

Weekly Report for Flu, Enterovirus, RSV, Norovirus and SARS-CoV-2 in Wastewater: 22 November 2023

Samples taken up to and including: 15 November 2023

Wastewater Monitoring in Wales has changed. Based on our substantial experience gained during the recent pandemic and our comprehensive historical dataset, the WEWASH team has developed a new streamlined programme.

This new programme collects samples from 11 different wastewater treatment works three days each week and continues to provide valuable insights by measuring level of SARS-CoV-2 and other viruses in our communities across all Welsh Health Boards. Between October 2021 and July 2023 the original programme sampled 47 different wastewater treatment works across Wales five days each week. There was a break in sampling between July 2023 and November 2023 which is reflected in the plots.

Signal for all markers is given as a daily rate of gene copies per 100,000 people (gc/day per 100k). **The signal for enterovirus and RSV in the national and health board plots can be based on limited successful samples**, and so caution should be exercised when interpreting it. Please check site level plots for greater detail. For plots showing enterovirus signal, the beige block represents a period where two enterovirus markers were being used (EV1 and EV2), with two lines being displayed. Currently, the EV2 marker is being used exclusively.

Details of sample sites can be found in Appendix I. Appendix II compares the original and new sampling regime for SARS-CoV-2.

The **WEWASH** consortium includes Bangor University, Cardiff University, Dŵr Cymru Welsh Water, Hafren Dyfrdwy and Public Health Wales. If you have any inquiries relating to this report, please contact us using wewash@cardiff.ac.uk.

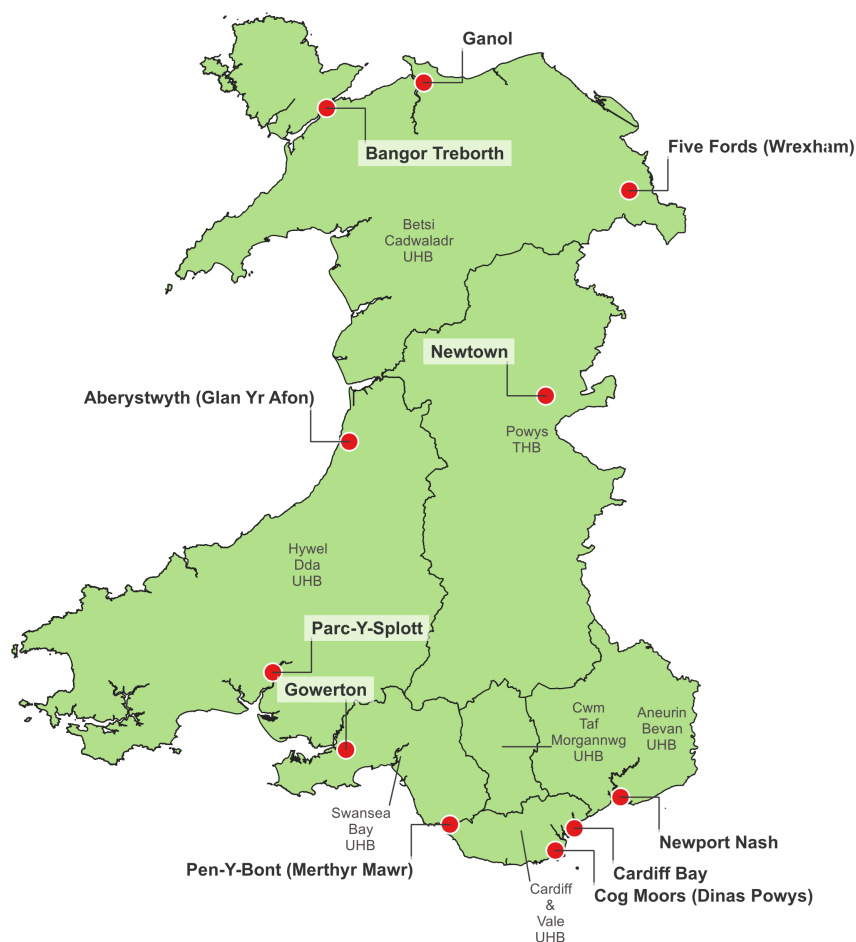


Figure 1. Map of the 11 wastewater treatment plants (WwTPs) monitored by the programme, along with their respective health boards.

National Summaries

SARS-CoV-2 National Summary

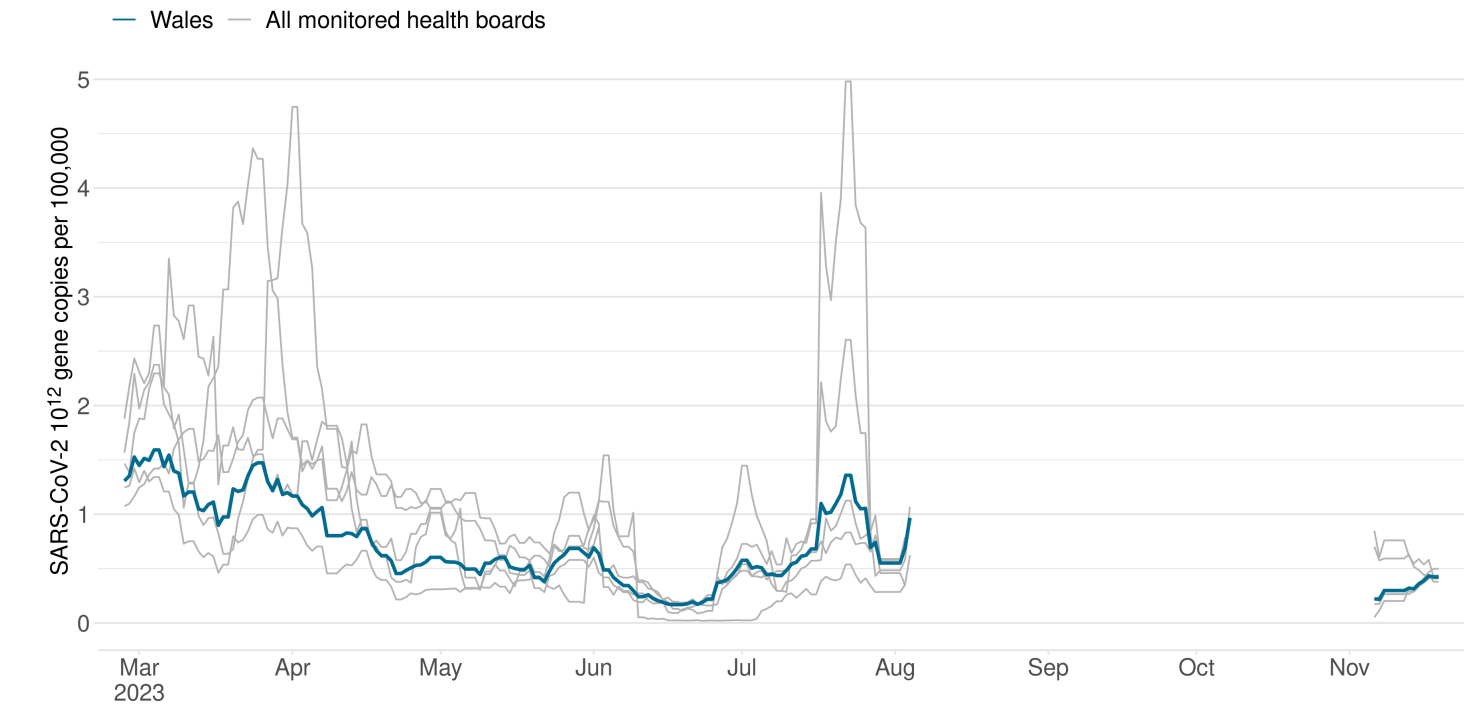


Figure 2. Level of SARS-CoV-2 given as a 10 day rolling mean at the national (blue line) and health board (grey lines) level.

