



National SARS-CoV-2 Wastewater Surveillance Programme

Week 5 2022 (30/01/2022—05/02/2022)

Report prepared on 10/02/2022

Background

People with COVID-19/SARS-CoV-2 infection can shed the virus in their stool, which can then be detected in wastewater, making environmental surveillance of wastewater a feasible means to monitor the circulation of SARS-CoV-2, the virus that causes COVID-19 disease, in the population.

The National SARS-CoV-2 Wastewater Surveillance Programme (NWSP) has been established through a partnership with Irish Water, the National Virus Reference Laboratory (NVRL), University College Dublin (UCD), the HSE Health Protection Surveillance Centre (HPSC) and Health Intelligence Unit (HIU). Samples from 68 wastewater catchment areas across Ireland are taken on a weekly basis and analysed for the presence of SARS-CoV-2. The wastewater catchment area of Ringsend in Dublin is sampled twice a week given the size of the population it captures. These 68 wastewater catchment areas (see Figure 2) cover 80% of the population connected to public wastewater treatment facilities.

The NWSP is an additional tool in Ireland's response to COVID-19/ SARS-CoV-2. The NWSP aims to complement our case-based surveillance systems (i.e. monitoring the number of people testing positive or presenting to a healthcare provider with symptoms) through acting as an early warning system for the circulation, or an increase in the circulation, of SARS-CoV-2 in a wastewater catchment area.

Please note that stool or wastewater are not recognised sources of transmission for SARS-CoV-2. Standard hygiene measures should be used after using the toilet. [Guidance from the WHO](#) for water and sanitation providers recommends standard best practices, including PPE for those working in proximity to wastewater, be followed.

Summary of results from week 5, 2022

In week 5¹, 2022 SARS-CoV-2 was detected in wastewater samples from the 68 wastewater catchment areas analysed (n=68). These results are in keeping with the ongoing high incidence rate of COVID-19 currently being seen throughout Ireland. Despite the incidence remaining high, the SARS-CoV-2 viral load of wastewater is stable or decreasing across the majority of catchment areas. While recent case based surveillance has suggested a stable incidence in recent weeks, the results of wastewater surveillance offers further reassurance given the limitations of case-based surveillance in light of recent changes to testing policies.

Please read 'Data uses' and 'Data limitations and uncertainties' in the technical notes prior to making any interpretation of the data.

¹ Dates of epidemiological weeks are available in the technical notes and at: <https://www.hpsc.ie/notifiablediseases/resources/epidemiologicalweeks/>

Overview of SARS-CoV-2 detection in wastewater in Ireland

Results are presented as the numerical value of the concentration of SARS-CoV-2 in the wastewater sample and as a descriptive category. The descriptive categories used are ‘positive’ when SARS-CoV-2 RNA was detected and could be quantified; ‘weak positive’ when SARS-CoV-2 RNA was detected but was below the quantification limit (BQL); ‘undetected’ when the numerical value was below the detection limit (BDL); and ‘unavailable’ if a result was not available because either a sample was not received or could not be fully analysed e.g. if flow data were not available. Please see the glossary and technical notes for further explanations.

In week 5, 2022, 69 samples were received and analysed for 68 wastewater catchment areas (Ringsend catchment area served by Ringsend wastewater treatment plant is sampled twice a week). SARS-CoV-2 RNA was detected in samples from all 68 wastewater catchment areas tested. Between week 4 and week 5, the level (gc/day) of SARS-CoV-2 in wastewater increased in 16 wastewater catchment areas. 36 wastewater catchment areas remained steady and 16 wastewater catchment areas showed a decrease of 10% or more (See figure2) . Waste water sampling was limited over the Christmas/New Year period (Week 51, 2021 – Week 1, 2022). Data from Youghal catchment area prior week 1, 2022 are not included due to potential sampling errors.

