

## Coronavirus (COVID-19): Analysis

### Coronavirus (COVID-19): modelling the epidemic in Scotland (Issue No. 71)

#### 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 23rd 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 0.7 and 1.0, with the growth rate between -4% and -1%.

#### Key Points

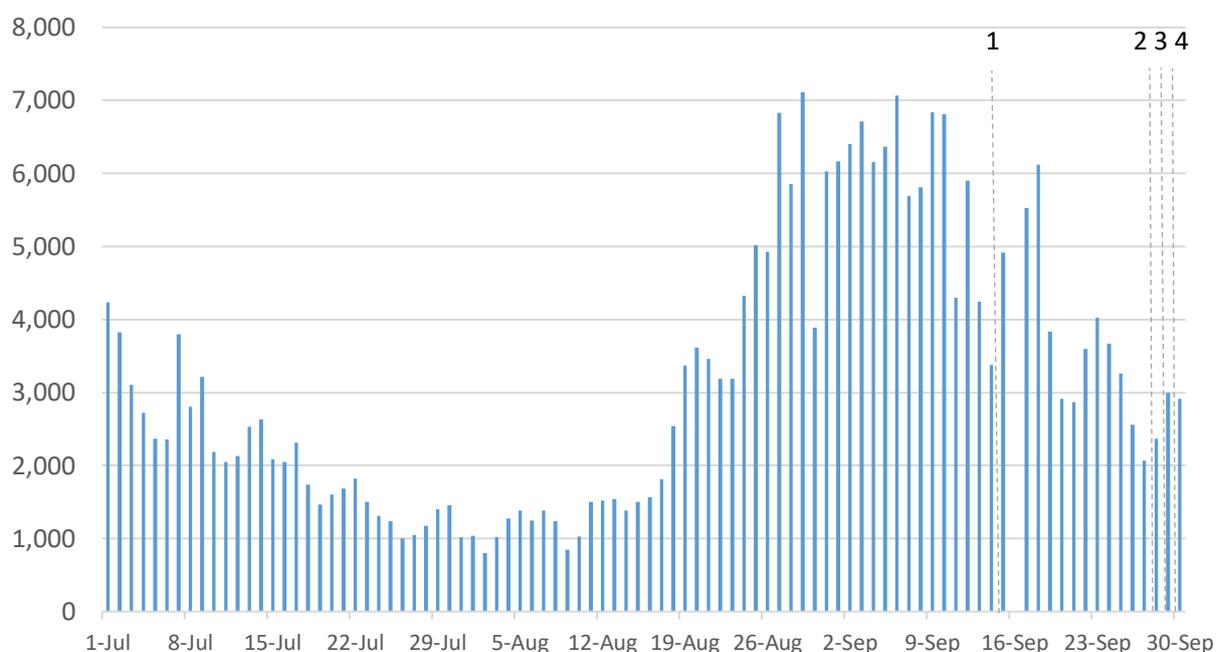
- The reproduction rate R in Scotland is currently estimated as being between 0.7 and 1.0, as of 14th September. The lower and upper limits have decreased since last week.
- The number of new daily infections for Scotland is estimated as being between 162 and 213, per 100,000 people. The lower and upper limits have decreased since last week.
- The growth rate for Scotland is currently estimated as between -4% and -1%.
- Average contacts have increased by approximately 17% in the last two weeks (comparing surveys pertaining to 9th September - 15th September and 23rd September - 29th September) with a current level of 5.4 daily contacts.

- Mean contacts within the workplace have increased by around 75% whereas contacts in the other setting (contacts outside home, school and work) have decreased by 9% in the last two weeks. Contacts within the home have remained at a similar level over the same period.
- All age groups between 18-59 have reported an increase in overall contacts with those aged 18-29 almost doubling in the last two weeks.
- Those aged between 18-39 have reported the biggest increase in interactions with those aged under 18 in the last two weeks.
- The proportion of individuals visiting a pub or restaurant increased from approximately 43% to 45% with individuals visiting a non-essential shop increasing from 39% to 41% in the last two weeks.
- The proportion of contacts reported to have been indoors only has increased from 57% to 67% within the last two weeks whereas the proportion of contacts occurring outside only has shown a decrease over the same period.
- 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, increasing from 82 to 87%.
- Hospital and ICU occupancies have plateaued. Hospital occupancy and intensive care use are likely to fall in the coming weeks.
- Modelled rates of positive tests per 100K using data to 27th September indicate that, for the week commencing 10th October 2021, there are 29 local authorities which are expected to exceed 50 cases per 100k with at least 75% probability.
- Of these, eight local authorities are expected to exceed 300 cases per 100k with at least 75% probability. These are Dundee, East Ayrshire, Fife, Glasgow, North Lanarkshire, South Ayrshire, South Lanarkshire and West Lothian.
- There are no local authorities which are expected to exceed 500 cases per 100k with at least 75% probability.
- Nationwide, levels of Covid-19 in wastewater (WW) have continued their decline, decreasing by 18% since last week. This puts WW viral levels somewhat below the July peak, as is the case for the rate of new cases.
- Modelling of long Covid gives estimates that on 17th October 2021 between 1.0% and 2.2% of the population are projected to experience symptoms for 12 weeks or more after their first suspected Covid infection in Scotland. The estimate is unchanged from last week.

## Recent cases

Figure 1 shows the number of cases reported in Scotland between July and September 2021<sup>1</sup>. 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 30th September 2021



R, growth rate and incidence are as of 14th September (dashed line 1). The medium term projections by the Scottish Government of infections, hospitalisations and ICU beds, the modelled rates of positive tests per 100k and the long Covid analysis use data to 27th September (dashed line 2). Wastewater data is to 28th September (dashed line 3). Contact pattern data is to 29th September (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 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

<sup>1</sup> 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.

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 14th September<sup>2</sup> in Scotland was between 0.7 and 1.0 (see Figure 2)<sup>3</sup>.

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

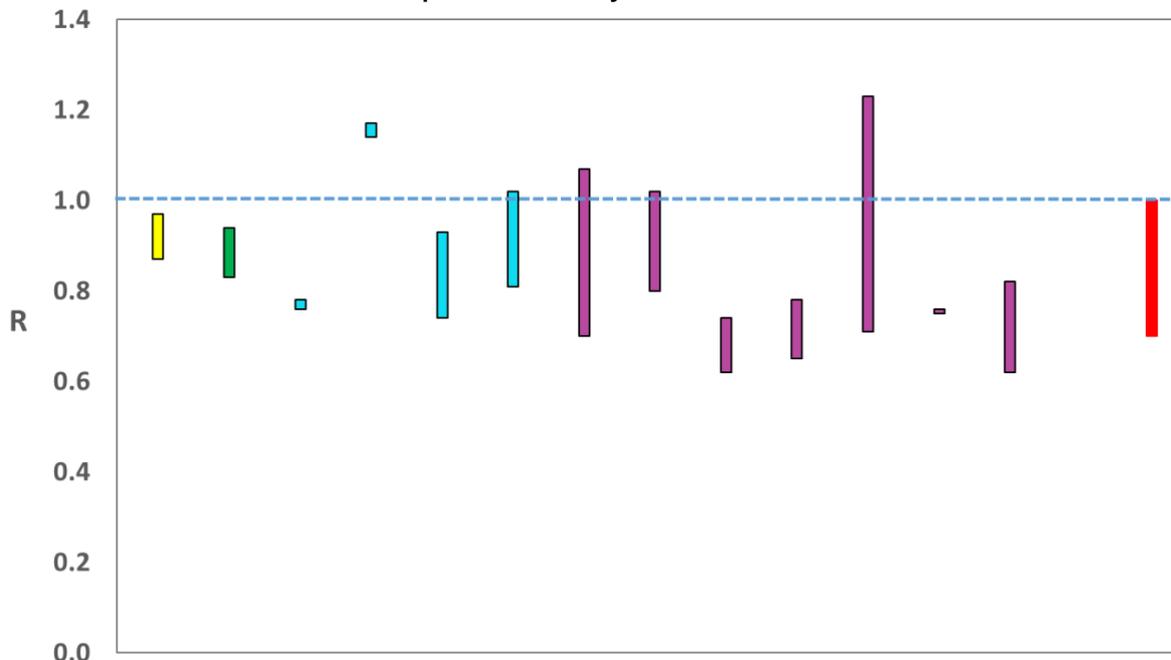
This week the Scottish Government presented two outputs to EMRG. The first uses confirmed cases, as published by Public Health Scotland (PHS), and deaths from National Records Scotland (NRS). The second uses instead wastewater data to estimate the number of cases, and deaths from NRS. Both outputs are shown in Figures 2 and 3.

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<sup>2</sup> Using data to 27th September.