SARS-CoV-2 Variants National Summary

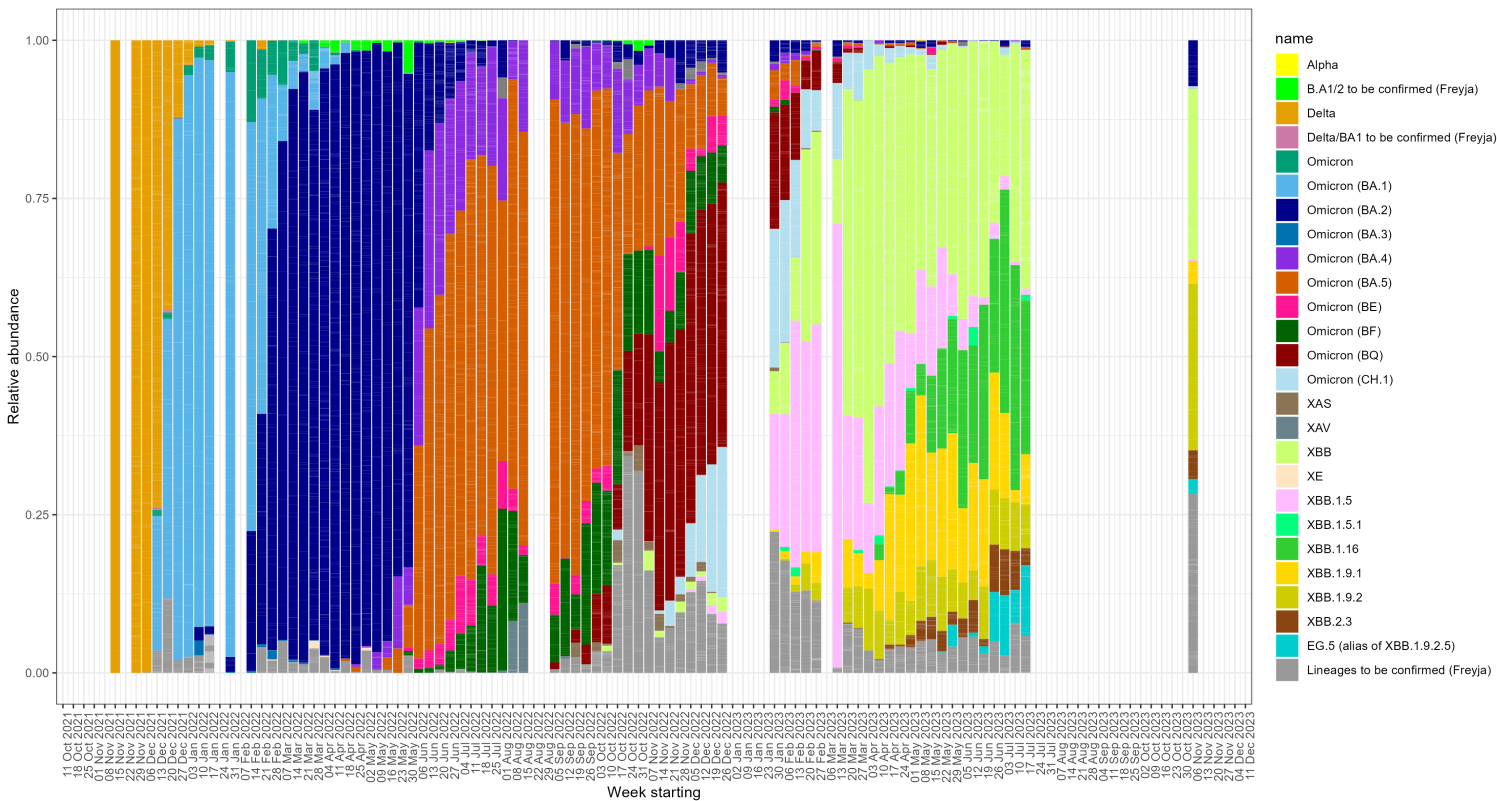


Figure 2. VOCs identified at the national level (plotting proportion of sequence reads assigned to each VOC using Freyja programme; see figure legend). Limitations of the Freyja tool in reconstructing and quantifying SARS-CoV-2 lineages from wastewater metabarcode sequencing should be considered.

Norovirus (NoVGI) National Summary

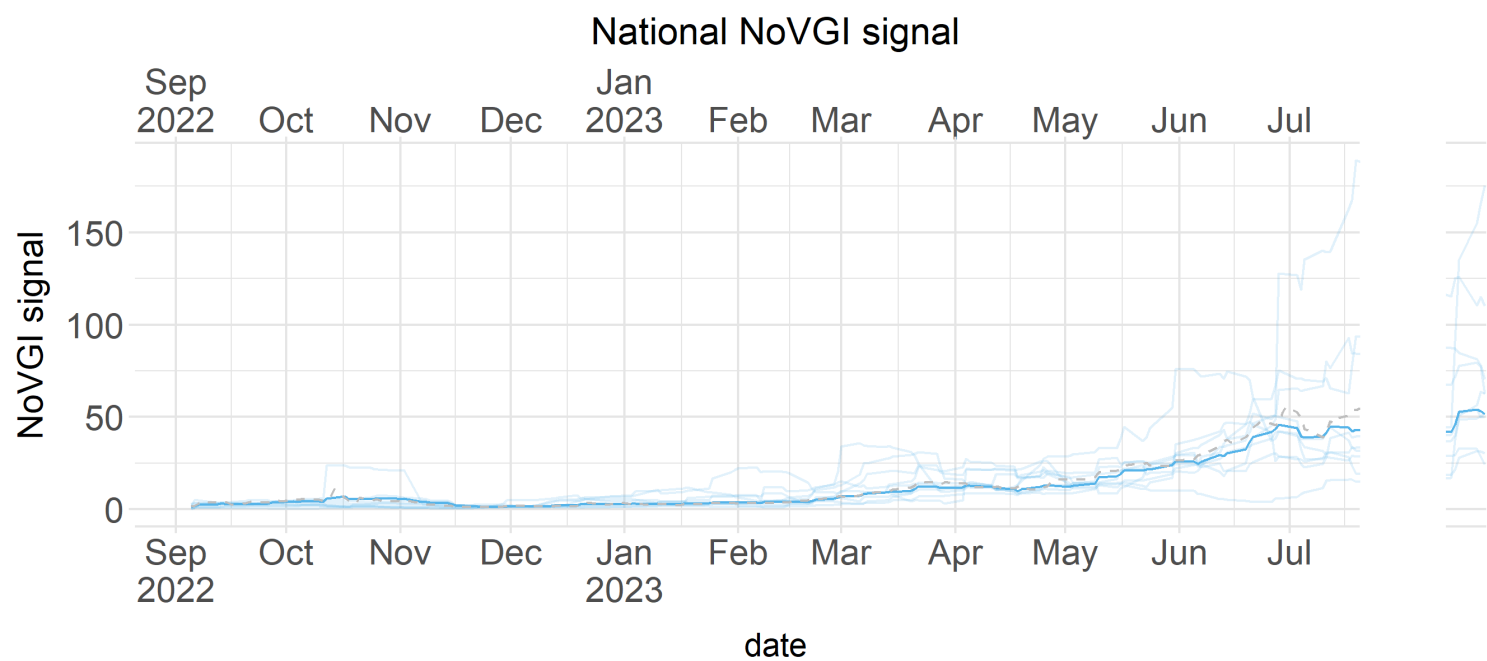


Figure 3. Level of Norovirus (NoVGI) given as a 10 day rolling mean at the national (bold line) and L2 regional (faint lines) level. National level based on historical data from 47 WwTPs and 5 days a week (taken until 21st July 2023) is also shown (grey dashed line).

Norovirus (NoVGII) National Summary

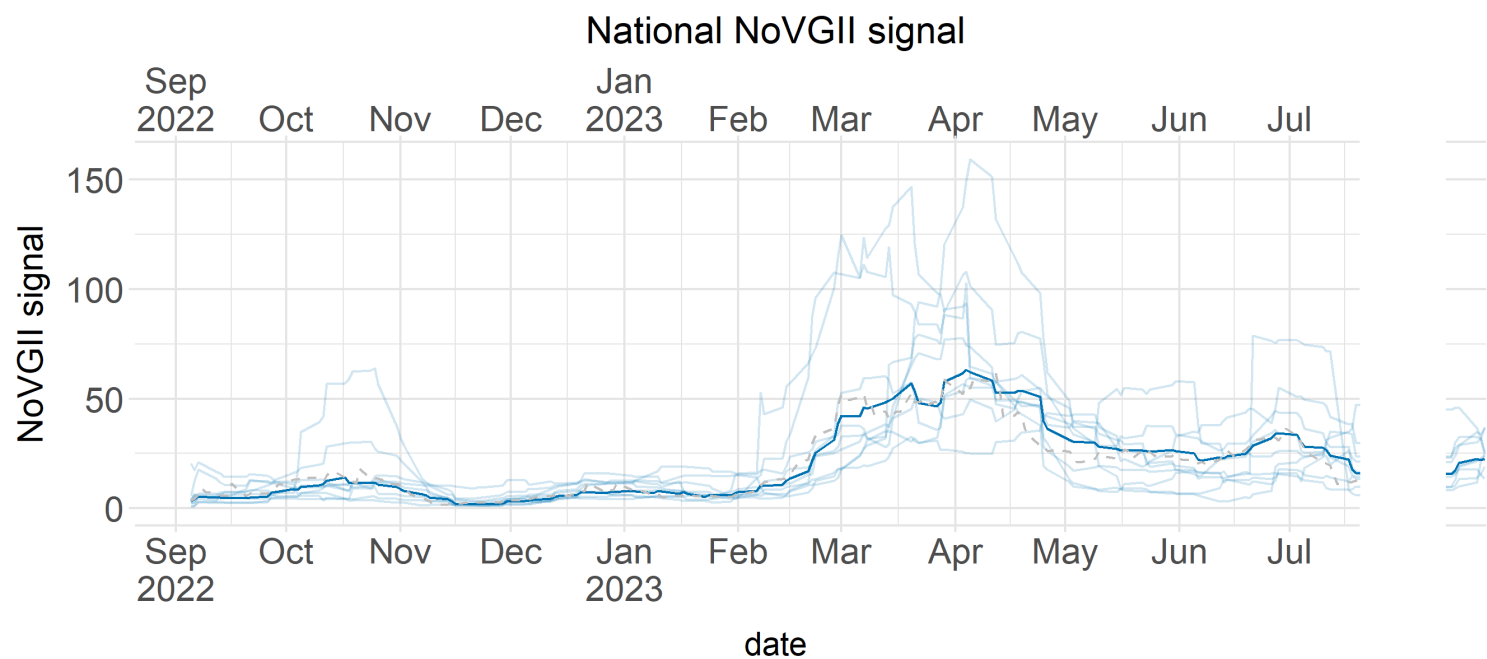


Figure 4. Level of Norovirus (NoVGII) given as a 10 day rolling mean at the national (bold line) and L2 regional (faint lines) level. National level based on historical data from 47 WwTPs and 5 days a week (taken until 21st July 2023) is also shown (grey dashed line).

