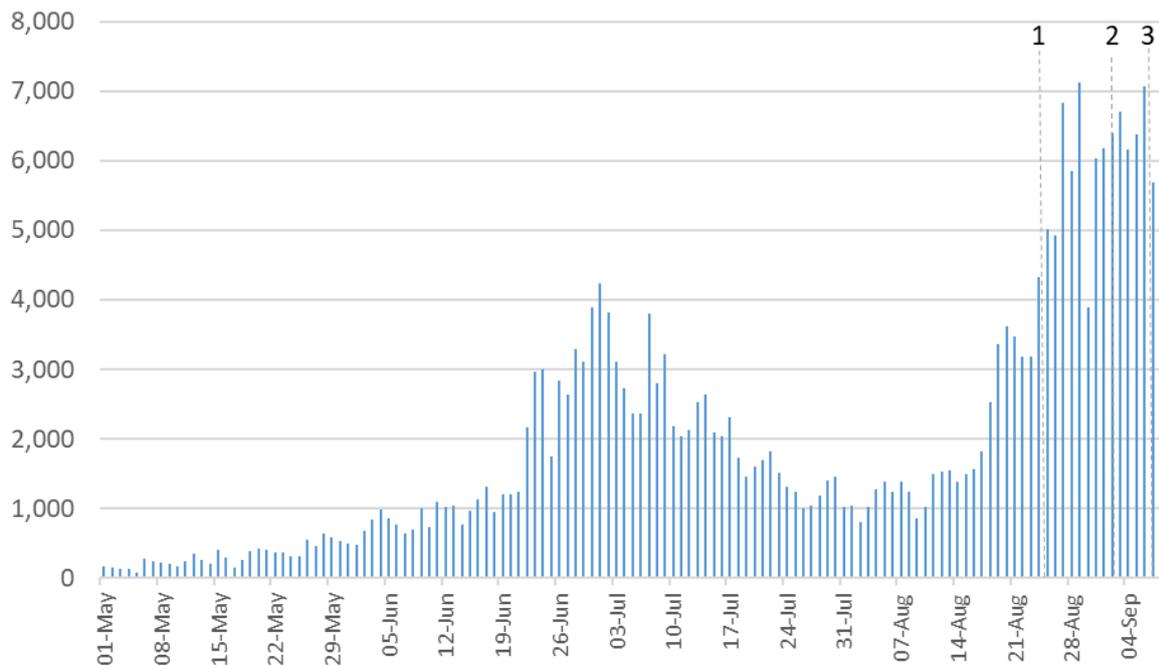
(contacts outside home, school and work) have remained at a similar level.

- Mean contacts have increased in the 18-29 and 30-39 age groups by approximately 29% and 20% respectively. Increases across the age groups are largely driven by a rise in contacts within the work setting.
- The highest interactions between age groups is between those 30-39 with those under 18. The biggest increase in interactions in the last two weeks is seen between those within 18-49 age groups with individuals aged between 5-12.
- The proportion of individuals using public transport has decreased from approximately 25% to 21% with individuals visiting a pub or restaurant also decreasing, from 49% to 46%, in the last two weeks.
- The proportion of individuals wearing a face covering where they have at least one contact outside of the home has decreased slightly compared to two weeks prior, from 84% to 81%.
- Hospitalisations are rising. Future hospital occupancy and intensive care use are likely to continue rising.
- Modelled rates of positive tests per 100K using data to 3rd September indicate that, for the week commencing 19th September 2021, there are 29 local authorities which are expected to exceed 50 cases per 100k with at least 75% probability.
- Of these, 18 local authorities are expected to exceed 500 cases per 100k with at least 75% probability. These are Aberdeen City, Aberdeenshire, City of Edinburgh, Dundee City, East Ayrshire, East Dunbartonshire, East Renfrewshire, Falkirk, Fife, Glasgow City, Highland, North Ayrshire, North Lanarkshire, Renfrewshire, South Ayrshire, South Lanarkshire, West Dunbartonshire and West Lothian.
- Four local authorities (Fife, Glasgow City, North Lanarkshire and Renfrewshire) are expected to exceed 1000 cases per 100k with at least 75% probability.
- Nationwide, levels of Covid-19 in wastewater have risen by around 64% since the previous week. In the week prior, levels increased by 30%.
- As a result Covid-19 levels in wastewater this week are at the highest reported since the start of the pandemic.
- Modelling of Long Covid estimates that on 26th September 2021 between 0.8% and 2.2% of the population are projected to experience symptoms for 12 weeks or more after their first suspected Covid infection in Scotland. This is unchanged from last week.

Recent cases

Figure 1 shows the number of cases reported in Scotland between May and September 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 8th September 2021



R, growth rate and incidence are as of 24th August (dashed line 1). This report covers the period up to 3rd September for wastewater analysis and the modelled rates of positive tests per 100k (dashed line 2). The medium term projections by the Scottish Government of infections, hospitalisations and ICU beds, the contact patterns and the long Covid analysis use data to 6th September (dashed line 3).

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 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, Public Health England (PHE) and the Joint Biosecurity Centre. 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 24th August¹ in Scotland was between 1.2 and 1.5 (see Figure 2)².

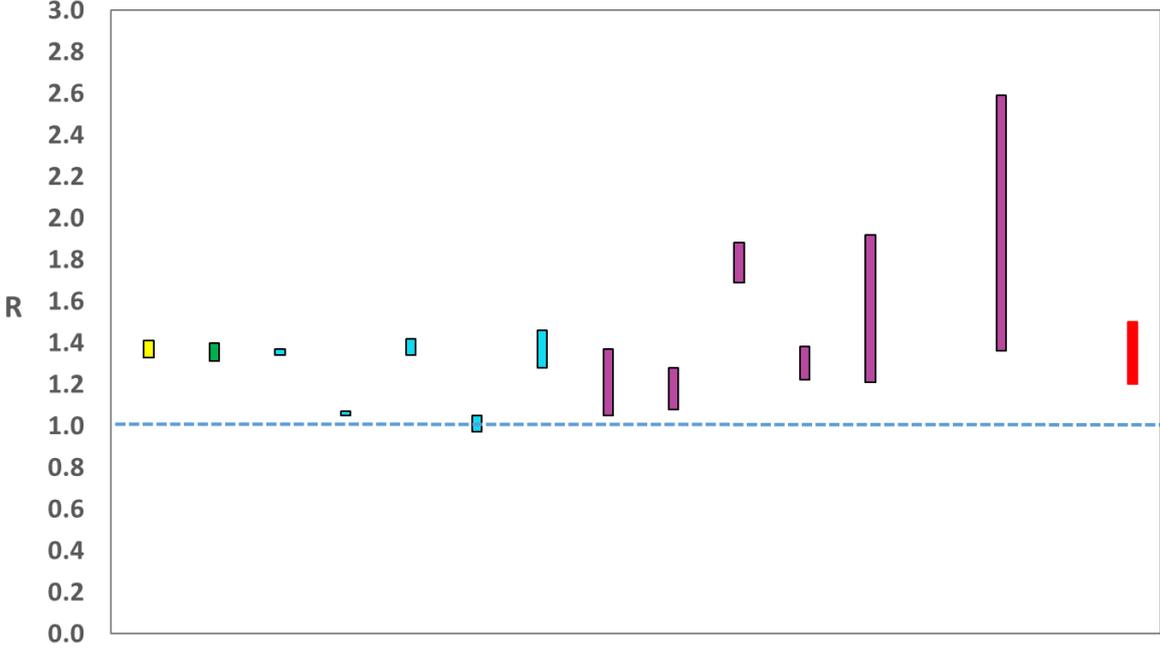
R is an indicator that lags by two to three weeks and therefore should not be expected to reflect recent fluctuations.

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 2 and 3.

¹ Using data to 3rd September.

² 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.

Figure 2. Estimates of R_t for Scotland, as of 24th August, including 90% confidence intervals, produced by EMRG³.

