Weekly Report on Severe Acute Respiratory Infection (SARI), Week 47 2022 (week ending 27/11/2022)

This report includes data on SARI hospitalised cases, aged 15 years and older who were admitted to St. Vincent's University Hospital (SVUH), Dublin up to week 47 2022.

Please note that this report on SARI surveillance pertains to one hospital site only, data are not nationally representative. Therefore caution is advised when interpreting rates and trends as outlined in the report, which may fluctuate due to the low case numbers.

Key points

- In week 47 2022 (week ending 27/11/2022):
  - There were 24 SARI cases reported in week 47 2022, an increase compared to 19 SARI cases reported during week 46 2022
  - The incidence rate per emergency hospitalisations was 87 per 1,000 emergency admissions, an increase compared to 68.3 per 1,000 during week 46 2022
  - The incidence rate per hospital catchment population was 7.9 per 100,000 population aged ≥15 years, an increase compared to the rate of 6.2 per 100,000 in week 46 2022
  - The highest proportion of SARI cases was among those aged 65 years and older (n=19; 79.2%), median age was 73 years (interquartile range (IQR): 65–79)
  - Among SARI cases admitted in week 47 2022, 22 (91.7%) were reported as having underlying medical conditions
  - SARS-CoV-2 PCR testing was carried out on all SARI cases, three (12.5%) of which tested positive, an increase compared to 5.3% (n=1) in week 46 2022
  - Influenza PCR testing was carried out on 22 (91.7%) SARI cases, one (4.5%) of which tested positive for influenza B, there were no influenza positive cases in week 46 2022.
  - Respiratory syncytial virus (RSV) PCR testing was carried out on 22 (91.7%) SARI cases, four (18.2%) of which tested positive, compared to 21.1% (n=4) positivity in week 46 2022
- There were 75 SARI cases admitted to St. Vincent's University Hospital (SVUH) between weeks 44 and 47 2022. In total, during 2022, 612 SARI cases have been admitted to SVUH
  - The median age of SARI cases admitted during weeks 44-47 2022 was 74 years (IQR: 65-82 years), the median age of all cases admitted in 2022 was 75 years (IQR: 63-83 years)
  - Among SARI cases admitted during weeks 44–47 2022, 94.7% (n=71) reported having underlying medical conditions; overall 95.3% (n=583) of those admitted during 2022 reported having underlying conditions
  - Among SARI cases for whom admission to ICU is known, admitted during weeks 44-47 2022, 26.7% (4/15) were reported to have been admitted to ICU and/or required respiratory support, compared to 56.9% (278/489) during weeks 1-47 2022
  - Among SARI cases admitted since the roll-out of the second COVID-19 booster (22/04/2022) who tested positive by PCR for SARS-CoV-2 with known vaccination status, 76.5% (65/85) had not received a second booster vaccine dose >7 days prior to their onset of illness
  - Of those discharged, with known outcome, admitted during 2022, 10% (n=45) died in hospital

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Background

Severe acute respiratory infection (SARI) is of major relevance to public health worldwide. Surveillance of SARI is essential to monitor the (co-) circulation of respiratory pathogens and to assess disease severity. Data collected as part of SARI surveillance can provide important early warning information in the context of respiratory disease outbreaks and pandemics. SARI data can also be used as a platform to measure vaccine and antiviral effectiveness and impact.

The objectives of SARI surveillance are:

- To describe the number and incidence of SARI cases by aetiology, time, place and person
- To describe and monitor trends, intensity of activity and severity of SARI infections
- To identify groups at risk of severe disease
- To detect unusual and unexpected events
- To assess the SARI burden of disease in the participating hospital
- To assess and monitor vaccine and antiviral effectiveness

Methods

SARI surveillance was implemented in one tertiary care adult hospital; St. Vincent's University Hospital, Dublin (SVUH). Surveillance commenced on the 5th of July 2021. SARI cases are identified from new admissions through the Emergency Department (E/D).The SARI surveillance system includes people who are aged 15 years or older.

Case definition

SARI cases are identified from new admissions through the Emergency Department, based on clinical symptoms. Patients that develop SARI during their admission, or are admitted through alternate routes, are not included in the surveillance system.

Clinical SARI case:

The European Centre for Disease Prevention and Control (ECDC) clinical SARI case definition is currently used for the SARI surveillance project in Ireland:

- ECDC SARI definition: A hospitalised (defined as hospitalised for at least 24 hours) person with acute respiratory infection, with at least one of the following symptoms: cough, fever, shortness of breath OR sudden onset of anosmia, ageusia or dysgeusia with onset of symptoms within 14 days prior to hospital admission.

The ECDC clinical SARI case definition has been used for the SARI surveillance project since week 34 2021. The World Health Organization (WHO) clinical SARI case definition was used from week 27 to week 33 2021. The WHO SARI definition is defined as follows A hospitalised* person with an acute respiratory infection, and history of fever or measured fever of ≥ 38°C, and cough, and onset within the last 10 days.

Denominator data

Denominator data for hospital catchment area are based on population projections for 2021. Population projections are provided by the Health Intelligence Unit (HIU) of the Health Service Executive (HSE) and were extracted from Health Atlas Ireland on 31/08/2021.