<sup>3</sup> 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 14th September, including 90% confidence intervals, produced by EMRG<sup>4</sup>.

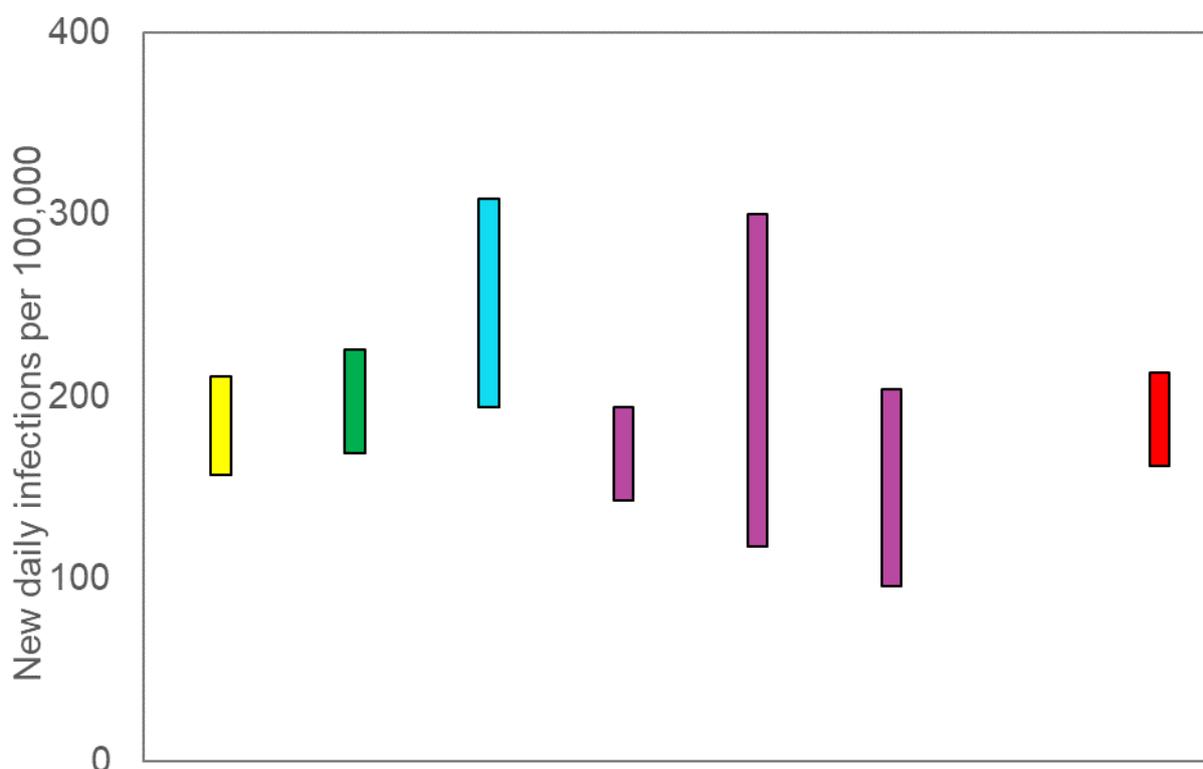


Source: EMRG

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 14th September, was that the incidence of new daily infections in Scotland was between 162 and 213 new infections per 100,000. This equates to between 8,900 and 11,600 people becoming infected each day in Scotland. The lower and upper limits have decreased since last week.

<sup>4</sup> 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 27th September. R, incidence and growth rate as of 14<sup>th</sup> September.

Figure 3. Estimates of incidence for Scotland, as at 14th September, including 90% confidence intervals, produced by EMRG<sup>2</sup>.



Source: EMRG

The consensus from UKHSA for this week is that the growth rate in Scotland is between -4% and -1% per day as at 14th September. 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 17% in the last two weeks (comparing surveys pertaining to 9th September - 15th September and 23rd September - 29th September) with a current level of 5.4 daily contacts as seen in Figure 4. Mean contacts within the work have increased by around 75% whereas contacts in the other setting (contacts outside home, school and work) have decreased by 9% in the last two weeks. Contacts within the home have remained at a similar level over the same period.

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

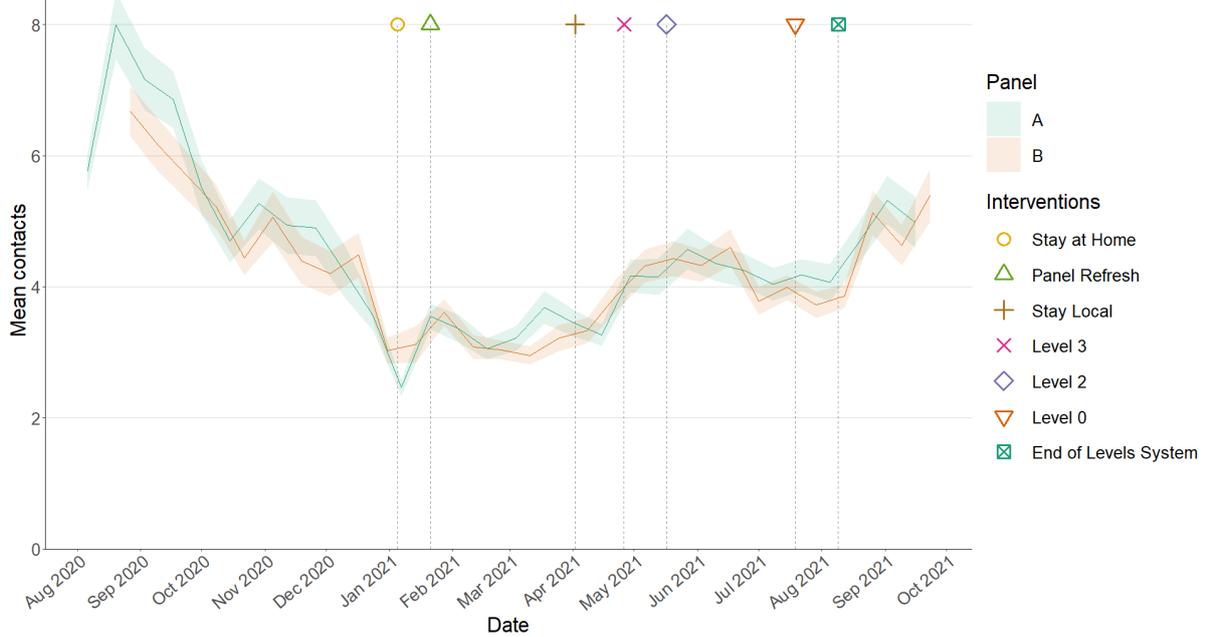
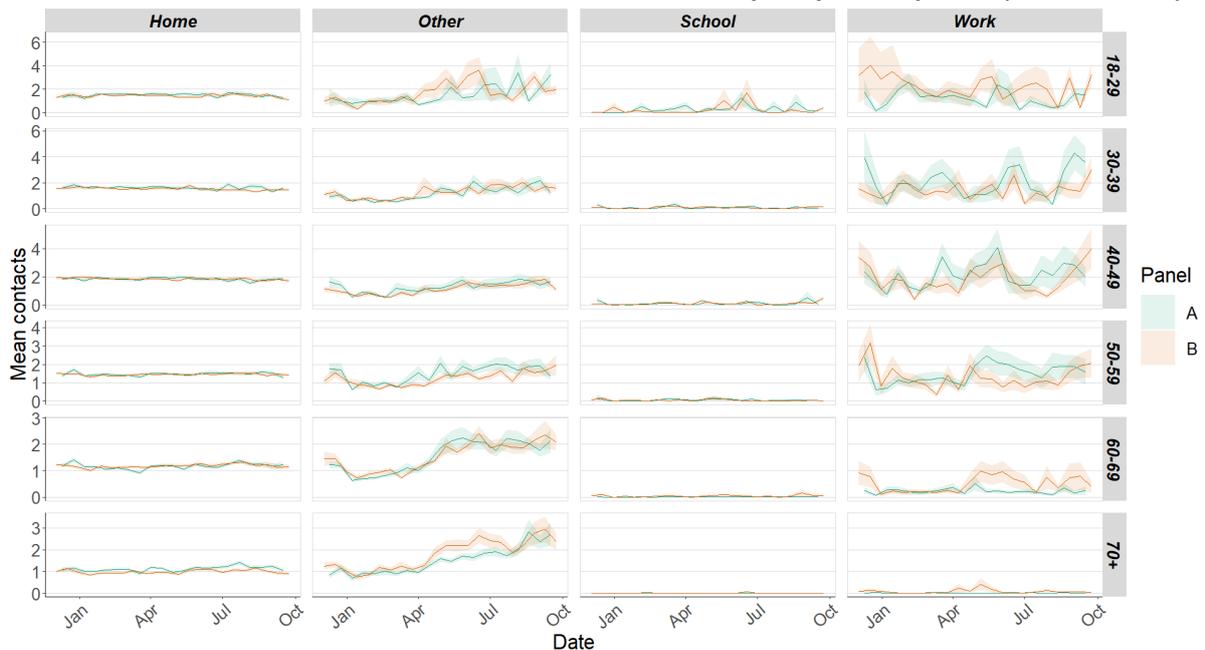