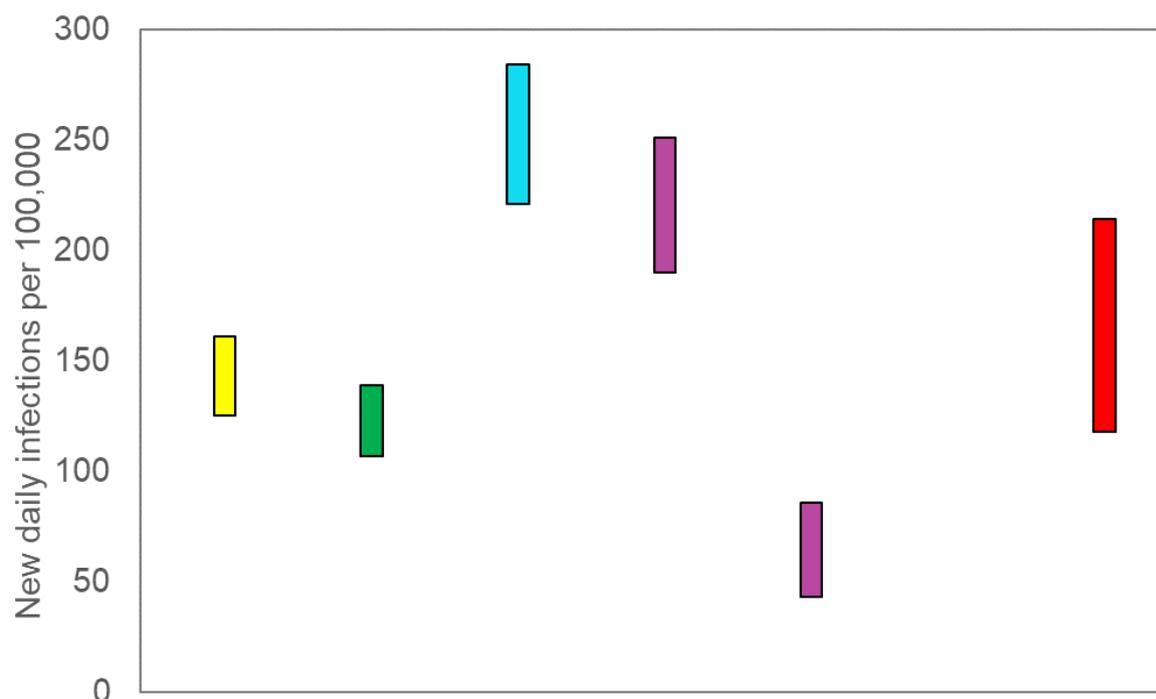


Source: EMRG

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 24th August, was that the incidence of new daily infections in Scotland was between 118 and 214 new infections per 100,000. This equates to between 6,400 and 11,700 people becoming infected each day in Scotland.

³ 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 3rd September R_t , incidence and growth rate as of 24th August.

Figure 3. Estimates of incidence for Scotland, as at 24th August, including 90% confidence intervals, produced by EMRG².



Source: EMRG

The consensus from UKHSA for this week is that the growth rate in Scotland is between 3% and 7% per day as at 24th August. The lower and upper limits have decreased since last week.

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

Average contacts have increased by approximately 14% in the last two weeks (comparing surveys pertaining to 19th August - 25th August and 2nd September - 8th September) with a current level of 5.3 daily contacts as seen in Figure 4. Mean contacts within the work setting (Figure 5) have increased by 63% in the last two weeks whereas contacts within the home and other setting (contacts outside home, school and work) have remained at a similar level.

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

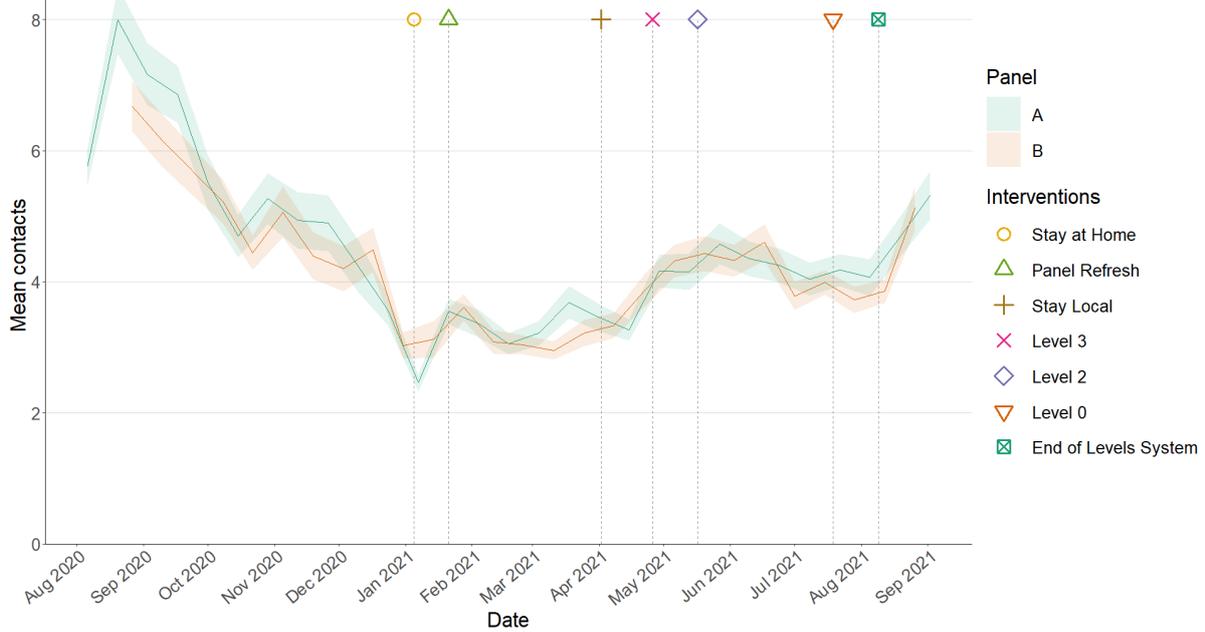
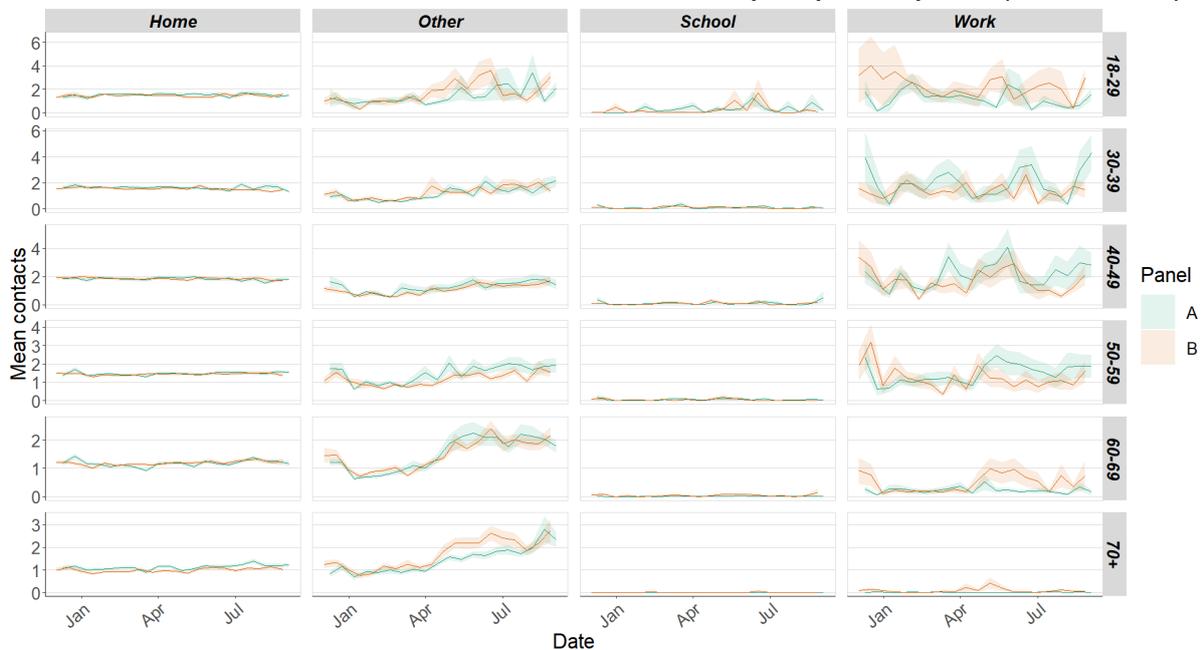


Figure 5 shows how contacts change across age group and setting. Mean contacts have increased in the 18-29 and 30-39 age groups by approximately 29% and 20% respectively. Increases across the age groups are largely driven by a rise in contacts within the work setting.