Denominator data on all-cause hospital admissions, via the Emergency Department, were provided by the SVUH statistics department.

Data collection and reporting

Clinical data were collected and managed using REDCap electronic data capture tools hosted at University College Dublin. Laboratory data is extracted from APEX, the laboratory information management system (LIMS), using IBM Cognos software hosted at SVUH.

Case-based data are reported by SVUH to the HSE Health Protection Surveillance Centre (HPSC) on a weekly basis. Data are also reported by HPSC to ECDC via The European Surveillance System (TESSy) on weekly basis as part of European level SARI surveillance.

COVID-19 vaccination data were collected from the National COVID-19 Vaccination Management System (COVAX), and linked to SARI cases by the HSE-Integrated Information service, where data were available.

Reference dates[1]

05/07/2021 (Week 27 2021) – Commencement of SARI surveillance project

27/09/2021 (Week 39 2021) – Rollout of the first COVID-19 booster vaccination

22/04/2022 (Week 16 2022) – Rollout of the second COVID-19 booster vaccination

Week number refers to the week of hospital admission. Weeks run from Monday to Sunday, as per the international ISO week[2].

[1] Refer to Health Protection Surveillance Centre (hpsc.ie) for further details on the COVID-19 pandemic waves in Ireland
[2] Monday to Sunday (ISO week) used as per ECDC/WHO/international reporting protocol

Results

SARI cases and incidence rates

In total, 612 SARI cases were admitted to St. Vincent's University Hospital (SVUH) during 2022 (weeks 1-47 2022).

In week 47 2022:

- 24 SARI cases were reported in week 47 2022, compared to 19 SARI cases reported in week 46 2022 (Figure 1).
- The SARI incidence rate was 7.9 per 100,000 hospital catchment population aged ≥15 years, compared to the rate of 6.2 per 100,000 in week 46 2022.
- The SARI incidence rate per emergency hospitalisations was 87 per 1,000, compared to the rate of 68.3 per 1,000 in week 46 2022.

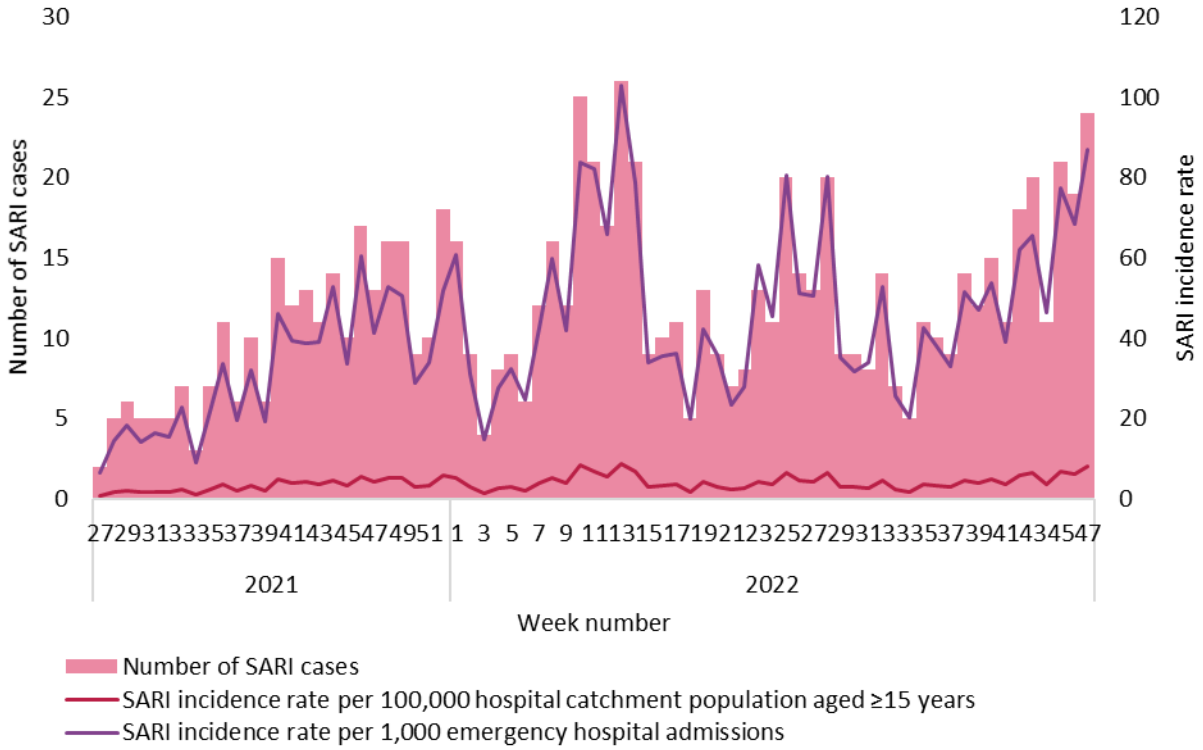

Figure 1 Number and incidence of SARI hospitalised cases (emergency admission) by week of hospital admission, since SARI surveillance began to current week (week 47) 2022 (n=864).

