



Epidemiology of intensive care admissions in cases of COVID-19 (aged 15 years and older) in Ireland in 2020

The following report provides data on cases (aged 15 years and older) with laboratory confirmed COVID-19 who have been admitted to ICU in 2020 (Week 8 to Week 53) 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: Admissions to ICU in 2020 (in those aged 15 years and older)

Numbers

- There were 717 admissions to ICU in people where COVID-19 disease was the primary reason for admission.
- The number of admissions was highest in March and April 2020 (with 171 and 206 admissions respectively).

Age and Sex

- Over two thirds (68%) of those admitted to ICU were male, giving a male to female ratio of 2.1:1.
- The majority of admissions to ICU (87%) were in people aged between 45 and 85 years.
- The median age at time of admission to ICU was 63 years (range: 17-90 years).

Underlying Medical Conditions

- The majority (88%) of those admitted to ICU had at least one underlying medical condition.
- In those with an underlying condition, the most frequently seen conditions were chronic heart disease (51%); hypertension (45%); chronic respiratory disease (33%) and diabetes mellitus (31%).
- There were three admissions to ICU in pregnant women and two in women <6 weeks post-partum.

Clinical Complications

- The most frequently reported clinical complications during ICU stay were primary viral pneumonia (74%) and acute respiratory distress syndrome (ARDS) (71%).

Invasive Ventilation

- Of those admitted to ICU, almost two thirds (65%) were invasively ventilated (64% conventional mechanical ventilation and 1% ECMO).

Outcome

- Of those admitted to ICU, 72% were discharged alive and 28% died.
- Of those who died (n=203), 177 patients were reported as having died in ICU and 26 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 (46%)

Length of Stay

- For those discharged alive, the median length of stay in ICU was 12 days (range 1-163 days).
- For those who died, the median length of stay was 14 days (range 1-135 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 717 admissions to ICU in 2020 (Week 1 to Week 53). Table 1 and Figure 1 provide a summary of these cases.

Table 1: Summary of cases (aged 15 years and older) of COVID-19 admitted to ICU in Ireland during 2020^{1 2}

		Number of cases	Percentage
Total number of cases admitted to ICU		717	100.0
Total number of cases discharged alive		514	71.7
Deaths in ICU cases		203	28.3
Route of admission	Ward	494	68.9
	Emergency Department	189	26.4
	Other hospital - ICU	0	0.0
	Other hospital - non ICU	11	1.5
Sex and age	Male:female ratio	2.1:1	-
	Median age (years)	63	-
	Age range (years)	17 - 90	-
	15-24	8	1.1
	25-34	21	2.9
	35-44	59	8.2
	45-54	126	17.6
	55-64	187	26.1
Underlying medical conditions	65-74	214	29.8
	75-84	93	13.0
	85+	9	1.3
	Those with underlying medical conditions (%)	634	88.4
	Acute Respiratory Distress Syndrome (ARDS)	453	63.2
	Require non-invasive mechanical ventilation	268	37.4
	Require invasive mechanical ventilation	360	50.2
	Require renal replacement therapy	52	7.3
Illness severity (at time of admission)	Primary viral pneumonia	532	74.2
	Secondary bacterial pneumonia	215	30.0
	Acute respiratory distress syndrome (ARDS)	506	70.6
	Acute kidney injury	216	30.1
Clinical complications reported during ICU stay (at time of discharge in those who have been discharged)	Sepsis	252	35.1
	Multi-organ failure	137	19.1
	Biphasic intermittent positive airway pressure (BiPAP)	163	22.7
	Continuous positive airway pressure (CPAP)	174	24.3
Type of ventilation reported during ICU stay (at time of discharge in those who have been discharged)	Conventional mechanical ventilation	459	64.0
	High frequency oscillatory ventilation (HFOV)	13	1.8
	ECMO	7	1.0
	Median (days)	12	-
Length of stay for those discharged alive	Range (days)	1 - 163	-
	Median (days)	14	-
Length of stay for those who died	Range (days)	1 - 135	-

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.