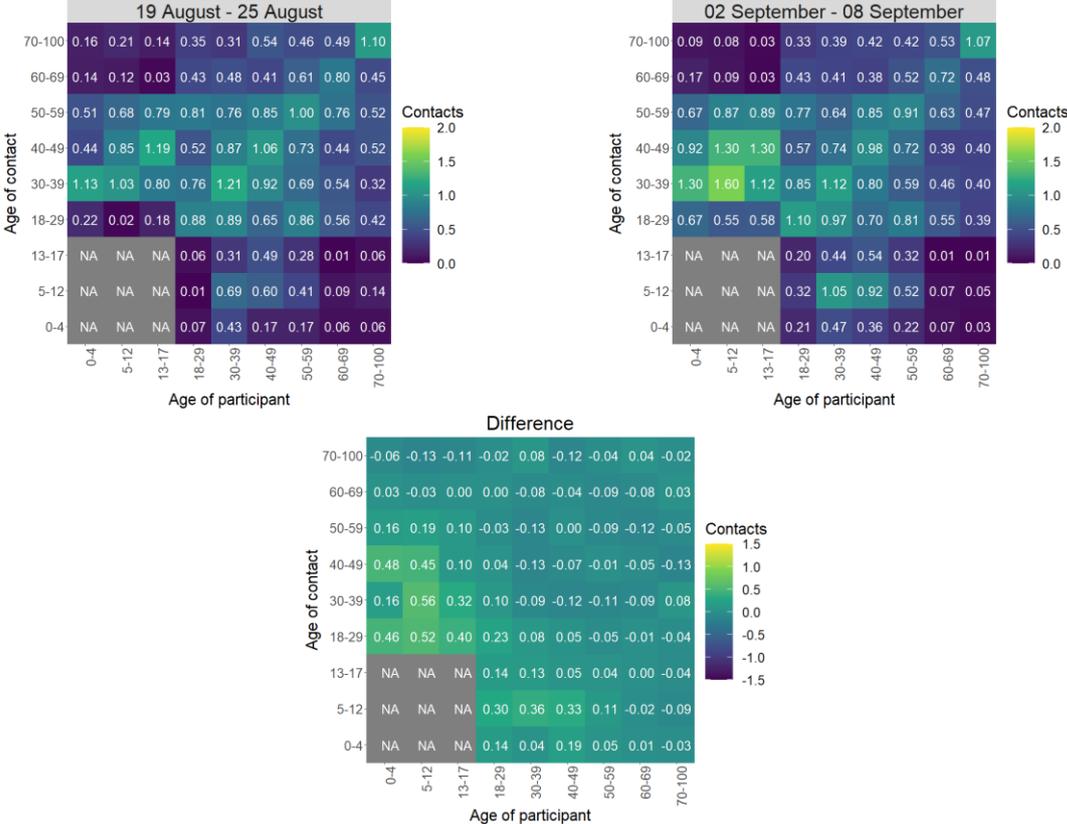
Figure 5. Average (mean) contacts for each panel per day by setting for adults in Scotland, truncated to 100 contacts per participant (from SCS).



The heatmaps in Figure 6 show the mean overall contacts between age groups for the weeks relating to 19th August - 25th August and 2nd September - 8th September and the difference between these periods.

The highest interactions between age groups is between those 30-39 with those under 18. The biggest increase in interactions in the last two weeks is seen between those within 18-49 age groups with individuals aged between 5-12.

Figure 6. Overall mean contacts by age group for the weeks relating to 19th August - 25th August and 02 September - 08th September.



As seen in Figure 7, the proportion of participants visiting different locations remains at similar levels across the majority of locations. The biggest changes are seen with those using public transport and also individuals visiting a pub or restaurant. The proportion of individuals using public transport decreased from approximately 25% to 21% with individuals visiting a pub or restaurant also decreasing, from 49% to 46%, in the last two weeks.

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

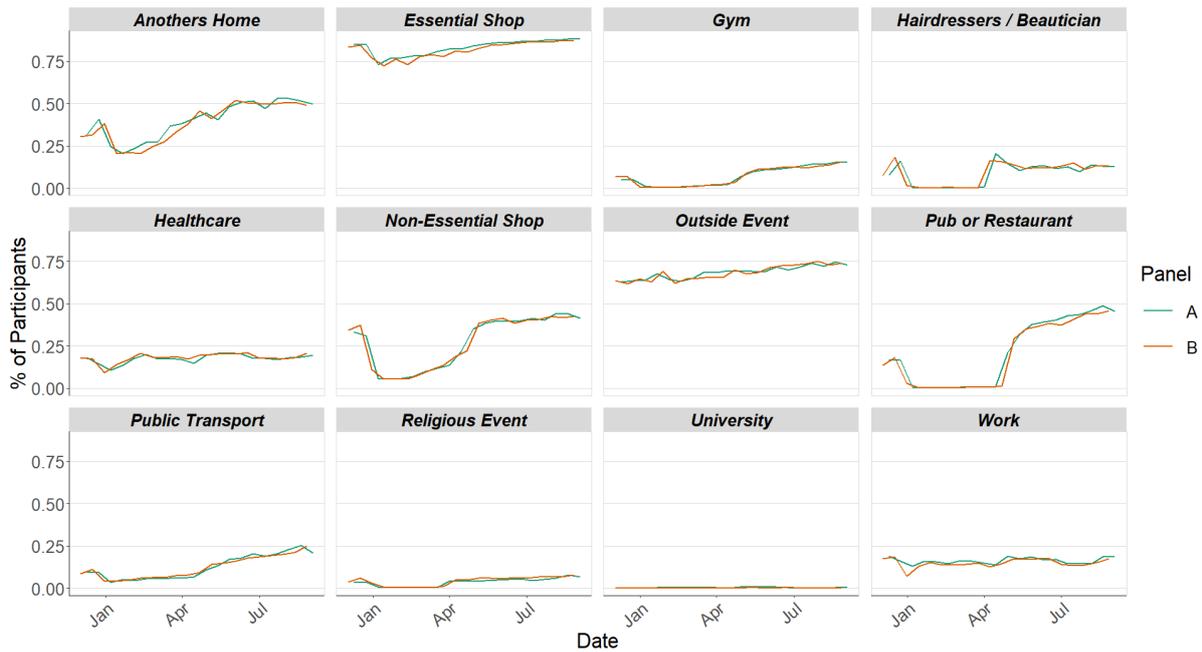
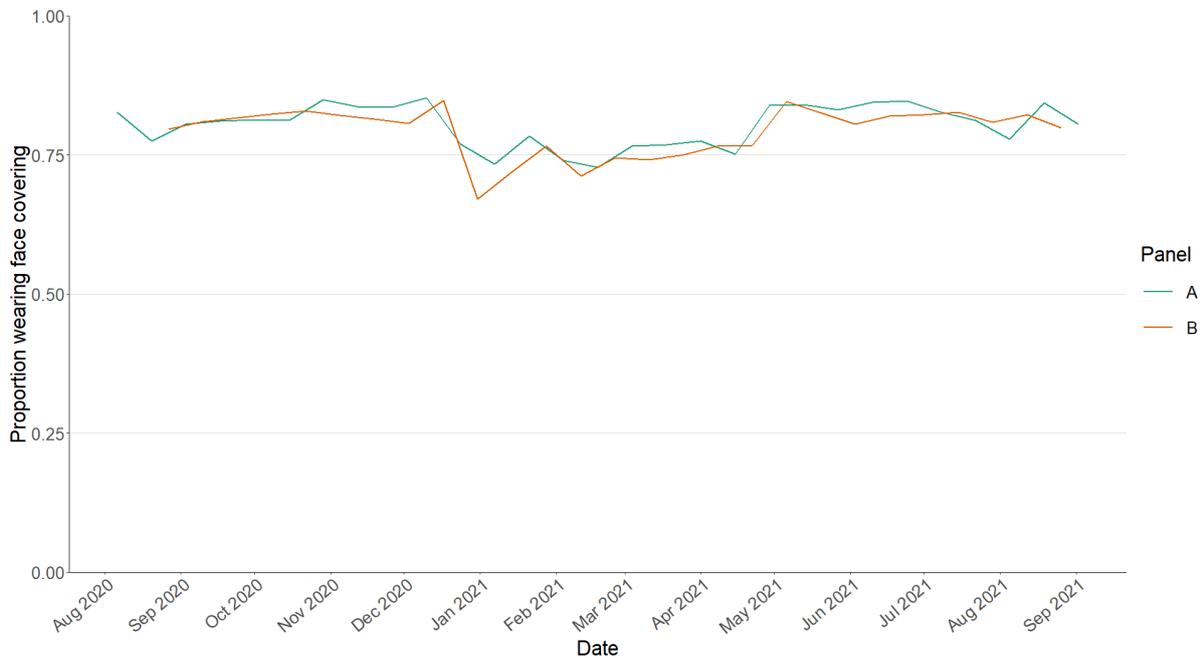


Figure 8 shows the number of people wearing a face covering where they have at least one contact outside of the home. This has decreased slightly compared to two weeks prior, from 84% to 81%.