NOTE: Data were extracted from the SARI surveillance database at HPSC on 30/11/2022, and are subject to ongoing review, validation and update. As a result, figures in this report may differ from previously published figures.

Demographics

In week 47 2022, of the 24 SARI cases reported:

- Females accounted for a higher proportion of SARI cases (n=14, 58.3%) (Table 1)
- The median age of SARI cases admitted was 73 years (interquartile range: 65 - 79 years)
- The incidence rate amongst those aged 65 years and older was 31.7 per 100,000, compared to the rate of 21.7 per 100,000 in week 46 2022.

Table 1 Number and proportion of SARI cases by sex and age, for the current week (week 47), weeks 44 to 47, 2022, and for weeks 1-47 2022.

		Week 47, 2022		Weeks 44-47 2022		Weeks 1-47 2022	
		n	%	n	%	n	%
Total number of SARI cases		24		75		612	
Sex	Male	10	41.7	30	40.0	312	51.0
	Female	14	58.3	45	60.0	300	49.0
Age (years)	Mean	72		71		72	
	Median	73		74		75	
	Interquartile range	65 - 79		65 - 82		64 - 83	
	Range	47 - 92		20 - 92		16 - 101	
Age group	15-24 years	0	0.0	3	4.0	14	2.3
	25-34 years	0	0.0	0	0.0	13	2.1
	35-44 years	0	0.0	1	1.3	18	2.9
	45-54 years	2	8.3	2	2.7	38	6.2
	55-64 years	3	12.5	12	16.0	76	12.4
	65-74 years	8	33.3	20	26.7	133	21.7
	75-84 years	7	29.2	24	32.0	189	30.9
	85+ years	4	16.7	13	17.3	131	21.4

*Surveillance excludes children under 15 years of age

The incidence rate per 100,000 hospital catchment population by age group is shown in Figure 2.

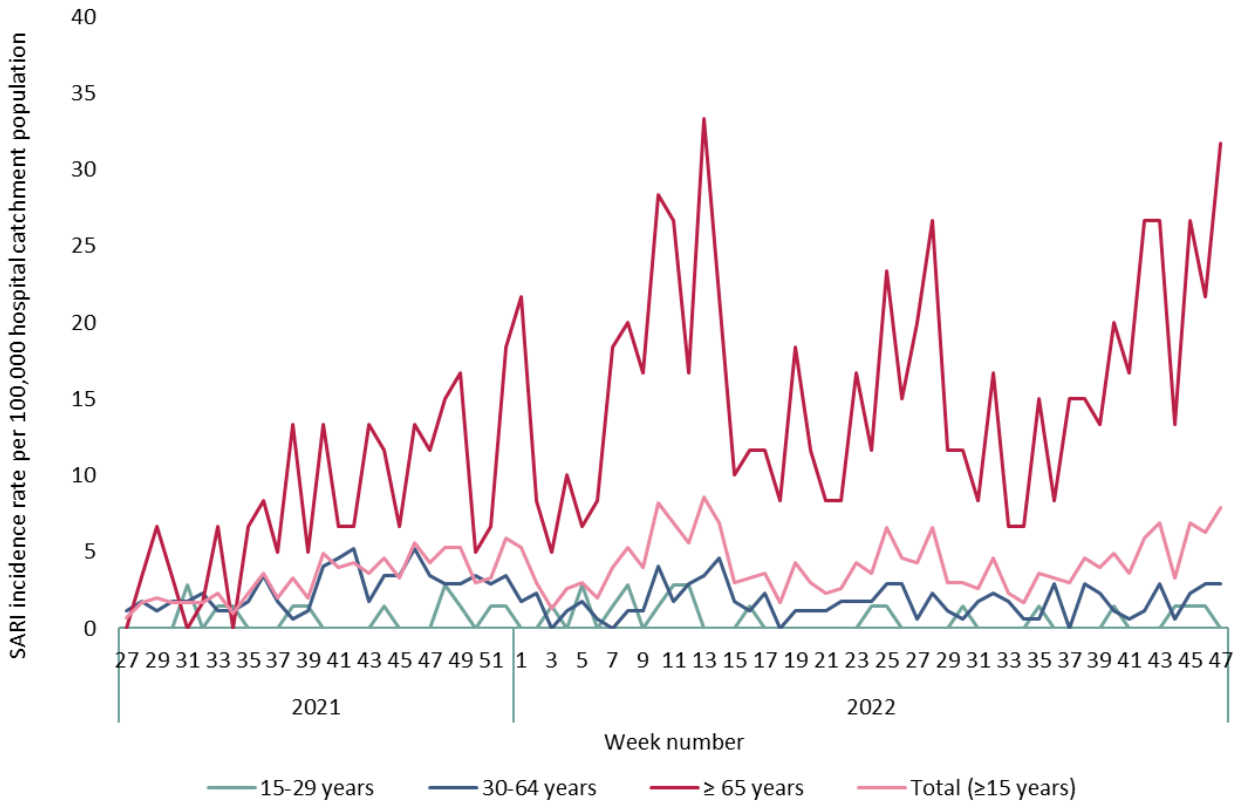

Figure 2 SARI incidence rate per 100,000 hospital catchment population by age group and week of hospital admission, since SARI surveillance began to the current week (week 47) 2022 (n=864)

Underlying medical conditions and risk factors

The number and proportion of individual underlying medical conditions, where known, among those that reported having underlying medical conditions are displayed in table 2.