Flu (flu-A) National Summary

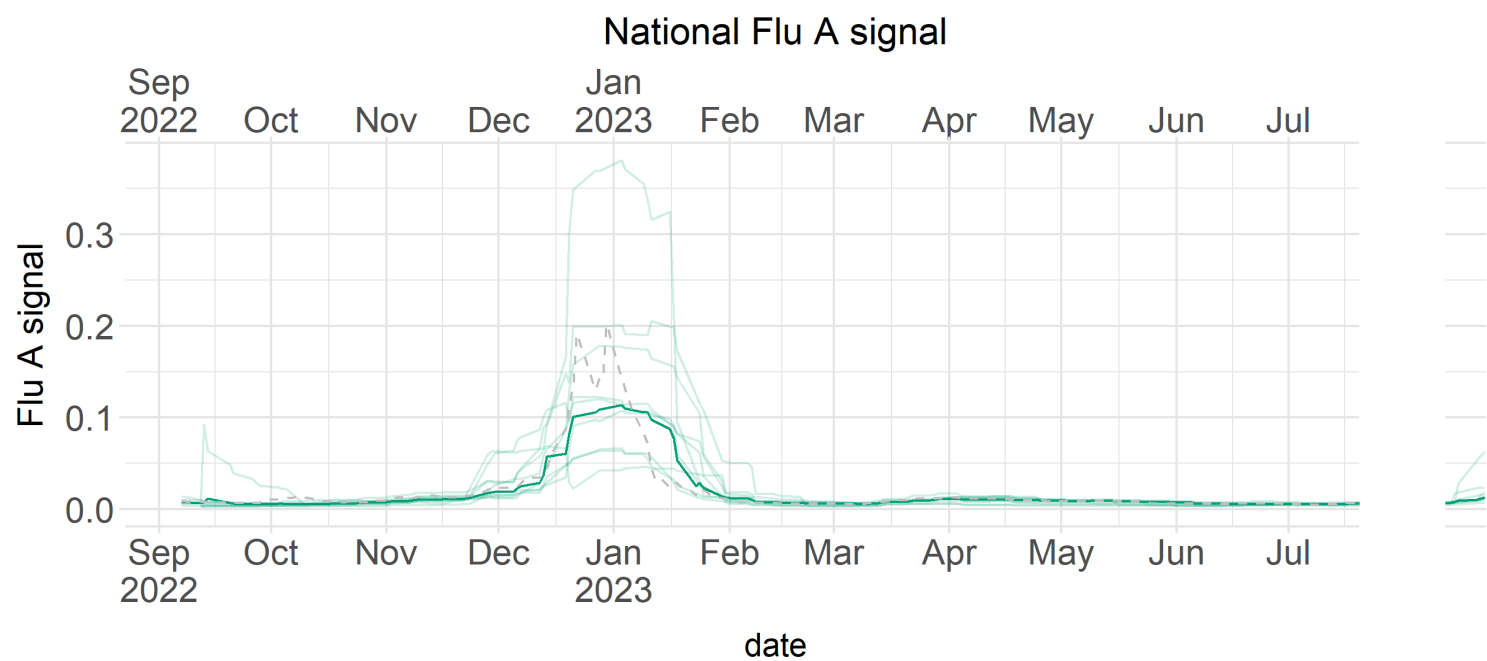


Figure 5. Level of flu (flu-A) given as a 10 day rolling mean at the national (bold line) and L2 regional (faint lines) level. National level based on historical data from 47 WwTPs and 5 days a week (taken until 21st July 2023) is also shown (grey dashed line).

Enterovirus (EV1 & EV2) National Summary

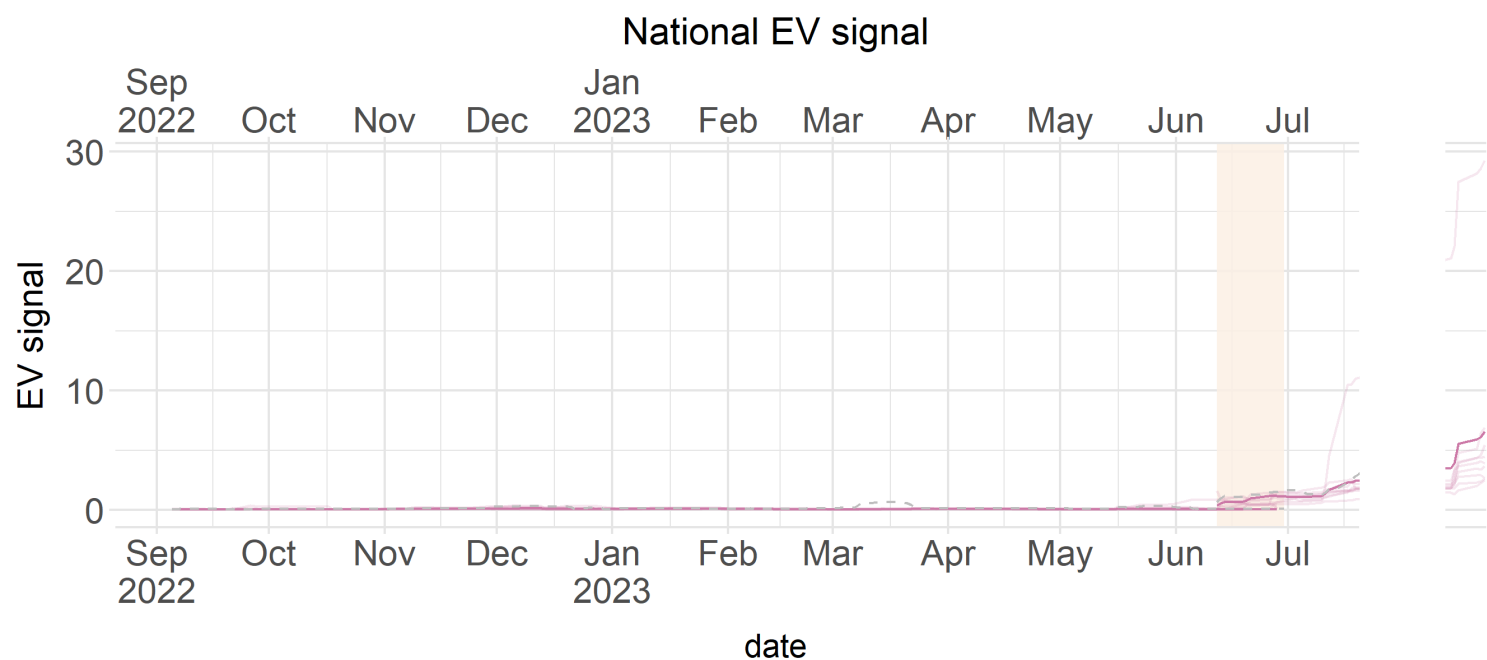


Figure 6. Level of enterovirus (EV1 & EV2) given as a 10 day rolling mean at the national (bold line) and L2 regional (faint lines) level. National level based on historical data from 47 WwTPs and 5 days a week (taken until 21st July 2023) is also shown (grey dashed line).

Respiratory Syncytial Virus (RSV) National Summary

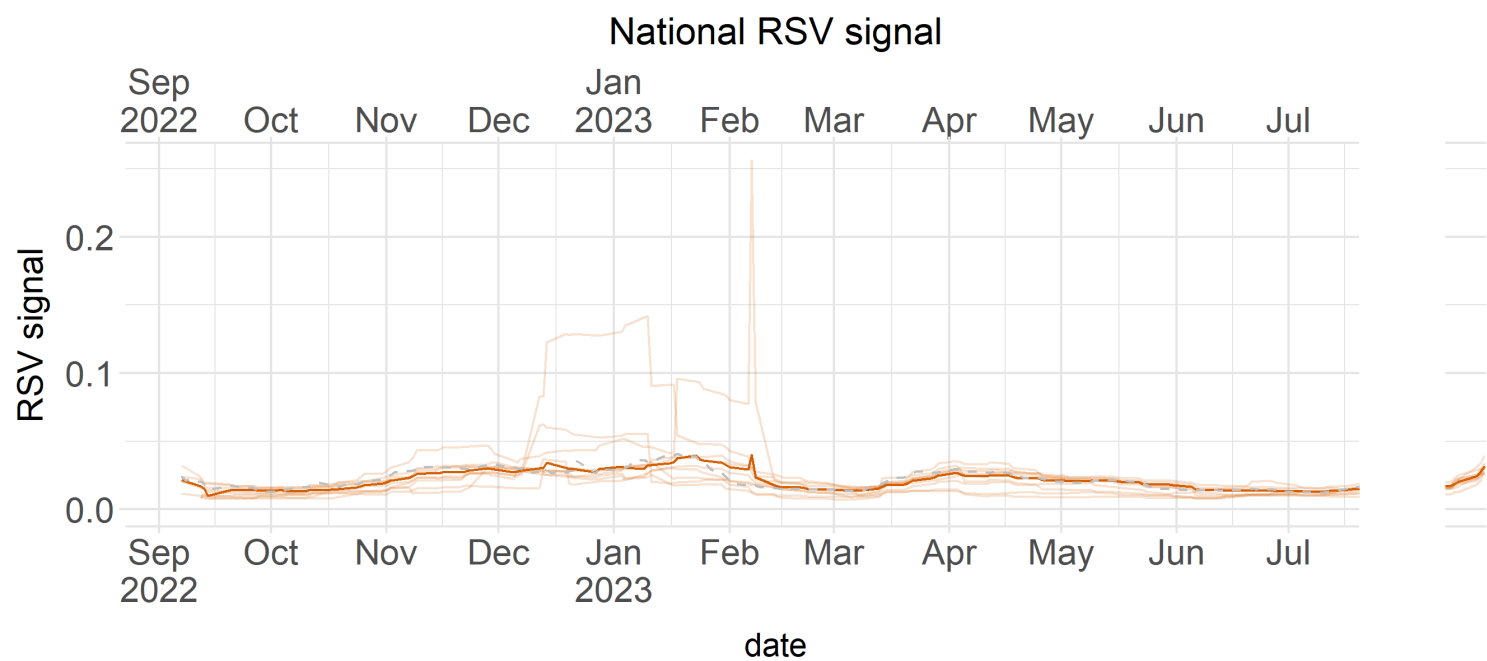


Figure 7. Level of respiratory syncytial virus (RSV) given as a 10 day rolling mean at the national (bold line) and L2 regional (faint lines) level. National level based on historical data from 47 WwTPs and 5 days a week (taken until 21st July 2023) is also shown (grey dashed line).

