



Weekly Report on Severe Acute Respiratory Infection (SARI), Week 1 2023 (week ending 08/01/2023)

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 1 2023. **Due to the extended holiday period, data collection is on-going for weeks 51 and 52 2022, the data shown for these weeks is incomplete.**

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 1 2023 (week ending 08/01/2023):
 - There were 30 SARI cases reported in week 1 2023, a decrease compared to 33 SARI cases reported during week 52 2022
 - The incidence rate per emergency hospitalisations was 107.1 per 1,000 emergency admissions, a decrease compared to 115.4 per 1,000 during week 52 2022
 - The incidence rate per hospital catchment population was 9.9 per 100,000 population aged ≥ 15 years, a decrease compared to the rate of 10.9 per 100,000 in week 52 2022
 - The highest proportion of SARI cases was among those aged 65 years and older (n=22; 73.3%), median age was 75 years (interquartile range (IQR): 64–81)
 - Among SARI cases admitted in week 1 2023, 24 (80%) were reported as having underlying medical conditions
 - SARS-CoV-2 PCR testing was carried out on all SARI cases, four (13.3%) of which tested positive, an increase compared to 9.4% (n=3) in week 52 2022
 - Influenza PCR testing was carried out on all SARI cases, ten (33.3%) of which tested positive for influenza A (not subtyped), compared to 34.4% (n=11) positivity in week 52 2022.
 - Respiratory syncytial virus (RSV) PCR testing was carried out on all SARI cases, three (10%) of which tested positive, an increase compared to 3.1% (n=1) positivity in week 52 2022
- There were 107 SARI cases admitted to St. Vincent's University Hospital (SVUH) between weeks 50 2022 and 1 2023. In total, during 2022, 727 SARI cases have been admitted to SVUH
 - The median age of SARI cases admitted during weeks 50 2022-1 2023 was 75 years (IQR: 65-82 years), the median age of all cases admitted in 2022 was 75 years (IQR: 64-83 years)
 - Among SARI cases admitted during weeks 50 2022–1 2023, 62.6% (n=67) reported having underlying medical conditions; overall 90.4% (n=657) of those admitted during 2022 reported having underlying conditions
 - Among SARI cases for whom admission to ICU is known, admitted during weeks 50 2022-1 2023 2022, 70.6% (12/17) were reported to have been admitted to ICU and/or required respiratory support, compared to 59.7% (352/590) during 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, 68% (68/100) 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, 10.5% (n=60) died in hospital

Table of Contents

Key points	
Background	3
Methods.....	3
Results	5
SARI cases and incidence rates.....	5
Demographics.....	6
Underlying medical conditions and risk factors	7
Symptoms	8
Severe clinical course during hospitalisation	8
Laboratory testing for SARS-CoV-2, influenza and RSV	10
COVID-19 Vaccination status.....	12
Outcome	14
Acknowledgements.....	15
Technical notes.....	15
Appendix.....	17
Table A1.....	17

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 $\geq 38^{\circ}\text{C}$, 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 dates¹

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 week².

¹ Refer to [Health Protection Surveillance Centre \(hpsc.ie\)](https://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, 727 SARI cases were admitted to St. Vincent’s University Hospital (SVUH) during 2022. Data collection is on-going for weeks 51 and 52 2022.

In week 1 2023:

- 30 SARI cases were reported in week 1 2023, compared to 33 SARI cases reported in week 52 2022 (Figure 1).
- The SARI incidence rate was 9.9 per 100,000 hospital catchment population aged ≥15 years, compared to the rate of 10.9 per 100,000 in week 52 2022.
- The SARI incidence rate per emergency hospitalisations was 107.1 per 1,000, compared to the rate of 115.4 per 1,000 in week 52 2022.