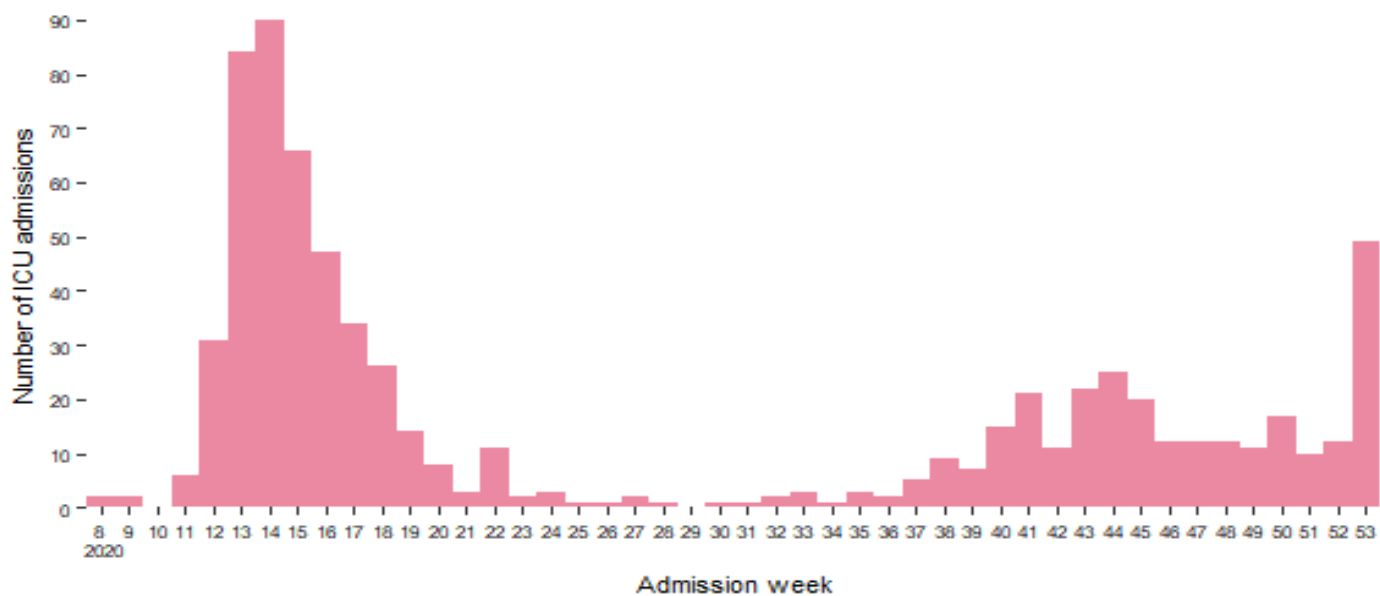


Figure 1: Cases of COVID-19 (aged 15 years and older) admitted to ICU by week of admission in Ireland (Week 1 to 53, 2020) ^{3 4}

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 2020 (aged 15 years and over), 68% were male and 32% were female, giving a male:female ratio of 2.1:1. The mean age at time of admission to ICU was 61 years and the median age was 63 years (IQR: 52-71 years; range: 17-90 years).

Table 2 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 (2020)

Age group (yrs)	Female		Male		Total		Rate per 100,000 population
	n	%	n	%	n	%	
15-24	4	1.8	4	0.8	8	1.1	1.4
25-34	8	3.5	13	2.7	21	2.9	3.2
35-44	17	7.5	42	8.6	59	8.2	7.9
45-54	39	17.1	87	17.8	126	17.6	20.1
55-64	58	25.4	129	26.4	187	26.1	36.7
65-74	63	27.6	151	30.9	214	29.8	57.3
75-84	35	15.4	58	11.9	93	13.0	47.3
85+	4	1.8	5	1.0	9	1.3	13.3
Total	228	100.0	489	100.0	717	100.0	19.1