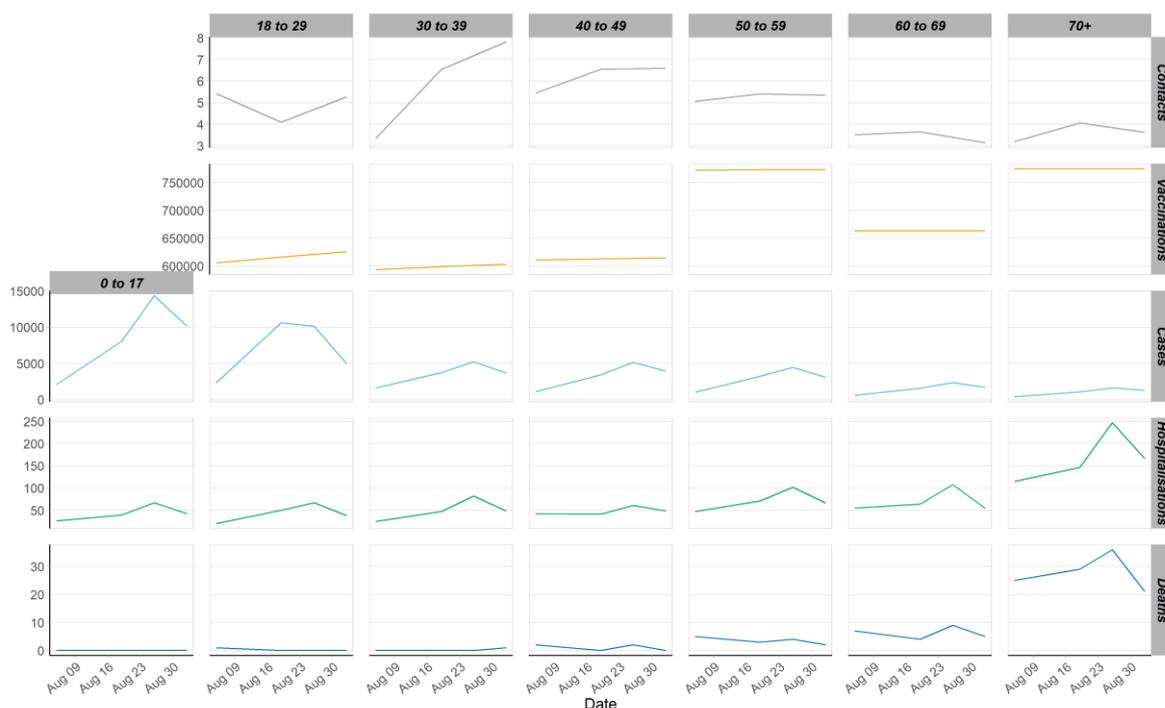
Figure 8. Proportion of adults wearing a face coverings over time (with at least one contact outside of the home).



From Figure 9, it can be seen that the older age groups have lower levels of contacts and higher vaccinations than the youngest age group, they

also have the lowest weekly case number comparatively to the younger age groups. Despite that they have higher weekly hospitalization levels and deaths to that seen with the younger age groups.

Figure 9. Average contacts for Panel A, weekly cases, covid-19 hospital admissions and deaths⁴ and cumulative vaccinations by age band⁵.



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. Figure 10 shows three projections over the three weeks to 26th September.

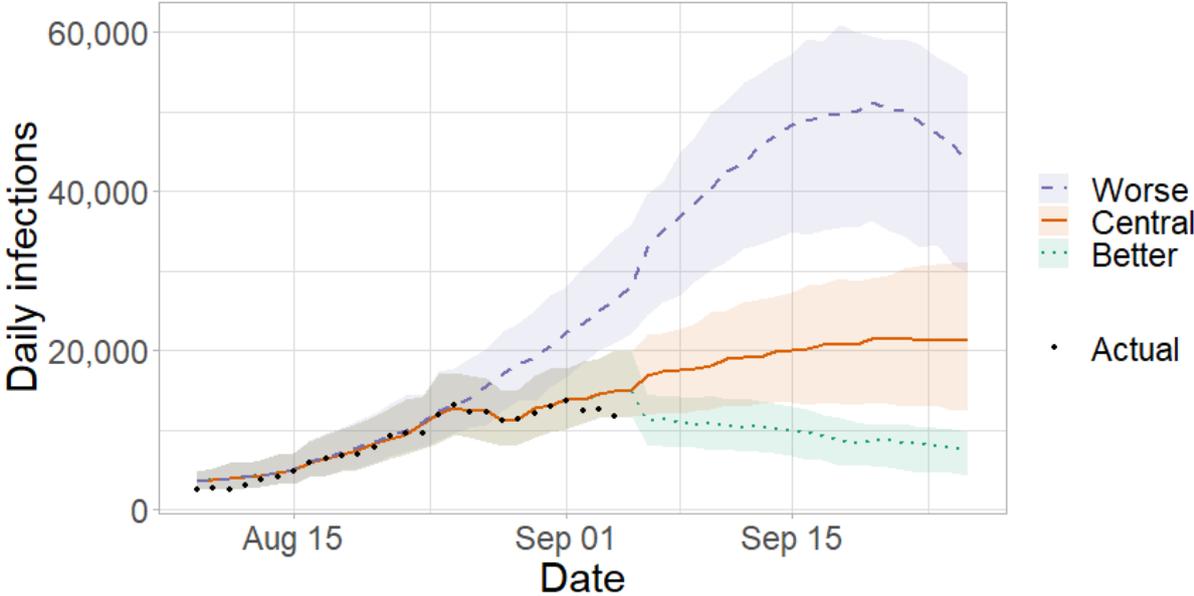
Worse assumes that infections have followed waste water data and continued to rise over the past week, in spite of the plateau in cases confirmed by PCR. Central follows recent confirmed case trends, and accounts for the possibility of an increase in the next few weeks as universities return. Better assumes that transmission will fall from the current level⁶.

⁴ Deaths, Cases and Hospitalisations from [PHS COVID-19 daily cases in Scotland dashboard](#).

⁵ Vaccination and contact data for the 0-17 age cohort is not presented due to the vast majority of this age group not being offered vaccinations and the SCS excluding contacts between children.

⁶ All scenarios are based on current vaccine roll-out plans and efficacy assumptions.

Figure 10. Medium term projections of modelled total new daily infections, adjusting positive tests⁷ to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 6th September.



There is uncertainty as to how much infections will increase or decrease in coming weeks.

Figure 11 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.

Hospital and ICU occupancies are rising. The scale of any future increase in hospital occupancy and intensive care use is highly uncertain, and depends on the number of infections.

⁷ The actual positive tests are adjusted to coincide with the estimated day of infection.

Figure 11. Medium term projections of modelled hospital bed demand, from Scottish Government modelling, based on positive test data reported up to 6th September.