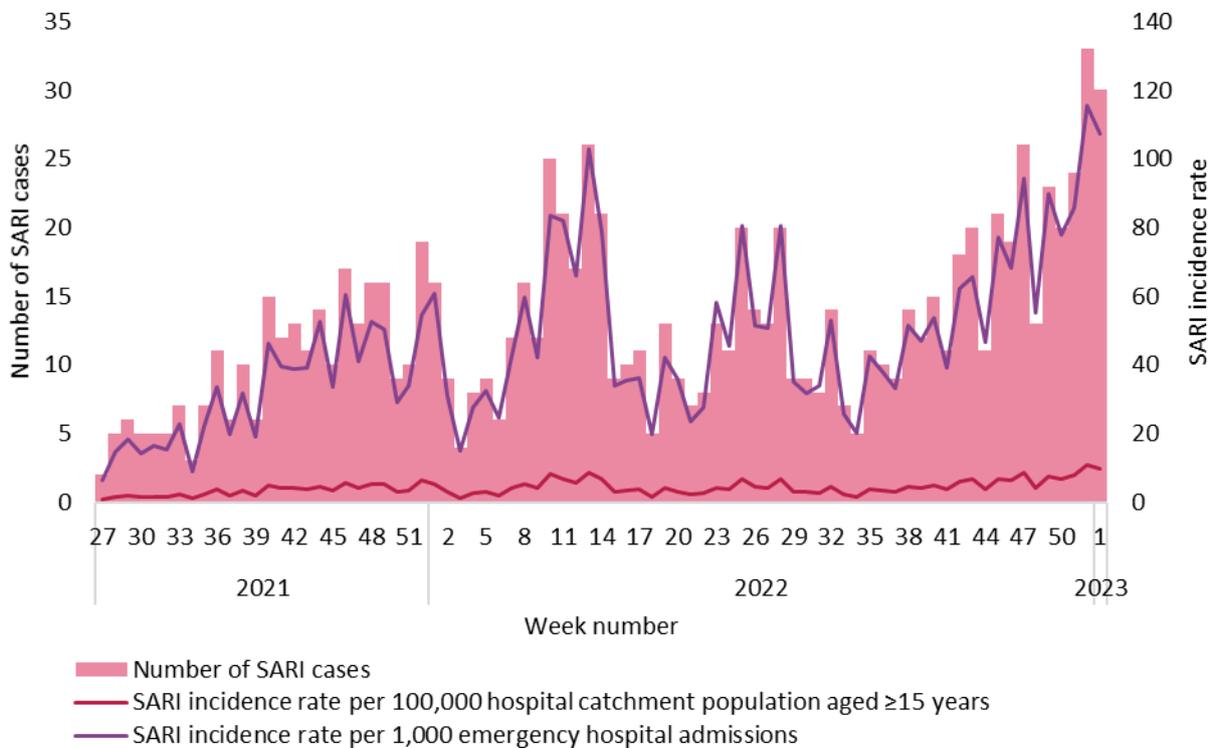


Figure 1 Number and incidence of SARI hospitalised cases (emergency admission) by week of hospital admission, since SARI surveillance began to current week (week 1 2023) (n=1010). Data collection is on-going for weeks 51 and 52 2022.

NOTE: Data were extracted from the SARI surveillance database at HPSC on 11/01/2023, 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 1 2023, of the 30 SARI cases reported:

- Females accounted for a higher proportion of SARI cases (n=17, 56.7%) (Table 1)
- The median age of SARI cases admitted was 75 years (interquartile range: 64 - 81 years)
- The incidence rate amongst those aged 65 years and older was 36.7 per 100,000, compared to the rate of 43.4 per 100,000 in week 52 2022.

Table 1 Number and proportion of SARI cases by sex and age, for the current week, weeks 50 2022 to 1 2023 and for weeks 1-52 2022.

		Week 1, 2023		50 2022 - 1 2023		Weeks 1-52 2022	
		n	%	n	%	n	%
Total number of SARI cases		30		107		727	
Sex	Male	13	43.3	48	44.9	367	50.5
	Female	17	56.7	59	55.1	360	49.5
Age (years)	Mean	69		71		72	
	Median	75		75		75	
	Interquartile range	64 - 81		65 - 82		64 - 83	
	Range	20 - 94		20 - 99		16 - 101	
Age group	15-24 years	2	6.7	3	2.8	16	2.2
	25-34 years	1	3.3	4	3.7	17	2.3
	35-44 years	1	3.3	3	2.8	23	3.2
	45-54 years	2	6.7	5	4.7	42	5.8
	55-64 years	2	6.7	11	10.3	94	12.9
	65-74 years	7	23.3	27	25.2	162	22.3
	75-84 years	10	33.3	37	34.6	227	31.2
85+ years	5	16.7	17	15.9	146	20.1	

*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.