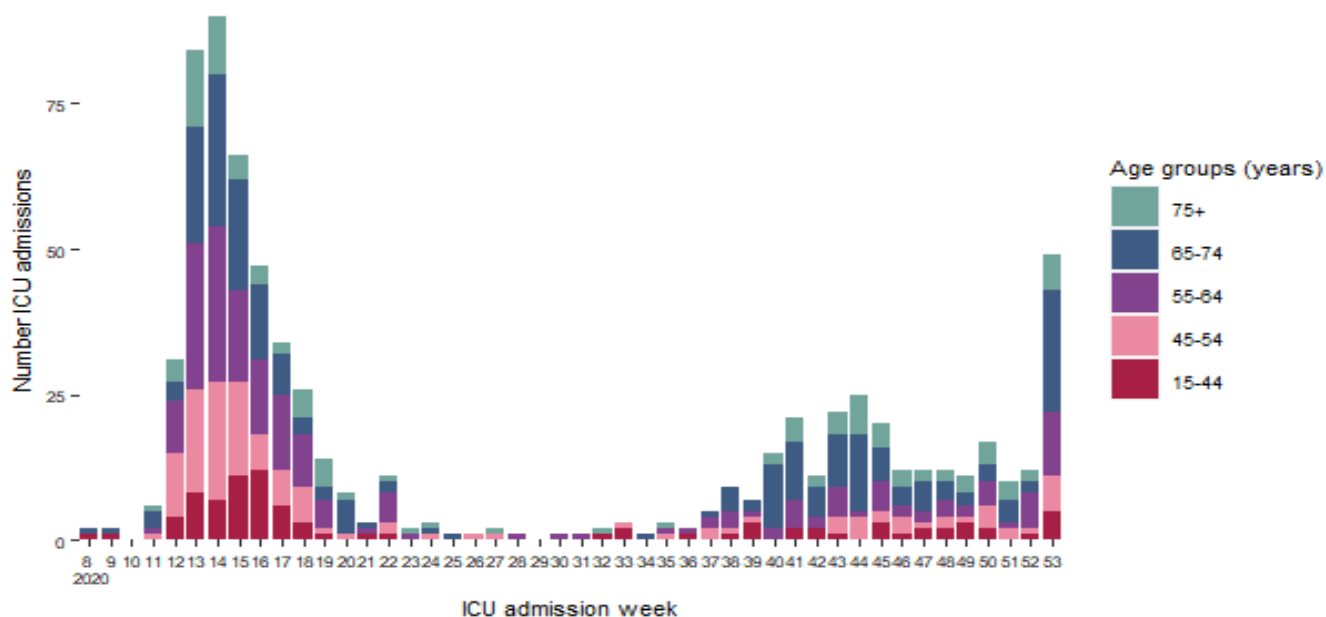


Figure 2: Cases of COVID-19 (aged 15 years and older) admitted to ICU by week of admission in Ireland, stratified by age group ⁵ (Week 1 to 53, 2020)

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 are five confirmed cases of COVID-19 reported among pregnant women or women less than six weeks post-partum in 2020 (17% 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 (2020) ⁶

Underlying medical conditions	Number	Total admissions
One or more underlying clinical conditions	634	88.4
No underlying medical conditions	83	11.6
	Number	Those with underlying illness
Chronic heart disease	325	51.3
Hypertension	283	44.6
Chronic kidney disease	73	11.5
Chronic liver disease	23	3.6
Chronic neurological disease	39	6.2
Cancer malignancy	97	15.3
Immunodeficiency including HIV	53	8.4
Immunodeficiency due to HIV		
Immunodeficiency due to solid organ transplant	3	0.5
Immunodeficiency due to therapy	11	1.7
Chronic respiratory disease	209	33.0
Chronic obstructive pulmonary disease	87	13.7
Bronchiectasis	10	1.6
Cystic fibrosis	2	0.3
Interstitial lung fibrosis	9	1.4
Asthma (requiring medication)	93	14.7
Severe asthma	2	0.3
Mild to moderate asthma	16	2.5
Pregnant	3	0.5
<= 6 weeks post partum	2	0.3
Obesity (BMI >= 40)	117	18.5
Diabetes	199	31.4
Type 1	21	3.3
Type 2	156	24.6
Gestational diabetes	0	0
Type unspecified	22	3.5
Haemoglobinopathy	6	0.9
Alcohol related disease	24	3.8

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 717 cases (aged 15 years and over) admitted to ICU in 2020, 514 were discharged alive (72%) and 203 died (28%). Of those who died, 177 patients were reported as having died in ICU and 26 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 (2020)

