



Epidemiology of intensive care admissions in cases of COVID-19 (aged 15 years and older) in Ireland in 2021

The following report provides data on cases (aged 15 years and older) with laboratory confirmed COVID-19 who have been admitted to ICU during 2021 (Week 1 to Week 52) and notified to the Computerised Infectious Disease Reporting system (CIDR) at HPSC, as of midnight on 16/02/2023.

Additional reports on COVID-19 ICU surveillance can be found [here](#). Data are provisional and subject to ongoing review, validation, and update. As a result, figures in this report may differ from previously published figures.

Please note this report only includes cases reported to HPSC who are in ICU primarily for the treatment of COVID and does not include cases in ICU for other clinical conditions which have an incidental finding of COVID-19.

Key Points: Admission to ICU in 2021 (15 years and over)

Numbers

- There were 1,643 admissions to ICU in people where COVID-19 disease was the primary reason for admission.
- The number of admissions was highest in January 2021 (n=481).

Age and Sex

- Sixty one percent of people admitted to ICU were male, giving a male to female ratio of 1.5:1.
- The majority of admissions to ICU (81%) were in people aged between 45 and 85 years.
- The median age at time of admission to ICU was 61 years (range: 15-91 years).

Underlying Medical Conditions

- The majority (85%) of those admitted to ICU had at least one underlying medical condition.
- In those with an underlying condition, the most frequently seen conditions were hypertension (47%); chronic heart disease (35%); chronic respiratory disease (33%); diabetes mellitus (26%).
- There were 47 admissions to ICU in pregnant women and 13 in women <6 weeks post-partum.

Clinical Complications

- The most frequently reported clinical complications during ICU stay were primary viral pneumonia (85%) and acute respiratory distress syndrome (69%).

Ventilation

- Of those admitted to ICU, 55% were invasively ventilated (53% conventional mechanical ventilation, 2% ECMO)

Outcome

- Of those admitted to ICU, 64% were discharged alive and 36% died.
- Of those who died (n=597), 541 patients were reported as having died in ICU and 56 died following transfer from ICU to a ward or high dependency unit.
- The proportion who died was highest among those aged 75 years and older (72%)

Length of Stay

- For those discharged alive, the median length of stay in ICU was 9 days (range 1-219 days).
- For those who died, the median length of stay in ICU was 13 days (range 1-127 days)

Acknowledgements

The Intensive Care Society of Ireland (ICSI) and the HSE Critical Care Programme support the provision of data by hospitals on all critical care patients with COVID-19 to HPSC. The HPSC processes and reports on this information on behalf of the regional Directors of Public Health/Medical Officers of Health. Sincere thanks are extended to all those who are participating in the collection of these data. This includes staff in ICU units, the HSE COVID-19 Contact Management Programme (CMP), notifying clinicians, laboratory staff, public health doctors, nurses, surveillance scientists, microbiologists and administrative staff. Sincere thanks are also extended to the staff at the National Office of Clinical Audit for the daily provision of data on ICU admissions and discharges.

1.0 Summary of cases of COVID-19 admitted to ICU

There were 1,643 people with COVID-19 disease admitted to ICU during 2021 (Week 1 to Week 52). Table 1 and Figure 1 provide a summary of these cases.

Table 1: Summary of cases (aged 15 years and older) with COVID-19 admitted to ICU in Ireland (2021)^{1 2}

		Number of cases	Percentage		
Total number of cases admitted to ICU		1,643	100.0		
Total number of cases discharged alive		1,046	63.7		
Deaths in ICU cases		597	36.3		
Route of admission	Ward	1,219	74.2		
	Emergency Department	377	22.9		
	Other hospital - ICU	2	0.1		
	Other hospital - non ICU	36	2.2		
	Male:female ratio	1.5:1	-		
	Median age (years)	61	-		
	Age range (years)	15 - 91	-		
	15-24	32	1.9		
	25-34	92	5.6		
	35-44	169	10.3		
Sex and age	45-54	313	19.1		
	55-64	395	24.0		
	65-74	447	27.2		
	75-84	176	10.7		
	85+	19	1.2		
	Underlying medical conditions		Those with underlying medical conditions (%)	1,401	85.3
			Acute Respiratory Distress Syndrome (ARDS)	1,094	66.6
Illness severity (at time of admission)	Require non-invasive mechanical ventilation		1,090	66.3	
	Require invasive mechanical ventilation		488	29.7	
	Require renal replacement therapy		68	4.1	
	Primary viral pneumonia		1396	85.0	
		Secondary bacterial pneumonia	510	31.0	
Clinical complications reported during ICU stay (at time of discharge in those who have been discharged)	Acute respiratory distress syndrome (ARDS)		1,136	69.1	
	Acute kidney injury		391	23.8	
	Sepsis		515	31.3	
	Multi-organ failure		178	10.8	
	Biphasic intermittent positive airway pressure		556	33.8	
Type of ventilation reported during ICU stay (at time of discharge in those who have been discharged)	Continuous positive airway pressure (CPAP)		784	47.7	
	Conventional mechanical ventilation		876	53.3	
	High frequency oscillatory ventilation (HFOV)		27	1.6	
	ECMO		32	1.9	
	Length of stay for those discharged alive	Median (days)		9	-
Range (days)		1 - 219	-		
Median (days)		13	-		
Length of stay for those who have died	Range (days)		1 - 127	-	