Weekly proportions can be based on small numbers and can vary from week to week; caution is therefore advised interpreting changes in weekly proportions.

Table 2 Number and proportion of SARI cases with pre-existing conditions, reported on hospital admission, for week 47, weeks 44 – 47 and weeks 1-47, 2022.

Underlying medical condition*	Week 47 2022 (n=22)		Weeks 44-47 2022 (n=71)		Weeks 1-47 2022 (n=583)	
	n	%	n	%	n	%
Heart disease	10	**41.7**	28	**39.4**	240	**41.2**
Hypertension	6	**25.0**	29	**40.8**	234	**40.1**
Lung disease	10	**41.7**	29	**40.8**	200	**34.3**
Cancer	5	20.8	18	25.4	126	21.6
Neurological disease	4	16.7	17	23.9	104	17.8
Asthma	4	16.7	19	26.8	91	15.6
Diabetes	3	12.5	14	19.7	98	16.8
Kidney disease	0	0.0	5	7.0	41	7.0
Intellectual disability	0	0.0	2	2.8	26	4.5
Immunocompromised	1	4.2	1	1.4	17	2.9
Obesity	0	0.0	0	0.0	16	2.7
Cystic fibrosis	0	0.0	0	0.0	2	0.3
Other chronic conditions**	12	50.0	35	49.3	279	47.9

*SARI cases could be reported with one or more underlying medical condition
** Data reported on other chronic conditions may include some of the chronic conditions listed above; these data are under review and may change over time.

Among female SARI cases admitted during weeks 44-47 2022, none were reported as being pregnant at the time of admission. In total during weeks 1-47 2022, 1.4% (n=4) of female SARI cases were reported as being pregnant.

Healthcare workers accounted for 2.7% (n=2) of SARI cases admitted during weeks 44-47 2022. In total during weeks 1-47 2022, 2.6% (n=15) of SARI cases were reported as being healthcare workers.

Symptoms

Information on clinical symptoms, either at or prior to hospital admission, was reported for all SARI cases. The most common symptoms reported were cough and shortness of breath (Table 3).

Table 3 Number and proportion of SARI cases with clinical symptoms, either at or prior to hospital admission, for week 47 2022, weeks 44 to 47 2022, and weeks 1-47 2022.

Clinical symptom*	Week 47 2022 (n= 24)		Weeks 44 - 47 2022 (n= 75)		Weeks 1-47 2022 (n= 612)	
	n	%	n	%	n	%
Cough	22	**91.7**	61	**81.3**	475	**77.6**
Shortness of breath	17	**70.8**	53	**70.7**	453	**74.0**
Fever	9	37.5	27	36.0	282	46.1
General deterioration	12	50.0	37	49.3	251	41.0
Malaise	1	4.2	8	10.7	83	13.6
Headache	2	8.3	3	4.0	33	5.4
Muscular pain	1	4.2	2	2.7	35	5.7
Sore throat	4	16.7	5	6.7	44	7.2
Ageusia	0	0.0	0	0.0	4	0.7
Anosmia	0	0.0	0	0.0	4	0.7
Dysgeusia	0	0.0	0	0.0	3	0.5

*SARI cases could be reported with one or more clinical symptom

Severe clinical course during hospitalisation

Information on the clinical course during hospitalisation is only available after discharge and there may be a delay between discharge and data collection, due to the manual data collection methods required.

Among those for whom discharge information is available, the most common complication reported was pneumonia, see table 4 for further information.

Table 4 Number and proportion of SARI cases by complication, for weeks 44-47 2022, and weeks 1-47 2022

	Weeks 44-47 2022 (n=2)		Weeks 1-47 2022 (n=452)	
Complications*	**n**	**%**	**n**	**%**
Pneumonia	1	50.0	50	**11.1**
ARDS	0	0.0	43	9.5
Sepsis	0	0.0	11	2.4
Multiorgan failure	0	0.0	1	0.2
Myocarditis	0	0.0	0	0.0
Long COVID	0	0.0	0	0.0
Other complications**	1	50.0	126	27.9
No complications	0	0.0	251	55.5
Unknown	0	0.0	2	0.4

*SARI cases could be reported with one or more complication

**Data reported on “other complications” may include some of the complications listed above; these data are under review and may change over time.

Information on ICU admission and respiratory support may be available prior to discharge, see table 5, however length of stay in ICU is only available after discharge, therefore, data on ICU length of stay for weeks 44-47 are not included, due to the small numbers involved.