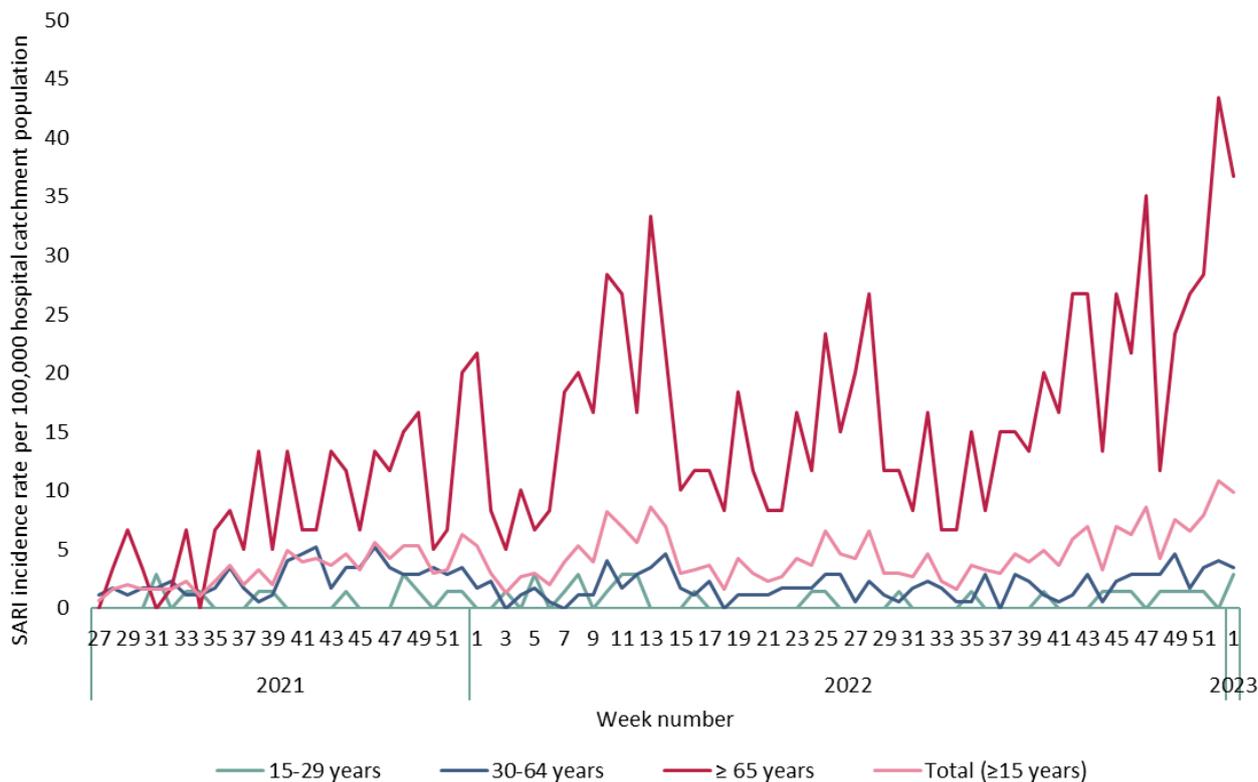


Figure 2 SARI incidence rate per 100,000 hospital catchment population by age group and week of hospital admission, since SARI surveillance began to the current week (week 1 2023) (n=1010)

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 current week, weeks 50 2022 – 1 2023 and weeks 1-52 2022.

Underlying medical condition*	Week 1 2023 (n=24)		50 2022-1 2023 (n=67)		Weeks 1-52 2022 (n=657)	
	n	%	n	%	n	%
Heart disease	5	20.8	25	37.3	272	41.4
Hypertension	15	62.5	29	43.3	259	39.4
Lung disease	3	12.5	24	35.8	231	35.2
Cancer	0	0.0	2	3.0	133	20.2
Neurological disease	8	33.3	18	26.9	116	17.7
Asthma	3	12.5	11	16.4	101	15.4
Diabetes	4	16.7	12	17.9	110	16.7
Kidney disease	1	4.2	1	1.5	46	7.0
Intellectual disability	0	0.0	2	3.0	32	4.9
Immunocompromised	0	0.0	0	0.0	17	2.6
Obesity	1	4.2	2	3.0	17	2.6
Cystic fibrosis	0	0.0	0	0.0	2	0.3
Other chronic conditions**	11	45.8	28	41.8	314	47.8

*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 aged 15-44 years admitted during weeks 50 2022-1 2023, none were reported as being pregnant at the time of admission. In total during 2022, 18.8% (n=6) of female SARI cases aged 15-44 years were reported as being pregnant at the time of admission.

