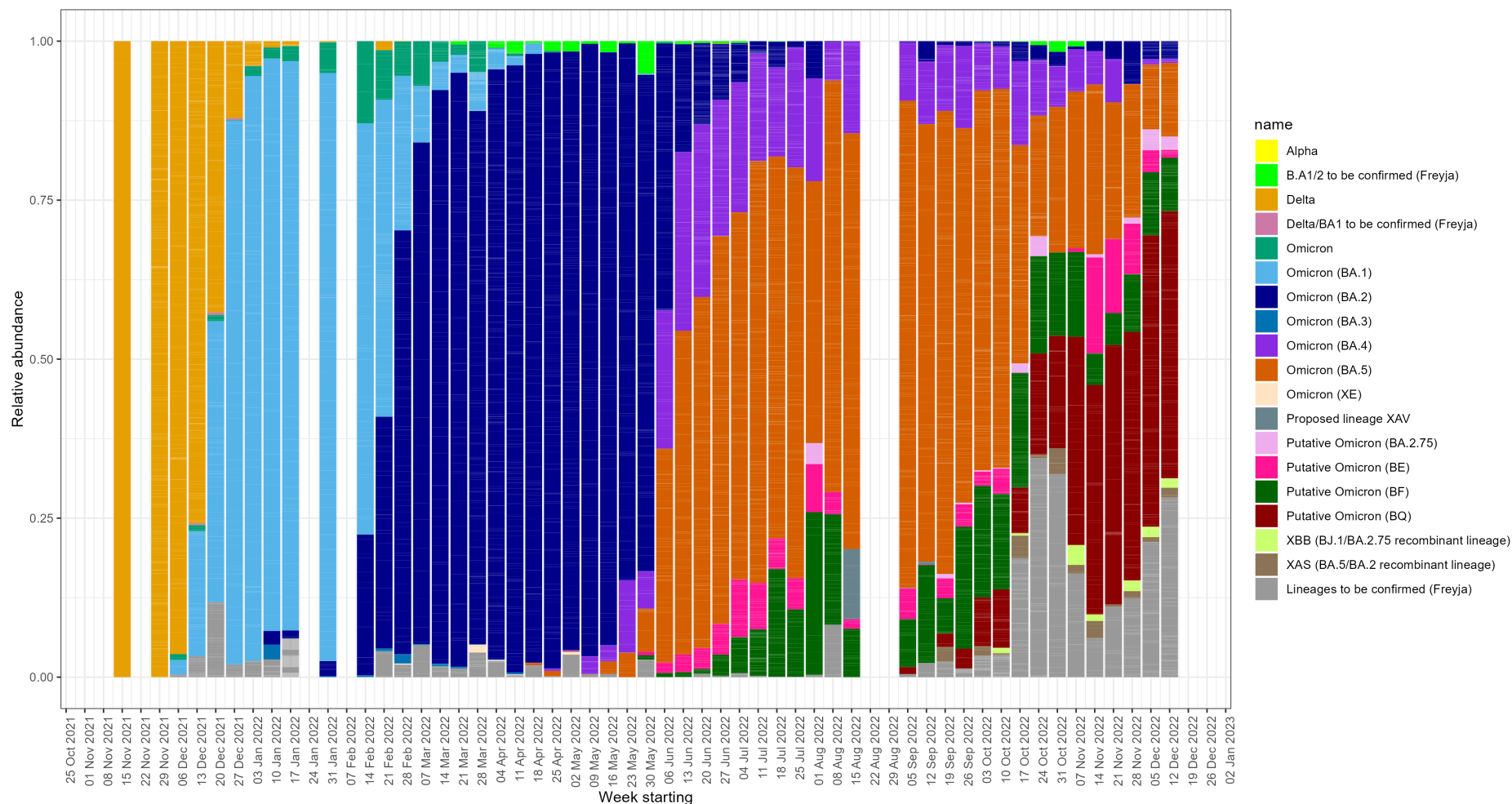


# Detection of SARS-CoV-2 Variants of Concern (VoC) via Wastewater Sequencing: 6 January 2023

## Samples taken up to: 14 December 2022

Detection summary of SARS-CoV-2 Variants of Concern (VoC), including Omicron sub-lineages in Wales, via wastewater sequencing. Figures and tables summarise the occurrence of SARS-CoV-2 VOCs detected in samples from the Wales Wastewater Monitoring Programme's 47 WwTWs. All samples are sequenced together in the Bangor laboratory on a Nextseq 1000.

