Respiratory Viruses in Luxembourg (ReViLux)

Report – Sentinel Week 03 and Sequencing Update

Summary

At the end of week **2025/03**, the sentinel network detected a medium epidemic activity with an upward trend, based on **13.1%** of 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 **Influenza A** was **35.2%**, **17.2%** for **Human rhinovirus, 11.3 %** for **RSV** and **9.6 %** for **Influenza B**.

During the week **2025/03**, **Influenza A activity** increased, Influenza B slightly decreased and RSV with peak in week 2025/52 continued to decrease.

In total, this season (24/25) 1,186 samples were tested with 192 Influenza positive samples (43 Influenza B and 149 Influenza A). Seventy one (51.1%) Influenza A samples have been subtyped as A(H1)pdm9 and 68 (48.9%) as A(H3) virus. Among those RSV subtyped (N=149, 87.6%), there was a mixture of RSV- A (52.3%) and RSV-B (47.7%).

Regarding SARS-CoV-2 genomic surveillance in Luxembourg, since beginning of April 2024, several sub-variants of JN.1 have been circulating in Luxembourg. The estimated distribution for **XEC** was **64.8%** (95%CI: 53.9-74.7%), and **19.3%** (95%CI: 11.7-29.1%) for **KP.3** during the weeks 2024/51-2025/01.

Currently circulating variants

Sub-variant	Genetic features	First detected in Luxembourg	Estimated prevalence (2024/51-2025/01)
JN.1*	BA.2.86 + S:L455S	25.08.2023	6.8%
KP.3	JN.1 + S:F456L, S:Q493E, S:V1104L	03.04.2024	19.3%
KP.2	JN.1 + S:R346T, S:F456L, S:V1104L	08.04.2024	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	2.3%
XEC	JN.1 + S:T22N, S:F59S, S:F456L, S:Q493E, S:V1104L	19.07.2024	64.8%

**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 2025/03**), **13.1%** of the consultations were reported as ILI, representing a medium epidemic activity for Luxembourg, according to ECDC and the Moving Epidemic Method. Over the past three weeks medium ILI rates have been observed, but with an upward trend. 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.

Table 1. Syndromic surveillance over the last 4 weeks

Week	ARI		ILI		Total consultations
	N	%	N	%	
2024/52	74	20.05	28	7.59	369
2025/01	45	24.73	12	6.59	182
2025/02	33	10.71	29	9.42	308
2025/03	73	12.54	76	13.06	582

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

Laboratory results

Over the last week, the most frequently detected viruses (according to positivity rates) were **Influenzavirus A (35.2%)**, **Human rhinovirus (17.2%)** and **RSV (11.3%).** In week 2025/03, Influenza B positivity was **9.6%** and **SARS-CoV-2** positivity was **1.6%** in the sentinel network. Influenzavirus A activity remained high at 35.2% and Influenzavirus B activity decreased slightly to just under 10%. Overall, 149 Influenza A and 43 Influenza B cases have been

detected during this season. Above 90% of the samples were subtyped with 51.1 % A(H1)pdm9 and 48.9% as A(H3).