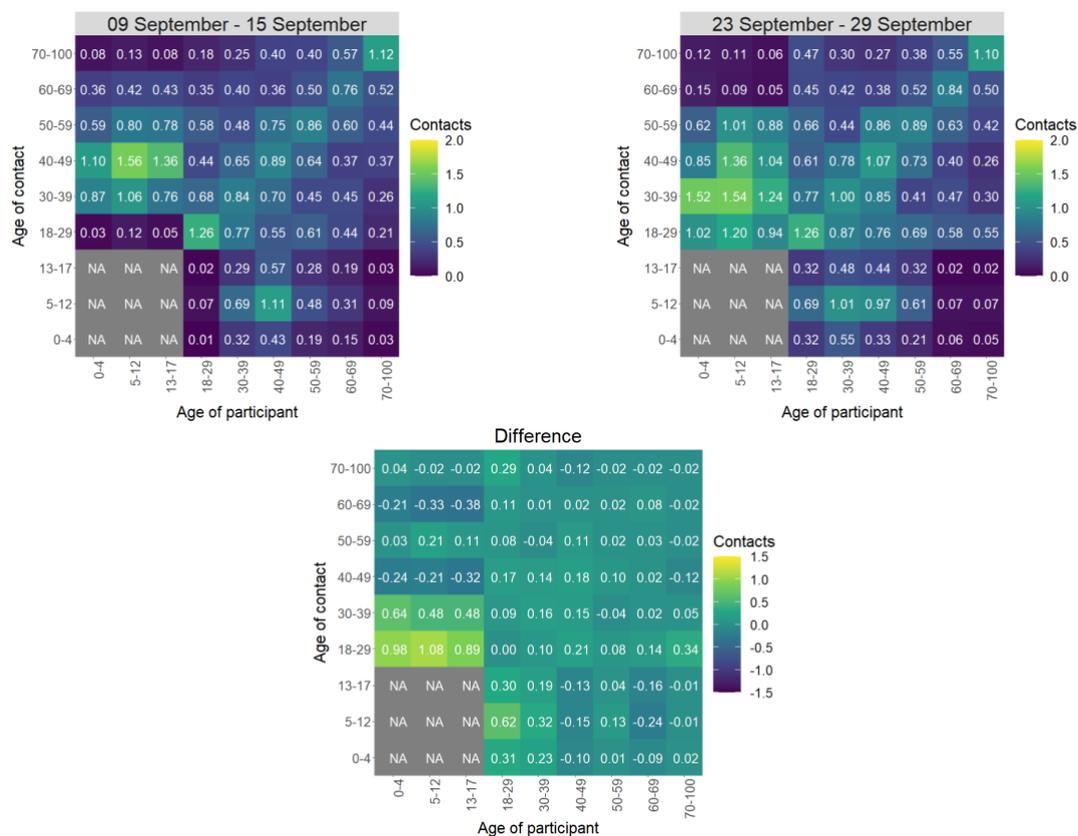
Figure 5 shows how contacts change across age group and setting. All age groups between 18-59 have reported an increase in overall contacts with those aged 18-29 almost doubling in the last two weeks. Increases within these age groups are largely driven by increased contacts within the work setting. Mean contacts for individuals over 60 have decreased over the same period

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 9th September - 15th September and 23rd September - 29th September and the difference between these periods.

Figure 6: Overall mean contacts by age group before for the weeks relating to 9th September - 15th September and 23rd September - 29th September. Those aged between 18-39 have reported the biggest increase in interactions with those aged under 18 in the last two weeks.



As seen in Figure 7, the proportion of participants visiting different locations remains at similar levels across the majority of locations. The biggest increases are seen with those using visiting a pub or restaurant and also individuals visiting a non-essential shop. The proportion of individuals visiting a pub or restaurant increased from approximately 43% to 45% with individuals visiting a non-essential shop increasing from 39% to 41% in the last two weeks.

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

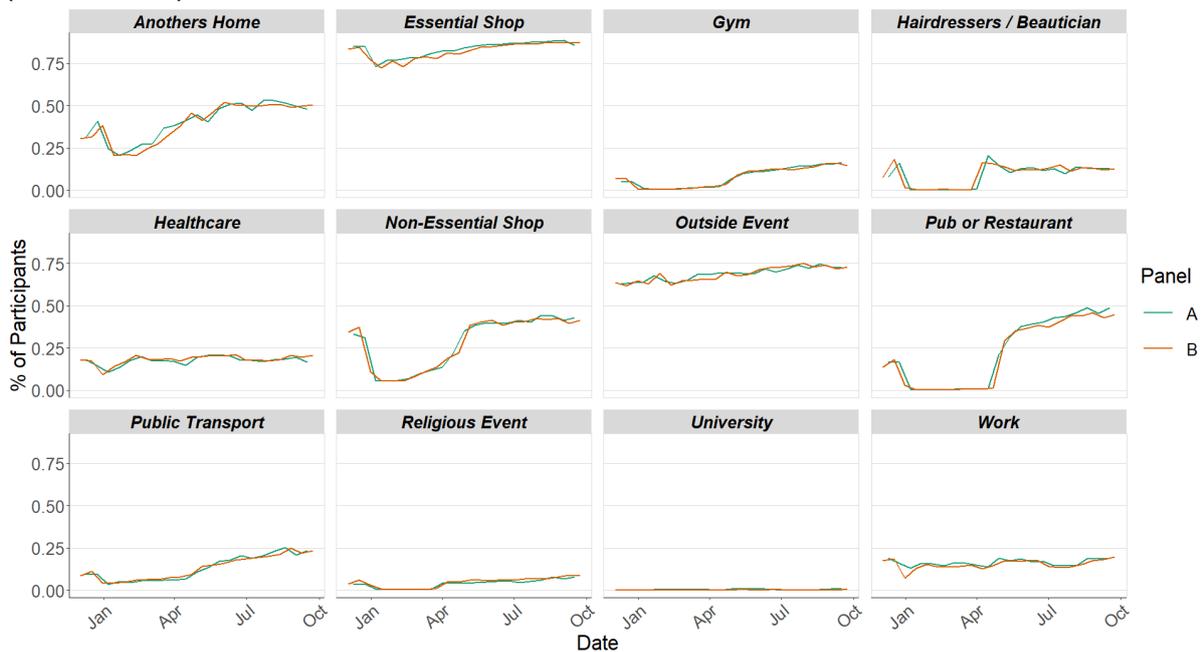


Figure 8 shows the proportion of participants that reported contacts had indoors and outdoors for contacts individually reported for panel B. A contact can be recorded as both indoor and outdoor. The graph also shows contacts reported as outside only and indoor only. The proportion of contacts reported to have been indoors only has increased from 57% to 67% within the last two weeks whereas the proportion of contacts occurring outside only has shown a decrease over the same period.