Among those for whom healthcare worker status is known, healthcare workers accounted for 1.6% (1/64) of SARI cases admitted during weeks 50 2022-1 2023. In total during weeks 1-52 2022, 2.2% (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 current week, weeks 50 2022 to 1 2023, and weeks 1-52 2022.

Clinical symptom*	Week 1 2022 (n= 30)		50 2022 - 1 2023 (n= 107)		Weeks 1-52 2022 (n= 727)	
	n	%	n	%	n	%
Cough	22	73.3	60	56.1	543	74.7
Shortness of breath	17	56.7	49	45.8	512	70.4
Fever	13	43.3	40	37.4	326	44.8
General deterioration	13	43.3	41	38.3	298	41.0
Malaise	1	3.3	3	2.8	90	12.4
Headache	0	0.0	1	0.9	38	5.2
Muscular pain	5	16.7	8	7.5	40	5.5
Sore throat	1	3.3	4	3.7	49	6.7
Ageusia	0	0.0	0	0.0	4	0.6
Anosmia	1	3.3	1	0.9	4	0.6
Dysgeusia	0	0.0	0	0.0	3	0.4

*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 discharged SARI cases by complication, for weeks 50 2022-1 2023, and weeks 1-52 2022. Data collection is on-going for weeks 51 and 52 2022.

Complications*	Weeks 50 2022 - 1 2023 (n=9)		Weeks 1-52 2022 (n=569)	
	n	%	n	%
Pneumonia	0	0.0	51	9.0
ARDS	0	0.0	47	8.3
Sepsis	0	0.0	11	1.9
Multiorgan failure	0	0.0	2	0.4
Myocarditis	0	0.0	1	0.2
Encephalitis	0	0.0	1	0.2
Other complications**	0	0.0	149	26.2
No complications	4	44.4	336	59.1
Unknown	5	55.6	7	1.2

*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 50 2022-1 2023 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 50 2022-1 2023, weeks 1-52 2022. Data collection is on-going for weeks 51 and 52 2022.

		Weeks 50 2022 - 1 2023 (n=12)		Weeks 1-52 2022 (n=575)	
		n	%	n	%
Respiratory support	High-flow oxygen therapy*	10	83.3	331	57.6
	Invasive ventilation	0	0.0	18	3.1
	No respiratory support given	2	16.7	226	39.3
		(n=17)		(n=590)	
		n	%	n	%
Admitted to ICU	Yes	2	11.8	28	4.7
	No	15	88.2	262	44.4
	Yes, and/or respiratory support	12	70.6	352	59.7
ICU length of stay (days)**	Mean	-	-	23	-
	Median	-	-	10	-
	Interquartile range	-	-	6 - 36	-
	Range	-	-	<1-85	-

**SARI cases which required invasive and/or non-invasive ventilation and/or ICU admission

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 RSV³.

In week 1 2023:

- SARS-CoV-2 PCR testing was carried out on all SARI cases, four (13.3%) of which were positive, compared to 9.4% (n=3) positivity in week 52 2022 (Figure 3)
- Influenza PCR testing was carried out on all SARI cases, 10 (33.3%) of which were positive for influenza A (not subtyped), compared to 34.4% (n=11) positivity in week 52 2022.
- RSV PCR testing was carried out on all SARI cases, three (10%) of which were positive, compared to 3.1% (n=1) in week 52 2022.