Table 5 Number and proportion of SARI cases by respiratory support and ICU admission, for weeks 44-47 2022, weeks 1-47 2022

		Weeks 44-47 2022 (n=3)		Weeks 1-47 2022 (n=453)	
		n	**%**	**n**	**%**
Respiratory support	High-flow oxygen therapy*	3	100.0	260	57.4
	Invasive ventilation	0	0.0	14	3.1
	No respiratory support given	0	0.0	179	39.5
		(n=15)		**(n=489)**	
		n	**%**	**n**	**%**
Admitted to ICU	Yes	2	13.3	25	5.1
	Yes, and/or respiratory support	4	26.7	278	56.9
	No	13	86.7	464	94.9
ICU length of stay (days)**	Mean	-		21	
	Median	-		9	
	Interquartile range	-		6 - 36	
	Range	-		<1-72	

*Non-invasive ventilation

**Data on ICU length of stay are not available for weeks 44-47 due to low number of cases discharged

Data collection is ongoing for those not yet discharged from hospital.

Laboratory testing for SARS-CoV-2, influenza and RSV

PCR testing:

SARI cases are tested by PCR for SARS-CoV-2, influenza and RSV on admission. For a small proportion of cases, there is a lag time with testing for influenza and RSV[3].

In week 47 2022:

- SARS-CoV-2 PCR testing was carried out on all SARI cases, three (12.5%) of which were positive, compared to 5.3% (n=1) positivity in week 46 2022 (Figure 3)
- Influenza PCR testing was carried out on 22 (91.6%) SARI cases, one (5%) of which was positive for influenza B, there were no positive influenza cases in week 46 2022.
- RSV PCR testing was carried out on 22 (91.6%) SARI cases, four (18.2%) of which were positive, compared to 21.1% (n=4) in week 46 2022.

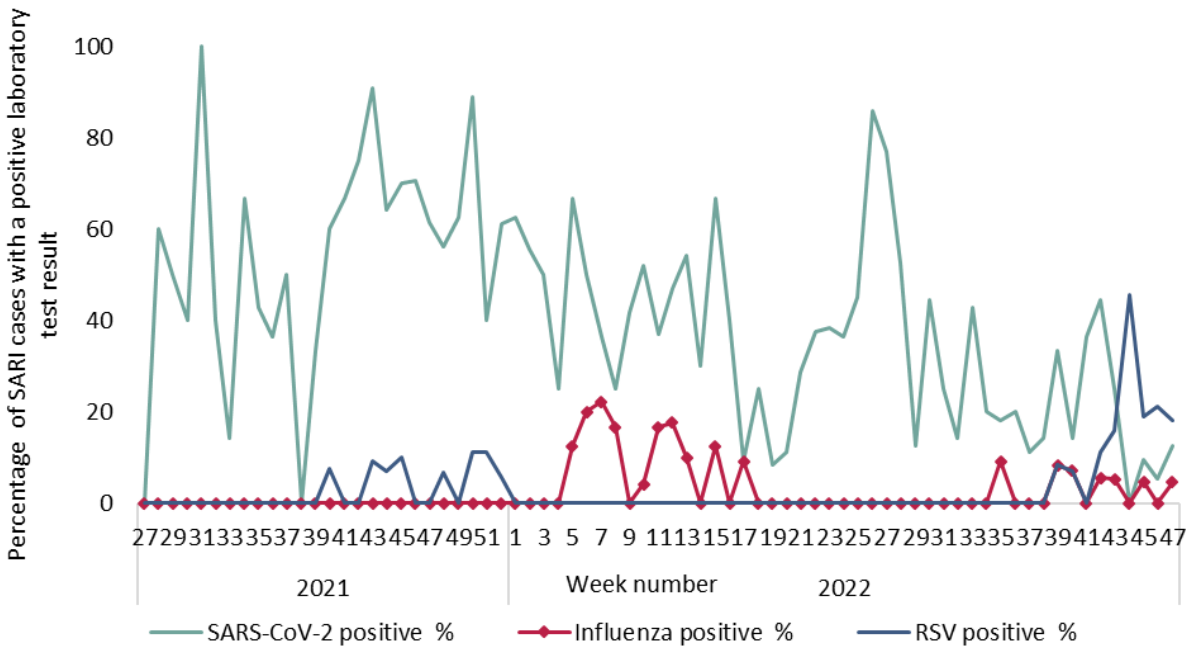

Figure 3 Percentage of SARI cases with a positive laboratory test result for SARS-CoV-2, influenza and RSV by week, since the beginning of SARI surveillance to the current week (week 47, 2022).

SARS CoV-2:

SARS-CoV-2 PCR testing is carried out on admission, table 6 displays the number and proportion of SARI cases tested for SARS-CoV-2 by PCR test result.

[3] Due to reagent supply issues, samples are occasionally sent to external laboratories for influenza and RSV testing.

Table 6 Number and proportion of SARI cases tested for SARS-CoV-2, for week 47 2022, weeks 44 to 47, 2022 and weeks 1-47, 2022

Laboratory test	Laboratory test result	Week 47 2022 (n=24)		Weeks 44-47 2022 (n=75)		Weeks 1-47 2022 (n=601)	
		n	%	n	%	n	%
Tested for SARS-CoV-2	Positive	3	**12.5**	7	**9.3**	206	**34.3**
	Negative	20	83.3	66	88.0	367	61.1
	Indeterminate*	1	4.2	2	2.7	28	4.7

* Ct value (cycle threshold) >30

RSV and influenza:

The influenza surveillance season runs from week 40 (early October) to week 20 (end of May) each season. During this time, seasonal influenza viruses and RSV usually circulate at higher levels, compared to the summer period.