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

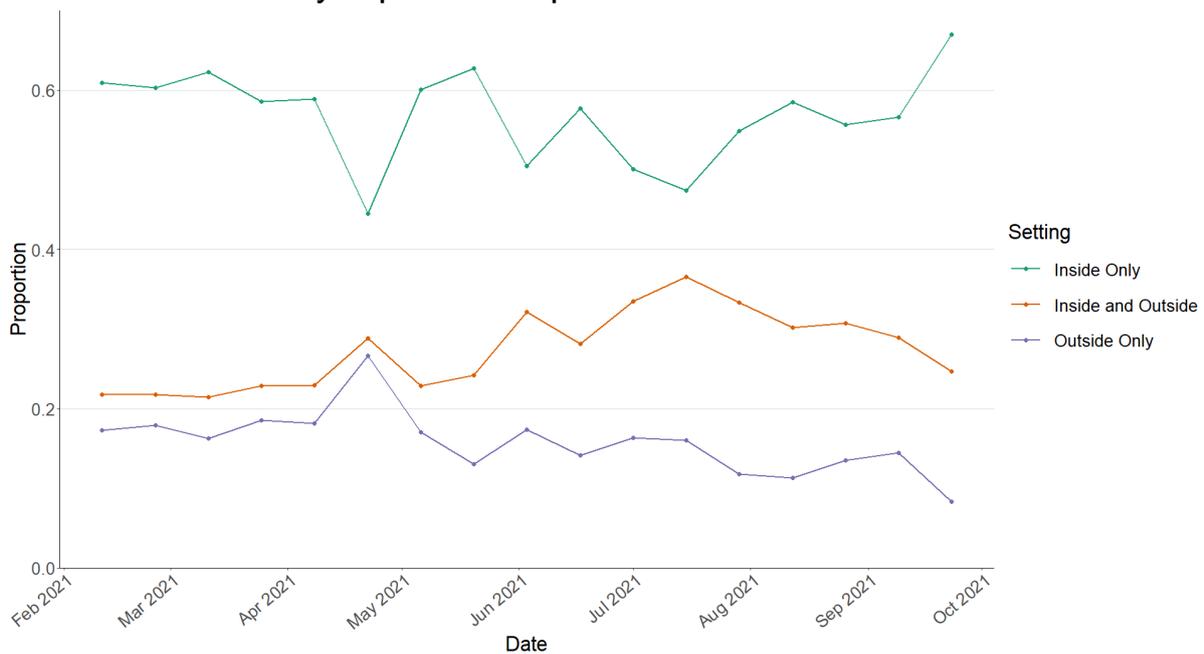
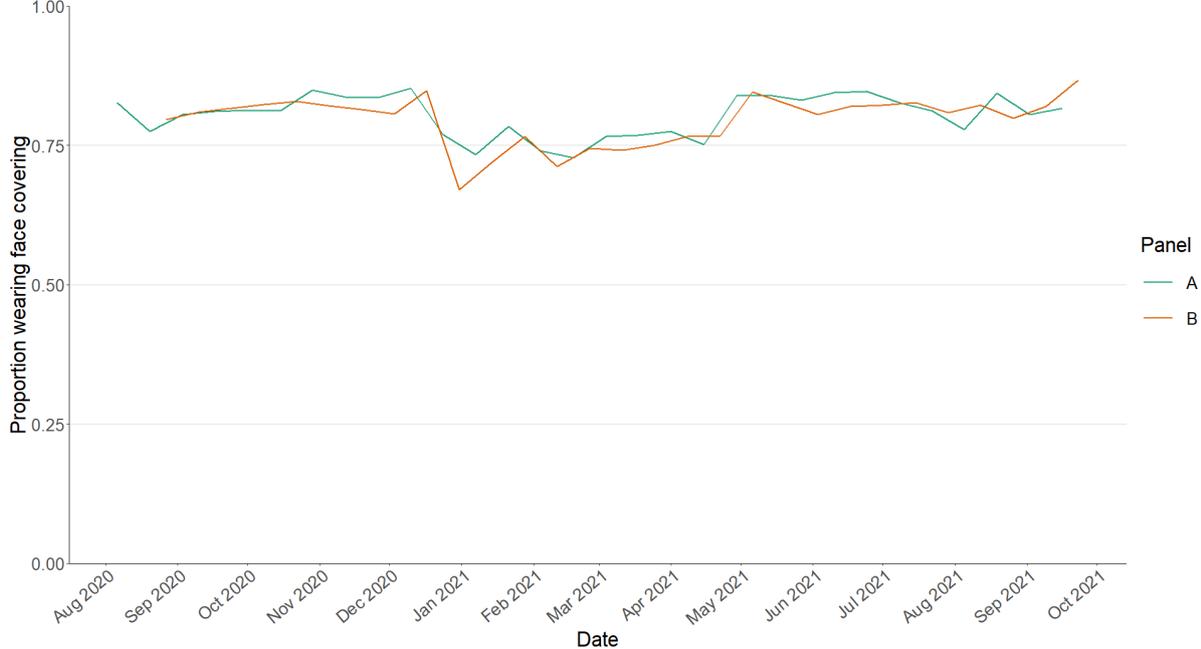


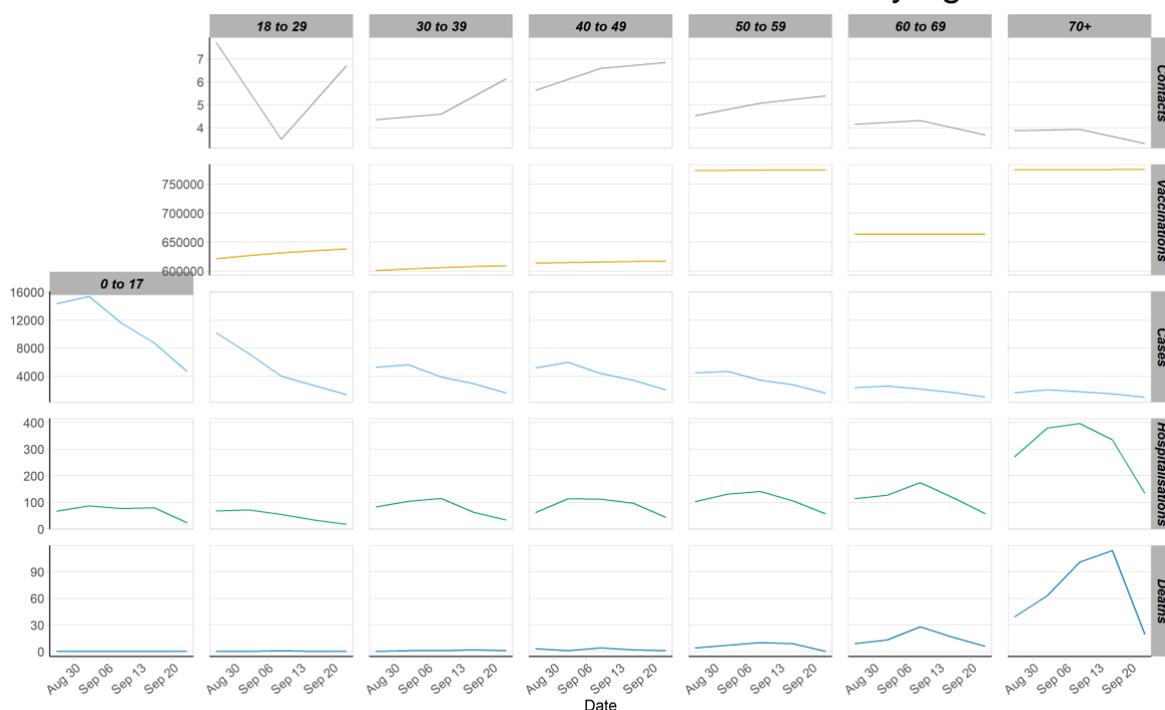
Figure 9 shows the number of people wearing a face covering where they have at least one contact outside of the home. This has increased in the last two weeks, increasing from 82 to 87%.

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



From Figure 10, it can be seen that the oldest age group has lower levels of contacts and higher vaccinations than the youngest age groups, they also have the lowest weekly case number comparatively to the younger age groups. Despite that they have higher weekly hospitalization levels to that seen with the younger age groups.

Figure 10: Average contacts for Panel B, weekly cases, covid-19 hospital admissions and deaths<sup>5</sup> and cumulative vaccinations by age band<sup>6</sup>



### 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 11 shows two projections over the three weeks to 17th October.

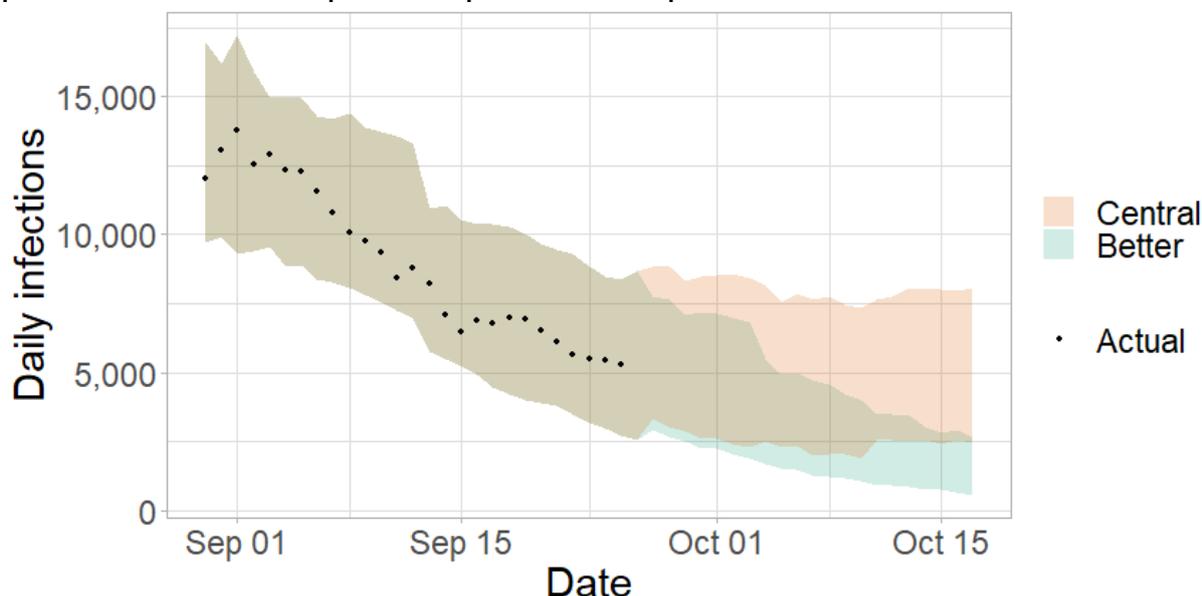
‘Central’ assumes that infections will plateau at the current level. ‘Better’ assumes that infections will continue to fall<sup>7</sup>.