Health Board Summaries

SARS-CoV-2 Health Board Summary

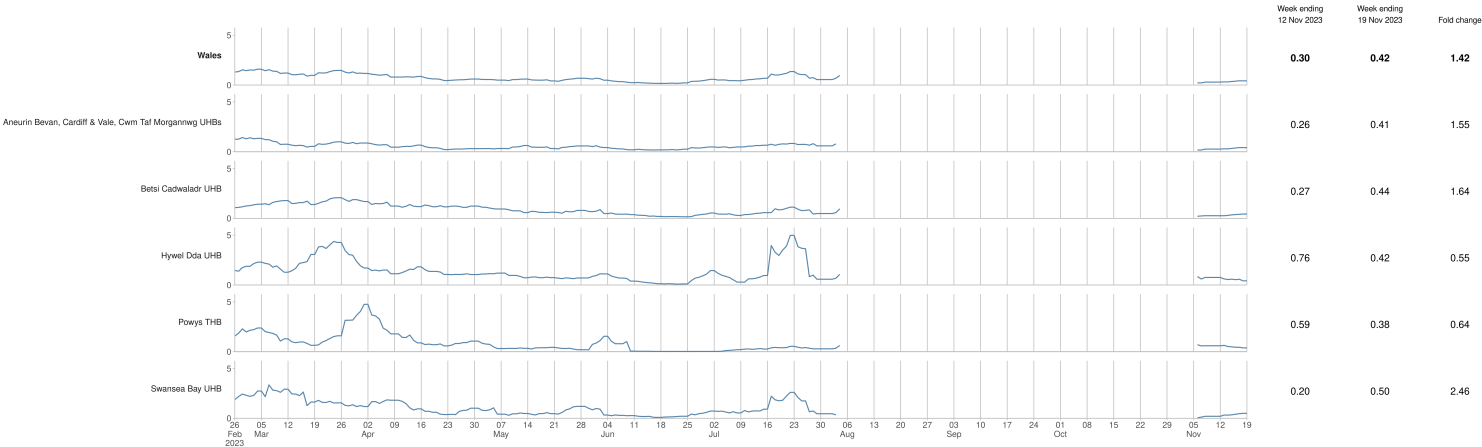


Figure 8. Level of SARS-CoV-2 given as a 10 day rolling mean at the health board level with respective fold changes in signal.

Betsi Cadwaladr UHB Summary

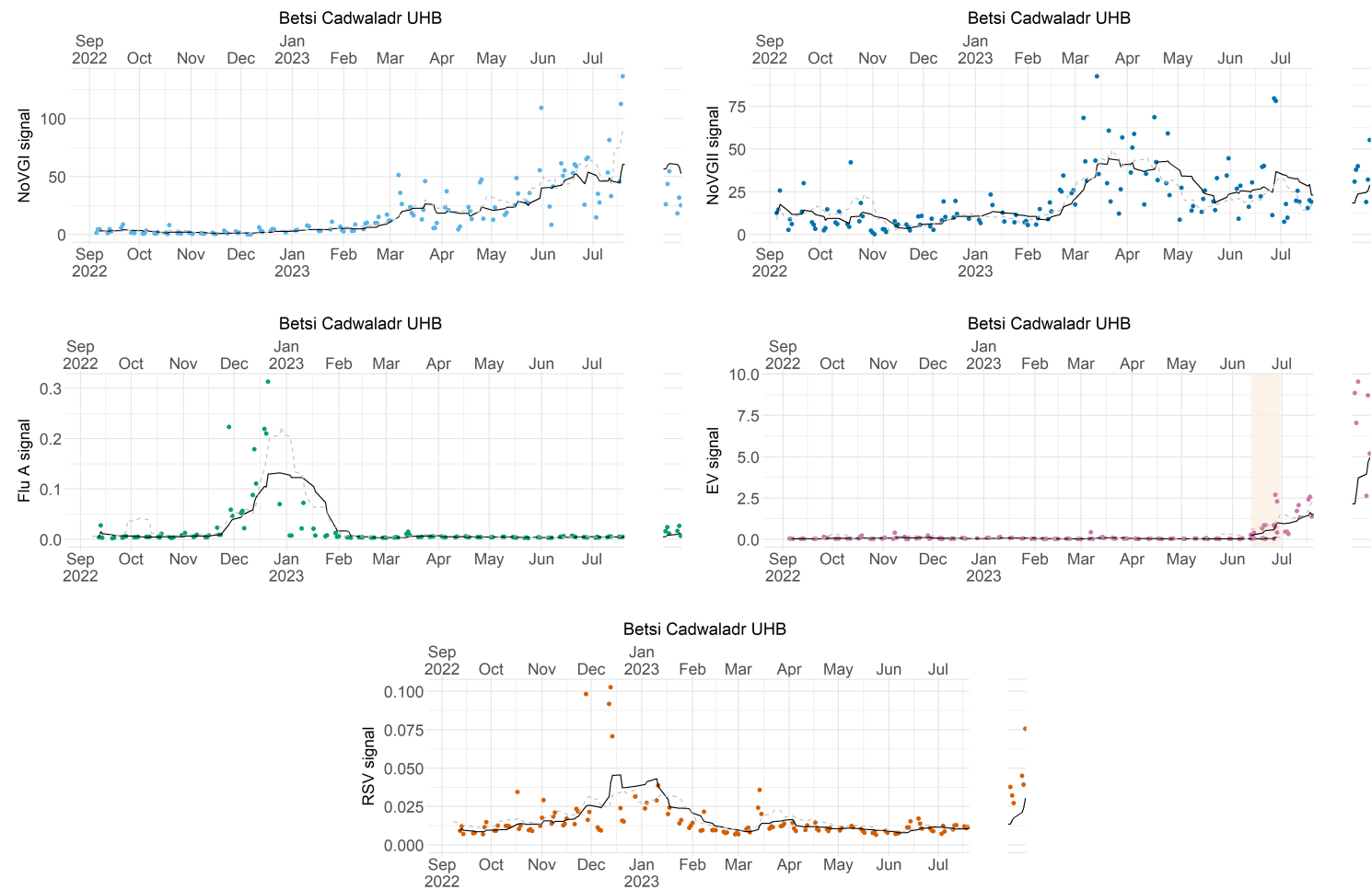


Figure 9. Level of norovirus, flu, enterovirus and RSV given as a 10 day rolling mean for Betsi Cadwaladr UHB.