Samples that are PCR positive for influenza are sent to the NVRL for influenza typing/subtyping/genetic and antigenic characterisation.

Table 7 displays the influenza type/subtype for all influenza positive samples and RSV PCR test results during the 2022/2023 influenza season (weeks 40-47 2022).

Table 7 Number of positive RSV and influenza SARI cases and influenza type/subtype for current week (week 47), preceding week (week 46) and 2022/2023 season (weeks 40-47 2022)

Positive laboratory result	Week 47 2022 (n= 22)		Week 46 2022 (n=19)		2022/2023 season (n=135)	
	n	%	n	%	n	%
RSV	4	**18.2**	4	**21.1**	23	**17.0**
Influenza A (H1)pdm09	0	0	0	0	2	1.5
Influenza A (H3)	0	0	0	0	1	0.7
Influenza A (not subtyped)	0	0	0	0	1	0.7
Influenza B	1	4.5	0	0	1	0.7
Total influenza	1	**4.5**	0	**0**	5	**3.7**

Genomic analysis:

SARS-CoV-2:

SARI samples that are positive for SARS-CoV-2 and that have a cycle threshold (Ct) value <25 are referred for whole genome sequencing (WGS).

Since SARI surveillance began (week 27 2021) to week 44 2022, all WGS testing was performed in the National Virus Reference Laboratory (NVRL). The molecular lab in SVUH has been identified as a spoke WGS testing site as part of the national SARS-CoV-2 WGS surveillance programme, and from week 45 2022, SARI WGS testing will be performed on-site at SVUH.

In 2022 (weeks 1 to 47), 85% (n=175) SARS-CoV-2 positive SARI samples have met the Ct criteria for WGS, of these 9.7% (n=17) were not sequenced, for reasons such as insufficient sample volume, or the sample could not be located, results are pending on 10.3% (n=18), and results have been received for 80% (n=140), see figure 4 below.

Omicron has been the dominant variant identified in SARI cases admitted in 2022, 99.3% (n=139) of samples sequenced were identified as Omicron, the last Delta variant was identified in week 1 2022.

ECDC has placed the Omicron BA.4 and BA.5 sublineages with the spike mutation R346X on the list of variants under monitoring (VUMs). There have been three SARI cases identified with this mutation, admitted in weeks 34, 36 and 45 2022.

Figure 4 shows sequenced SARI cases by week of hospitalisation and Pango Lineage for cases admitted since SARI surveillance began to the current week, further information on Pango Lineage is available in the appendix (Table A1).

Further sequencing data on cases admitted between weeks 41 and weeks 47 2022, are still awaited.