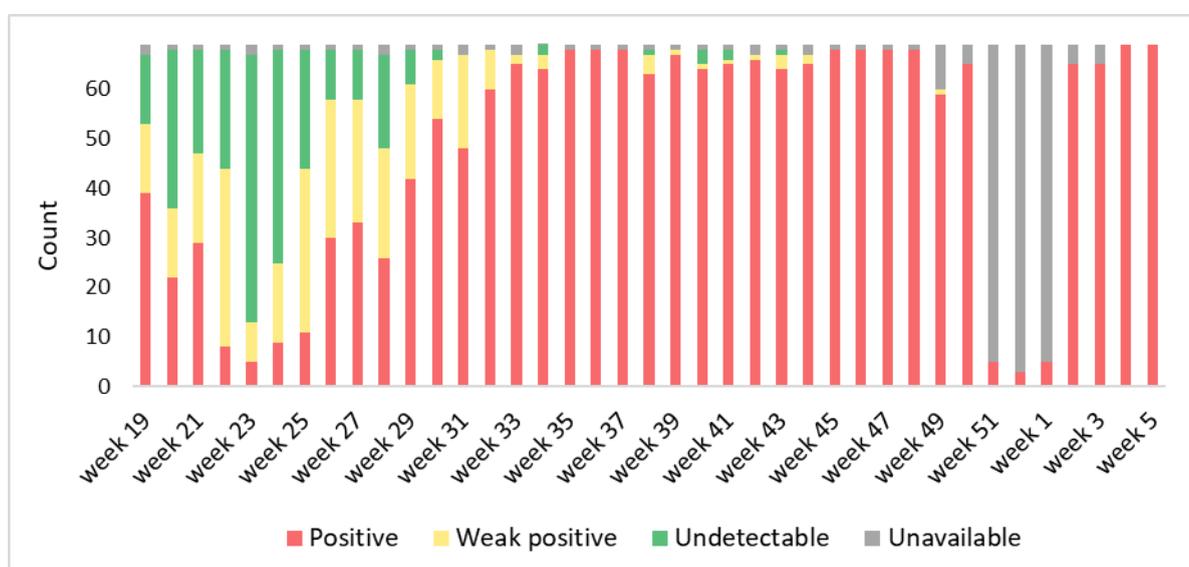


Figure 1. SARS-CoV-2 detection categories in Ireland by week, NWSP, weeks 19, 2021—5, 2022

**Samples with an undetected result may have SARS-CoV-2 present but the amount was too low to be detected by the test. It does not mean that SARS-CoV-2 is not circulating in the wastewater catchment area of the Wastewater treatment plant (WWTP).*

Table 1 and Figure 2 summarise the results from wastewater samples taken during week 5, 2022. Figures 1 and Table 2a summarises the results by category for each wastewater catchment area during weeks 19, 2021—5, 2022 for all NWSP catchment areas except Ringsend. Results for the Ringsend catchment area is summarised separately in Table 2b and Figure 3b as samples are taken at Ringsend biweekly.

Figure 3 summarises the SARS-CoV-2 RNA levels and 3 week moving average of those levels by wastewater catchment area each week since the start of the NWSP in week 19, 2021.

Please note that wastewater data from different wastewater catchment areas should not be directly compared. All data are subject to ongoing validation.

Table 1. National Wastewater Surveillance Programme sampling results by wastewater catchment area, week 5, 2022

County	Wastewater catchment area	Sample type	Sample date	Result category [^]
Carlow	Carlow	Complete (composite)	01/02/2022	Positive*
	Tullow	Unknown	01/02/2022	Positive*
Cavan	Cavan	Complete (composite)	31/01/2022	Positive
	Virginia	Complete (composite)	31/01/2022	Positive*
Clare	Ennis North	Complete (composite)	30/01/2022	Positive
	Shannon	Complete (composite)	31/01/2022	Positive
Cork	Ballincollig	Incomplete (composite)	31/01/2022	Positive
	Clonakilty	Incomplete (composite)	31/01/2022	Positive*
	Cork City	Complete (composite)	31/01/2022	Positive
	Cork Lower Harbour	Unknown	31/01/2022	Positive
	Fermoy	Complete (composite)	31/01/2022	Positive
	Mallow	Complete (composite)	31/01/2022	Positive
	Midleton	Complete (composite)	31/01/2022	Positive
	Youghal	Complete (composite)	31/01/2022	Positive
Donegal	Bunrana	Complete (composite)	01/02/2022	Positive
	Letterkenny	Complete (composite)	01/02/2022	Positive*
Dublin	Balbriggan	Complete (composite)	31/01/2022	Positive*
	Malahide	Grab	31/01/2022	Positive*
	Portrane Donabate	Complete (composite)	31/01/2022	Positive*
	Ringsend	Complete (composite)	31/01/2022	Positive*
	Ringsend	Complete (composite)	02/02/2022	Positive*
	Shanganagh	Complete (composite)	01/02/2022	Positive
	Swords	Complete (composite)	31/01/2022	Positive
Galway	Galway	Complete (composite)	31/01/2022	Positive*
	Tuam	Complete (composite)	30/01/2022	Positive
Kerry	Killarney	Complete (composite)	31/01/2022	Positive
	Tralee	Complete (composite)	31/01/2022	Positive*
Kildare	Athy	Unknown	01/02/2022	Positive
	Kildare	Grab	02/02/2022	Positive*
	Lower Liffey Valley Regional Sewerage Scheme (Leixlip)	Complete (composite)	01/02/2022	Positive*
	Upper Liffey Valley Sewerage Scheme (Osberstown)	Complete (composite)	01/02/2022	Positive*
Kilkenny	Kilkenny	Complete (composite)	31/01/2022	Positive
	Thomastown	Complete (composite)	31/01/2022	Positive
Laois	Portarlinton	Complete (composite)	31/01/2022	Positive*
	Portlaoise	Complete (composite)	31/01/2022	Positive
Leitrim	Carrick on Shannon	Complete (composite)	01/02/2022	Positive
	Manorhamilton	Complete (composite)	01/02/2022	Positive
Limerick	Castletroy	Grab	31/01/2022	Positive
	Limerick City	Complete (composite)	31/01/2022	Positive
Longford	Edgeworthstown	Complete (composite)	01/02/2022	Positive*
	Longford	Complete (composite)	01/02/2022	Positive*
Louth	Drogheda	Complete (composite)	31/01/2022	Positive*
	Dundalk	Complete (composite)	31/01/2022	Positive
Mayo	Ballina	Complete (composite)	31/01/2022	Positive
	Castlebar	Complete (composite)	30/01/2022	Positive*

