

Respiratory Viruses in Luxembourg (ReViLux)

Report – Sentinel Week 41 and Sequencing Update

Summary

Last week (**week 2024/41**), the sentinel network detected a baseline epidemic activity, based on **3.6%** of the consultations being associated with influenza-like illness. Among the specimens collected by the sentinel network over the last week, the percentage of positive tests for **Human rhinovirus** was **52.3%**, followed by **16.7%** for **SARS-CoV-2** and **7.7%** for **Adenovirus**. The number of SARS-CoV-2 cases reported increased from 7.1% (week 2024/40) to 16.7% (week 2024/41).

Regarding SARS-CoV-2 genomic surveillance in Luxembourg, starting from week 48 of 2023, the most common variant seen was JN.1, a sub-variant of BA.2.86 designated as a variant of concern (VOI). Since beginning of April 2024, several sub-variants of JN.1 have been circulating in Luxembourg.

The estimated distribution for KP.3 was 65.0% (95%CI: 55.8-73.5%), and 20.0% (95%CI: 13.3-28.3%) for XEC during the weeks 2024/36-2024/39.

Currently circulating variants

Sub-variant	Genetic features	First detected in Luxembourg	Estimated prevalence (2024/36-39)
JN.1*	BA.2.86 + S:L455S	25.08.2023	5.8%
KP.3	JN.1 + S:F456L, S:Q493E, S:V1104L	03.04.2024	65.0%
KP.2	JN.1 + S:R346T, S:F456L, S:V1104L	08.04.2024	4.1%
JN.1.7	JN.1 + S:T572I, S:E1150D	10.01.2024	0.0%
JN.1.18	JN.1 + S:R346T	10.01.2024	0.0%
LB.1	JN.1+ S:S31-, S:Q183H, S:R346T, S:F456L	22.05.2024	3.3%
XEC	JN.1 + S:T22N, S:F59S, S:F456L, S:Q493E, S:V1104L	19.07.2024	20.0%

**JN.1 excludes sub-variants listed in table*

Sentinel Surveillance Network

The Sentinel Surveillance aims at monitoring the circulating respiratory viruses, from traditional ones like Influenza to more recent ones like SARS-CoV-2, and hence underpin public health actions. The Sentinel Network is a group of general practitioners and paediatricians spread across the country. They report the weekly number of patients showing symptoms suggestive of acute respiratory infection (ARI) and influenza-like illness (ILI), and those patients are then sampled and tested for a panel of respiratory viruses. The circulation of respiratory viruses in the north hemisphere is generally monitored by seasons that go from week 40 to week 20. The period between weeks 20 and 40 is usually called inter-season.

Clinical results

Last week (**end of week 2024/41**), **3.6%** of the consultations were reported as ILI, representing a baseline epidemic activity for Luxembourg, according to ECDC and the Moving Epidemic Method. Over the past few weeks baseline ILI rates have been observed. Similar levels have been observed during previous season at this time of the year. The history of ILI consultations is displayed in Figure 1, and a detailed summary of the number of ARI and ILI cases during the last four weeks is included in Table 1.

Laboratory results

Over the last week, the most frequently detected viruses (according to positivity rates) were **Human rhinovirus (52.3%)**, followed by **SARS-CoV-2 (16.7%)** and **Adenovirus (7.7%)**. No further Influenza or RSV cases have been detected in week 2024/41.

Table 1. Syndromic surveillance over the last 4 weeks

Week	ARI		ILI		Total consultations
	N	%	N	%	
2024/38	38	11.31	10	2.98	336
2024/39	49	15.65	10	3.19	313
2024/40	59	17.05	15	4.34	346
2024/41	81	22.44	13	3.60	361

ARI: Acute Respiratory Infections; ILI: Influenza-Like Illness.

Figure 1. Percentage of patients with influenza-like illness over the last three seasons
Background colours according to intensity of circulation: baseline, low, medium, high, very high.