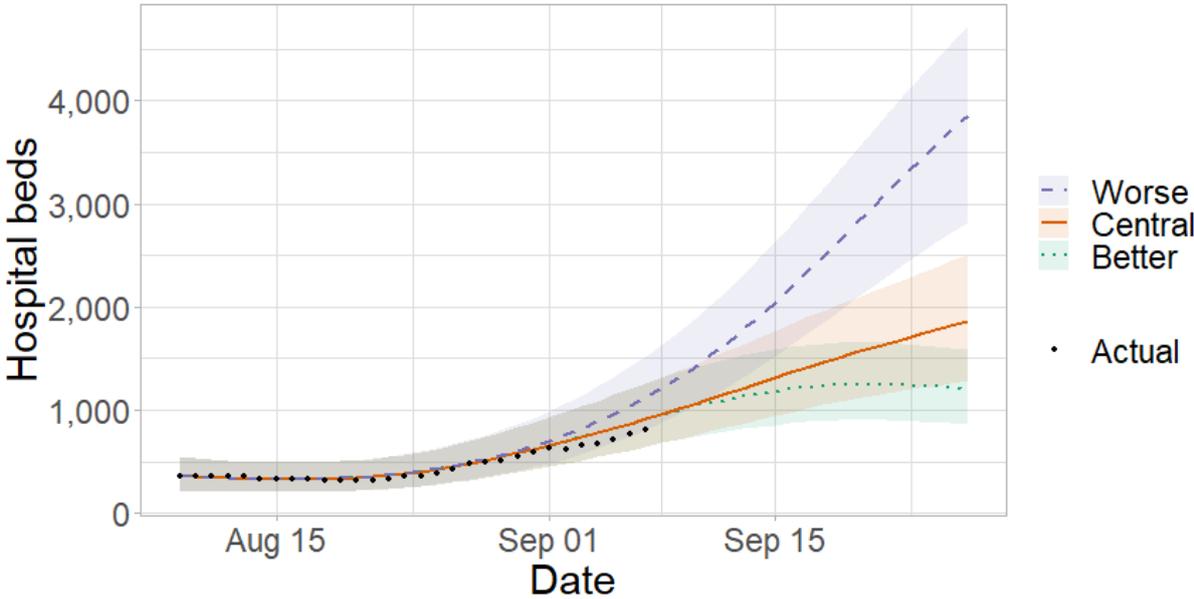
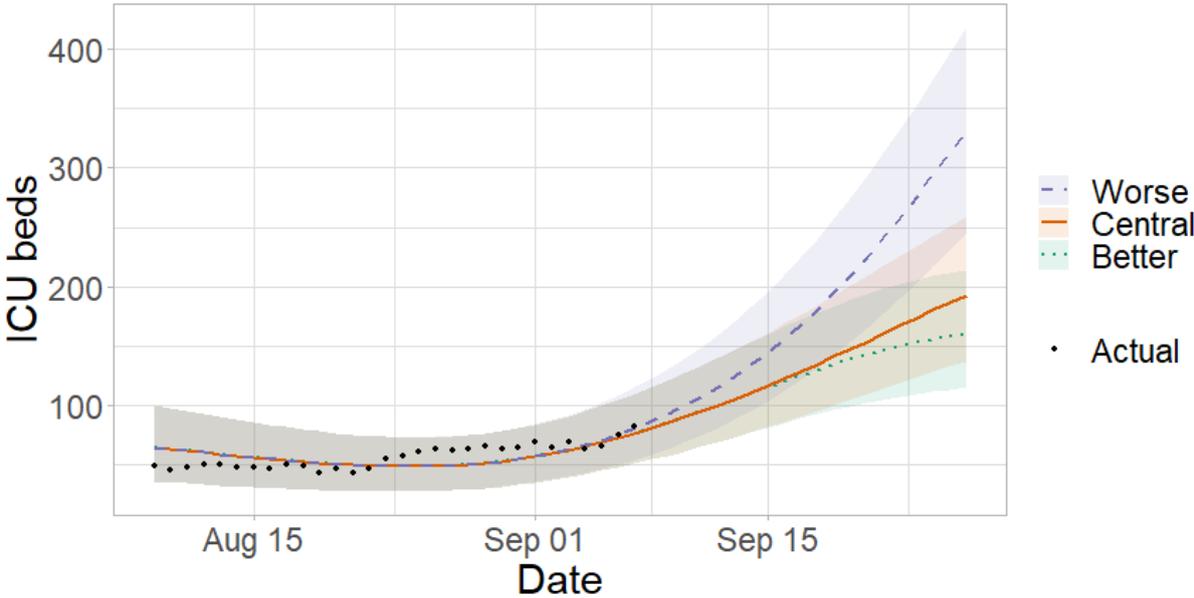


Figure 12 shows the impact of the projection on ICU bed demand.

Figure 12. Medium term projections of modelled ICU bed demand, from Scottish Government modelling⁸, based on positive test data reported up to 6th September.



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.

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 epidemic⁹ (Figures 13 and 14), combining estimates from several independent models (including the Scottish Government's logistics modelling, as shown in Figures 10-12). 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 September and **do not include the effects of any 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 September. 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 can be used, with judgement, as the projection from which estimates may be derived until the 28th September, albeit at lower confidence than the 90% credible interval.

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

⁹ Three week projections are provided here: [Scientific evidence supporting the government response to coronavirus \(COVID-19\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/evidence/scientific-evidence-supporting-the-government-response-to-coronavirus-covid-19)

Figure 13. SPI-M medium-term projection of daily hospitalisations in Scotland, at 50% and 90% credible intervals.

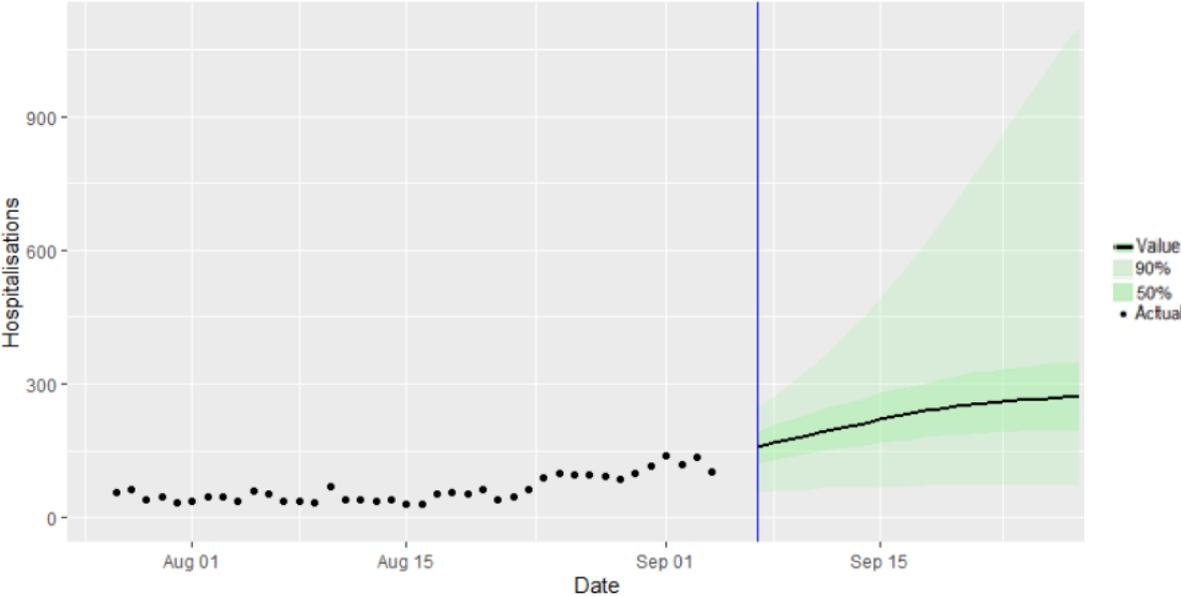
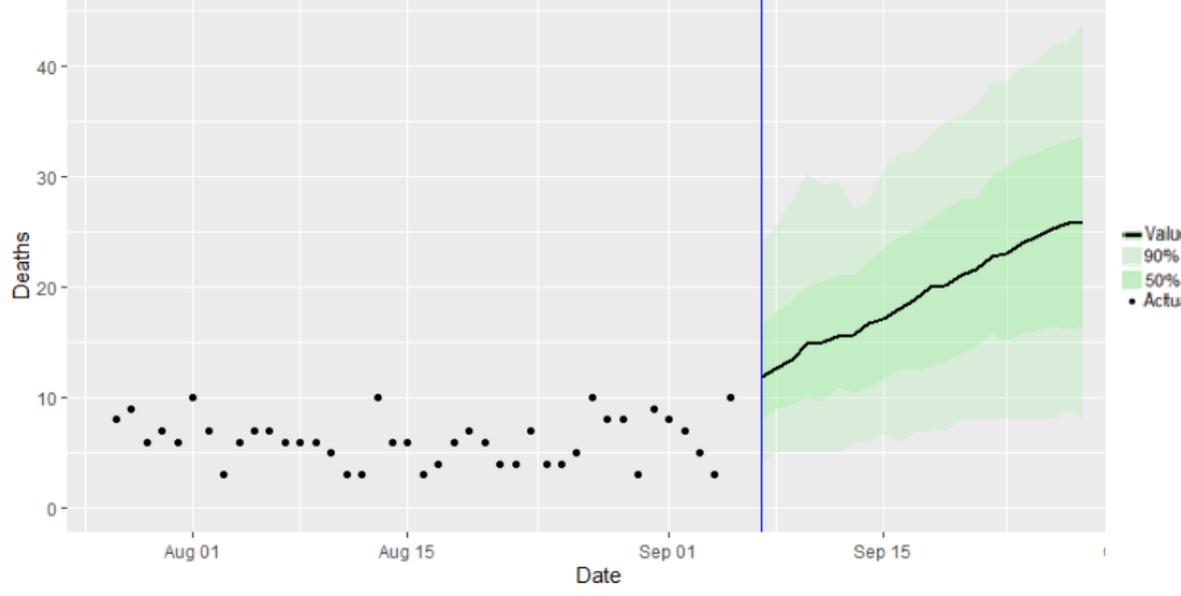


Figure 14. SPI-M medium-term projection of daily deaths in Scotland, including 50% and 90% credible intervals.



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 September 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 SPI-M 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.

Because infections may still be rising rapidly in some areas, the local projections may not fully reflect this.

Modelled rates of positive tests per 100K using data to 3rd September (Figure 15) indicate that, for the week commencing 19th September 2021, there are 29 local authorities which are expected to exceed 50 cases per 100k with at least 75% probability¹⁰.