Cardiff & Vale, Aneurin Bevan and Cwm Taf Morgannwg UHBs Summary

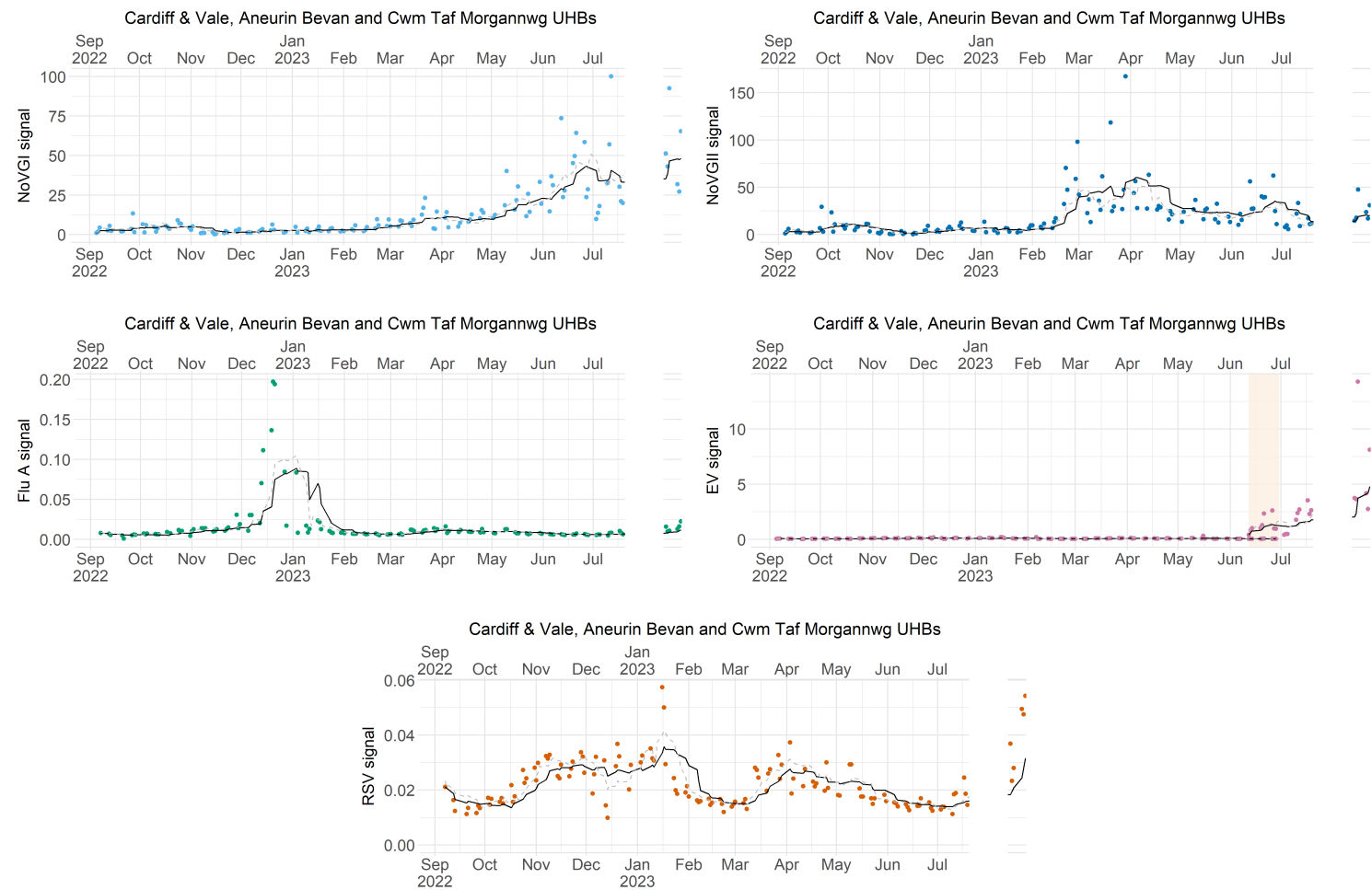


Figure 10. Level of norovirus, flu, enterovirus and RSV given as a 10 day rolling mean for Cardiff & Vale, Aneurin Bevan and Cwm Taf Morgannwg UHBs.

Hywel Dda UHB Summary

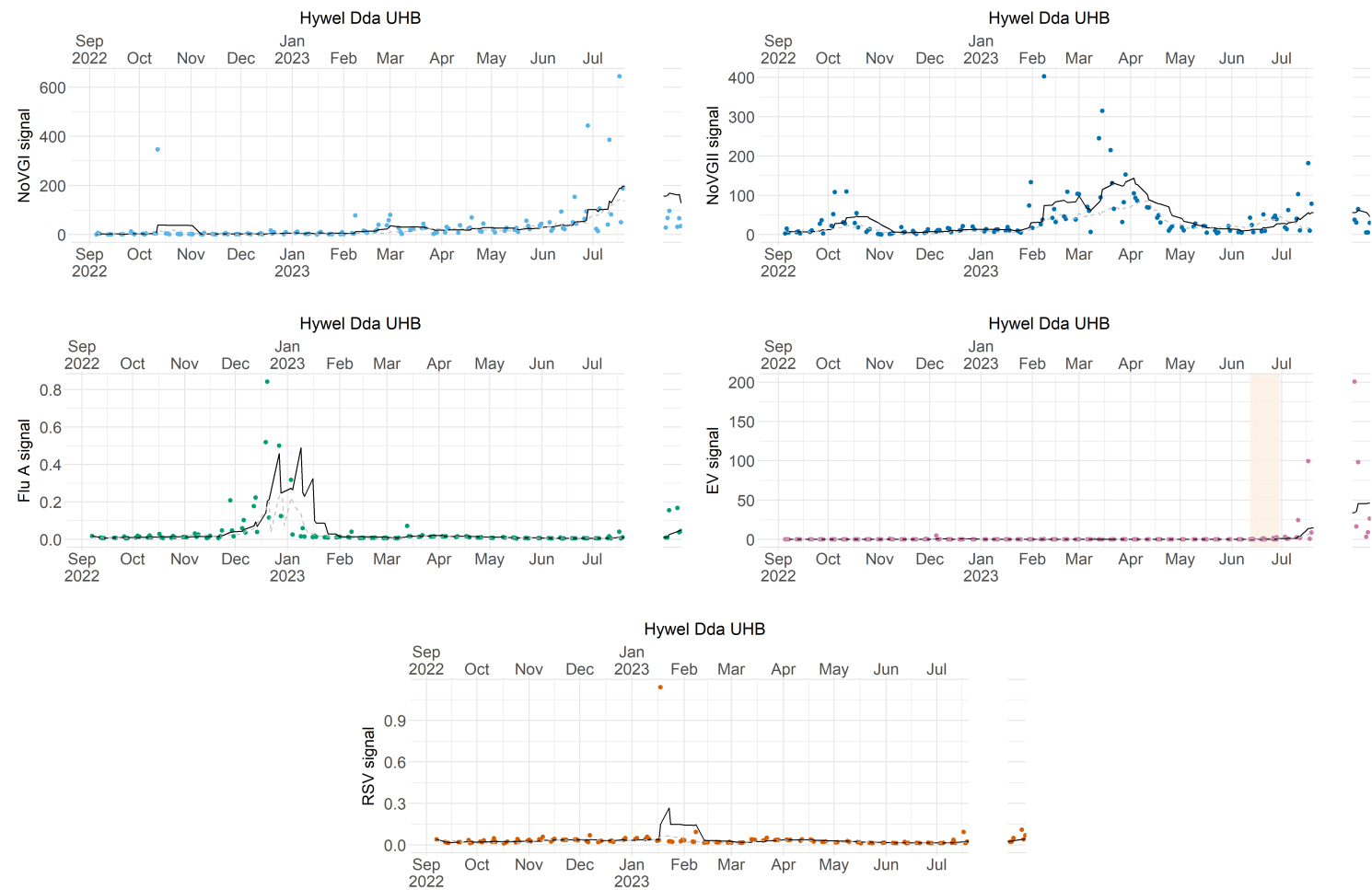


Figure 11. Level of norovirus, flu, enterovirus and RSV given as a 10 day rolling mean for Hywel Dda UHB.

Powys THB Summary

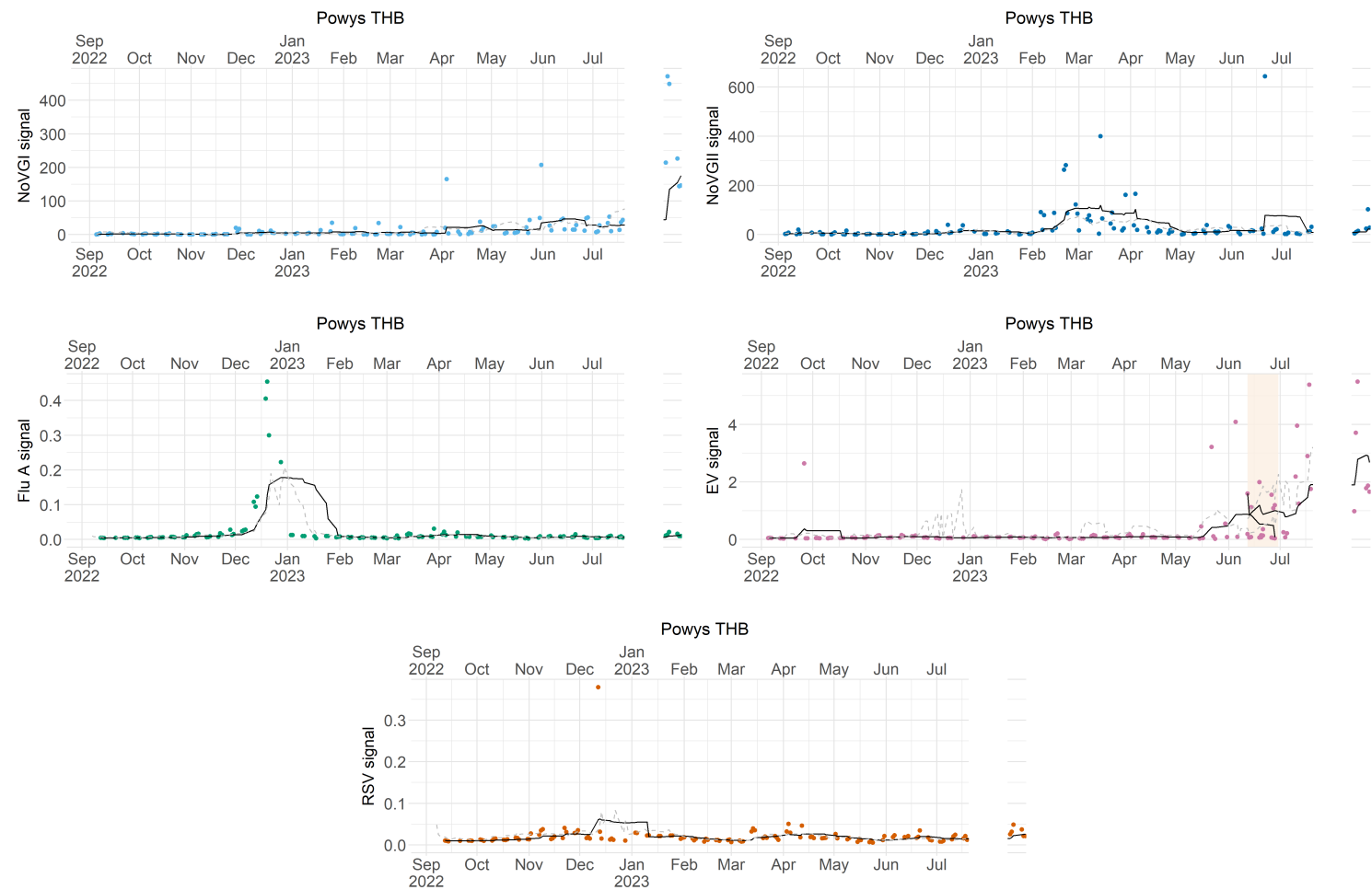


Figure 12. Level of norovirus, flu, enterovirus and RSV given as a 10 day rolling mean for Powys THB.