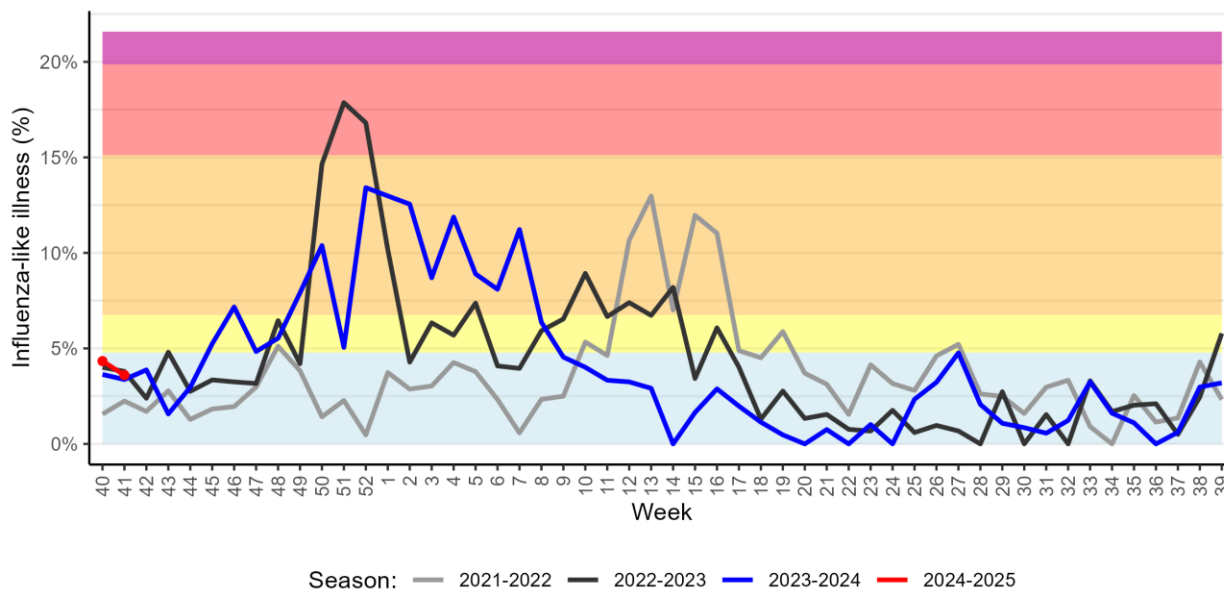


Table 2. Distribution of respiratory viruses detected within the Sentinel Network over the last 2 weeks compared to previous year.

Virus	Season 2024/25		Season 2023/24
	Positivity Rate in %		
	W40	W41	W41
Human rhinovirus	38.6	52.3	45.3
SARS-CoV-2	7.1	16.7	14.1
Adenovirus	2.9	7.7	1.6
Parainfluenzavirus	8.6	3.1	3.1
Influenzavirus B	1.4	0.0	0.0
Metapneumovirus	0.0	0.0	0.0
Respiratory syncytial virus	0.0	0.0	3.1
Influenzavirus A	0.0	0.0	0.0

*Co-detection counted once for each virus detected. All data is provisional as possibility of reporting delays.