<sup>5</sup> Deaths, Cases and Hospitalisations from [PHS COVID-19 daily cases in Scotland dashboard](#).

<sup>6</sup> 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.

<sup>7</sup> All scenarios are based on current vaccine roll-out plans and efficacy assumptions. Data to 27th September.

Figure 11. Medium term projections of modelled total new daily infections, adjusting positive tests<sup>8</sup> to account for asymptomatic and undetected infections, from Scottish Government modelling, based on positive test data reported up to 27th September.



In the coming weeks it is likely that infections will either decrease or plateau.

Figure 12 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 have plateaued and are likely to fall in the coming weeks.

<sup>8</sup> The actual positive tests are adjusted to coincide with the estimated day of infection.

Figure 12. Medium term projections of modelled hospital bed demand, from Scottish Government modelling, based on positive test data reported up to 27th September.

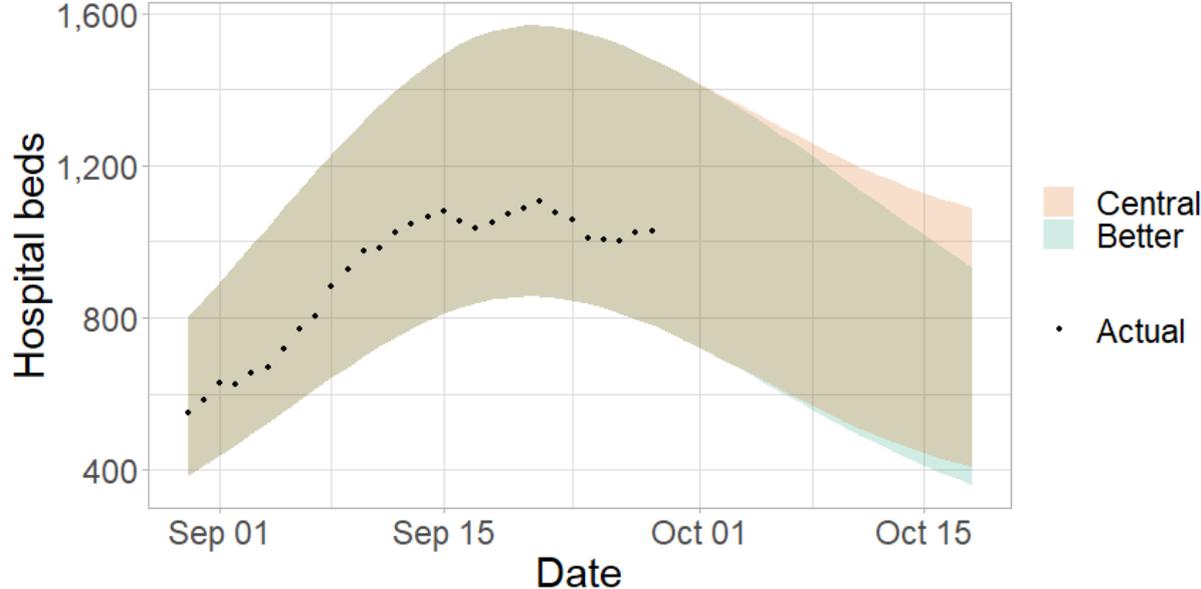
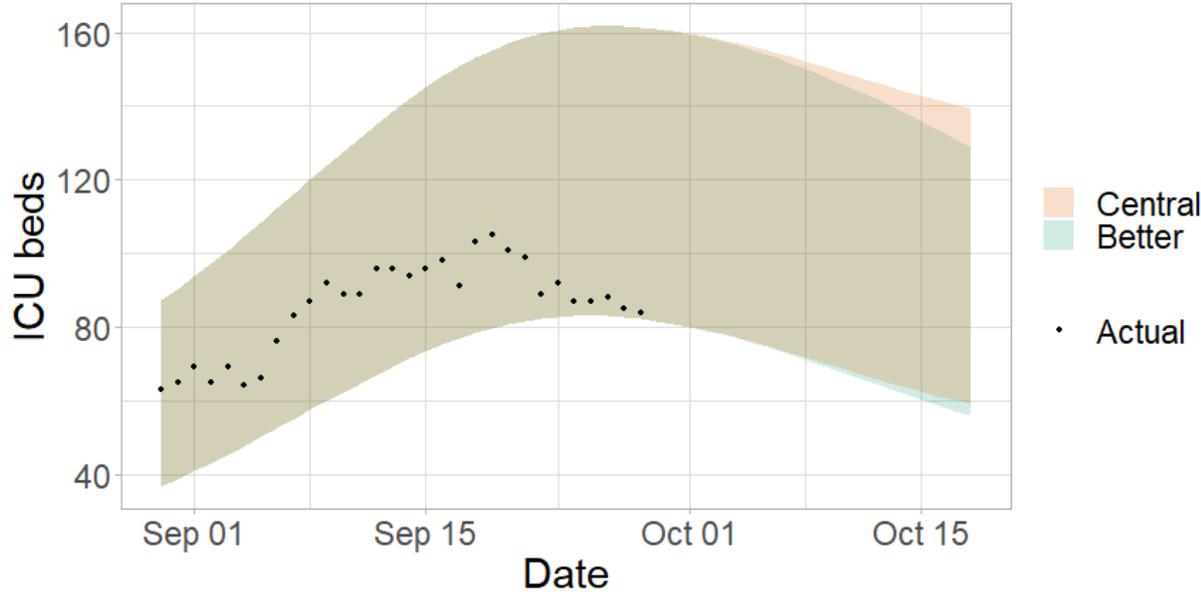


Figure 13 shows the impact of the projection on ICU bed demand.

Figure 13. Medium term projections of modelled ICU bed demand, from Scottish Government modelling<sup>9</sup>, based on positive test data reported up to 27th September.



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

<sup>9</sup> 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.

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

SPI-M produces projections of the epidemic<sup>10</sup> (Figures 14 and 15), combining estimates from several independent models (including the Scottish Government's logistics modelling, as shown in Figures 11-13). 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 27th 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 27th 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 12th October, 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.

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<sup>10</sup> 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 14. SPI-M medium-term projection of daily hospitalisations in Scotland, at 50% and 90% credible intervals.