Of these, 18 local authorities are expected to exceed 500 cases per 100k with at least 75% probability. These are Aberdeen City, Aberdeenshire, City of Edinburgh, Dundee City, East Ayrshire, East Dunbartonshire, East Renfrewshire, Falkirk, Fife, Glasgow City, Highland, North Ayrshire, North Lanarkshire, Renfrewshire, South Ayrshire, South Lanarkshire, West Dunbartonshire and West Lothian.

Four local authorities (Fife, Glasgow City, North Lanarkshire and Renfrewshire) are expected to exceed 1000 cases per 100k with at least 75% probability¹¹.

¹⁰ The exceptions are Na h-Eileanan Siar, Orkney Islands and Shetland Islands.

¹¹ Values are included in Table 1 in the Technical Annex.

Figure 15. Probability of local authority areas exceeding thresholds of cases per 100K (19th to 25th September 2021), data to 3rd September.



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

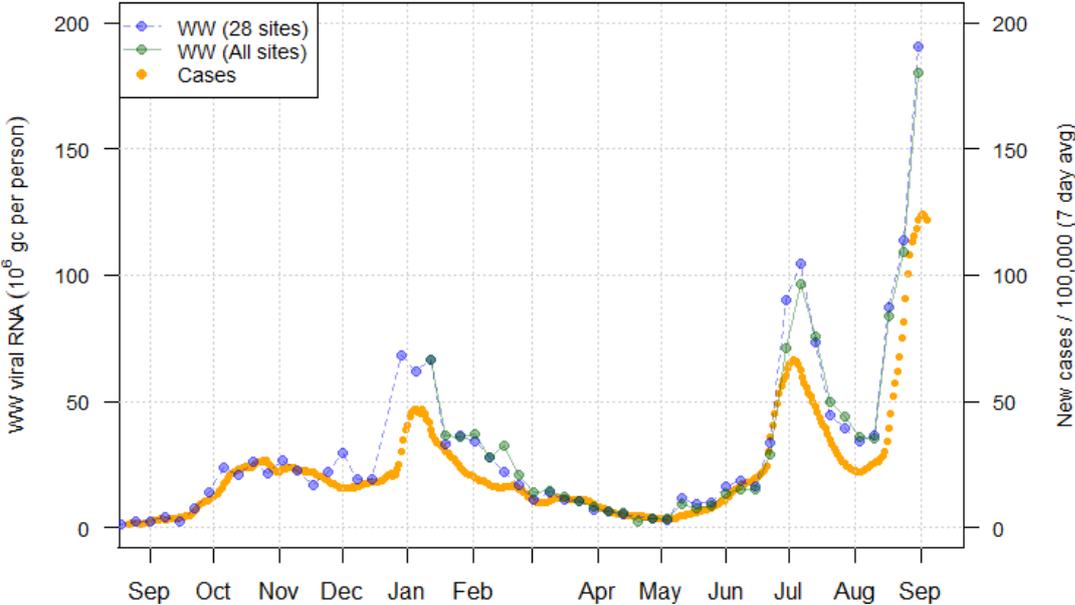
Levels of Covid-19 in wastewater collected at a number of sites around Scotland are adjusted for population and local changes in intake flow rate and compared to 7-day average daily new case rates derived from Local Authority and Neighbourhood (Intermediate Zone) level aggregate data. See Technical Annex in Issue 34 of these Research Findings for the methodology.

Nationwide, levels of wastewater Covid-19 have continued to rise to around 180 million gene copies per person per day (Mgc/p/d) compared to around 110 million gene copies per person per day (Mgc/p/d) last week, increasing by approximately 64%. This means wastewater virus levels are currently at the highest levels since the wider monitoring scheme started in August 2020.

Figure 16 shows the national weekly aggregate for the original 28 sites (sampled from August 2020, in blue) and, from January 2021, the aggregate for the full set of 110 sampled sites (in green), with a small number of unrealistically large outliers excluded. Although both

wastewater and new cases have risen in the last week, the smoothed 7 day running mean of national average new case rates suggests that the number of new cases may have stabilised in the last few days. This is not reflected in the national level wastewater data shown in Figure 16.

Figure 16. National average trends in wastewater and daily new case rates (7 day moving average). 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.



At some sites, such as Seafield in Edinburgh (Figure 17), the levels of wastewater Covid-19 appear to have stopped rising in the last week, while at other sites such as Hatton (Figure 18), which covers Dundee City, levels have continued to rise.

Figure 17. Wastewater Covid-19 and daily case rate (7 day moving average) for Seafield in City of Edinburgh (covered pop: 606k). The black line and red shaded area provide a smoothed curve and confidence interval for wastewater Covid-19 that is estimated from a generalised additive model based on a Tweedie distribution.

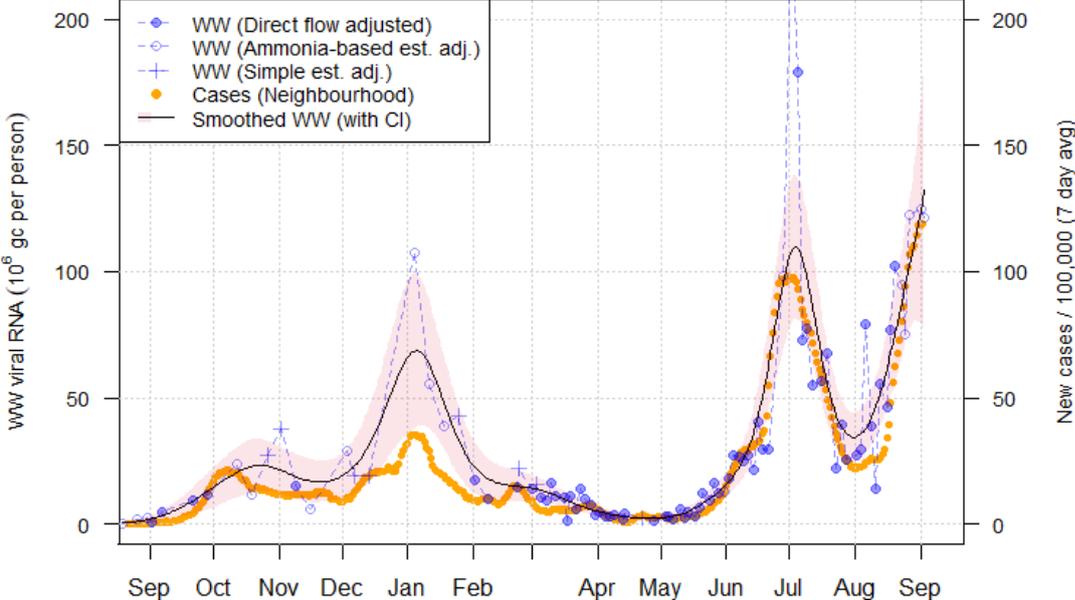
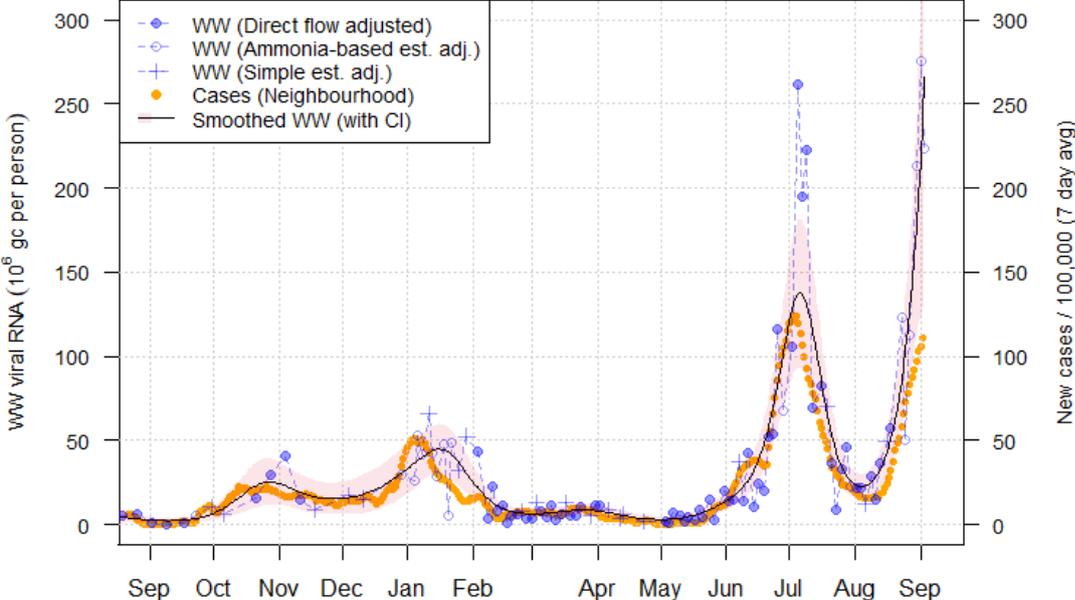


Figure 18. Wastewater Covid-19 and daily case rate (7 day moving average) for Hatton in Dundee City (covered pop: 194k). The black line and red shaded area provide a smoothed curve and confidence interval for wastewater Covid-19 that is estimated from a generalised additive model based on a Tweedie distribution.