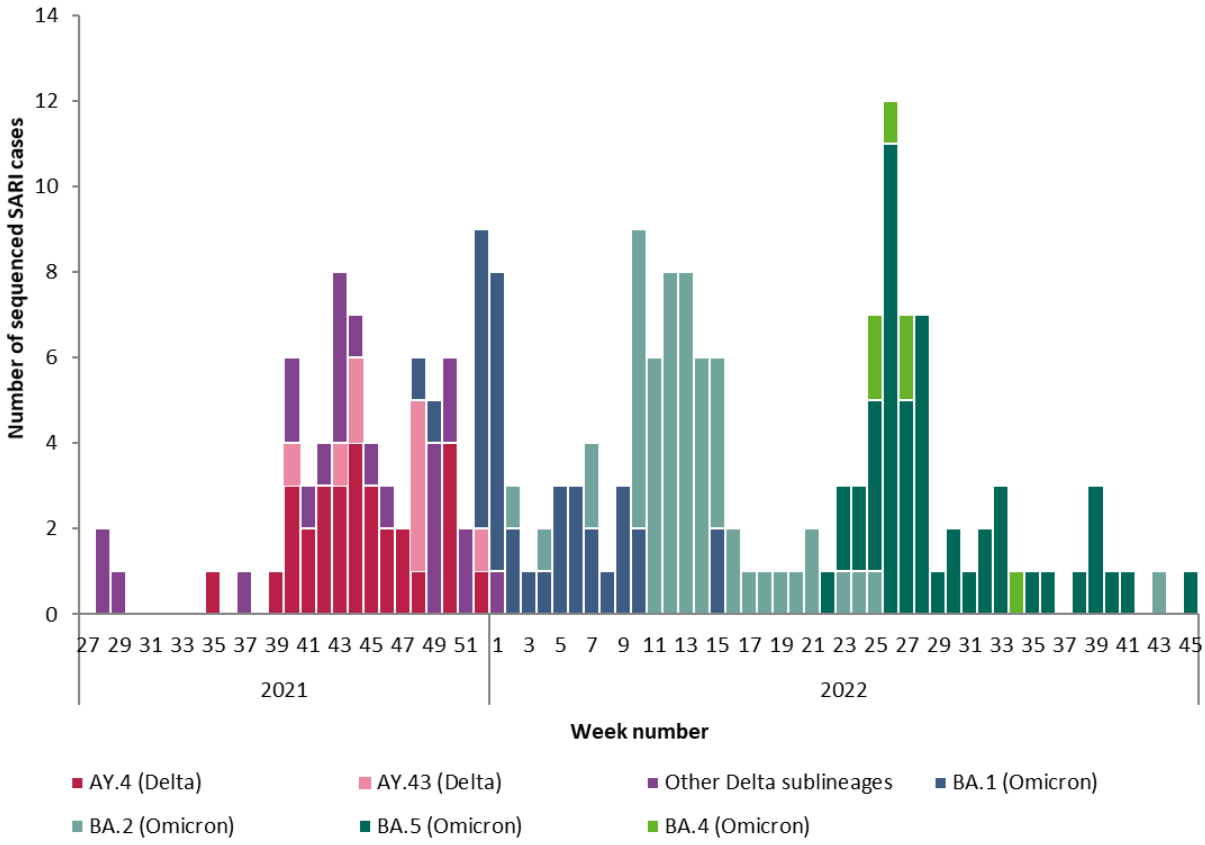

Figure 4 Number of SARI cases sequenced and reported by the National Virus Reference Laboratory, by week of hospitalisation, since SARI surveillance began to the week 45 2022 (n=211)

COVID-19 Vaccination status

Vaccination data are available approximately one week after cases are notified, therefore the vaccination status for the current week's SARI cases is recorded as unknown.

Amongst the SARI cases, admitted since the rollout of the second booster (22/04/2022), who tested positive by PCR for SARS-CoV-2 with known COVID-19 vaccination status, 76.5% (n=65) had not received a second booster vaccine dose >7 days prior to the epidemiological date of their episode of illness (Table 8).

Refer to the technical notes for the full list of definitions regarding epidemiological date and COVID-19 vaccination status[4].

NOTE: Data are provisional and subject to ongoing review, validation and update.

Table 8 Number and proportion of SARI cases by COVID-19 vaccination status, SARS-CoV-2 PCR result and date of hospitalisation

SARS CoV-2 PCR positive	Admitted since rollout of second booster* (n=287)		Weeks 1-47 2022 (n=473)	
Vaccine status	**n**	**%**	**n**	**%**
Not vaccinated	9	10.6	19	10.9
Primary series - Partial	0	0.0	1	0.6
Primary series - Complete	8	9.4	28	16.0
First booster	48	56.5	107	61.1
Second booster	20	23.5	20	11.4
Total	**85**	**100**	**175**	**100**
SARS CoV-2 PCR negative				
Vaccine status	**n**	**%**	**n**	**%**
Not vaccinated	3	1.5	7	2.3
Primary series - Partial	0	0.0	0	0.0
Primary series - Complete	15	7.4	30	10.1
First booster	113	55.9	190	63.8
Second booster	71	35.1	71	23.8
Total	**202**	**100**	**298**	**100**

*Rollout of second booster began on 22/04/2022

Table 9 displays the clinical course and outcome of those admitted since the rollout of the second booster (22/04/2022) by SARS CoV-2 PCR result and vaccination status.
Data collection for clinical course and outcome is on-going for those still admitted.

Table 9 Number and proportion of SARI cases, admitted since the rollout of the second booster, by COVID-19 vaccination status, and SARS-CoV-2 PCR result (n=287)

SARS CoV-2 PCR positive			Required respiratory support		ICU admission		Died in hospital	
Vaccination status	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Not vaccinated	9	10.6	3	10.0	0	0.0	0	0.0
Primary series - Partial	0	0.0	0	0.0	0	0.0	0	0.0
Primary series - Complete	8	9.4	3	10.0	0	0.0	0	0.0
First booster	48	56.5	17	56.7	2	66.7	3	75.0
Second booster	20	23.5	7	23.3	1	33.3	1	25.0
Total	**85**	**100**	**30**	**100**	**3**	**100**	**4**	**100**
SARS CoV-2 PCR negative								
Vaccination status	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Not vaccinated	3	1.5	3	3.6	0	0.0	0	0.0
Primary series - Partial	0	0.0	0	0.0	0	0.0	0	0.0
Primary series - Complete	15	7.4	7	8.4	0	0.0	1	14.3
First booster	113	55.9	54	65.1	4	100.0	3	42.9
Second booster	71	35.1	19	22.9	0	0.0	3	42.9
Total	**202**	**100**	**83**	**100**	**4**	**100**	**7**	**100**

[4] Refer to www.hse.ie for further information on the COVID-19 vaccination rollout

Outcome

Of the 612 SARI cases admitted during 2022, 73.9% (n=452) have been discharged (Table 10). During weeks 44 to 47 2022, 75 SARI cases were admitted to St Vincent's University Hospital, discharge data are available for 2.7% (n=2), collection of discharge data is a manual process, therefore there is a significant lag time between discharge and data collection.

Of the 45 cases admitted during 2022, who died in hospital, 32 (71.1%) were male and 13 (28.9%) were female. The median age was 82 years (interquartile range 75 – 87 years).

Table 10 Number and proportion of discharged SARI cases by outcome and hospital length of stay, for weeks 44 to 47, 2022, and weeks 1-47 2022.