## National Summary

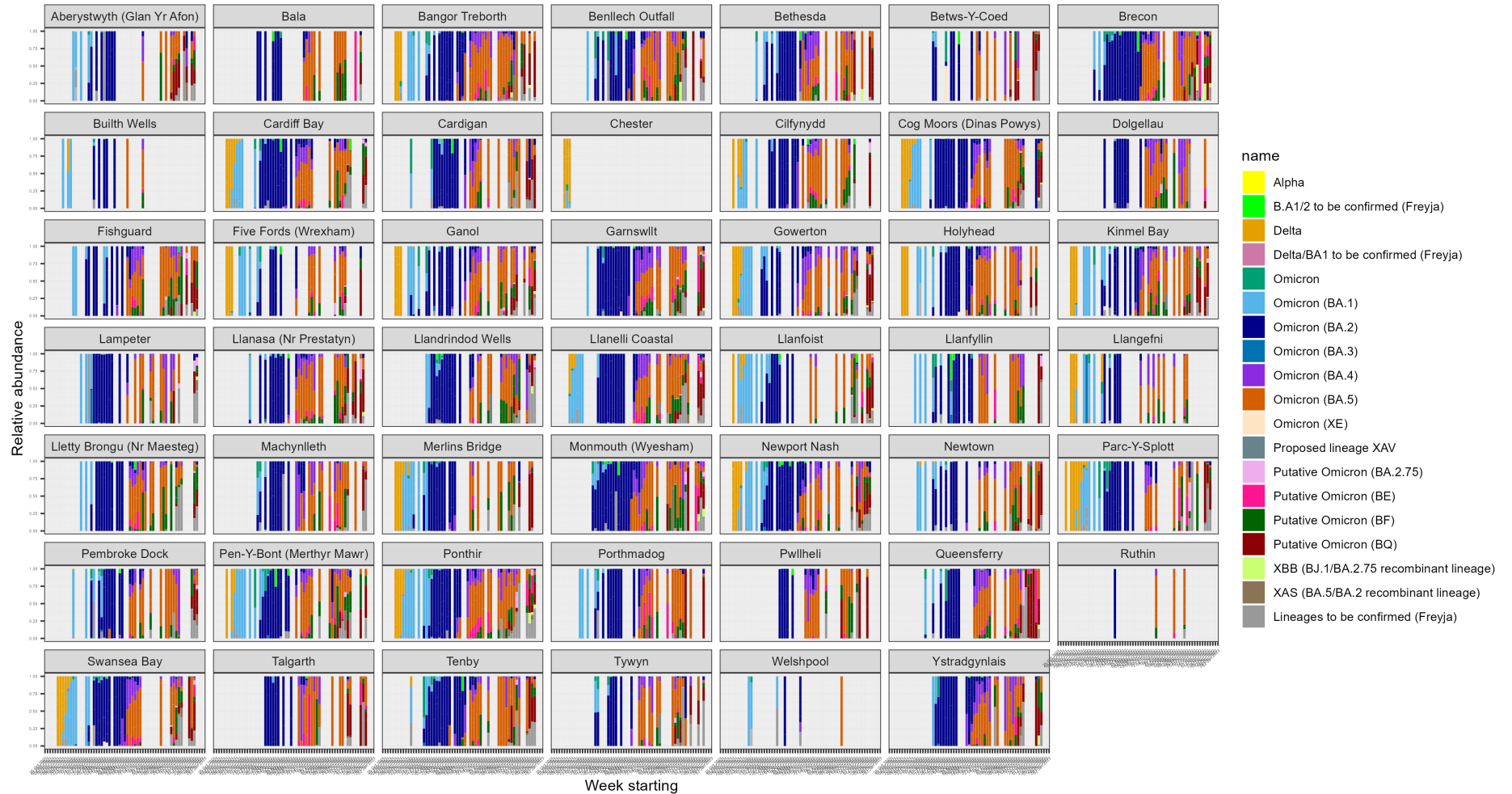


**Figure 1.** VOCs identified at the national level (across all 47 WwTPs covered by the Programme) since 15 November 2021 (plotting proportion of sequence reads assigned to each VOC using Freyja programme; see key). Black lines within the stacked bar plot relate to the detection of sub-lineages.

A variety of Omicron lineages differentiated by Freyja tool have been designated as specific sub-lineages and potential recombinants under the Pango dynamic nomenclature system (e.g. BE, BF, BQ, XAV, XAS, as noted in Fig. 1 and Table 1), but this does not necessarily imply any difference in biology. To highlight this, these lineages are labelled as putative Omicron or proposed lineages in the report, pending further investigation and information from other sources (e.g. clinical testing/sequencing). For example, the XAS lineage is proposed as an Omicron BA5/BA.2 recombinant as noted [here](#).

The limitations of the Freyja tool in reconstructing and quantifying SARS-CoV-2 lineages from wastewater metabarcode sequencing should also be kept in mind.

## Site-level Summary



**Figure 2.** VOCs identified at the WwTW site level (across all 47 WwTWs covered by the Programme) since 15 November 2021 (plotting proportion of sequence reads assigned to each VOC using Freyja programme; see key). Black lines within the stacked bar plot relate to the detection of sub-lineages.