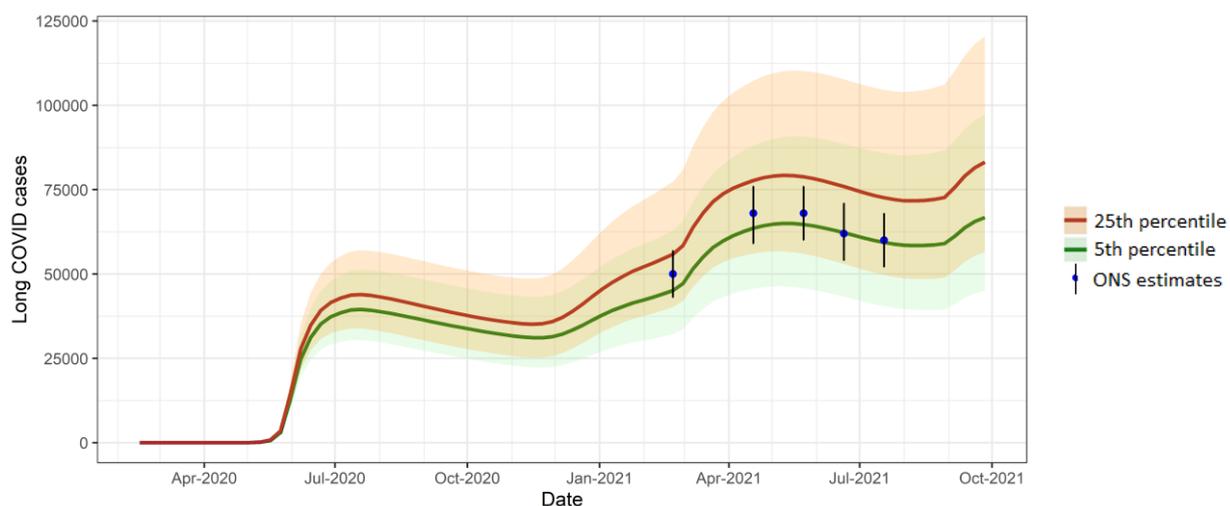
What estimates do we have of the number of people experiencing long Covid symptoms?

The Scottish Government is modelling the number of people likely to experience long Covid symptoms. This has been projected to estimate long Covid rates in the future, based on Scottish Government medium term projection modelling, as set out in Figure 19.

This modelling estimates that at 26th September 2021 between 45,000 (0.8% of the population) and 121,000 (2.2%) people are projected to experience symptoms for 12 weeks or more after their first suspected Covid infection in Scotland.

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

Figure 19. Estimates of long Covid prevalence at 12 weeks from 16th February 2020 to 26th September 2021 for the 5th and 25th percentile better long Covid rates (showing 95% confidence intervals). ONS estimates with range also shown.



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. Further information can be found at <https://www.gov.scot/coronavirus-covid-19>.

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.

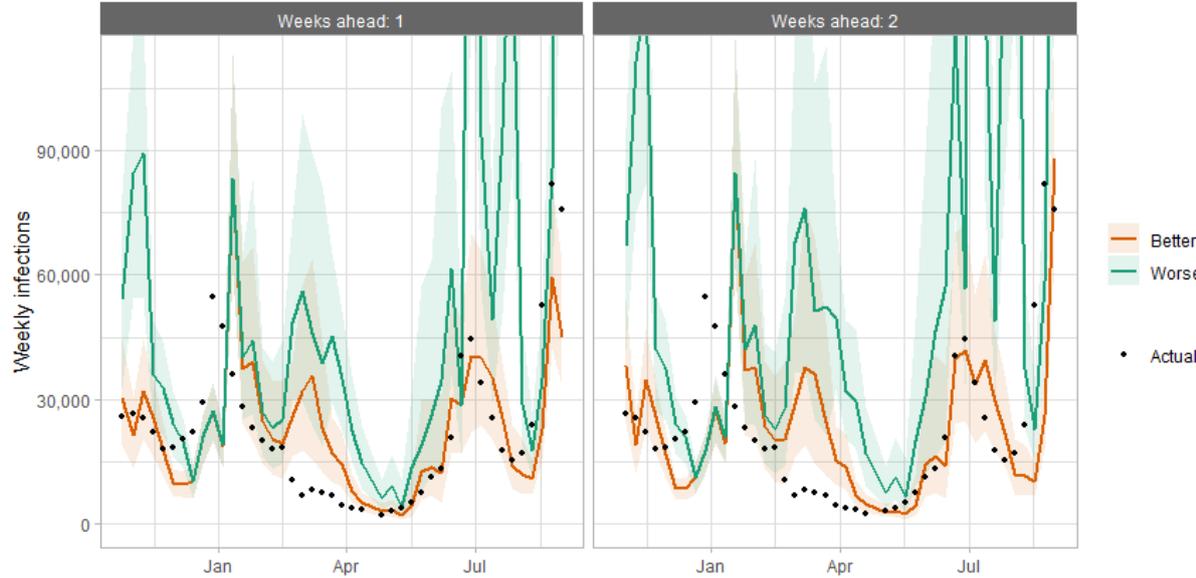
Modelling also allows us to make short-term forecasts of what may happen with a degree of uncertainty. These can be used in health care and other planning. The modelling in this research findings is undertaken using different types of data which going forward aims to both model the progress of the epidemic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

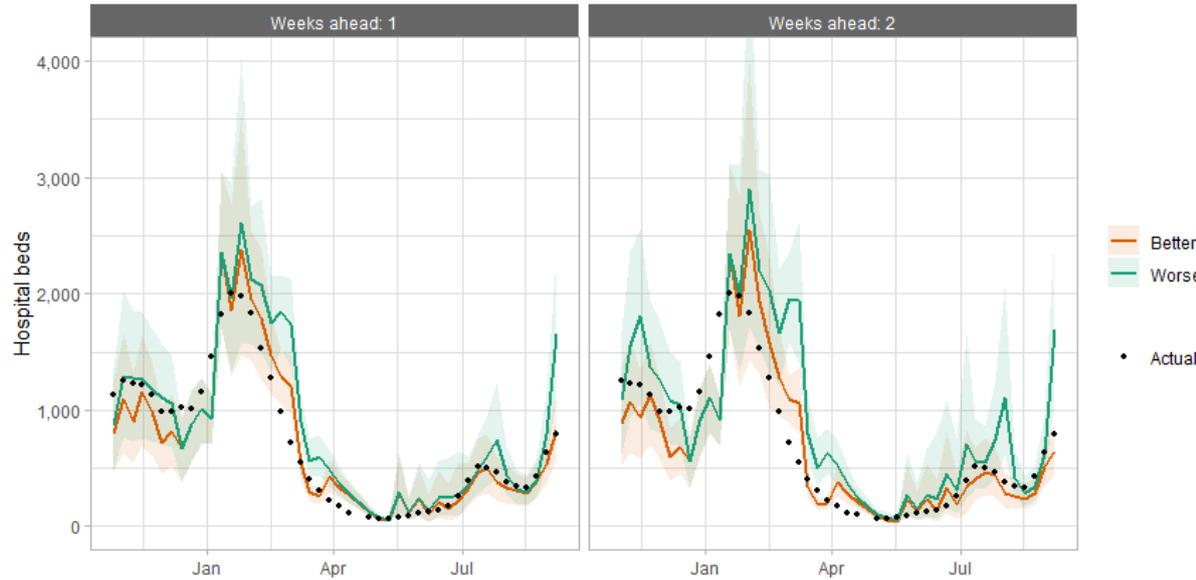
The following charts show the history of our modelling projections in comparison to estimates of the actual data. The infections projections were largely accurate during October to mid-December and from mid-January onward. During mid-December to mid-January, the projections underestimated the number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

Figure 20. 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 21. 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, after which they include people in ICU over the 28 day limit.