Table 1(continued). National Wastewater Surveillance Programme sampling results by wastewater catchment area, week 5, 2022

County	Wastewater catchment area	Sample type	Sample date	Result category^
Meath	Navan	Grab	31/01/2022	Positive*
	Trim	Complete (composite)	01/02/2022	Positive*
Monaghan	Carrickmacross	Incomplete (composite)	31/01/2022	Positive
	Monaghan	Complete (composite)	31/01/2022	Positive
Offaly	Birr	Complete (composite)	30/01/2022	Positive
	Tullamore	Complete (composite)	31/01/2022	Positive*
Roscommon	Monksland	Complete (composite)	31/01/2022	Positive*
	Roscommon	Complete (composite)	31/01/2022	Positive
Sligo	Enniscrone	Complete (composite)	31/01/2022	Positive
	Sligo	Complete (composite)	01/02/2022	Positive
Tipperary	Clonmel	Complete (composite)	31/01/2022	Positive*
	Nenagh	Unknown	31/01/2022	Positive*
	Roscrea	Complete (composite)	31/01/2022	Positive
	Thurles	Complete (composite)	31/01/2022	Positive
Waterford	Dungarvan	Complete (composite)	31/01/2022	Positive
	Tramore	Complete (composite)	30/01/2022	Positive
	Waterford	Complete (composite)	31/01/2022	Positive*
Westmeath	Athlone	Complete (composite)	30/01/2022	Positive
	Mullingar	Complete (composite)	01/02/2022	Positive
Wexford	Courtown Gorey	Complete (composite)	01/02/2022	Positive*
	Enniscorthy	Complete (composite)	30/01/2022	Positive
	Wexford	Complete (composite)	31/01/2022	Positive*
Wicklow	Greystones	Complete (composite)	01/02/2022	Positive
	Wicklow	Complete (composite)	01/02/2022	Positive

* Flow rate was not available at time of reporting, the average 2020 flow rate for the wastewater plant is used to calculate result.

** Samples with an 'undetectable' result may have SARS-CoV-2 present but the amount was too low to be detected by the test. It does not mean that SARS-CoV-2 is not circulating in the wastewater catchment area.