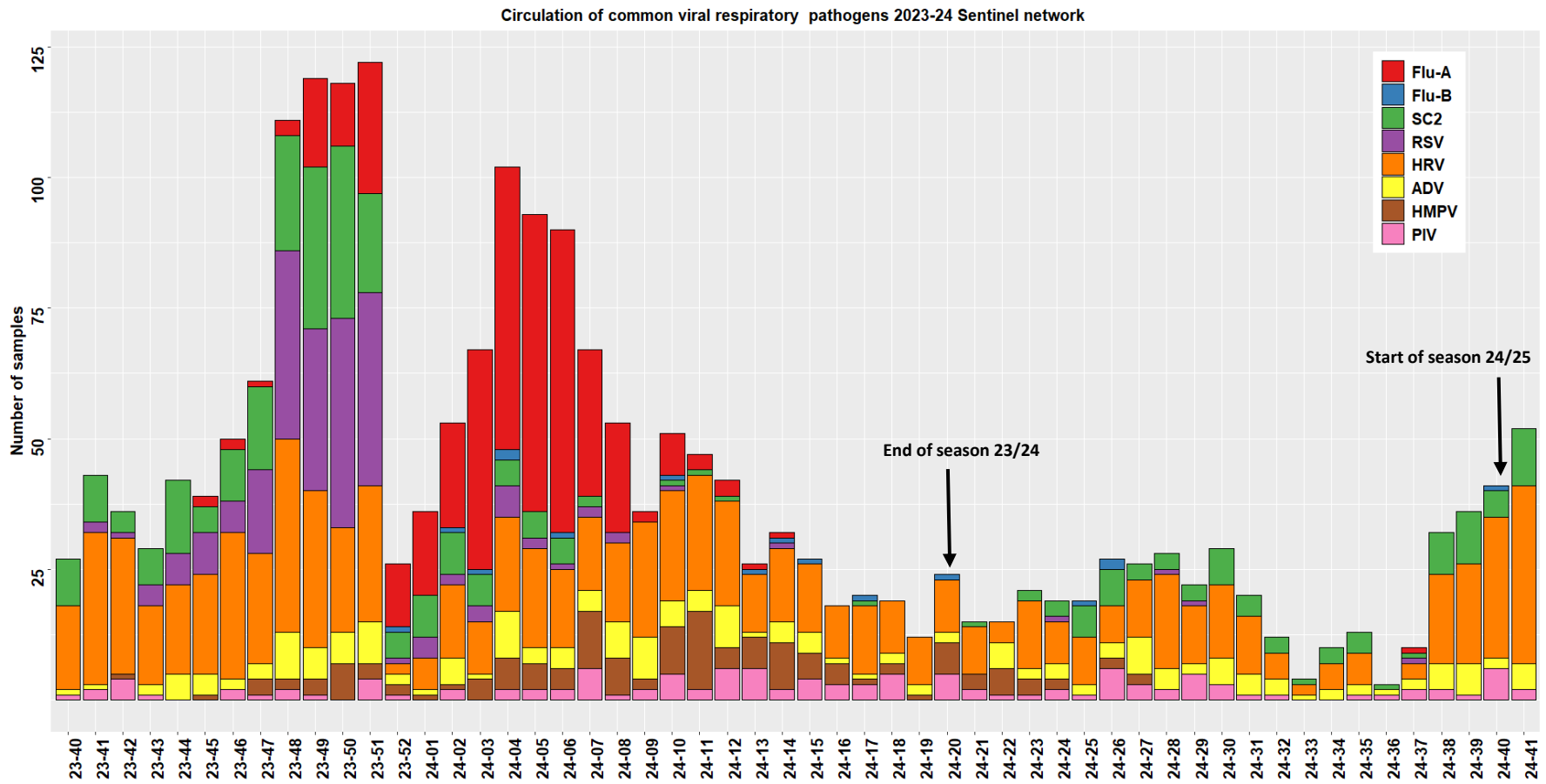


Figure 2. Distribution of respiratory viruses detected within the Sentinel Network, by calendar week. Results from last weeks are not yet consolidated.
 FLU-A: influenza A; FLU-B: influenza B; PIV: parainfluenzavirus; RSV: respiratory syncytial virus; ADV: adenovirus; MPV: metapneumovirus; HRV: human rhinovirus; SC2: SARS-CoV-2.

SARS-CoV-2 Genomic Surveillance

LNS receives positive specimens (nasopharyngeal or oropharyngeal swabs analysed by RT-PCR) from the national network of laboratories. A selection of hospital specimens are sequenced, as well as a representative selection of community specimens. Illumina devices are used. Bioinformatic analyses are based on a standardised pipeline, and lineage assignment is performed through the PANGOLin software (4.3.1, pango-data 1.30, mode UShER).

Sequencing activity

120 samples from 688 cases (17.4%) reported in Luxembourg were sequenced with specimen dates between week 2024/37 and 2024/39. Approximately 55.5% were hospital samples and the remaining samples were community samples.

Variant circulation

For samples sequenced between 9th and 29th of September 2024 (2024/37-2024/39), the estimated distribution was **65.0%** (95%CI: 55.8-73.5%) for **KP.3** and **20.0%** for **XEC** (95%CI: 13.3-28.3%), which is a recombinant of JN.1 sub-variants.