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

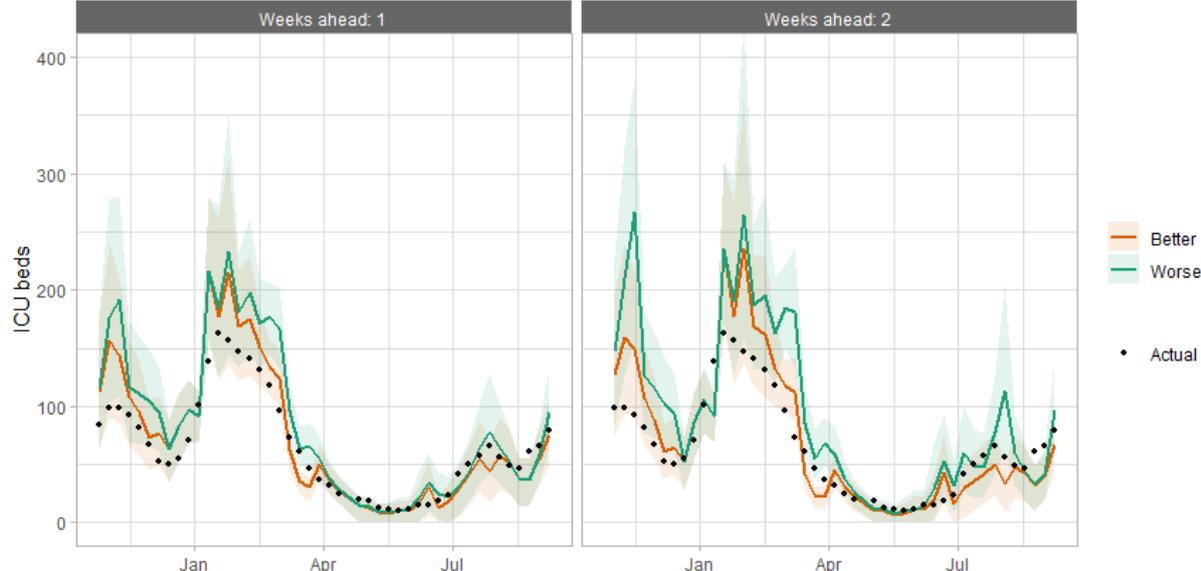


Table 1. Probability of local authority areas exceeding thresholds of cases per 100K (19th to 25th September 2021), data to 6th September.

Local Authority (LA)	Probability of exceeding (cases per 100k)					
	50	100	300	500	1000	1500
Aberdeen City	75-100%	75-100%	75-100%	75-100%	25-50%	5-15%
Aberdeenshire	75-100%	75-100%	75-100%	75-100%	25-50%	15-25%
Angus	75-100%	75-100%	75-100%	50-75%	15-25%	15-25%
Argyll and Bute	75-100%	75-100%	75-100%	50-75%	50-75%	15-25%
City of Edinburgh	75-100%	75-100%	75-100%	75-100%	50-75%	25-50%
Clackmannanshire	75-100%	75-100%	75-100%	50-75%	50-75%	25-50%
Dumfries & Galloway	75-100%	75-100%	75-100%	50-75%	25-50%	0-5%
Dundee City	75-100%	75-100%	75-100%	75-100%	25-50%	15-25%
East Ayrshire	75-100%	75-100%	75-100%	75-100%	50-75%	15-25%
East Dunbartonshire	75-100%	75-100%	75-100%	75-100%	25-50%	25-50%
East Lothian	75-100%	75-100%	75-100%	50-75%	15-25%	5-15%
East Renfrewshire	75-100%	75-100%	75-100%	75-100%	50-75%	25-50%
Falkirk	75-100%	75-100%	75-100%	75-100%	50-75%	15-25%
Fife	75-100%	75-100%	75-100%	75-100%	75-100%	25-50%
Glasgow City	75-100%	75-100%	75-100%	75-100%	75-100%	50-75%
Highland	75-100%	75-100%	75-100%	75-100%	25-50%	15-25%
Inverclyde	75-100%	75-100%	75-100%	50-75%	50-75%	25-50%
Midlothian	75-100%	75-100%	75-100%	50-75%	25-50%	15-25%
Moray	75-100%	50-75%	50-75%	25-50%	5-15%	5-15%
Na h-Eileanan Siar	25-50%	25-50%	25-50%	15-25%	0-5%	0-5%
North Ayrshire	75-100%	75-100%	75-100%	75-100%	50-75%	15-25%
North Lanarkshire	75-100%	75-100%	75-100%	75-100%	75-100%	50-75%
Orkney Islands	25-50%	15-25%	0-5%	0-5%	0-5%	0-5%
Perth and Kinross	75-100%	75-100%	75-100%	25-50%	5-15%	0-5%
Renfrewshire	75-100%	75-100%	75-100%	75-100%	75-100%	50-75%
Scottish Borders	75-100%	75-100%	75-100%	50-75%	5-15%	0-5%
Shetland Islands	25-50%	25-50%	25-50%	25-50%	0-5%	0-5%
South Ayrshire	75-100%	75-100%	75-100%	75-100%	25-50%	5-15%
South Lanarkshire	75-100%	75-100%	75-100%	75-100%	50-75%	50-75%
Stirling	75-100%	75-100%	75-100%	50-75%	25-50%	5-15%
West Dunbartonshire	75-100%	75-100%	75-100%	75-100%	50-75%	25-50%
West Lothian	75-100%	75-100%	75-100%	75-100%	50-75%	15-25%

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

Table 2 provides population weighted daily averages for normalised WW Covid-19 levels in the weeks beginning 21st and 28th August, 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 period¹².

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

Local authority (LA)	Average daily WW case estimate, with outliers included		Average daily WW case estimate, with outliers removed		Coverage ¹³
	w/b 21st August	w/b 28 th August	w/b 21st August	w/b 28 th August	
Aberdeen City	88	150	88	150	80 %
Aberdeenshire	62	131	56	127	50 %
Angus	84	196	84	196	56 %
Argyll and Bute	--	--	--	--	3 %
City of Edinburgh	97	123	97	123	96 %
Clackmannanshire	183	192	183	192	92 %
Dumfries & Galloway	103	97	103	97	36 %
Dundee City	96	237	96	237	100 %
East Ayrshire	122	234	122	234	72 %
East Dunbartonshire	107	249	107	249	99 %
East Lothian	92	124	92	124	65 %
East Renfrewshire	161	232	161	232	95 %
Falkirk	58	131	58	131	69 %
Fife	108	130	108	124	52 %
Glasgow City	131	267	131	267	98 %
Highland	92	141	92	141	37 %
Inverclyde	48	89	48	89	92 %
Midlothian	114	142	114	142	88 %
Moray	23	52	23	52	70 %
Na h-Eileanan Siar	40	5	--	5	21 %
North Ayrshire	90	116	90	116	93 %
North Lanarkshire	123	151	123	151	91 %
Orkney Islands	11	12	11	12	34 %
Perth and Kinross	--	144	--	68	44 %
Renfrewshire	156	348	156	348	57 %
Scottish Borders	108	62	110	56	56 %
Shetland Islands	1	1	1	1	29 %
South Ayrshire	122	265	122	265	82 %
South Lanarkshire	199	279	199	279	82 %
Stirling	35	16	35	16	63 %
West Dunbartonshire	107	126	107	126	98 %
West Lothian	--	131	--	131	85 %

¹² 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 both with and without the outliers removed. See Technical Annex in Issue 60 of these Research Findings for further details.

¹³ Coverage as at the week beginning 28th August 2021.

This publication will be available in accessible HTML on the [gov.scot](http://www.gov.scot) website

© Crown copyright 2021

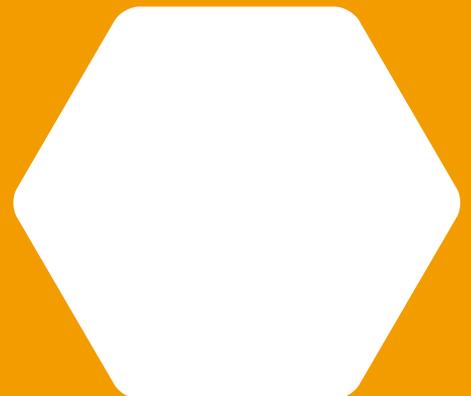
You may re-use this information (excluding logos and images) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit <http://www.nationalarchives.gov.uk/doc/open-government-licence/> or e-mail: psi@nationalarchives.gsi.gov.uk. Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

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

This document is also available from our website at www.gov.scot.
ISBN: 978-1-80201-363-4

The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

Produced for
the Scottish Government
by APS Group Scotland
PPDAS939246 (09/21)
Published by
the Scottish Government,
September 2021



ISBN 978-1-80201-363-4

Web Publication

PPDAS939246 (09/21)