**Table 1.** Relative abundance of SARS-CoV-2 sub-lineages since the last report. Samples taken up to 14 December 2022.

Site	Date	BA.2.75	BA.4	BA.5	BE	BF	BQ	XBB	XBE
Bangor Treborth	2022-12-14	0.0%	0.0%	13.8%	0.0%	0.2%	80.6%	0.0%	0.0%
Benllech Outfall	2022-12-14	0.0%	0.0%	55.0%	0.0%	0.0%	8.4%	0.0%	0.0%
Bethesda	2022-12-14	0.0%	0.0%	24.1%	0.0%	4.0%	70.3%	0.0%	0.0%
Brecon	2022-12-13	0.0%	0.0%	5.9%	0.0%	10.9%	57.7%	5.8%	0.0%
Cardiff Bay	2022-12-13	4.0%	0.8%	0.8%	1.3%	13.5%	41.5%	0.4%	0.0%
Cardigan	2022-12-13	0.0%	0.0%	14.4%	0.0%	0.0%	76.7%	0.0%	0.0%
Cog Moors (Dinas Powys)	2022-12-14	0.0%	0.0%	15.8%	0.0%	5.5%	38.6%	2.1%	0.9%
Fishguard	2022-12-13	0.0%	0.0%	21.8%	0.0%	38.4%	30.1%	0.0%	0.0%
Ganol	2022-12-14	1.0%	0.0%	15.9%	0.0%	12.9%	31.2%	4.1%	0.0%
Garnswllt	2022-12-14	2.6%	0.0%	5.2%	7.4%	2.2%	65.0%	3.8%	0.0%
Gowerton	2022-12-14	0.0%	5.3%	6.9%	0.0%	2.4%	63.9%	1.1%	0.0%
Lampeter	2022-12-13	12.0%	0.0%	0.0%	0.0%	10.3%	5.3%	5.2%	1.1%
Llandrindod Wells	2022-12-13	10.2%	0.0%	6.6%	2.2%	0.4%	0.0%	0.0%	0.0%
Llanelli Coastal	2022-12-14	0.6%	0.3%	1.8%	2.4%	4.8%	49.2%	0.0%	16.1%
Llanfoist	2022-12-13	4.0%	0.0%	1.2%	6.6%	1.0%	65.2%	3.4%	0.0%
Llanfyllin	2022-12-14	15.3%	1.4%	0.0%	0.0%	0.0%	18.7%	0.0%	0.0%
Lletty Brongu (Nr Maesteg)	2022-12-14	0.0%	0.2%	2.7%	0.2%	32.0%	24.6%	0.0%	0.0%
Machynlleth	2022-12-14	0.0%	0.0%	12.0%	2.1%	1.7%	10.4%	0.0%	0.0%
Monmouth (Wyesham)	2022-12-13	6.5%	8.1%	7.2%	3.0%	7.8%	35.6%	10.8%	5.0%
Newtown	2022-12-14	0.0%	0.0%	0.9%	1.7%	1.3%	73.4%	0.0%	0.0%
Parc-Y-Splott	2022-12-13	0.0%	0.0%	3.2%	0.0%	18.6%	42.0%	0.0%	0.0%
Pembroke Dock	2022-12-14	4.8%	0.0%	22.6%	1.1%	1.0%	35.2%	0.0%	0.0%
Pen-Y-Bont (Merthyr Mawr)	2022-12-14	0.0%	0.0%	10.3%	0.0%	12.8%	47.8%	1.2%	0.0%
Ponthir	2022-12-13	0.0%	2.2%	4.4%	0.0%	9.6%	33.0%	5.7%	0.0%
Porthmadog	2022-12-14	0.0%	0.0%	4.2%	0.0%	2.7%	86.4%	0.0%	0.0%
Talgarth	2022-12-13	0.0%	0.0%	41.8%	5.4%	3.5%	49.0%	0.0%	0.0%
Tenby	2022-12-14	0.0%	0.0%	10.6%	2.1%	11.9%	37.3%	0.0%	0.0%
Tywyn	2022-12-14	0.0%	0.9%	2.9%	0.5%	5.8%	20.0%	0.0%	0.0%
Ystradgynlais	2022-12-14	0.0%	0.4%	22.6%	0.0%	28.0%	19.1%	0.0%	0.0%

**Table 2.** Samples which did not pass the quality control in the reporting period.

Date	Site
2022-12-14	Bala
2022-12-14	Betws-Y-Coed
2022-12-14	Builth Wells
2022-12-14	Dolgellau
2022-12-14	Five Fords (Wrexham)
2022-12-14	Holyhead
2022-12-14	Kinmel Bay
2022-12-14	Llanasa (Nr Prestatyn)
2022-12-14	Llangefni
2022-12-13	Merlins Bridge
2022-12-13	Newport Nash
2022-12-14	Pwllheli
2022-12-14	Queensferry
2022-12-14	Ruthin
2022-12-14	Swansea Bay
2022-12-14	Welshpool