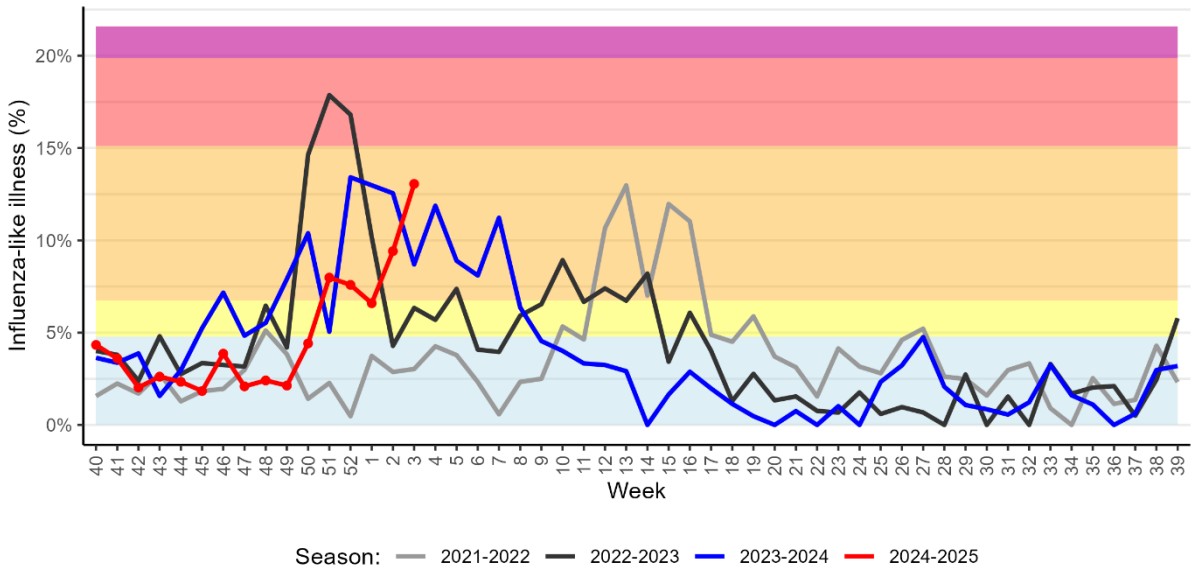


Figure 1. Percentage of patients with influenza-like illness over the last three seasons
Background colours according to intensity of circulation: baseline, low, medium, high, very high.

RSV activity continued to decline from 22.3% (2025/02) to 11.3% (week 2025/03). So far this season (24/25), hundred seventy RSV cases have been detected, including 78 (52.3%) RSV-A and 71 (47.7%) RSV-B. Approximately 75% (N=132) of cases were under 5 years old (Figure 2).

In total, 1,186 sentinel samples have been analysed with about 60% of samples belonging to age-group below 18 years (Figure 3) and with 51% of female cases. Over the last 2 weeks, Human rhinovirus, Influenza A and Influenza B were detected in all age-groups below 65 years, whereas Adenovirus and Parainfluenza viruses have been primarily detected in children under the age of 5. Human metapneumovirus continues to circulate at low levels (below 5%), primarily in children.

Over the last 2 weeks, approximately 65% (N=19) of all co-infections (N=29) were detected primarily in children below 5 years. The most commonly identified combination was Adenovirus and RSV, followed by Human rhinovirus and RSV.

An overview of the circulating viral pathogens during the current and previous inter- season is displayed in Figure 5 and Table 2.

Table 2. Distribution of respiratory viruses detected within the Sentinel Network over the last 4 weeks compared to previous year.

Virus	Season 2024/25					Season 2023/24	
	Positivity Rate in %						
	W52	**W01**	**W02**	**W03**	**Total N (%)**	**W03**	**Total N (%)**
Influenzavirus A	20.0	30.8	28.7	35.2	149 (12.6)	43.3	388 (16.5)
Human rhinovirus	20.0	26.3	16.1	17.2	394 (33.6)	10.9	572 (24.9)
Respiratory syncytial virus	31.4	28.2	22.3	11.3	170 (14.4)	3.3	212 (9.2)
Influenzavirus B	5.7	0.0	12.8	9.6	43 (3.6)	1.1	12 (0.5)
Adenovirus	0.0	18.4	8.6	4.1	93 (7.9)	3.4	125 (5.4)
Metapneumovirus	2.9	5.3	5.4	3.3	26 (2.2)	4.3	125 (5.4)
SARS-CoV-2	0.0	0.0	0.0	1.6	54 (4.6)	6.2	227 (9.7)
Parainfluenzavirus	5.7	0.0	1.1	0.8	55 (4.7)	0.0	77 (3.4)

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

Figure 2. Displays RSV cases according to different age groups with highest impact among the 1-4 years old.