		Weeks 44-47 2022 (n=2)		Weeks 1-47 2022 (n=452)	
		n	%	n	%
Outcome	Discharged alive	1	50.0	397	87.8
	Transferred to another hospital	0	0.0	10	2.2
	Died in hospital	1	50.0	45	10.0
Hospital length of stay (days)	Mean	3		12	
	Median	2		6	
	Interquartile range	1 - 3		3 - 13	
	Range	1 - 6		1 - 136	

Acknowledgements

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This report was produced by the SARI surveillance team at HPSC: Róisín Duffy, Adele McKenna, Lisa Domegan, Joan O'Donnell.

Technical notes

1. SARI case

A SARI case refers to an individual patient episode of care.

2. Epidemiological date

Epidemiological date is used to determine timing of Severe Acute Respiratory Infections. Epidemiological date is based on the earliest date available on the case, taken from date of onset of symptoms, laboratory specimen collection date, and date of hospitalisation.

3. Vaccination status

For the purposes of SARI surveillance, vaccination status of cases is as follows:

- **Primary vaccination series – Partial completion**, if:
  - Received one dose of a recommended two-dose vaccine schedule and the epidemiological date is ≥14 days after receipt of dose one.
  - Date of receipt of dose two of a recommended two-dose vaccine schedule is <14 days before the epidemiological date.
  - No identifiable linked record on the National COVID-19 Immunisation system, of receiving dose two of a recommended two-dose COVID-19 vaccine schedule.

- **Primary vaccination series - Complete**, if:
  - Received one dose of a recommended one-dose vaccine schedule, and the epidemiological date is ≥14 days after receipt of the dose.
  - Received two doses of a recommended two-dose vaccine schedule, and the epidemiological date is ≥14 days after receipt of the second dose.
  - Received three doses of a recommended three-dose vaccine schedule, and the epidemiological date is >7 days after receipt of the third dose. The recommended primary series for immunocompromised individuals is three doses of a recommended vaccine.
  - Date of receipt of first booster dose is ≤7 days before the epidemiological date.
  - There is no identifiable linked record on the National COVID-19 Immunisation system of receiving a booster dose of a recommended COVID-19 vaccine schedule.

- **First booster dose**, if:
  - They had a first booster dose of a recommended vaccine schedule, and the epidemiological date is >7 days after receipt of the booster dose.
  - Date of receipt of second booster dose is ≤7 days before the epidemiological date.
  - There is no identifiable linked record on the National COVID-19 Immunisation system of receiving a second booster dose of a recommended COVID-19 vaccine schedule.

- **Second booster dose**, if:
  - They had a second booster dose of a recommended vaccine schedule, and the epidemiological date is >7 days after receipt of the booster dose.

- **Not vaccinated**, if the following applies:
    - Vaccination record on the National COVID-19 Immunisation system indicates the person was vaccinated after the epidemiological date.
    - The SARI patient was reported as not vaccinated on the SARI hospital clinical questionnaire, and there is no identifiable linked record of COVID-19 vaccination on the National COVID-19 Immunisation system.

- **Vaccine status unknown**, if:
    - The SARI patient is reported on the SARI hospital clinical questionnaire as vaccinated, however there is no identifiable linked record of COVID-19 vaccination on the National COVID-19 Immunisation system. Vaccination status is reported as unknown, until verified on the National COVID-19 Immunisation system.
    - The SARI patient is reported on the SARI hospital clinical questionnaire as vaccination status unknown, AND there is no identifiable linked record of COVID-19 vaccination on the National COVID-19 Immunisation system

Appendix

Table A1

Number and proportion of SARI cases sequenced and reported by the National Virus Reference Laboratory, by Pango lineage, SARI cases week 27 2021 to week 45, 2022, (n=211)

Virus variant	Number of cases	% sequenced cases
Total sequenced	**211**	
Delta and Delta sublineages:	**63**	**29.9**
AY.4	30	14.2
AY.43	9	4.3
B.1.617.2	5	2.4
AY.122	4	1.9
AY.5	4	1.9
AY.4.5	2	0.9
AY.4.6	2	0.9
AY.4.2.2	1	0.5
AY.6	1	0.5
AY.4.10	1	0.5
AY.46.6	1	0.5
AY.98	1	0.5
AY.4.2*	2	0.9
Omicron sublineages	**148**	**70.1**
BA.1 lineages:		
BA.1	22	10.4
BA.1.1	14	6.6
BA.2 lineages:		
BA.2	41	19.4
BA.2.9	6	2.8
BA.2.3	5	2.4
BA.2.1	1	0.5
BA.2.18	1	0.5
BA.2.40.1	1	0.5
CV.1	1	0.5
BA.4 lineages:		
BA.4	4	1.9
BA.4.1	1	0.5
BA.4.4	1	0.5
BA.4.6	1	0.5
BA.5 lineages:		
BA.5.1	18	8.5
BA.5.2.1	8	3.8
BA.5	5	2.4
BA.5.2	6	2.8
BE.1	4	1.9
BF.7	2	0.9
BQ.1.8	2	0.9
BA.5.3	1	0.5
BA.5.2.6	1	0.5
BF.1	1	0.5
BQ.1	1	0.5

* Variant of interest