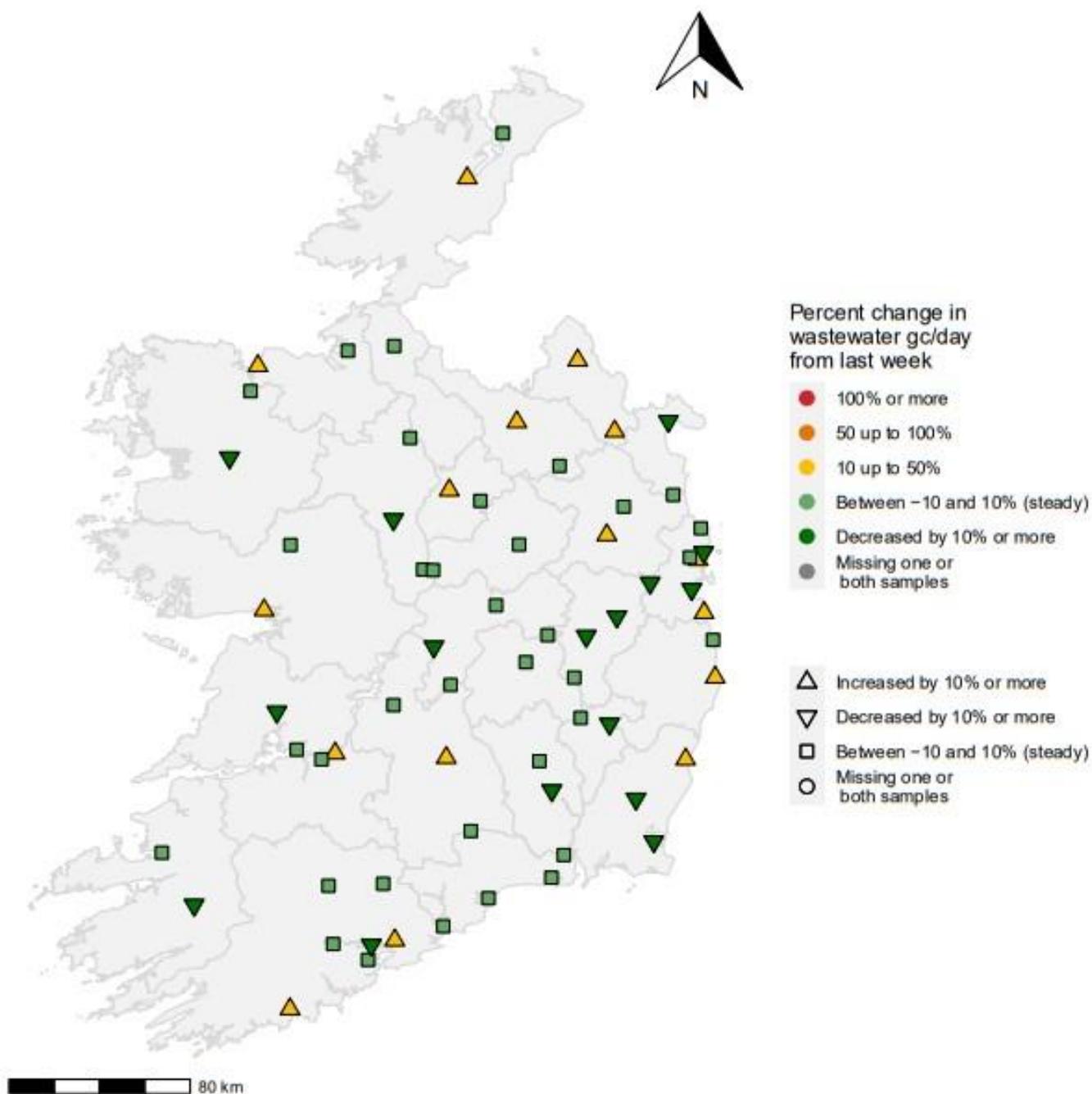
Table 2b. Biweekly results for SARS-CoV-2 detections in the Ringsend WWTP, week 19 to week 5, 2022

	Week	Specimen date	Result category	Result category**
2021	19	09/05/2021		Positive
		12/05/2021		Positive
	20	16/05/2021		Positive
		19/05/2021		Positive
	21	23/05/2021		Weak positive
		26/05/2021		Undetectable
	22	30/05/2021		Weak positive
		02/06/2021		Weak positive
	23	07/06/2021		Weak positive
		09/06/2021		Undetectable
	24	13/06/2021		Undetectable
		16/06/2021		Undetectable
	25	20/06/2021		Weak positive
		23/06/2021		Weak positive
	26	27/06/2021		Positive
		30/06/2021		Positive
	27	04/07/2021		Positive
		07/07/2021		Positive
	28	11/07/2021		Positive
		14/07/2021		Weak positive
	29	18/07/2021		Positive
		21/07/2021		Weak positive
	30	25/07/2021		Positive
		28/07/2021		Positive
	31	01/08/2021		Weak positive
		04/08/2021		Weak positive
	32	08/08/2021		Positive
		11/08/2021		Positive
	33	15/08/2021		Positive
		18/08/2021		Positive
	34	22/08/2021		Positive
		25/08/2021		Positive
	35	29/08/2021		Positive
		01/09/2021		Positive
	36	05/09/2021		Positive*
		08/09/2021		Positive*
	37	12/09/2021		Positive
		15/09/2021		Positive
	38	19/09/2021		Positive
		22/09/2021		Positive
	39	26/09/2021		Positive
		29/09/2021		Positive
	40	03/10/2021		Positive
		06/10/2021		Positive
	41	10/10/2021		Positive
		13/10/2021		Positive
	42	17/10/2021		Positive
		20/10/2021		Positive
	43	24/10/2021		Weak positive*
		27/10/2021		Positive
	44	31/10/2021		Positive
		03/11/2021		Positive
45	07/11/2021		Positive	
	10/11/2021		Positive	
46	14/11/2021		Positive*	
	17/11/2021		Positive*	
47	21/11/2021		Positive*	
	24/11/2021		Positive*	
48	28/11/2021		Positive*	
	01/12/2021		Positive*	
49	05/12/2021		Positive	
	08/12/2021		Positive*	
50	12/12/2021		Positive*	
	15/12/2021		Positive*	
51	19/12/2021		Positive	
	22/12/2021		Positive	
52	28/12/2021		Positive	
	29/12/2021		Positive	
2022	1	02/01/2022		Positive
		05/01/2022		Positive
	2	09/01/2022		Positive*
		12/01/2022		Positive*
	3	16/01/2022		Positive*
		19/01/2022		Positive*
	4	23/01/2022		Positive*
		26/01/2022		Positive*
	5	31/01/2022		Positive*
		02/02/2022		Positive*