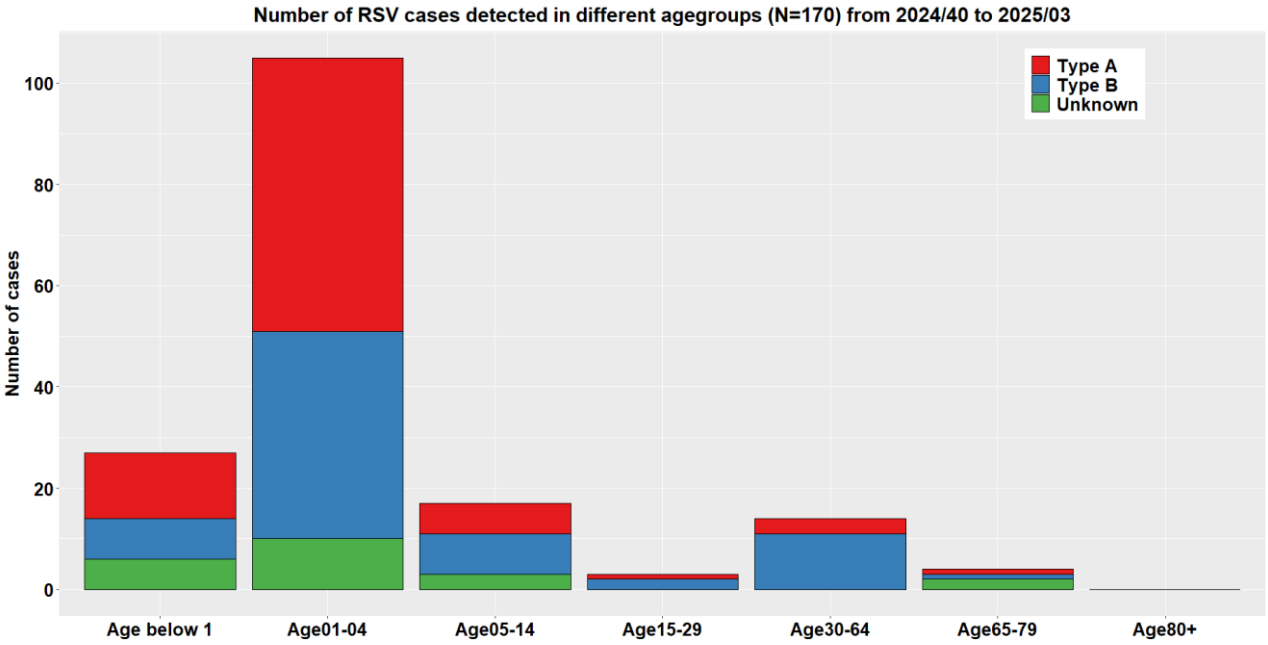


Figure 3. Displays number of sentinel samples received per week by age-group including overall sample positivity including Human rhinovirus (HRV, dotted line) and excluding HRV (black line). Secondary axis corresponds to positivity. Last week's results are not fully consolidated.