Swansea Bay UHB Summary

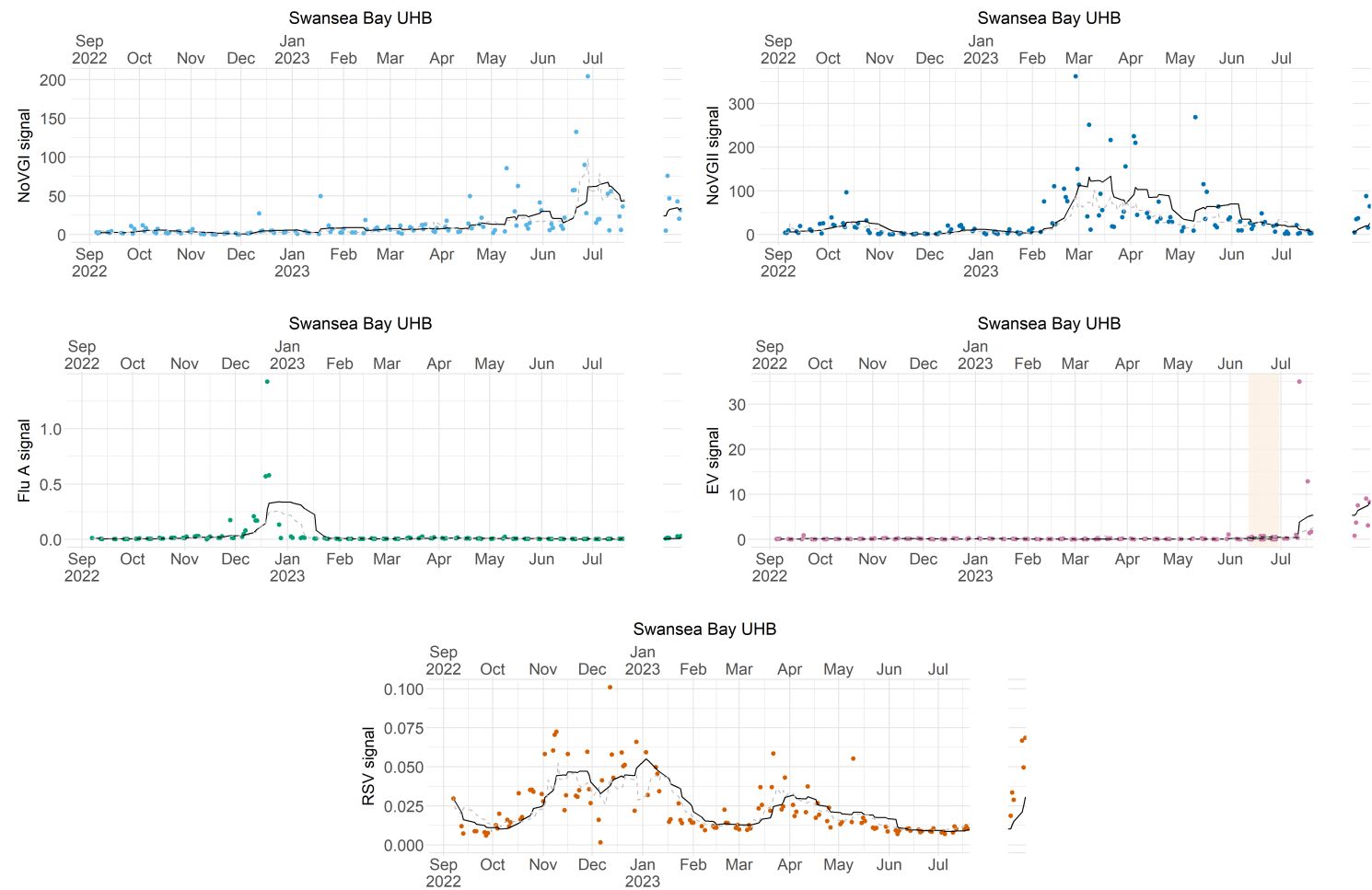


Figure 13. Level of norovirus, flu, enterovirus and RSV given as a 10 day rolling mean for Swansea Bay UHB.

Site-level Summary - SARS-CoV-2



Figure 14. Levels of SARS-CoV-2 identified at the site level (across 11 WwTPs covered by the Programme). Each point represents a sample and the line is a 10 day rolling average.

Site-level Summary - SARS-CoV-2 Variants

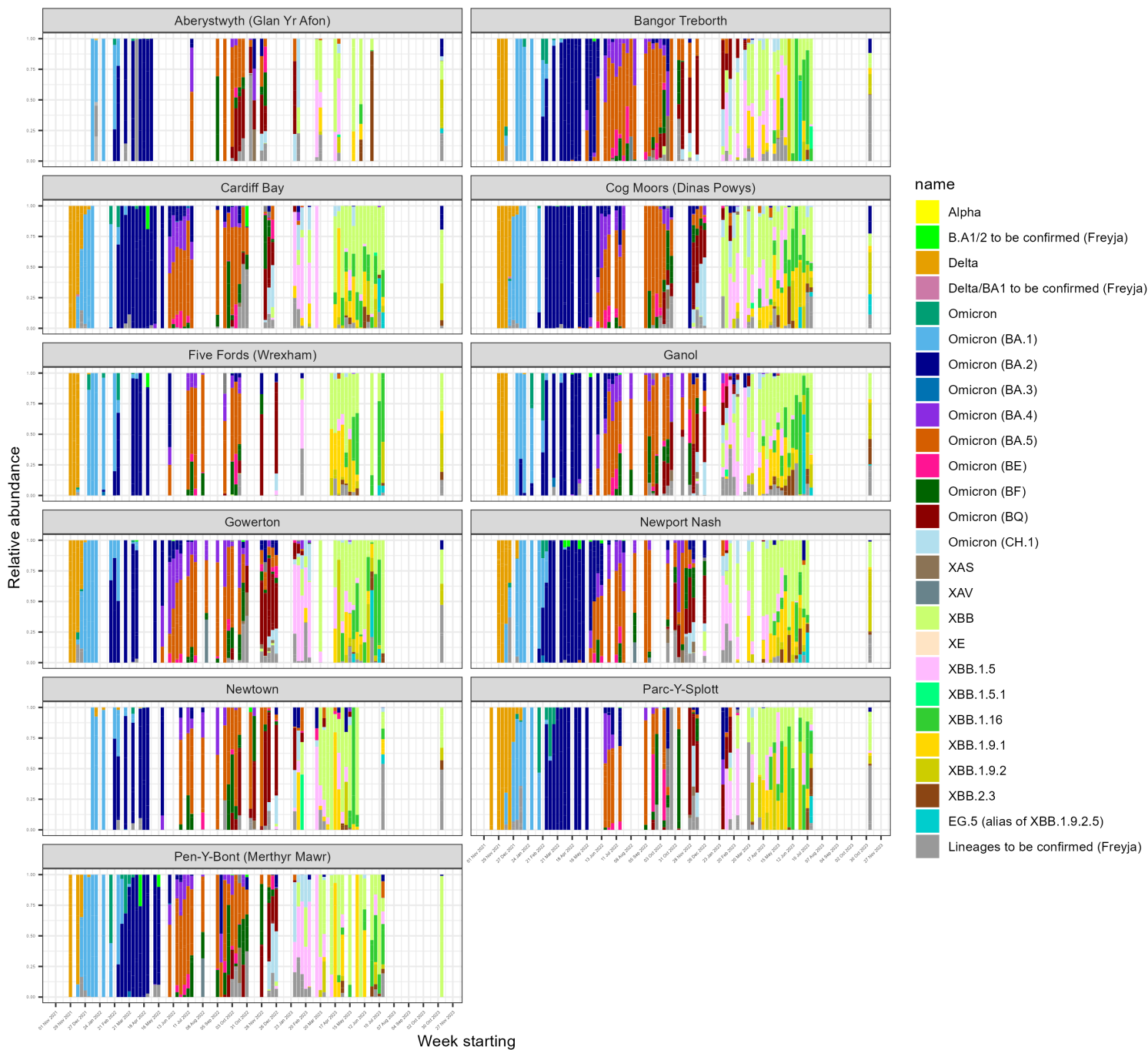


Figure 15. Proportions of SARS-CoV-2 variants identified at the site level (across 11 WwTPs covered by the Programme).