¹ For illness severity and clinical complications, more than one option can be selected so percentages will add to over 100%

² Length of stay for those discharged alive refers to duration of stay after final discharge from ICU. Length of stay reflects the cumulative duration of stay, where applicable, for patients with more than one ICU admission.

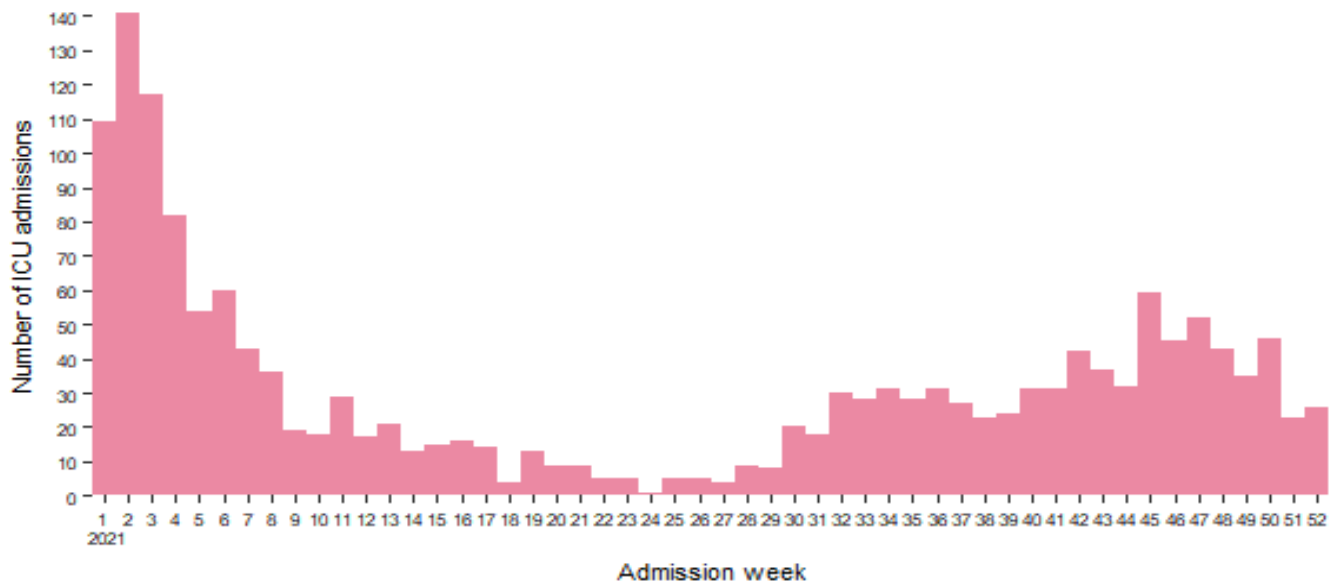


Figure 1: Cases of COVID-19 (aged 15 years and older) admitted to ICU by week of admission in Ireland (Week 1 to 52, 2021) ^{3 4}

³ See technical notes for more information on dates for which week numbers correspond

⁴ For cases with multiple ICU admissions, the date of first admission to ICU is presented

2.0 Age and sex distribution of cases of COVID-19 admitted to ICU

Of the admissions to ICU during 2021, 61% were male and 39% were female, giving a male: female ratio of 1.5:1. The mean age at time of admission to ICU was 58 years and the median age was 61 years (IQR: 49-69 years; range: 15-91 years).