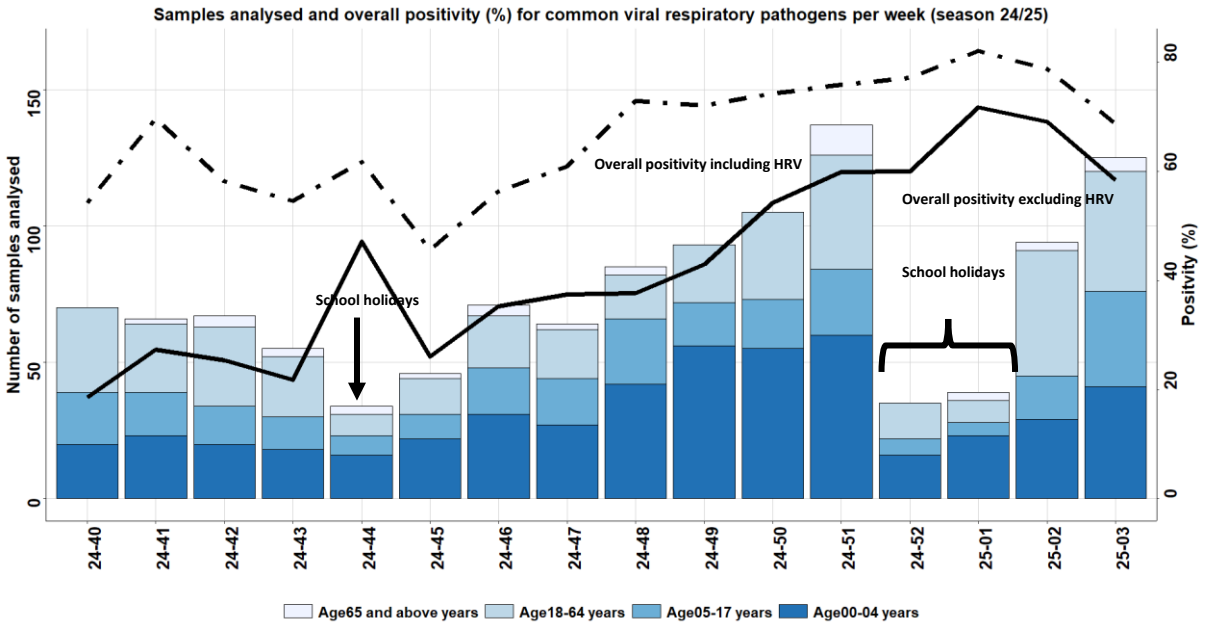
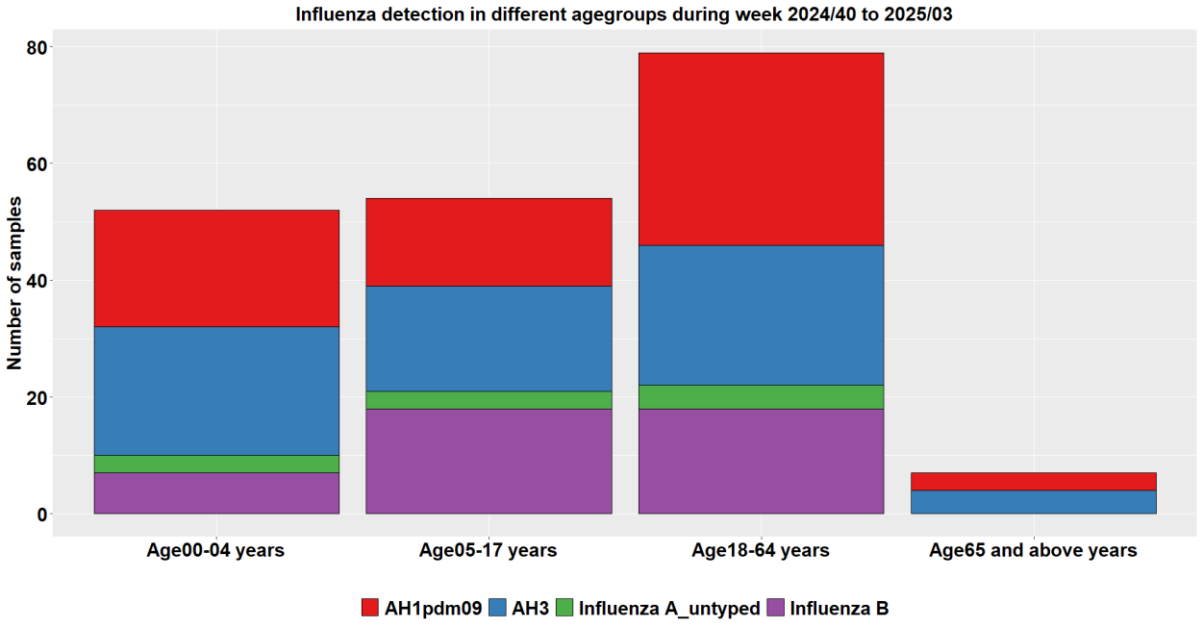


Figure 4. Displays detection of Influenza subtypes by age-group. Last week's results are not fully consolidated.