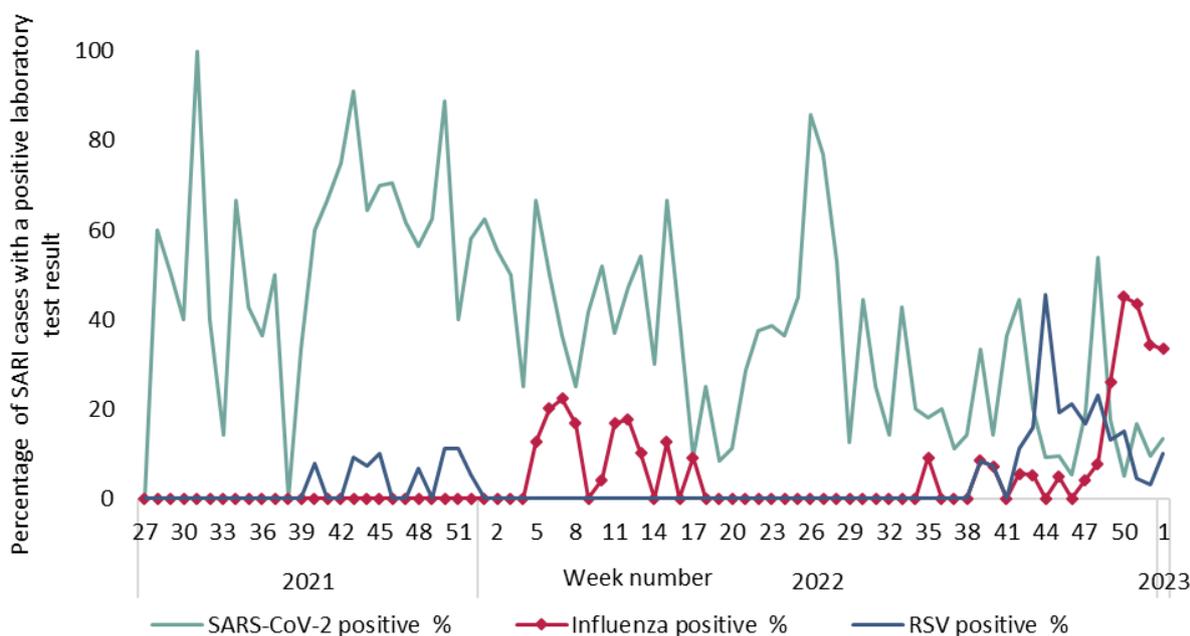


Figure 3 Percentage of SARI cases with a positive laboratory test result for SARS-CoV-2, influenza and RSV by week, since the beginning of SARI surveillance to the current week (week 1, 2023)

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 current week, weeks 50 2022 to 1 2023 and weeks 1-52, 2022

Laboratory test	Laboratory test result	Week 1 2023 (n=30)		50 2022 - 1 2023 (n=106)		Weeks 1-52 2022 (n=715)	
		n	%	n	%	n	%
Tested for SARS-CoV-2	Positive	4	13.3	12	11.3	227	31.7
	Negative	25	83.3	89	84.0	455	63.6
	Indeterminate*	1	3.3	5	4.7	33	4.6

* 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 2022 - 1 2023).

Table 7 Number of positive RSV and influenza SARI cases and influenza type/subtype for current week, preceding week and 2022/2023 season

Positive laboratory result	Week 1 2023 (n=30)		Week 52 2022 (n=32)		2022/2023 season (n=278)	
	n	%	n	%	n	%
RSV	3	10.0	1	3.1	34	12.2
Influenza A (H1)pdm09	0	0	0	0	3	1.1
Influenza A (H3)	0	0	0	0	2	0.7
Influenza A (not subtyped)	10	33.3	11	34.4	46	16.5
Influenza B (Victoria)	0	0	0	0	1	0.4
Total influenza	10	33.3	11	34.4	52	18.7

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.

Since week 1 2022, 85.3% (n=197) SARS-CoV-2 positive SARI samples have met the Ct criteria for WGS, of these 9.1% (n=18) were not sequenced, for reasons such as insufficient sample volume, or the sample could not be located, results are pending on 12.7% (n=25), and results have been received for 78.2% (n=154), see figure 4 below.

Omicron has been the dominant variant identified in SARI cases admitted in 2022, 99.4% (n=153) of samples sequenced were identified as Omicron, the last Delta variant was identified in week 1 2022.

ECDC has placed the Omicron sublineages with K444X and N460X spike mutations and BA.4 and BA.5 sublineages with the spike mutation R346X on the list of variants under monitoring (VUMs). There have been eight SARI cases identified with the R346X mutation, admitted between weeks 34 and 47 2022 , and seven cases identified with the K444X/N460X mutation admitted between weeks 39 and 47 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 and A2). Further sequencing data on cases admitted since week 47 2022, are still awaited.