Table 3 describes the sex and age distribution of cases of COVID-19 admitted to ICU. Figure 2 shows a graph of cases of COVID-19 admitted to ICU by week of ICU admission, stratified by age group.

Table 2: Cases of COVID-19 (aged 15 years and older) admitted to ICU by sex and age group, Ireland (2021)

Age group (yrs)	Female		Male		Total		Rate per 100,000 population
	(n)	(%)	(n)	(%)	(n)	(%)	
15-24	21	3.2	11	1.1	32	1.9	5.6
25-34	56	8.6	36	3.6	92	5.6	14.0
35-44	78	12.0	91	9.1	169	10.3	22.6
45-54	107	16.5	206	20.7	313	19.1	50.0
55-64	156	24.1	239	24.0	395	24.0	77.6
65-74	164	25.3	283	28.4	447	27.2	119.7
75-84	60	9.3	116	11.7	176	10.7	89.6
85+	6	0.9	13	1.3	19	1.2	28.1
Total	648	100.0	995	100.0	1,643	100.0	43.8

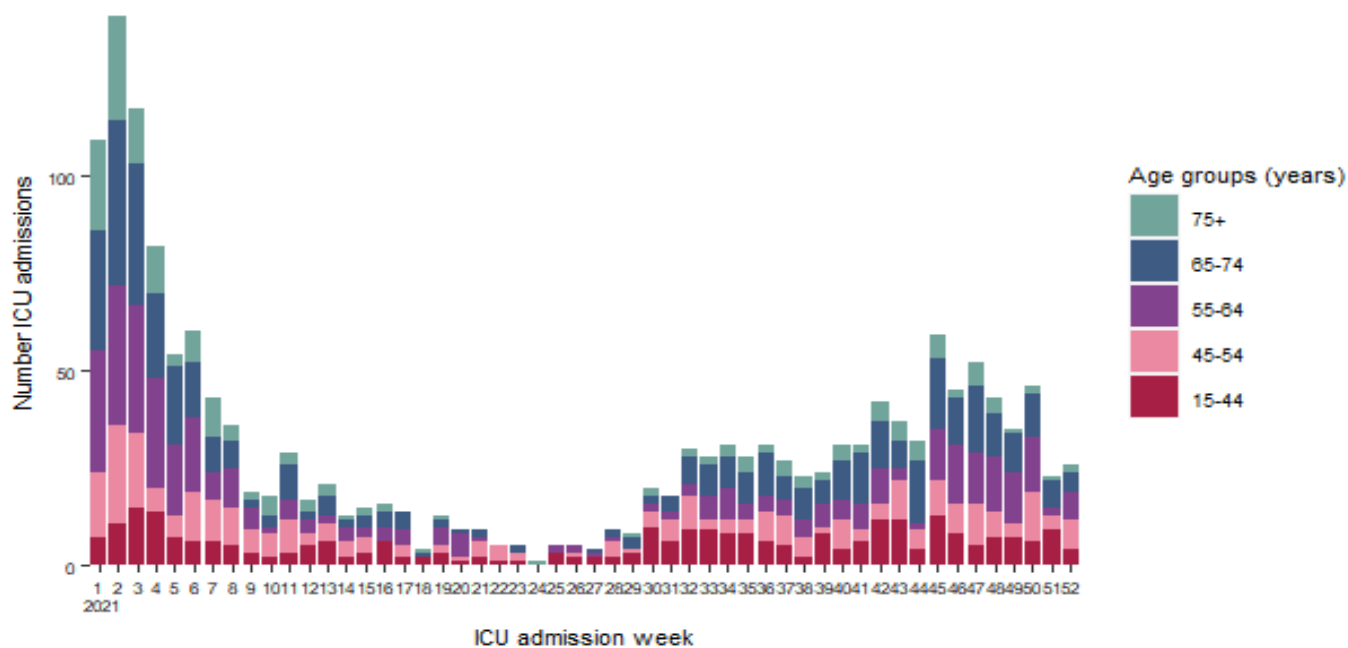


Figure 2: Cases of COVID-19 (aged 15 years and older) admitted to ICU by week of admission in Ireland, stratified by age group ⁵ (Week 1 to 52, 2021)

⁵ See technical notes for more information on dates for which week numbers correspond

3.0 Underlying medical conditions at time of admission to ICU

Table 3 describes the underlying medical conditions in cases of COVID-19 at time of first admission to ICU in Ireland.

There were 60 confirmed cases of COVID-19 reported among pregnant women or women less than six weeks post-partum during 2021 (39% of female cases aged 15-44 years).