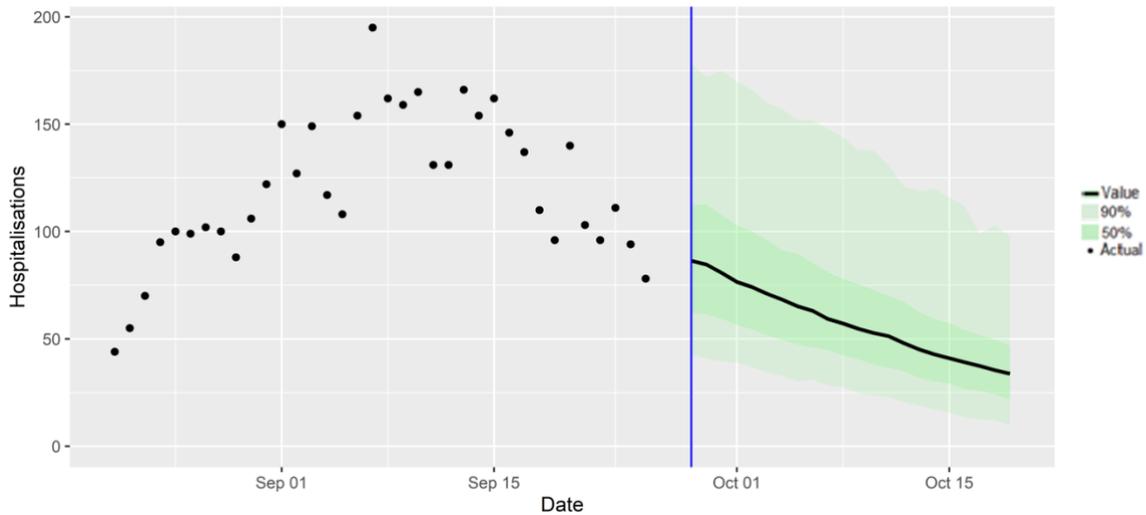
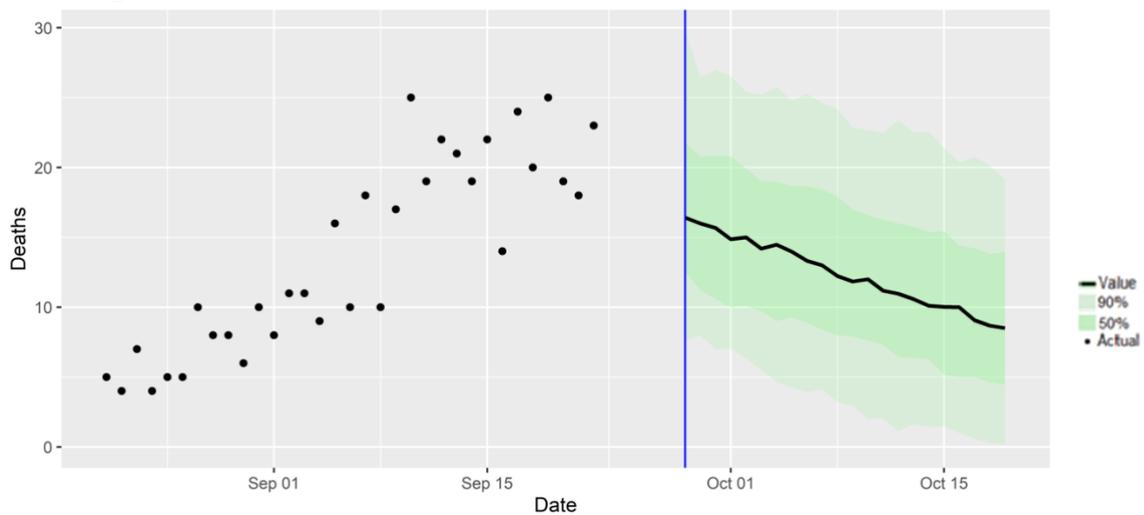


Figure 15. SPI-M medium-term projection of daily deaths in Scotland, including 50% and 90% credible intervals.



**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 27th 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 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.

The very high peak and subsequent sharp fall in cases in the cities of Edinburgh and Glasgow has resulted in very uncertain model

combinations this week, it is therefore likely that the uncertainty is overestimated in these areas and case numbers are in the lower range of the estimate. The continued very low case numbers in Shetland and Orkney has also resulted in a similar situation with case numbers also likely to be in the lower end of the uncertainty range.

Modelled rates of positive tests per 100K using data to 27th September (Figure 16) indicate that, for the week commencing 10th October 2021, there are 29 local authorities which are expected to exceed 50 cases per 100k with at least 75% probability<sup>11</sup>.

Of these, eight local authorities are expected to exceed 300 cases per 100k with at least 75% probability. These are Dundee, East Ayrshire, Fife, Glasgow, North Lanarkshire, South Ayrshire, South Lanarkshire and West Lothian.

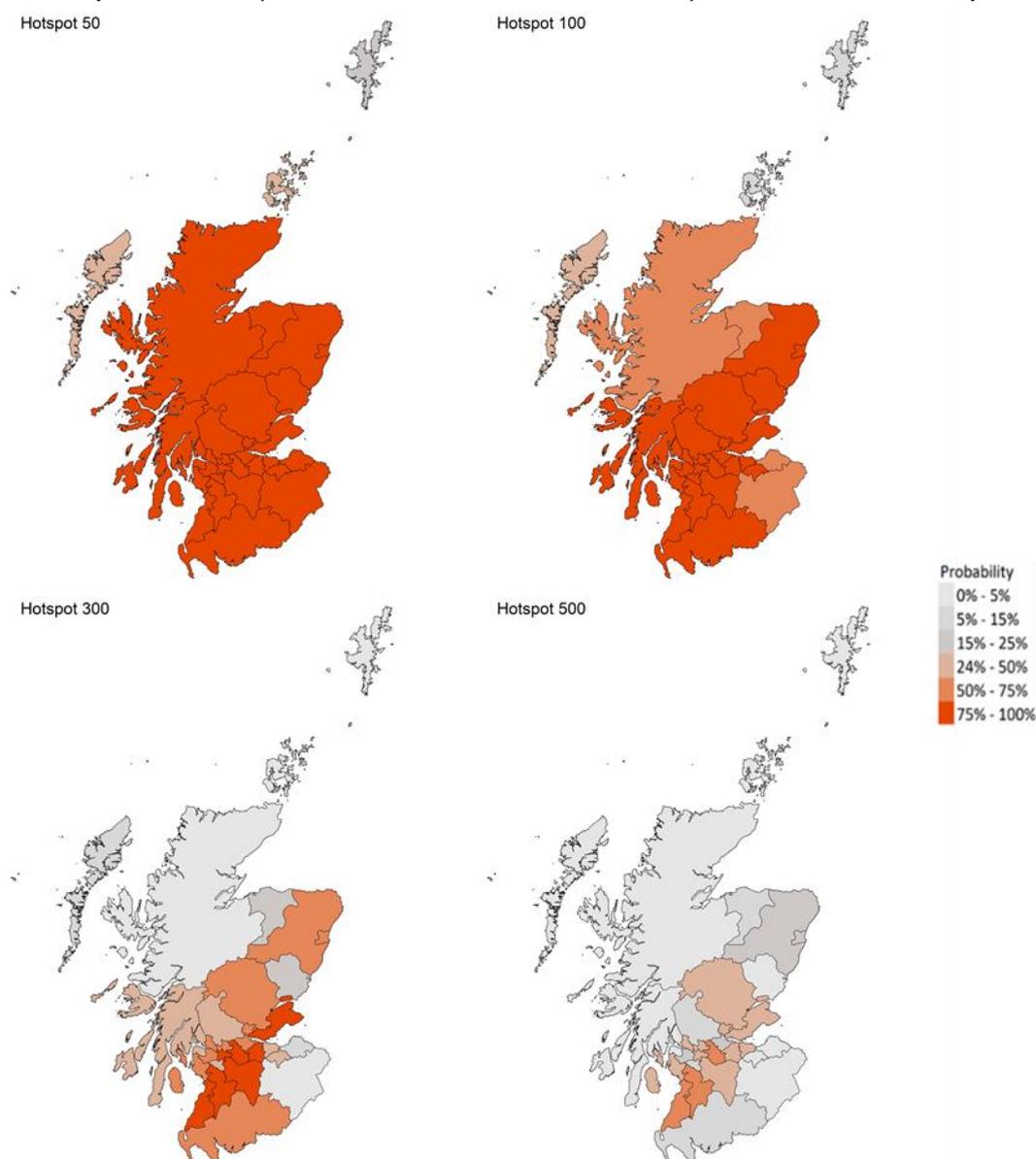
There are no local authorities which are expected to exceed 500 cases per 100k with at least 75% probability<sup>12</sup>.

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<sup>11</sup> The exceptions are Na h-Eileanan Siar, Orkney Islands and Shetland Islands.

<sup>12</sup> Values are included in Table 1 in the Technical Annex.

Figure 16. Probability of local authority areas exceeding thresholds of cases per 100K (10th to 16th October 2021), data to 27th September.