Site-level Summary - Norovirus (NoVGI)

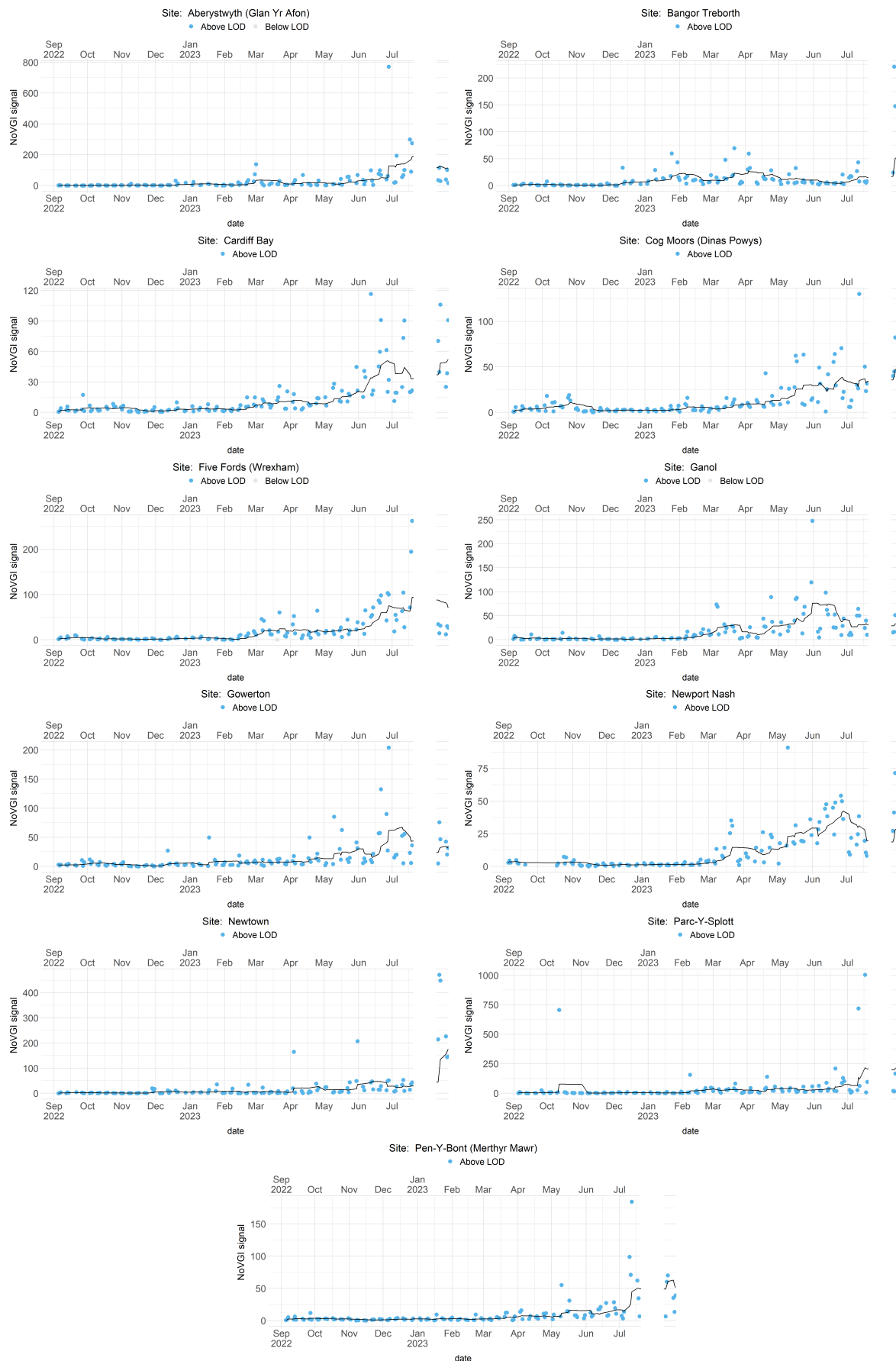


Figure 16. Levels of norovirus genogroup I (NoVGI) identified at the site level (across 11 WwTPs covered by the Programme). Each point represents a sample and the line is a 10 day rolling average.

Site-level Summary - Norovirus (NoVGII)

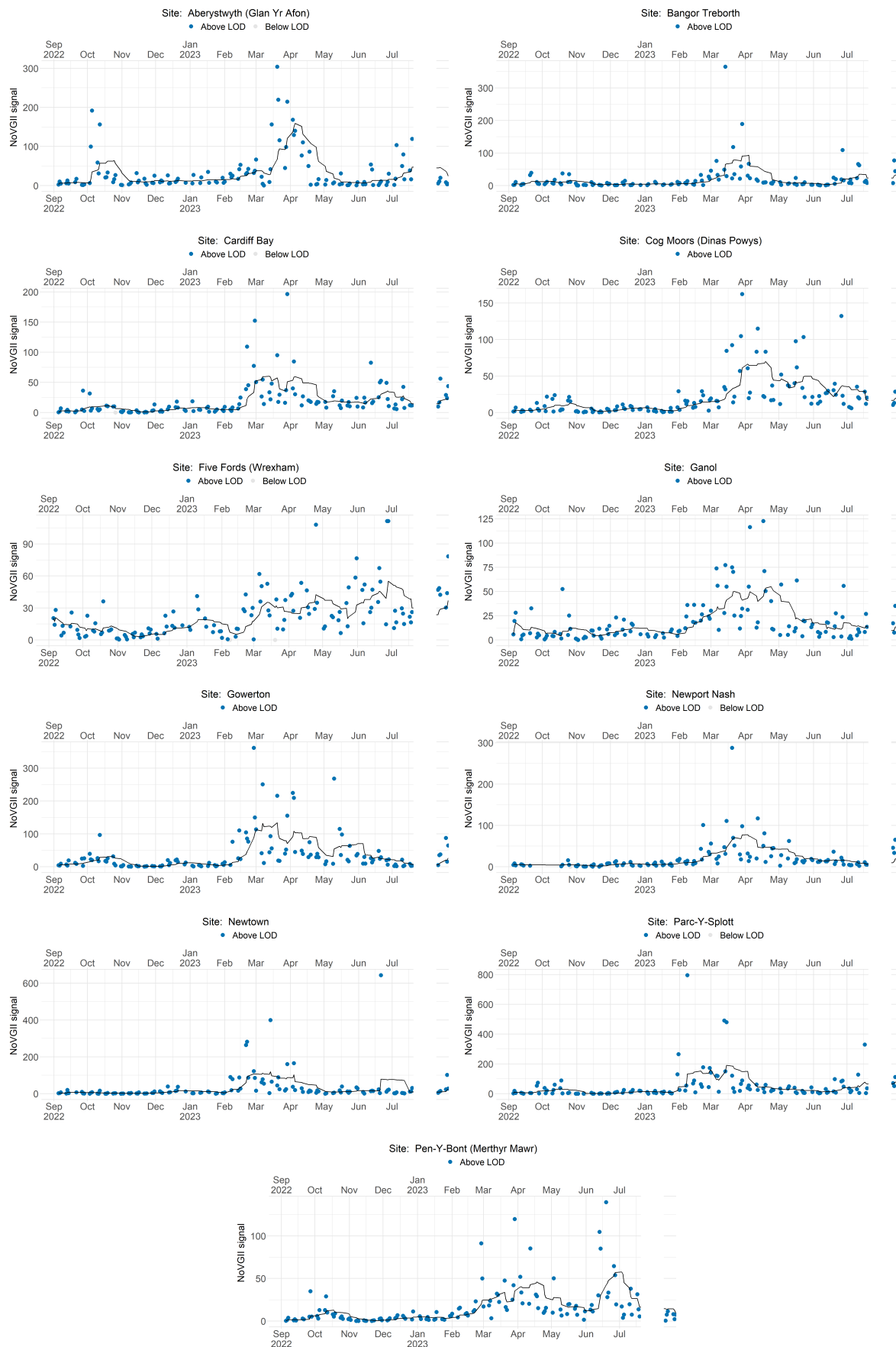


Figure 17. Levels of norovirus genogroup II (NoVGII) identified at the site level (across 11 WwTPs covered by the Programme). Each point represents a sample and the line is a 10 day rolling average.

Site-level Summary - flu (flu-A)