The sub-variants that are currently circulating show many genetic differences compared to previous circulating Omicron variants, so several sub-variants with key mutations are closely monitored.

An overview of the variants and lineages circulating is displayed in Figure 5, and further details are shown in Table 3. The history of the circulation of each variant since January 2021 is displayed in Figure 4.

Table 3. Distribution of SARS-CoV-2 lineages detected during weeks 2024/37 to 2024/39. Previously reported cases might be updated by retrospective analysis.

Lineage	weeks 37-39	
	%	CI %
KP.3	65.0	55.8 – 73.5
XEC	20.0	13.3 – 28.3
JN.1	5.8	2.4 – 11.7
KP.2	4.2	1.4 – 9.5
LB.1	3.3	0.9 – 8.3
Other	1.7	0.2 – 5.9

*JN.1 excludes sub-lineages listed in table

Over the past 3 weeks (2024/37-2024/39), 66 (55.0%) samples from hospital laboratories and 54 (45.0%) samples from private laboratories/ sentinel practitioners were sequenced. Table 4 compares sampling setting and variants.

Table 4. Comparison of lineage distribution by sampling setting.

Lineage	Community			Hospital		
	Women	Men	Total	Women	Men	Total
KP.3	80.6%	64.7%	75.0%	85.7%	69.2%	77.8%
XEC	19.4%	35.3%	25.0%	14.3%	30.8%	22.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

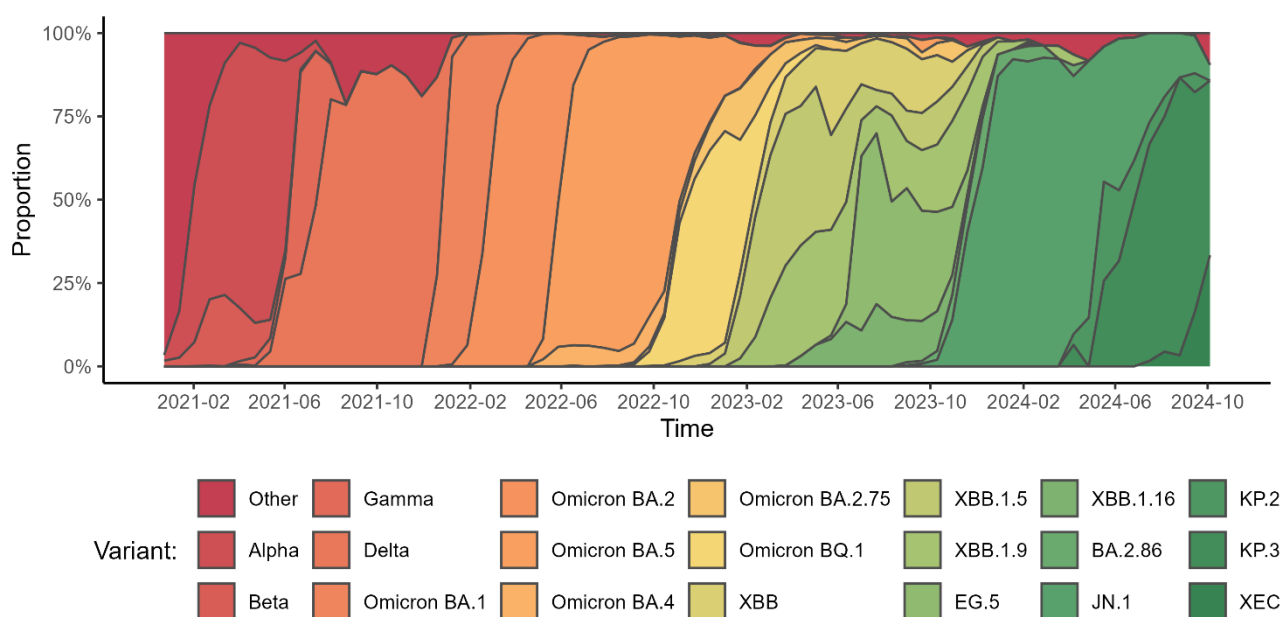


Figure 4. Proportion of each variant circulating in Luxembourg since January 2021. All displayed variants include descendant lineages, except those specified on the legend