* Flow rate was not available at time of reporting, the average 2020 flow rate for the wastewater plant is used to calculate result.

**Samples with an 'undetectable' result may have SARS-CoV-2 present but the amount was too low to be detected by the test. It does not mean that SARS-CoV-2 is not circulating in the wastewater catchment area.

Figure 2. Map showing the approximate location of wastewater catchment areas and results for SARS-CoV-2 detections during week 5, 2022 . Results are shown as percentage change in SARS-CoV-2 RNA (gc/day)[§] between week 4 and week 5, 2022 and whether this change is increasing, decreasing or steady[^].



[^]Wastewater catchment areas where the percentage difference in gc/day has increased or decreased by less than 10% between the current and previous weeks are considered to be steady.

[§]Viral load values based on GAM-smoothed estimates. See technical notes.

Figure 3a. SARS-CoV-2 concentration by wastewater catchment area by week (grey connected line), and 3 week moving average (maroon line), NWSP, weeks 19, 2021—5, 2022

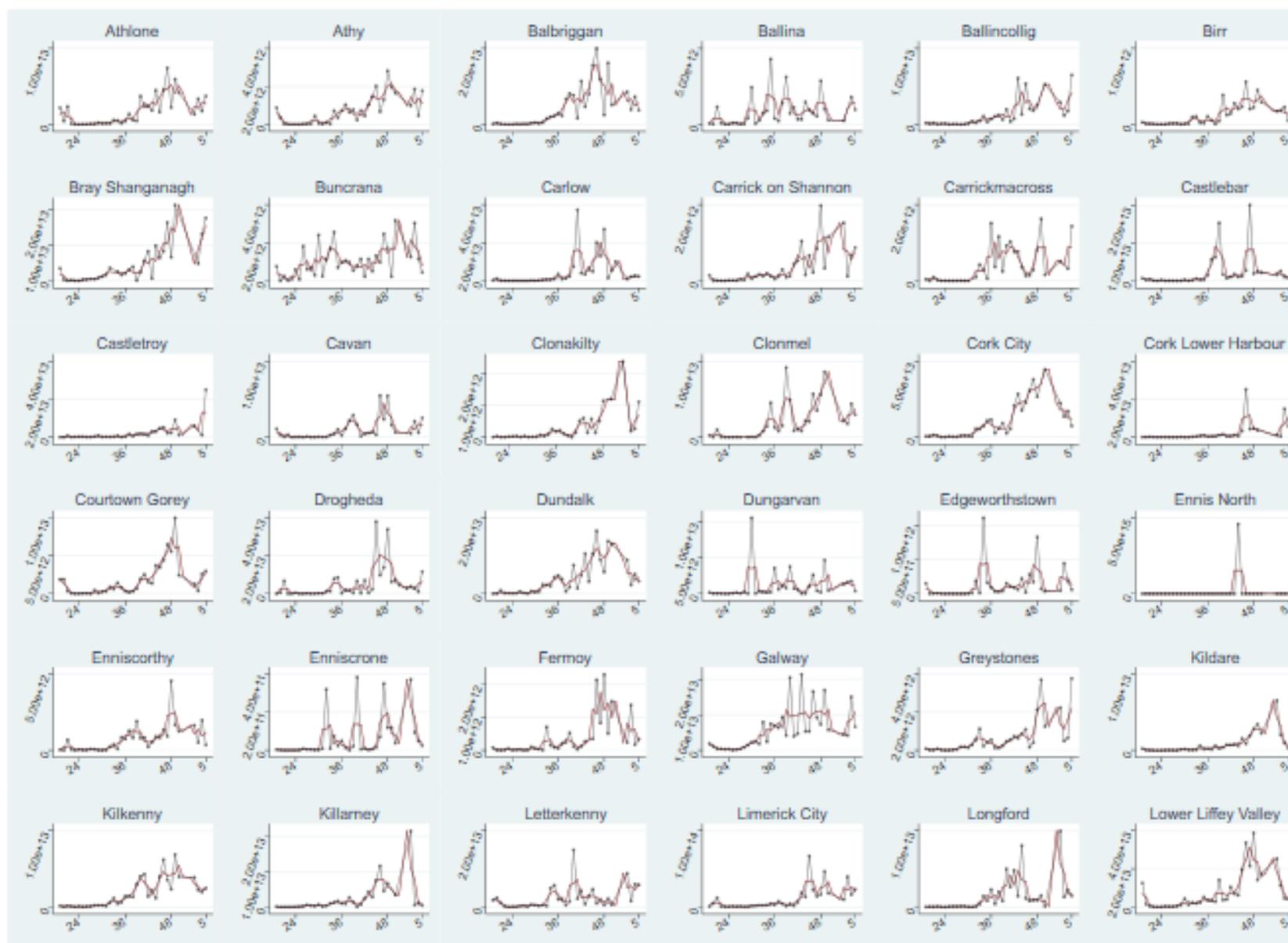


Figure 3a (continued). SARS-CoV-2 concentration by wastewater catchment area by sampling week (grey connected line), and 3 week moving average (maroon line), NWSP, weeks 19, 2021—5, 2022