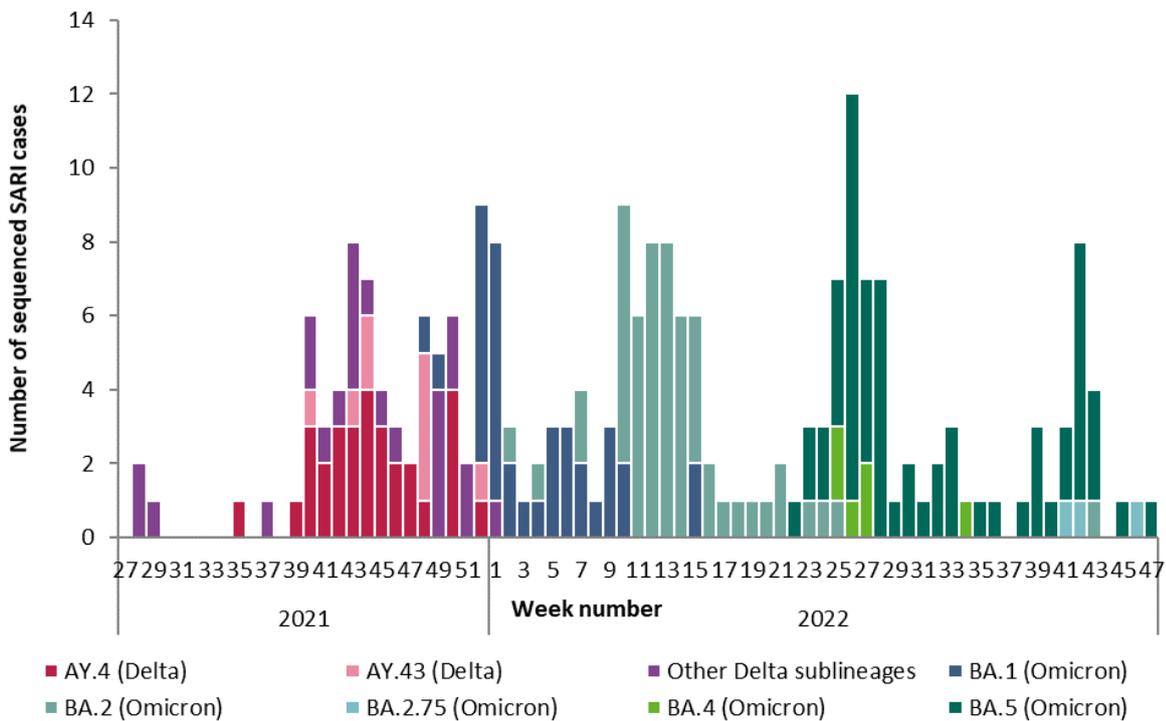


Figure 4 Number of SARI cases sequenced and reported by the National Virus Reference Laboratory, by week of hospitalisation, since SARI surveillance began to week 47 2022 (n=225)

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, 68% (n=68) 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 status⁴.

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=360)		Weeks 1-52 2022 (n=545)	
	Vaccine status	n	%	n
Not vaccinated	10	10.0	20	10.5
Primary series - Partial	0	0.0	1	0.5
Primary series - Complete	9	9.0	29	15.3
First booster	49	49.0	108	56.8
Second booster	32	32.0	32	16.8
Total	100	100	190	100
SARS CoV-2 PCR negative				
Vaccine status	n	%	n	%
Not vaccinated	6	2.3	9	2.5
Primary series - Partial	1	0.4	1	0.3
Primary series - Complete	21	8.1	36	10.1
First booster	128	49.2	205	57.7
Second booster	104	40.0	104	29.3
Total	260	100	355	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=360)

SARS CoV-2 PCR positive			Required respiratory support		ICU admission		Died in hospital	
Vaccination status	n	%	n	%	n	%	n	%
Not vaccinated	10	10.0	3	7.3	0	0.0	0	0.0
Primary series - Partial	0	0.0	0	0.0	0	0.0	0	0.0
Primary series - Complete	9	9.0	3	7.3	0	0.0	0	0.0
First booster	49	49.0	22	53.7	2	66.7	4	80.0
Second booster	32	32.0	13	31.7	1	33.3	1	20.0
Total	100	100	41	100	3	100	5	100
SARS CoV-2 PCR negative								
Vaccination status	n	%	n	%	n	%	n	%
Not vaccinated	6	2.3	3	2.4	1	12.5	1	5.3
Primary series - Partial	1	0.4	0	0.0	0	0.0	0	0.0
Primary series - Complete	21	8.1	13	10.3	0	0.0	1	5.3
First booster	128	49.2	65	51.6	6	75.0	7	36.8
Second booster	104	40.0	45	35.7	1	12.5	10	52.6
Total	260	100	126	100	8	100	19	100

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

Outcome

Of the 727 SARI cases admitted during 2022, 78.3% (n=569) have been discharged (Table 10). During weeks 50 2022 to 1 2023, 107 SARI cases were admitted to St Vincent's University Hospital, discharge data are available for 8.4% (n=9), collection of discharge data is a manual process, therefore there is a significant lag time between discharge and data collection.