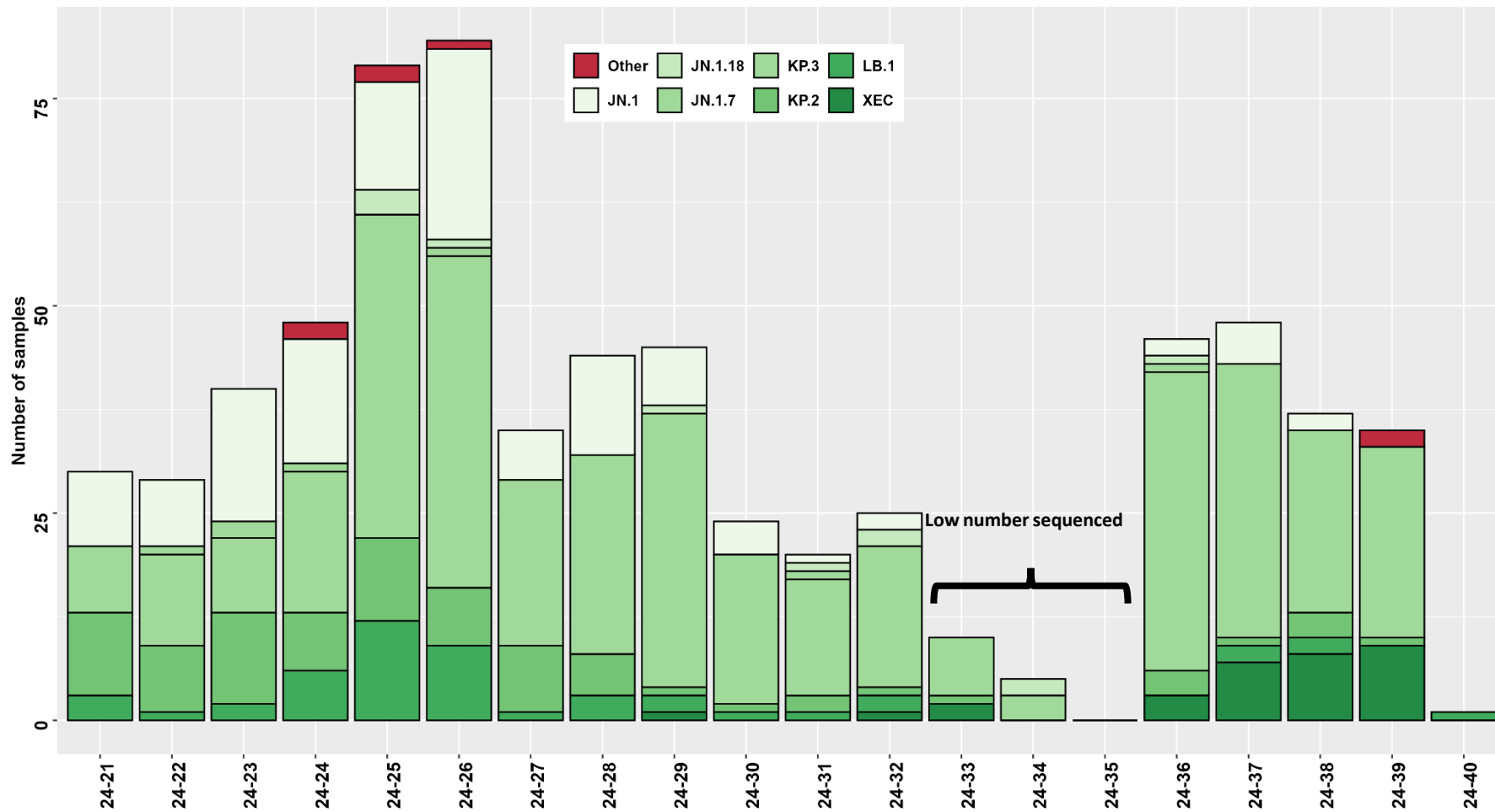


Figure 5. Distribution of lineages since 2024/21 (last 20 weeks).

* All displayed variants include descendant lineages, except those specified on the legend. Other in week “2024-39”: recombinant lineage of LB.1 and KP.3

References

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