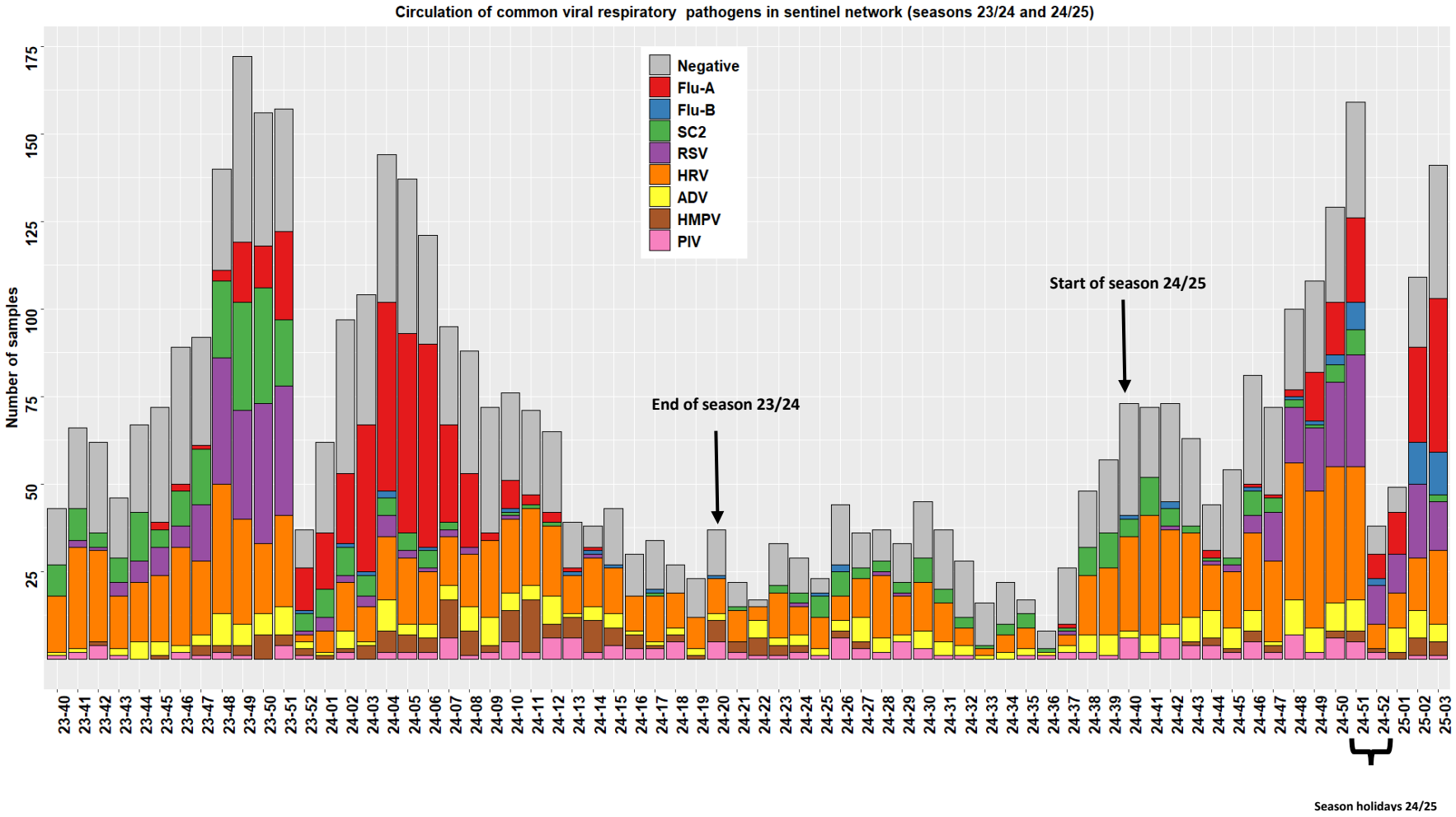


Figure 5. Distribution of respiratory viruses detected within the Sentinel Network, by calendar week. Results from last week are not yet consolidated.
FLU-A: influenzavirus A; FLU-B: influenzavirus B; PIV: parainfluenzavirus; RSV: respiratory syncytial virus; ADV: adenovirus; MPV: metapneumovirus; HRV: human rhinovirus; SC2: SARS-CoV-2

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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 1.31, mode UShER).