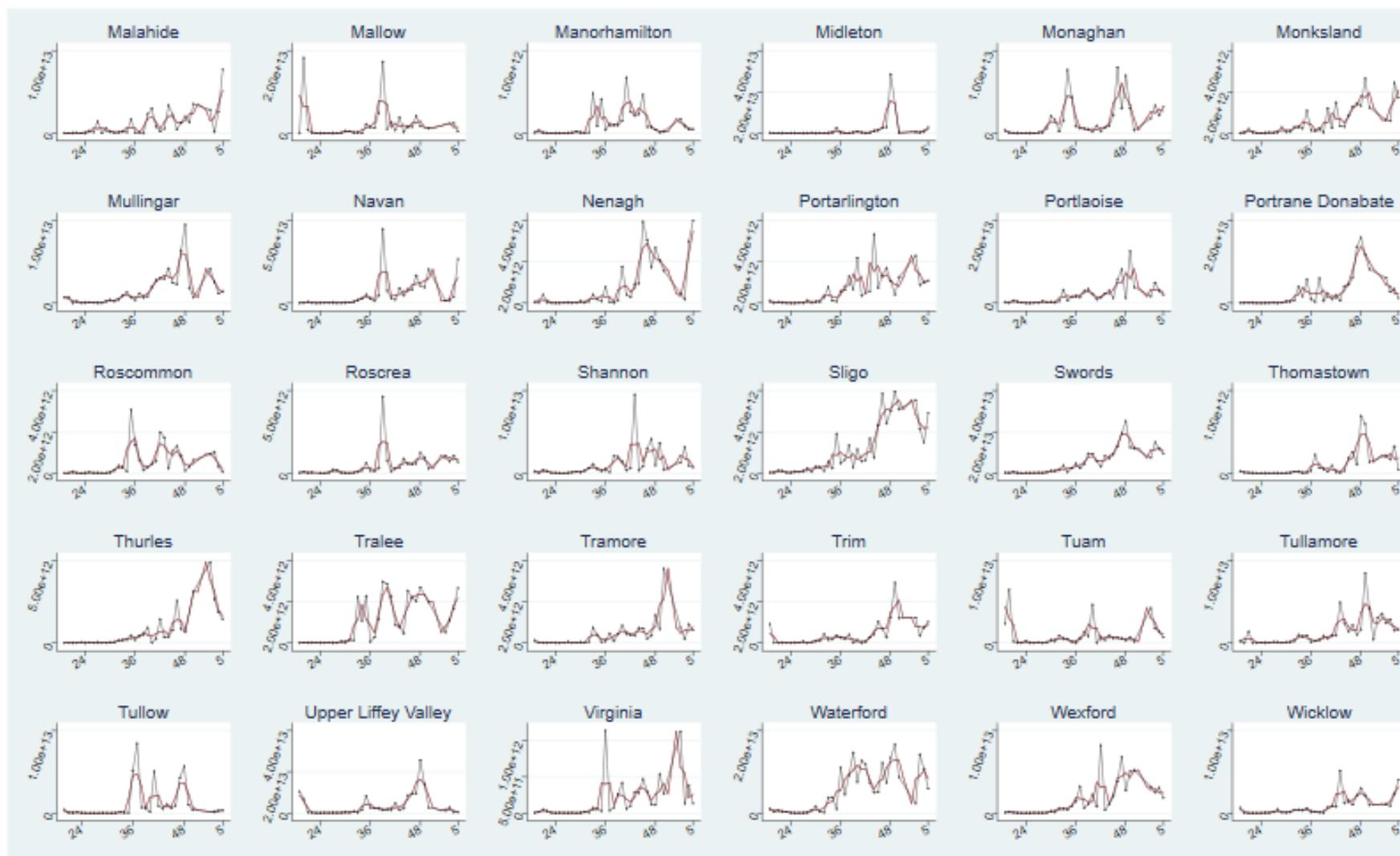
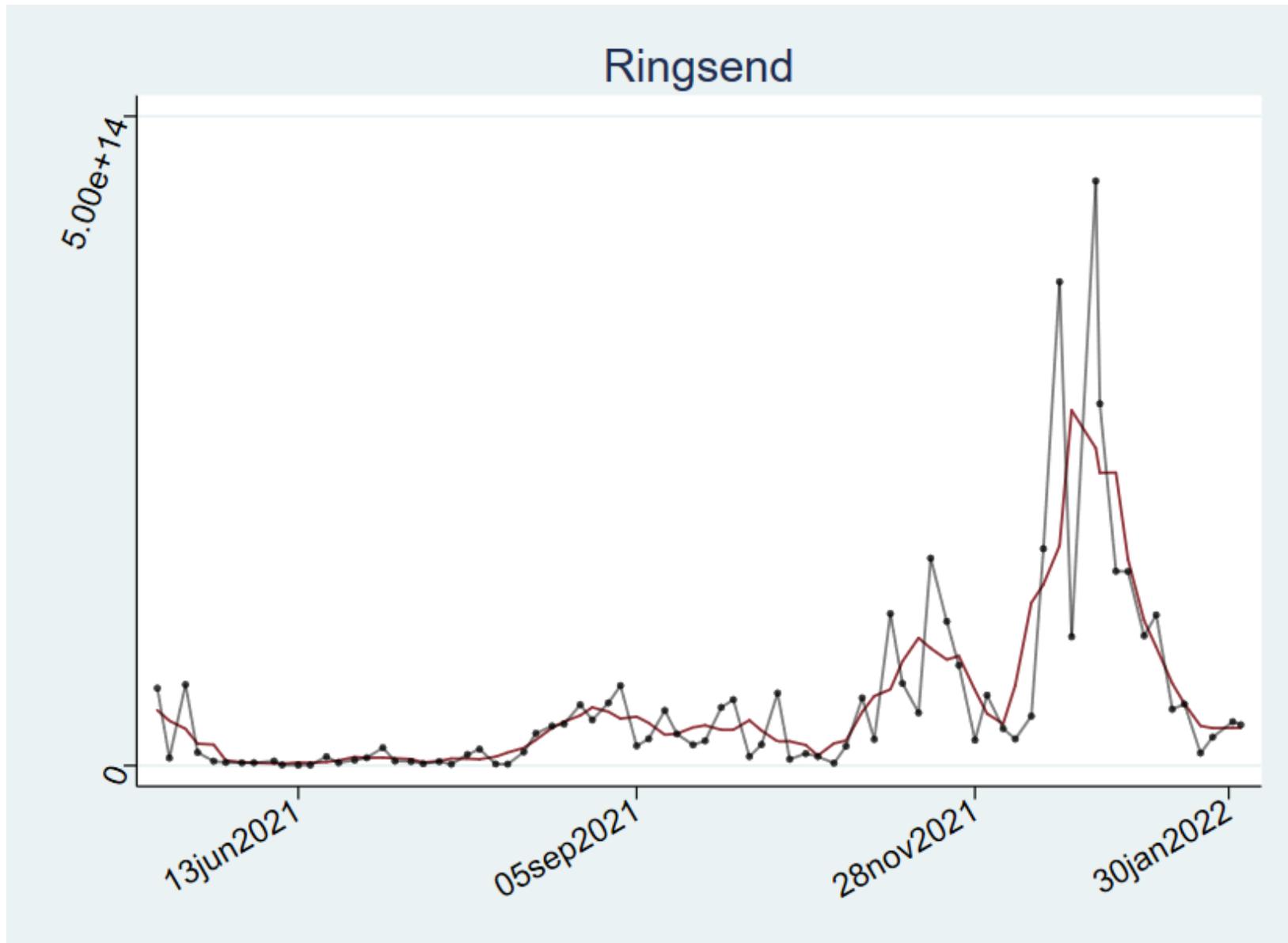


Figure 3b. SARS-CoV-2 concentration for Ringsend wastewater catchment area by sampling date (grey connected line), and 3 week moving average (maroon line), NWSP, weeks 19, 2021–5, 2022



Acknowledgements

Sincere thanks are extended to all those who are participating in the collection and processing of samples, processing data and reporting of data used in this report. This includes the staff at participating wastewater treatment plants, Irish Water, laboratory staff (UCD and NVRL), HSE COVID-19 Contact Management Programme (CMP), Health Intelligence Unit (HIU), surveillance scientists, microbiologists and administrative staff.