		Discharged alive		Died		Total
		Number of cases	Percentage	Number of cases	Percentage	
Age group (years)	15-44	78	88.6	10	11.4	88
	45-54	114	90.5	12	9.5	126
	55-64	147	78.6	40	21.4	187
	65-74	120	56.1	94	43.9	214
	75+	55	53.9	47	46.1	102
Sex	Male	353	72.2	136	27.8	489
	Female	161	70.6	67	29.4	228
Underlying conditions	Yes	433	68.3	201	31.7	634
	No	81	97.6	2	2.4	83

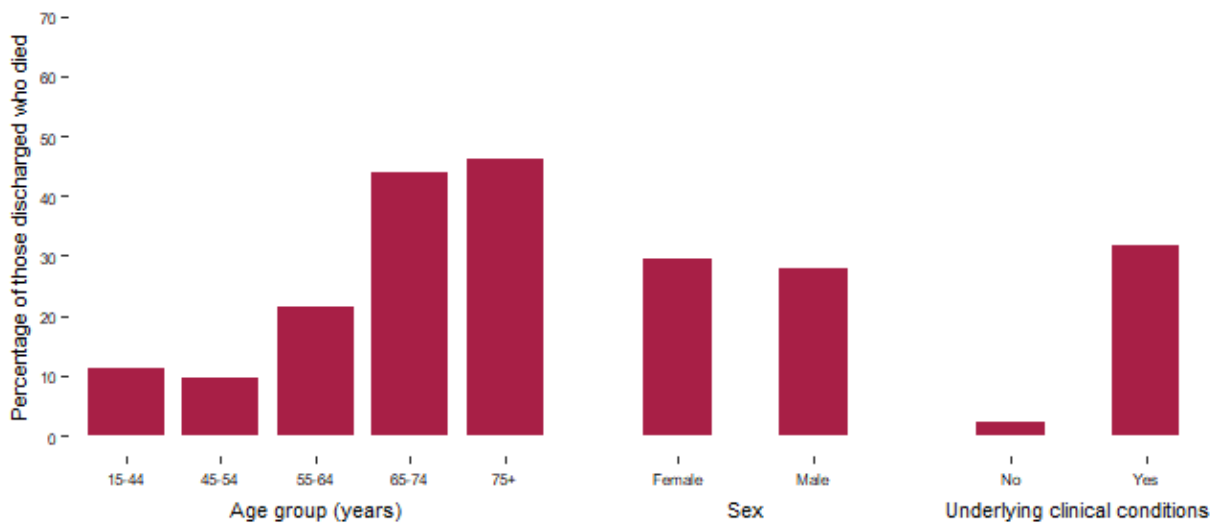


Figure 3: Profile of cases of confirmed COVID-19 (aged 15 years and older) who died in/post admission to ICU in Ireland (2020)

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 (2020) ⁷

	Number	%
Complications/illness during ICU stay		
Primary viral pneumonia	532	74.2
Secondary bacterial pneumonia	215	30.0
Acute respiratory distress syndrome (ARDS)	506	70.6
Pressor dependence during ICU stay	441	61.5
Myocarditis	20	2.8
Encephalitis	12	1.7
Sepsis	252	35.1
Multi-organ failure	137	19.1
Anti-coagulation for thrombotic event	25	3.5
Treatment acute kidney injuries (AKI)		
Acute kidney injury	216	30.1
Received CRRT/IHD	147	20.5
Use of ventilation during ICU stay		
Yes	581	81.0
No	136	19.0
Type of ventilations		
Biphasic intermittent positive airway pressure (BiPAP)	163	22.7
Continuous positive airway pressure (CPAP)	174	24.3
Conventional (including lung protective) mechanical ventilation	459	64.0
High frequency oscillatory ventilation (HFOV)	13	1.8
Required ECMO	7	1.0

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 (2020)

HSE area	Number of cases	Percentage	Rate per 100,000 population
East	359	50.1	21.0
Midlands	55	7.7	18.8
Mid-West	45	6.3	11.7
North-East	61	8.5	13.2
North-West	41	5.7	16.0
South-East	57	7.9	11.2
South	55	7.7	8.0
West	44	6.1	9.7
Total	717	100.0	15.1

⁸ See technical notes for counties associated with each HSE area

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](#)