Sequencing activity

88 samples from 230 cases (38.2%) reported in Luxembourg were sequenced with specimen dates between week 2024/51 and 2025/01. Approximately 30.7% were hospital samples and the remaining samples were community samples.

Variant circulation

For samples sequenced between 16th of December and 1st of January 2025 (2024/51-2025/01), the estimated distribution was **64.8%** (95%CI: 53.9-74.7%) for **XEC** (recombinant of JN.1sub-variant) and **19.3%** for **KP.3** (95%CI: 11.7-29.1%). Low circulation of other recombinant lineages such as XEP and XEK has been detected in recent weeks. An overview of the variants and lineages circulating is displayed in Figure 6. The history of the circulation of each variant since January 2021 is displayed in Figure 7.

During weeks 2024/45 to 2025/01, 86 (34.1%) samples from hospital laboratories and 166 (65.9%) 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	37.0%	37.1%	**37.1%**	38.9%	33.3%	**36.1%**
XEC	63.0%	62.9%	**62.9%**	61.1%	66.7%	**63.9%**
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

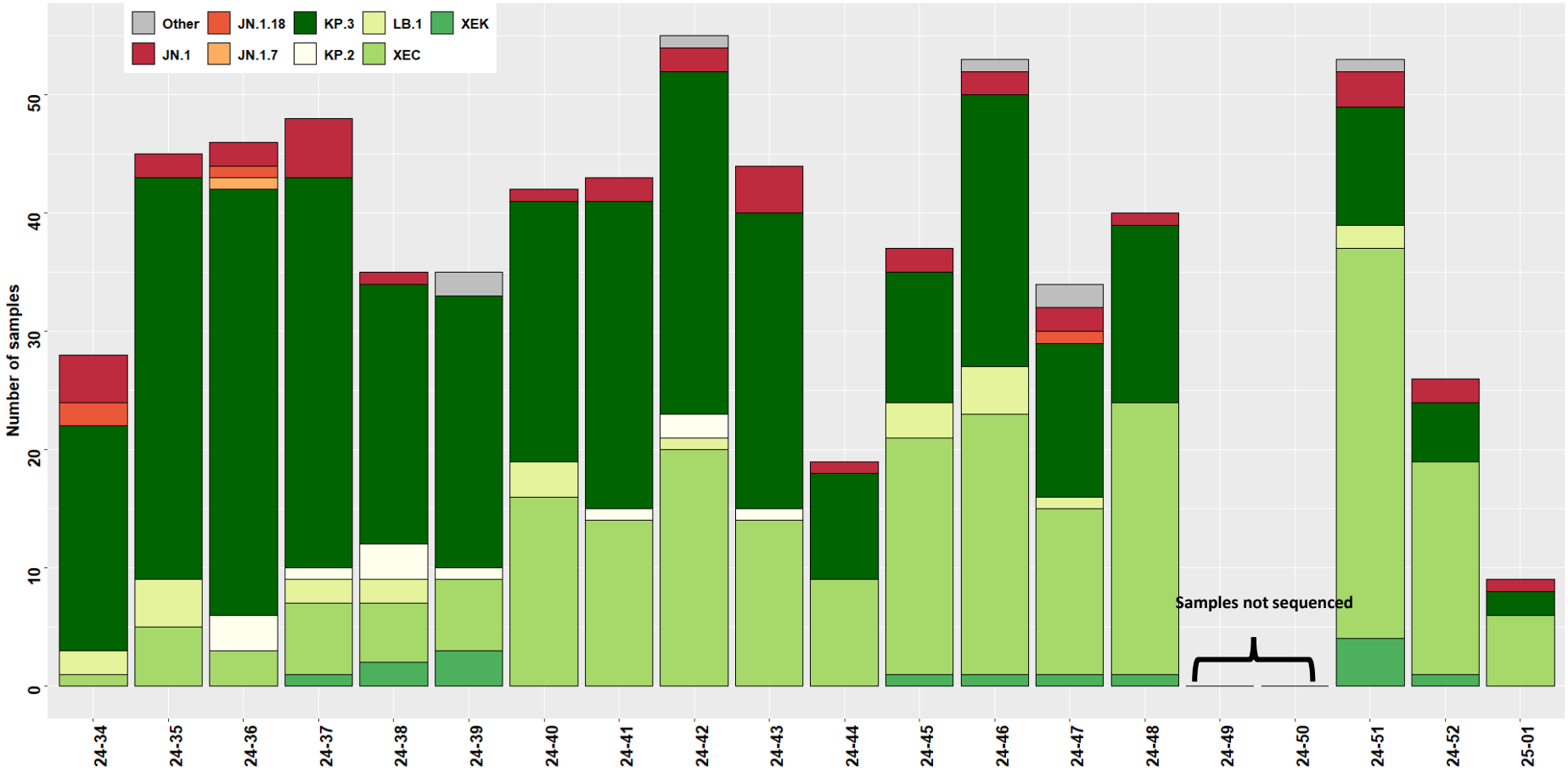

Figure 6. Distribution of lineages since 2024/34 (last 20 weeks).
All displayed variants include descendant lineages, except those specified on the legend, other: recombinant lineages (eg: XEP), data are not available for weeks 2024/49 and 2024/50 as priority given to sequence more recent samples

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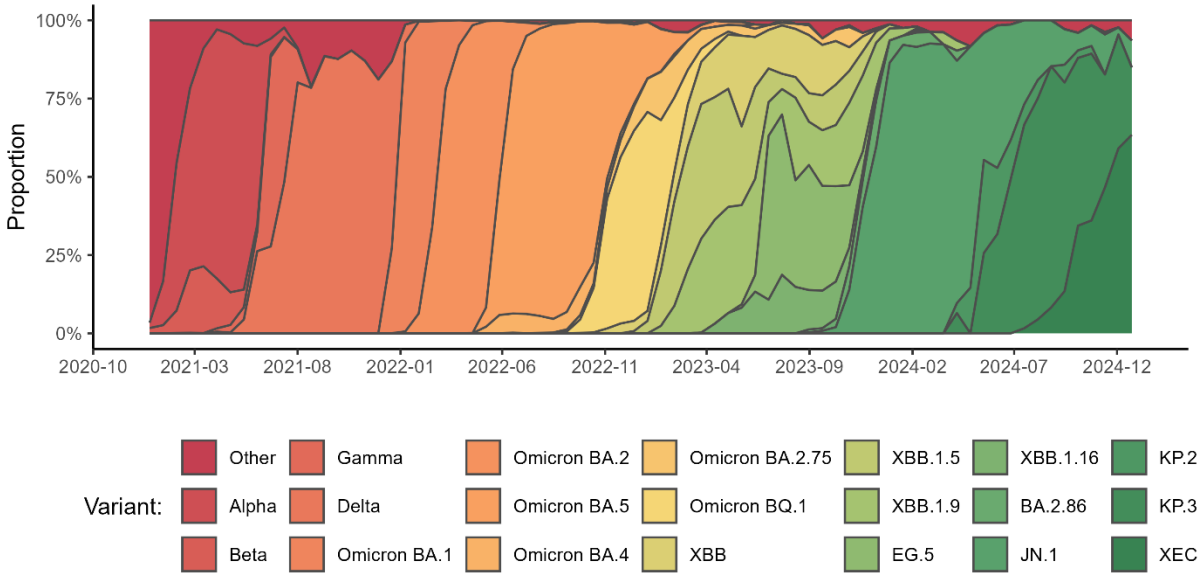
Figure 7. Proportion of each variant circulating in Luxembourg since January 2021.
All displayed variants include descendant lineages, except those specified on the legend



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