Report prepared by COVID-19 Epidemiology Team, HPSC

Glossary

Below detection limit (BDL):

The limit of detection is the lowest concentration of viral material that can be detected in a wastewater sample. If the concentration of viral material in a sample is below the limit of detection, it does not mean that there is no virus present. Viral material may be present, but it cannot be detected by the test due to its very low concentration.

Below Quantifiable Limits (BQL)

The limit of quantification is the lowest concentration of viral genetic material that can be reliably quantified. A result which is BQL means that viral RNA was detected but the concentration cannot be accurately determined.

Composite Samples:

Wastewater sample consists of numerous individual discrete samples taken at regular intervals over a period of 24 hours.

Flow rate

Is the total volume arising from the wastewater catchment area in the 24 hours the sample is taken (m³ per day) as measured at the inlet of the wastewater treatment plant.

Grab sample

A wastewater sample collected at a particular time and place can represent only the composition of the source at that time and place.

Technical notes

Wastewater sample collection: Staff of the participating wastewater treatment plants collect 24-hour composite samples on specified days. In some instances, incomplete composite, or grab samples may be collected.

Laboratory analysis of wastewater samples: Carried out by UCD. Following arrival of the wastewater samples in the laboratory, the virus is concentrated and the genetic material is extracted. The genetic material (RNA) is quantified using reverse transcriptase quantitative PCR which is used to determine the concentration of the virus in wastewater. The amount of viral genetic material per day entering a wastewater treatment plant can be calculated based on the concentration of the virus and the flow rate.

Selection of wastewater catchment areas for inclusion in the NWSP: Catchment areas were selected to provide the greatest coverage of the population and to represent catchment areas in all counties. Two catchment areas from each county have been included in the NWSP. In addition, we included all wastewater catchment areas greater than 10,000 population equivalent (PE) in size. The 68 wastewater catchment areas included in the NWSP cover 80% of the population connected to public wastewater treatment plants, and are shown in Figure 1.

Case based data: Data are currently based on information uploaded to the COVID Care Tracker (CCT). Please note that these data do not represent notified cases, and have not undergone normal data validation procedures. Data are therefore provisional and subject to ongoing review and update. As a result, figures in this report may differ from previously published figures.

Mapping: provided by Health intelligence Unit (HIU).

Data uses

Since the onset of the Covid-19 pandemic, analysis of wastewater for the presence of SARS-CoV-2 has been taking place in many European countries and elsewhere as recommended by the European Union. The NWSP will work with Departments of Public Health and other stakeholders on how the data can best support the public health response to SARS-CoV-2/COVID-19 in Ireland. At the current stage of the pandemic, circulation is widespread with high incidence rates across Ireland. The NWSP will likely be of greatest value when the circulation of SARS-CoV-2 and testing rates are lower, when a detection of SARS-CoV-2 in wastewater may be the first indication of circulation in a catchment area.

The NWSP will also be of value in monitoring for the presence of new variants of SARS-CoV-2 as they emerge.

Data limitations and uncertainties

In general, higher levels of SARS-CoV-2 in wastewater suggests more people with SARS-CoV-2 infection in the wastewater catchment area. However, people shed different amounts of virus during the period that they are infected which declines as they are clearing the virus. For this and other reasons it is therefore difficult to reliably estimate the number of people with SARS-CoV-2 infection in the catchment area based on analysis of SARS-CoV-2 RNA in wastewater.

Aside from the number of people with SARS-CoV-2 infection, and the amount of virus they shed, there are other factors which influence the amount of SARS-CoV-2 detected in wastewater. For example, wastewater treatment plants also take in surface waters from rainfall, which alters the flow rate of influent entering the treatment plant. The concentration of SARS-CoV-2 is therefore adjusted to take the daily flow rate of the plant into account. When a flow rate is not available for the day the composite sample was taken, the average annual flow rate is used instead.

Composite samples are the preferred sample type as they reflect wastewater passing through the sampling point for a 24-hour period. However, composite samples are not always possible. The NWSP will continue to monitor its methodology as part of its quality improvement process.

NWSP data should be reviewed in conjunction with data from other case-based surveillance systems.

Further information

A technical report by the Joint Research Centre (JRC) and the Directorate-General for Environment (DG-ENV) of the European Commission on wastewater surveillance for SARS-CoV-2 is available [here](#).

Links to dashboards of other SARS-CoV-2 wastewater surveillance programmes are available [here](#).