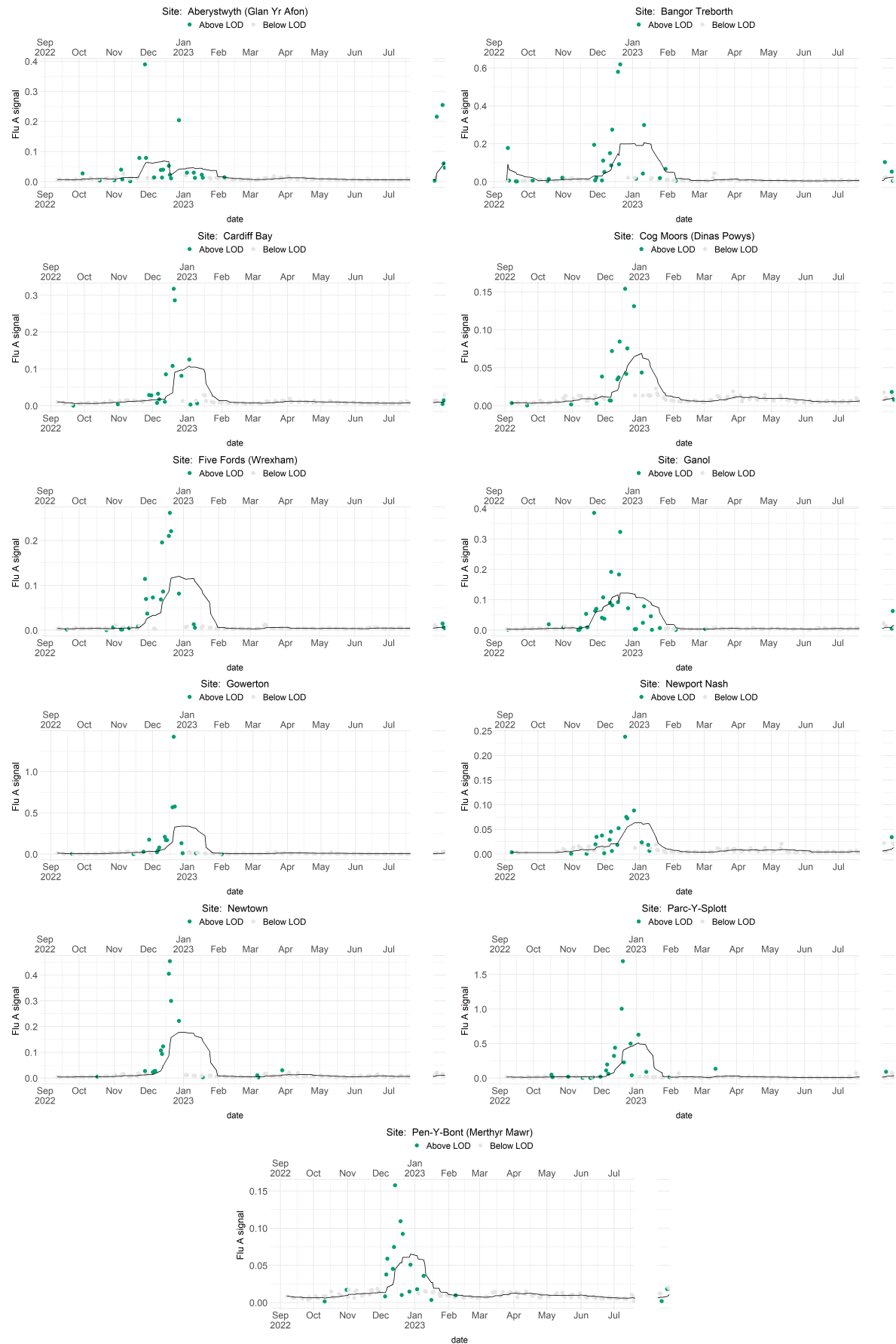


Figure 18. Levels of flu (flu-A) identified at the site level (across 11 WwTPs covered by the Programme). Each point represents a sample and the line is a 10 day rolling average.

Site-level Summary - Enterovirus (EV1 & EV2)

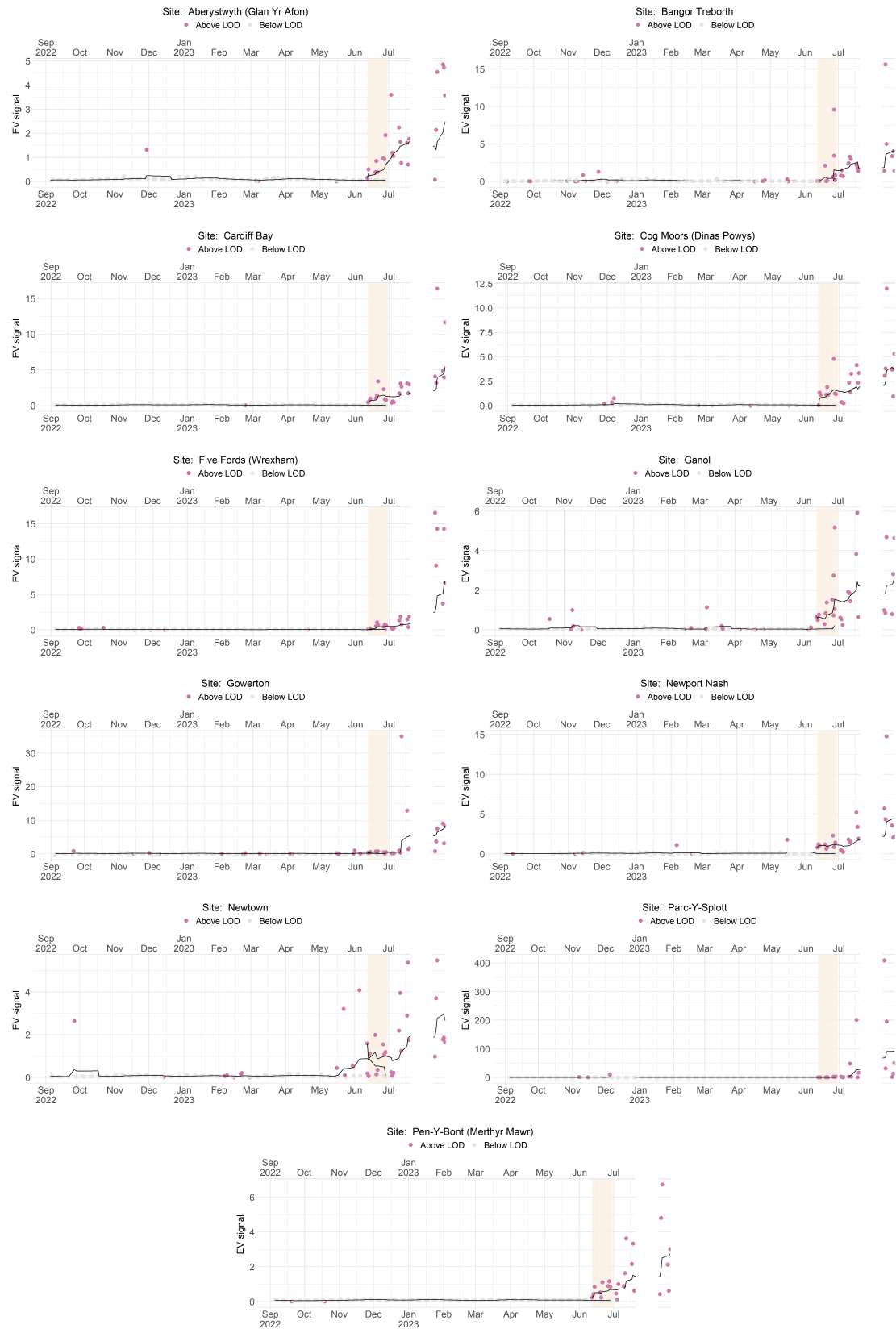


Figure 19. Levels of enterovirus (EV1 & EV2) identified at the site level (across 11 WwTPs covered by the Programme). Each point represents a sample and the line is a 10 day rolling average.

Site-level Summary - Respiratory Syncytial Virus (RSV)



Figure 20. Levels of Respiratory Syncytial Virus (RSV) identified at the site level (across 11 WwTPs covered by the Programme). Each point represents a sample and the line is a 10 day rolling average.

Appendix I

Health Board	Sampling Sites	Major City/Town
Cardiff & Vale, Aneurin Bevan and Cwm Taf Morgannwg UHBs*	Newport Nash	Newport
	Cardiff Bay	Cardiff
	Cog Moors (Dinas Powys)	Barry and Vale of Glamorgan
	Pen-Y-Bont (Merthyr Mawr)	Bridgend
Betsi Cadwaladr UHB	Bangor Treborth	Bangor
	Five Fords (Wrexham)	Wrexham
	Ganol	Llandudno
	Aberystwyth (Glan Yr Afon)	Aberystwyth
Hywel Dda UHB	Parc-Y-Splott	Carmarthen
Powys THB	Newtown	Newtown
Swansea Bay UHB	Gowerton	Swansea

* Due to overlapping wastewater treatment catchments, Cardiff & Vale, Aneurin Bevan, and Cwm Taf Morgannwg Health Boards are merged.

Appendix II

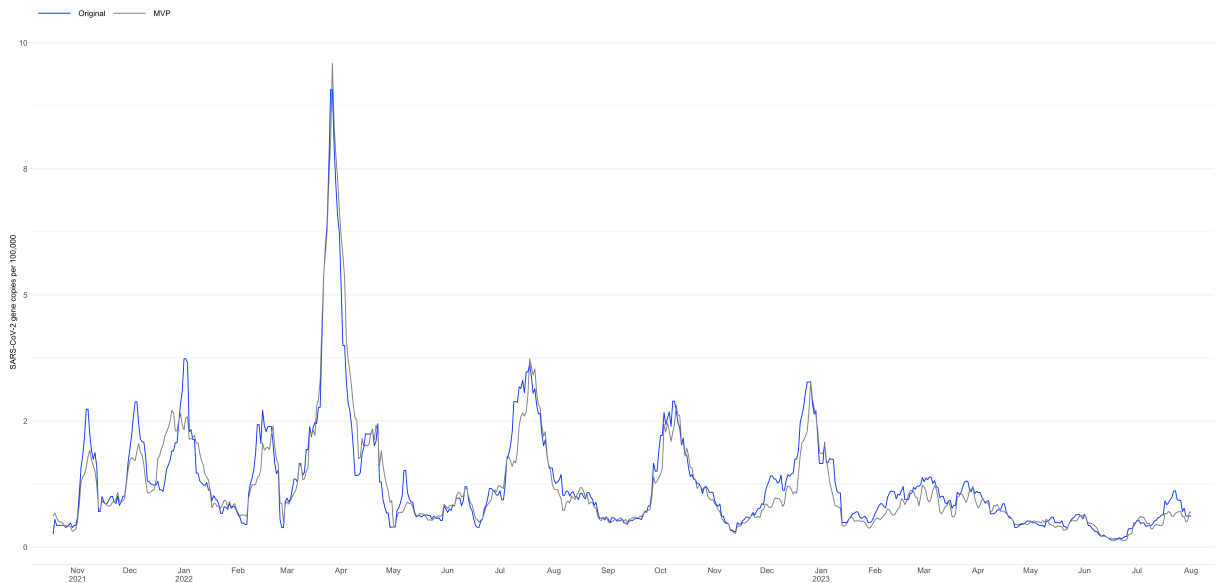


Figure 20. National level of SARS-CoV-2 based on historical data from 47 WwTPs and 5 days a week (taken until 21st July 2023) (blue) compared with the current sampling across 11 sites and 3 days a week (grey).

Appendix III