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

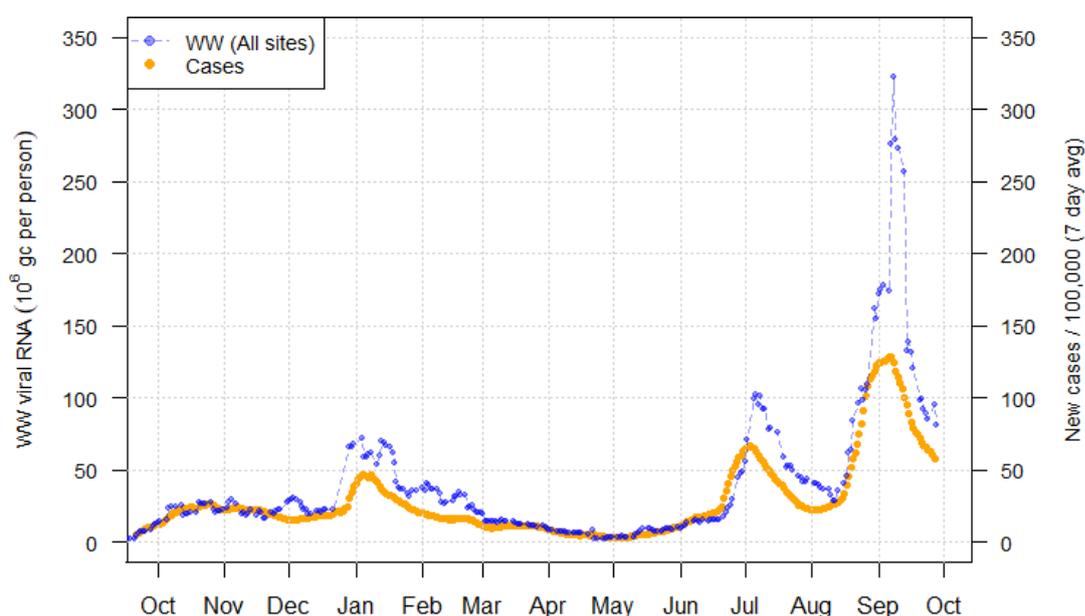
Levels of Covid-19 RNA in wastewater collected at a number of sites around Scotland are adjusted for population and local changes in intake flow rate and compared to 7 day average daily new case rates derived from Local Authority and Neighbourhood (Intermediate Zone) level aggregate data. See Technical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

Nationwide, levels of wastewater (WW) Covid-19 RNA have continued their decline, falling to around 80 million gene copies per person per day

(Mgc/p/d), from around 100 last week (15/9/21 to 21/9/21). This puts WW viral levels somewhat below the July peak, as is the case for the rate of new cases.

Figure 17 shows the national running average trend for the full set of sampled sites, with a small number of unrealistically large outliers excluded. As was the case last week, a new running average-based methodology for visualization of national trends has been introduced (see methodology update in previous issue).

Figure 17. National running average trends in wastewater Covid-19 and daily new case rates (7 day moving average) with the newest sample collected on 28th September<sup>13</sup>.



### 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.

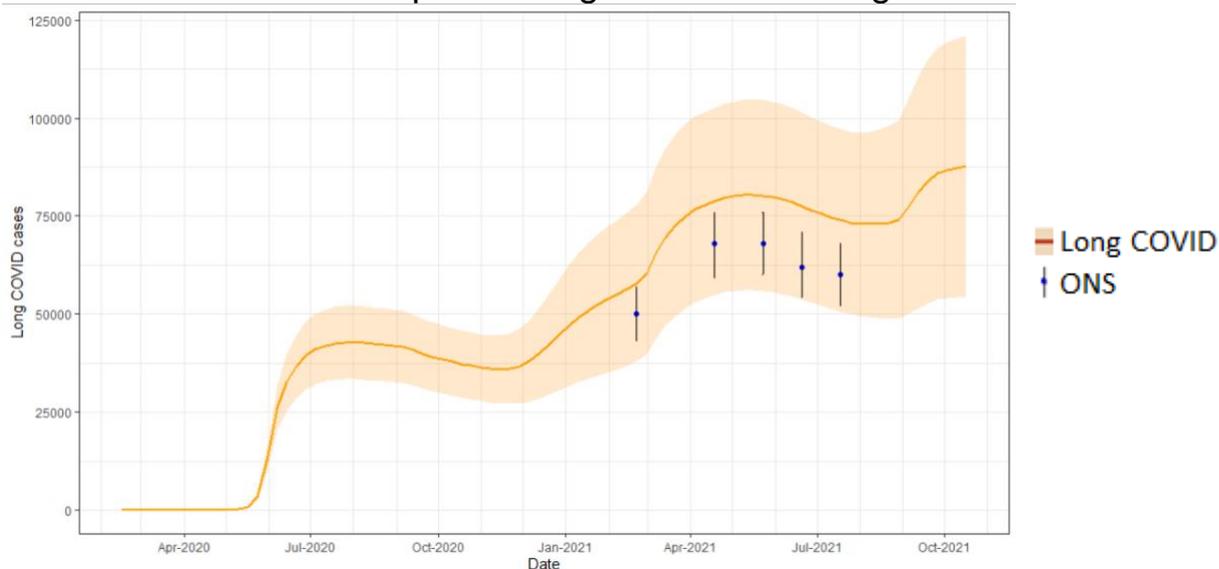
This modelling estimates that at 17th October 2021 between 54,000 (1.0% of the population) and 121,000 (2.2%) people are projected to

<sup>13</sup> 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.

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 18. Estimates of long Covid prevalence at 12 weeks from 16<sup>th</sup> February 2020 to 17<sup>th</sup> October 2021 (showing 90% confidence interval). ONS estimates of self-reported long COVID 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.

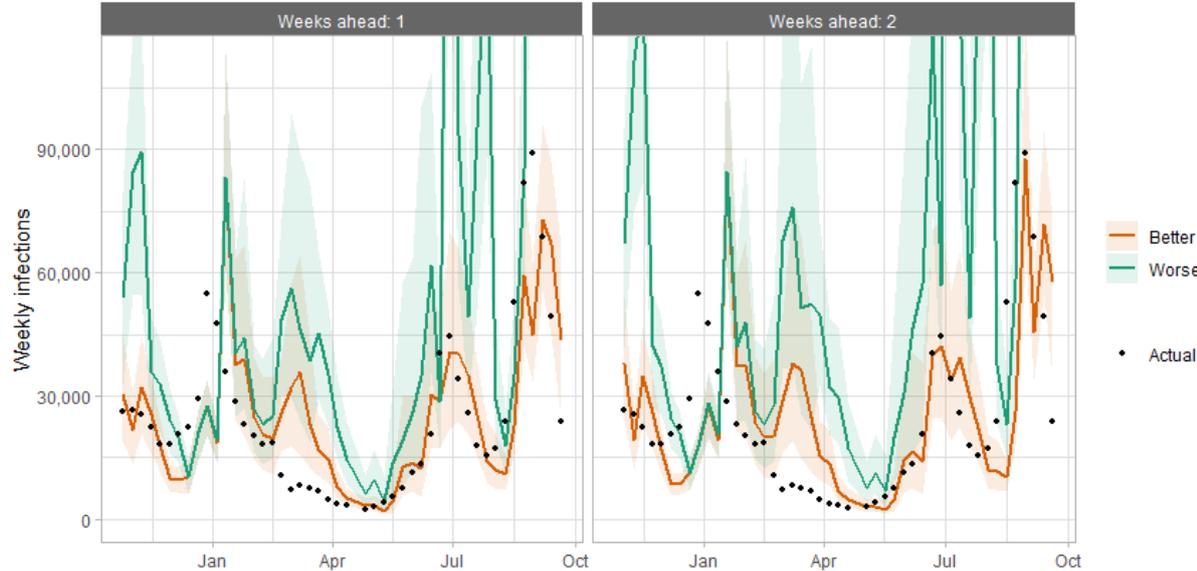
Modelling also allows us to make short-term forecasts of what may happen with a degree of uncertainty. These can be used in health care and other planning. The modelling in this research findings is undertaken using different types of data which going forward aims to both model the progress of the epidemic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

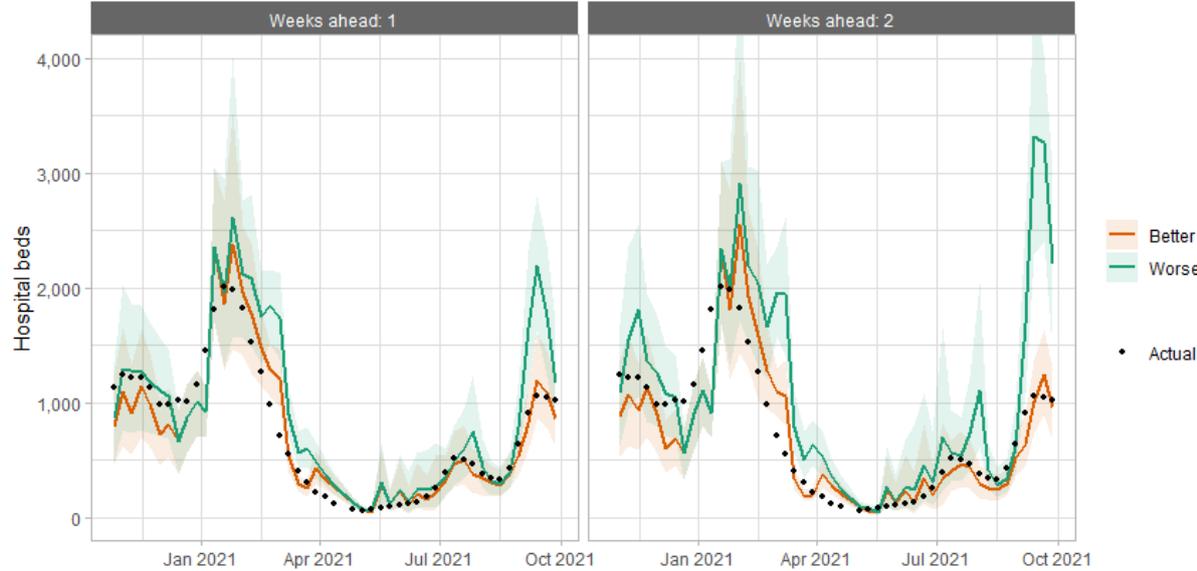
The following charts show the history of our modelling projections in comparison to estimates of the actual data. The infections projections were largely accurate during October to mid-December 2020 and from mid-January 2021 onwards. During mid-December 2020 to mid-January 2021, the projections underestimated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