**Table 3.** Sites where no samples were available for sequencing in the reporting period.

Site
Aberystwyth (Glan Yr Afon)
Cilfynydd

**Table 4.** Summary of all 47 monitored Welsh sites including data on quality control.

Site	Date	Population	Quality Control	Aligned Reads	Mapped Reads	Covered Bases
Aberystwyth (Glan Yr Afon)	2022-12-14	18026	FAILED	NA	NA	NA
Bala	2022-12-14	2054	FAILED	NA	NA	NA
Bangor Treborth	2022-12-14	25945	PASSED	38363	1.01%	66.52%
Benllech Outfall	2022-12-14	2605	PASSED	69348	1.32%	67.41%
Bethesda	2022-12-14	4721	PASSED	50314	1.44%	68.08%
Betws-Y-Coed	2022-12-13	419	FAILED	NA	NA	NA
Brecon	2022-12-13	8172	PASSED	105922	3.85%	85.68%
Builth Wells	2022-12-13	2554	FAILED	NA	NA	NA
Cardiff Bay	2022-12-13	612002	PASSED	102643	4.06%	77.5%
Cardigan	2022-12-13	4509	PASSED	19411	1.1%	54.38%
Cilfynydd	2022-12-14	61721	FAILED	NA	NA	NA
Cog Moors (Dinas Powys)	2022-12-14	204292	PASSED	170433	3.38%	72.39%
Dolgellau	2022-12-13	2431	FAILED	NA	NA	NA
Fishguard	2022-12-13	5499	PASSED	467975	15.29%	96.94%
Five Fords (Wrexham)	2022-12-14	93434	FAILED	NA	NA	NA
Ganol	2022-12-14	67101	PASSED	122808	3.03%	73.84%
Garnswllt	2022-12-14	28151	PASSED	152442	4.7%	88.16%
Gowerton	2022-12-14	52162	PASSED	389853	8.74%	90.75%
Holyhead	2022-12-13	15719	FAILED	NA	NA	NA
Kinmel Bay	2022-12-13	48234	FAILED	NA	NA	NA
Lampeter	2022-12-13	3046	PASSED	54614	2.55%	74.22%
Llanasa (Nr Prestatyn)	2022-12-13	22066	FAILED	NA	NA	NA
Llandrindod Wells	2022-12-13	5650	PASSED	41070	1.69%	65.21%
Llanelli Coastal	2022-12-14	52059	PASSED	271272	6.85%	66.86%
Llanfoist	2022-12-13	14830	PASSED	187824	6.64%	84.88%
Llanfyllin	2022-12-14	629	PASSED	142319	3.4%	80.98%
Llangefni	2022-12-14	5824	FAILED	NA	NA	NA
Lletty Brongu (Nr Maesteg)	2022-12-14	19375	PASSED	433374	15.33%	97.28%
Machynlleth	2022-12-14	2158	PASSED	179805	6.26%	85.19%
Merlins Bridge	2022-12-13	15366	FAILED	NA	NA	NA
Monmouth (Wyesham)	2022-12-13	10817	PASSED	198416	8.42%	92.4%
Newport Nash	2022-12-14	164985	FAILED	NA	NA	NA
Newtown	2022-12-14	10184	PASSED	26873	0.96%	52.05%
Parc-Y-Splott	2022-12-13	17308	PASSED	61192	1.04%	59.37%
Pembroke Dock	2022-12-14	16726	PASSED	41731	0.83%	59.46%
Pen-Y-Bont (Merthyr Mawr)	2022-12-14	118106	PASSED	235728	6.55%	89.69%
Ponthir	2022-12-13	91460	PASSED	222635	13.47%	93.8%
Porthmadog	2022-12-14	2908	PASSED	45888	1.26%	68.48%
Pwllheli	2022-12-13	4714	FAILED	NA	NA	NA
Queensferry	2022-12-13	29503	FAILED	NA	NA	NA
Ruthin	2022-12-13	5041	FAILED	NA	NA	NA
Swansea Bay	2022-12-13	168225	FAILED	NA	NA	NA
Talgarth	2022-12-13	1508	PASSED	110375	6.65%	79%
Tenby	2022-12-14	9727	PASSED	68211	1.99%	66.32%
Tywyn	2022-12-14	3363	PASSED	221716	6.22%	87.83%
Welshpool	2022-12-14	5022	FAILED	NA	NA	NA
Ystradgynlais	2022-12-14	10532	PASSED	365837	12.45%	95.26%