Of the 60 cases admitted during 2022, who died in hospital, 41 (68.3%) were male and 19 (31.7%) were female. The median age was 81 years (interquartile range 75 – 86 years).

Table 10 Number and proportion of discharged SARI cases by outcome and hospital length of stay, for weeks 50 2022 to 1 2023 and weeks 1-52 2022.

		Weeks 50 2022 - 1 2023 (n=9)		Weeks 1-52 2022 (n=569)	
		n	%	n	%
Outcome	Discharged alive	9	100.0	499	87.7
	Transferred to another hospital	0	0.0	10	1.8
	Died in hospital	0	0.0	60	10.5
Hospital length of stay (days)	Mean	3		12	
	Median	3		6	
	Interquartile range	1 - 5		3 - 13	
	Range	1 - 11		1 - 136	

Acknowledgements

Sincere thanks are extended to all those who participate in SARI surveillance, including those in St. Vincent's University Hospital, the UCD Clinical Research Centre and the National Virus Reference Laboratory. Thanks to members of the HSE Integrated Information Services (IIS) for work on the SARI-COVAX data linkages.

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This report was produced by the SARI surveillance team at HPSC: Róisín Duffy, Tuba Yavuz, 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 Pango lineage, SARI cases week 27 2021 to week 47, 2022, (n=225)

Virus variant	Number of cases	% sequenced cases
Total sequenced	225	
Delta and Delta sublineages:	63	28.0
AY.4	30	13.3
AY.43	9	4.0
B.1.617.2	5	2.2
AY.122	4	1.8
AY.5	4	1.8
AY.4.5	2	0.9
AY.4.6	2	0.9
AY.4.2.2	1	0.4
AY.6	1	0.4
AY.4.10	1	0.4
AY.46.6	1	0.4
AY.98	1	0.4
AY.4.2	2	0.9

Virus variant	Number of cases	% sequenced cases
Total sequenced	225	
Omicron sublineages	162	72.0
BA.1 lineages:		
BA.1	22	9.8
BA.1.1	14	6.2
BA.2 lineages:		
BA.2	41	18.2
BA.2.9	6	2.7
BA.2.3	5	2.2
BA.2.1	1	0.4
BA.2.18	1	0.4
BA.2.40.1	1	0.4
BA.2.75 lineages		
BN.1.2	1	0.4
BN.1.9	1	0.4
CV.1	1	0.4
BA.4 lineages:		
BA.4	3	1.3
BA.4.1	1	0.4
BA.4.4	1	0.4
BA.4.6	1	0.4
BA.5 lineages:		
BA.5.1	19	8.4
BA.5.2	11	4.9
BA.5.2.1	8	3.6
BA.5	5	2.2
BE.1	4	1.8
BA.5.2.6	2	0.9
BF.7	3	1.3

BQ.1.8	2	0.9
BA.5.3	1	0.4
BE.1.1.2	1	0.4
BF.1	1	0.4
BQ.1	1	0.4
BF.11.1	1	0.4
BQ.1	1	0.4
BQ.1.1.5	1	0.4
BQ.1.2	1	0.4

Table A2

Number of SARI cases sequenced and reported by Pango lineage and week of admission, SARI cases weeks 43 2021 to week 47, 2022

Virus variant	Pango lineage	2022 W47	2022 W46	2022 W45	2022 W44	2022 W43	Total
Omicron, BA.5	BA.5.2.6			1*			1
	BA.2					2	2
	BF.7	1*					1
	BQ.1.2					1†	1
Omicron, BA.2	BA.2					1	1
Omicron, BA.2.75	BN.1.9		1†				1
Total		1	1	1	0	4	7

*BA.4/BA.5 + R346X mutation

†K444X/N460X mutations