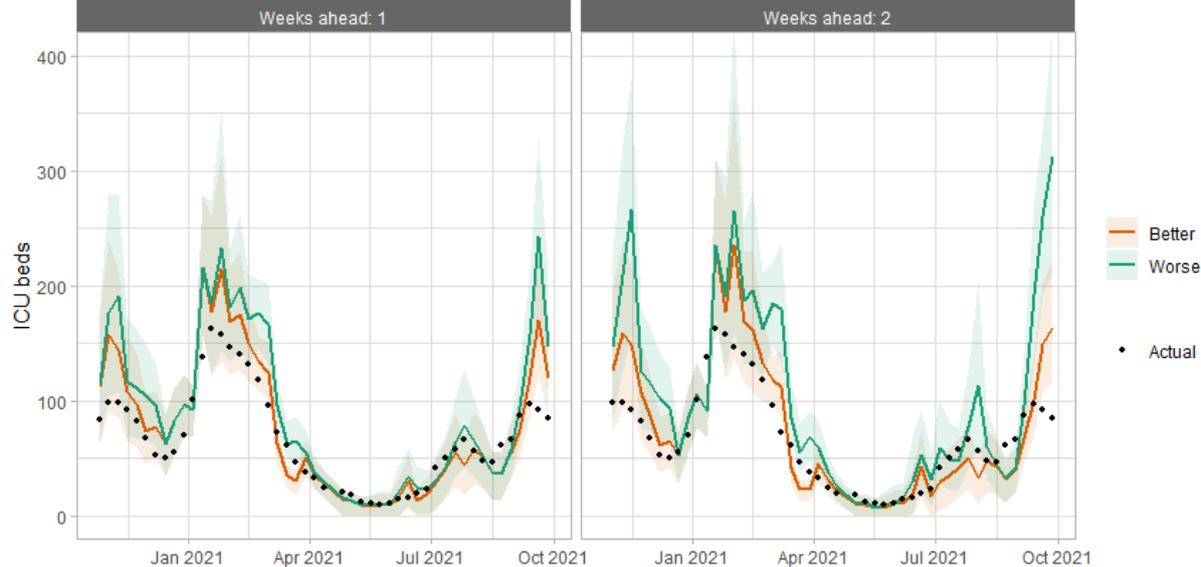


Table 1. Probability of local authority areas exceeding thresholds of cases per 100K (10th to 16th October 2021), data to 27th September.

Local Authority (LA)	Probability of exceeding (cases per 100k)					
	50	100	300	500	750	1000
Aberdeen City	75-100%	75-100%	50-75%	15-25%	5-15%	0-5%
Aberdeenshire	75-100%	75-100%	50-75%	15-25%	0-5%	0-5%
Angus	75-100%	75-100%	15-25%	0-5%	0-5%	0-5%
Argyll and Bute	75-100%	75-100%	25-50%	0-5%	0-5%	0-5%
City of Edinburgh	75-100%	75-100%	25-50%	25-50%	15-25%	5-15%
Clackmannanshire	75-100%	75-100%	50-75%	25-50%	5-15%	0-5%
Dumfries & Galloway	75-100%	75-100%	50-75%	5-15%	0-5%	0-5%
Dundee City	75-100%	75-100%	75-100%	25-50%	15-25%	5-15%
East Ayrshire	75-100%	75-100%	75-100%	50-75%	25-50%	5-15%
East Dunbartonshire	75-100%	75-100%	50-75%	25-50%	5-15%	0-5%
East Lothian	75-100%	50-75%	5-15%	0-5%	0-5%	0-5%
East Renfrewshire	75-100%	75-100%	25-50%	5-15%	0-5%	0-5%
Falkirk	75-100%	75-100%	50-75%	15-25%	0-5%	0-5%
Fife	75-100%	75-100%	75-100%	25-50%	15-25%	5-15%
Glasgow City	75-100%	75-100%	75-100%	25-50%	25-50%	25-50%
Highland	75-100%	50-75%	0-5%	0-5%	0-5%	0-5%
Inverclyde	75-100%	75-100%	25-50%	0-5%	0-5%	0-5%
Midlothian	75-100%	75-100%	25-50%	0-5%	0-5%	0-5%
Moray	75-100%	50-75%	15-25%	5-15%	0-5%	0-5%
Na h-Eileanan Siar	25-50%	25-50%	5-15%	0-5%	0-5%	0-5%
North Ayrshire	75-100%	75-100%	50-75%	25-50%	0-5%	0-5%
North Lanarkshire	75-100%	75-100%	75-100%	50-75%	25-50%	15-25%
Orkney Islands	25-50%	5-15%	0-5%	0-5%	0-5%	0-5%
Perth and Kinross	75-100%	75-100%	50-75%	25-50%	5-15%	0-5%
Renfrewshire	75-100%	75-100%	50-75%	15-25%	5-15%	0-5%
Scottish Borders	75-100%	50-75%	0-5%	0-5%	0-5%	0-5%
Shetland Islands	15-25%	5-15%	0-5%	0-5%	0-5%	0-5%
South Ayrshire	75-100%	75-100%	75-100%	50-75%	25-50%	5-15%
South Lanarkshire	75-100%	75-100%	75-100%	25-50%	15-25%	5-15%
Stirling	75-100%	75-100%	25-50%	5-15%	0-5%	0-5%
West Dunbartonshire	75-100%	75-100%	50-75%	25-50%	0-5%	0-5%
West Lothian	75-100%	75-100%	75-100%	25-50%	5-15%	0-5%

## 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 15th and 22nd September, 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<sup>14</sup>.

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 <sup>15</sup>
	w/b 15th September	w/b 22nd September	w/b 15th September	w/b 22nd September	
Aberdeen City	36	44	36	44	80%
Aberdeenshire	50	40	50	40	18%
Angus	125	85	125	85	43%
Argyll and Bute	–	–	–	–	0%
City of Edinburgh	87	82	87	82	96%
Clackmannanshire	71	–	71	–	0%
Dumfries & Galloway	35	92	35	92	29%
Dundee City	139	85	139	85	100%
East Ayrshire	70	150	70	150	57%
East Dunbartonshire	–	78	–	78	99%
East Lothian	87	73	87	73	65%
East Renfrewshire	136	73	136	73	89%
Falkirk	93	39	93	39	59%
Fife	104	65	104	65	48%
Glasgow City	141	83	141	83	98%
Highland	71	71	71	71	31%
Inverclyde	59	56	59	56	92%
Midlothian	100	86	100	86	88%
Moray	33	–	33	–	0%
Na h-Eileanan Siar	10	46	10	46	21%
North Ayrshire	45	63	45	63	92%
North Lanarkshire	183	92	183	92	88%
Orkney Islands	17	16	17	16	34%
Perth and Kinross	107	152	107	152	38%
Renfrewshire	120	38	120	38	57%
Scottish Borders	18	22	18	22	46%
Shetland Islands	6	3	6	3	29%
South Ayrshire	41	145	41	145	84%
South Lanarkshire	126	129	126	129	64%
Stirling	–	21	–	21	63%
West Dunbartonshire	5	78	5	78	48%
West Lothian	129	97	129	97	64%

<sup>14</sup> 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.

<sup>15</sup> Coverage as at the week beginning 22nd September 2021, when outliers are excluded.

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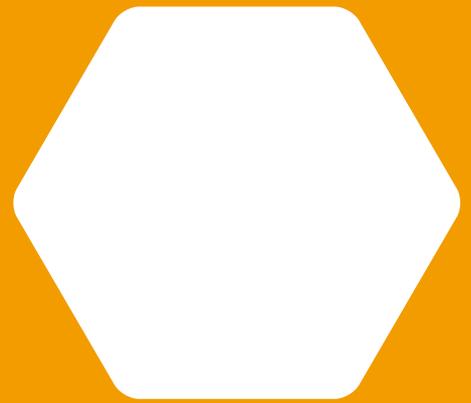
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