Table 3: Underlying medical conditions in cases of COVID-19 (aged 15 years and older) at time of admission to ICU, Ireland (2021) ⁶

Underlying medical conditions	Number	Total admissions
One or more underlying clinical conditions	1,401	85.3
No underlying medical conditions	242	14.7
	Number	Those with underlying illness
Chronic heart disease	488	34.8
Hypertension	652	46.5
Chronic kidney disease	160	11.4
Chronic liver disease	62	4.4
Chronic neurological disease	87	6.2
Cancer malignancy	195	13.9
Immunodeficiency including HIV	192	13.7
Immunodeficiency due to HIV	7	0.5
Immunodeficiency due to solid organ transplant	36	2.6
Immunodeficiency due to therapy	150	10.7
Chronic respiratory disease	468	33.4
Chronic obstructive pulmonary disease	236	16.8
Bronchiectasis	20	1.4
Cystic fibrosis	1	0.1
Interstitial lung fibrosis	16	1.1
Asthma (requiring medication)	195	13.9
Severe asthma	6	0.4
Mild to moderate asthma	139	9.9
Pregnant	43	3.1
<= 6 weeks post partum	17	1.2
Obesity (BMI >= 40)	188	13.4
Diabetes	367	26.2
Type 1	38	2.7
Type 2	283	20.2
Gestational diabetes	7	0.5
Type unspecified	39	2.8
Haemoglobinopathy	15	1.1
Alcohol related disease	46	3.3

⁶ More than one option can be selected for underlying condition so percentages will add to greater than 100%

4.0 Outcome for cases of COVID-19 admitted to ICU

Of the 1,643 cases (aged 15 years and over) admitted to ICU in 2021, 1,046 were discharged alive (64%) and 597 died (36%). Of those who died, 541 patients were reported as having died in ICU and 56 died following transfer from ICU to a ward or high dependency unit.

Table 4 describes the profile of patients with COVID-19 who have either been discharged alive from ICU or died in/post admission to ICU.

Figure 3 describes the percentage of cases who have died by age group, sex and presence of underlying medical conditions.

Table 4: Profile of cases of confirmed COVID-19 (aged 15 years and older) who were discharged alive from or died in/post admission to ICU in Ireland (2021)

		Discharged alive		Died		Total
		Number of cases	Percentage	Number of cases	Percentage	
Age group (years)	15-44	271	92.5	22	7.5	293
	45-54	246	78.6	67	21.4	313
	55-64	274	69.4	121	30.6	395
	65-74	201	45.0	246	55.0	447
	75+	54	27.7	141	72.3	195
Sex	Male	612	61.5	383	38.5	995
	Female	434	67.0	214	33.0	648
Underlying conditions	Yes	847	60.5	554	39.5	1,401
	No	199	82.2	43	17.8	242

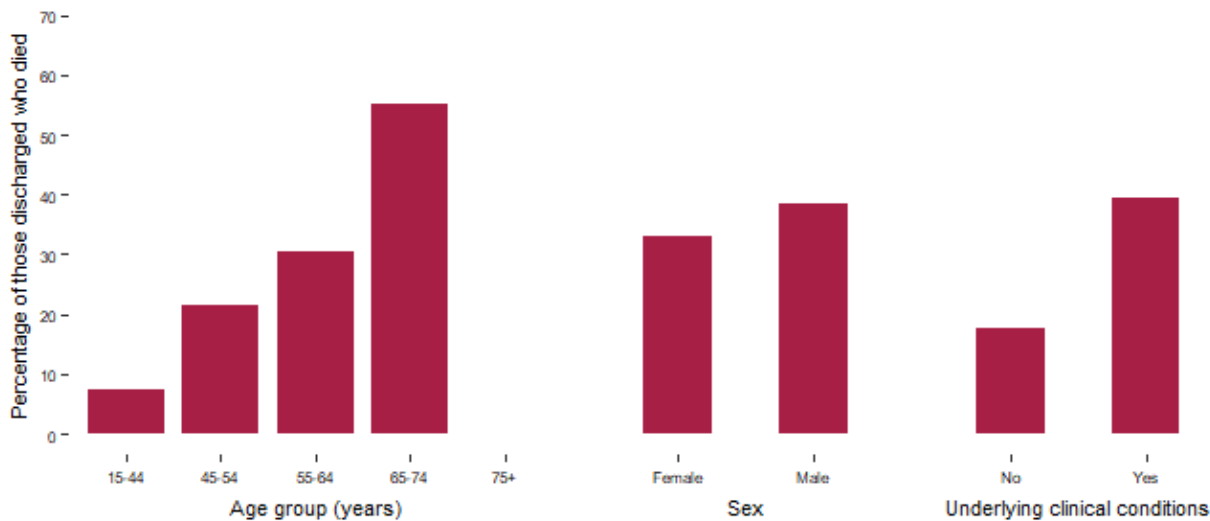


Figure 3: Profile of cases of confirmed COVID-19 (aged 15 years and older) who died in/post admission to ICU in Ireland (2021)

4.1 Clinical complications among those discharged from ICU

Table 5 describes the clinical complications reported for cases of COVID-19 at the time of discharge from ICU (includes information reported upon discharge, for those discharged to another ICU).

Table 5: Clinical complications and outcome of cases of COVID-19 (aged 15 years and older) at time of discharge from ICU, Ireland (2021) ⁷

	Number	% Of those discharged
Complications/illness during ICU stay		
Primary viral pneumonia	1396	85.0
Secondary bacterial pneumonia	510	31.0
Acute respiratory distress syndrome (ARDS)	1136	69.1
Pressor dependence during ICU stay	831	50.6
Myocarditis	21	1.3
Encephalitis	14	0.9
Sepsis	515	31.3
Multi-organ failure	178	10.8
Anti-coagulation for thrombotic event	214	13.0
Treatment acute kidney injuries (AKI)		
Acute kidney injury	391	23.8
Received CRRT/IHD	245	14.9
Use of ventilation during ICU stay		
Yes	1436	87.4
No	207	12.6
Type of ventilations		
Biphasic intermittent positive airway pressure (BiPAP)	556	33.8
Continuous positive airway pressure (CPAP)	784	47.7
Conventional (including lung protective) mechanical ventilation	876	53.3
High frequency oscillatory ventilation (HFOV)	27	1.6
Required ECMO	32	1.9

⁷ More than one option can be selected for clinical complications so percentages will add to greater than 100%

5.0 Admission activity by location

Table 6 describes the distribution of cases of COVID-19 admitted to ICU in Ireland by HSE area of residence.

Table 6: Area of residence of cases of COVID-19 (aged 15 years and older) admitted to ICU⁸, Ireland (2021)

HSE area	Number of cases	Percentage	Rate per 100,000 population
East	610	37.1	35.6
Midlands	142	8.6	48.6
Mid-West	85	5.2	22.1
North-East	183	11.1	39.7
North-West	121	7.4	47.1
South-East	156	9.5	30.6
South	168	10.2	24.3
West	178	10.8	39.3
Total	1,643	100.0	34.5

⁸ See technical notes for counties associated with each HSE area

Data extracted from CIDR by HPSC, 16/02/2023

Further reports

Further reports on COVID-19 surveillance can be found [here](#)

Technical notes

1. Data in this report are confidential and provisional, and may change following further data validation and review. Some of the variables in the tables have missing or unknown data and ongoing validation work will improve the accuracy and completeness of the data.
2. Case definitions for COVID-19 are [available](#)
3. Deaths included in this report can be during or after ICU stay. If a person was discharged alive from ICU and is reported to have subsequently died, they will be included as died for the analysis in this report.
4. Due to the relatively low proportion of patients that have completed their critical care, all outcomes should be interpreted with caution.
5. Please note that patients whose outcome data have not been received are assumed to remain in ICU.
6. Length of stay
 - Refers to duration of stay for patients after final discharge from ICU for those discharged alive from ICU (and excludes those transferred to another ICU).
 - Reflects the cumulative duration of stay, where applicable, for patients with more than one ICU admission
7. HSE areas: The counties covered by each HSE area are as follows:
 - HSE East (E): Dublin, Kildare & Wicklow;
 - HSE Midlands (M): Laois, Longford, Offaly & Westmeath;
 - HSE Midwest (MW): Clare, Limerick & N. Tipperary;
 - HSE Northeast (NE): Cavan, Louth, Meath & Monaghan;
 - HSE Northwest (NW): Donegal, Leitrim & Sligo;
 - HSE South (S): Kerry & Cork;
 - HSE Southeast (SE): Carlow, Kilkenny, S. Tipperary, Waterford & Wexford;
 - HSE West (W): Galway, Mayo & Roscommon.
8. Information on the epidemiological weeks can be found [here](#)